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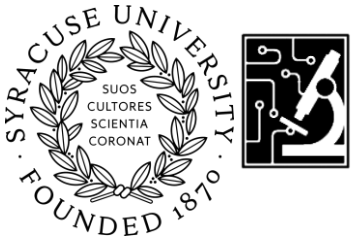

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Our goal has been to elevate the *Syracuse Journal of Science & Technology Law* into the preeminent outlet for legal and scholarly work on science and technology law. To bring exciting, relevant, and cutting-edge ideas into the legal discourse as society advances.

None of this would have been possible without the incredible editorial staff who put in countless hours into making volume 39 happen. Over a year of immense challenges the editorial staff was able to overcome numerous obstacles to modernize and bring the journal into the future. From upgrading our website, enhancing our digital presence, fundraising, and bringing our journal to more people through expanding access, it was a year of trials with numerous successes.

A special thank you must also go to our factuly advisor, Dr. Shuba Ghosh, Ph.D, J.D., who went out of his way to support the journal and help us when we needed it.

Thank you for your support for the *Syracuse Journal of Science & Technology Law*.

Go Orange!

Elliot M. Malin, MPA
Editor-in-Chief
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The Future of Election Law in an Advancing World: Safeguarding Nevada's Elections Through Investing in Technology and People

The Honorable Francisco "Cisco" Aguilar[1]
Secretary of State, State of Nevada

Abstract

Elections are the backbone of our country; they allow us to live within a free society that gives rise to the numerous freedoms that we hold to be self-evident. Without elections our quality of life and the values we have as a society would be at risk. As the Secretary of State of Nevada my team and I have been working to improve our electoral system through the implementation of cutting-edge technology to streamline the process, create more accountability, and increase transparency. At the same time, we have been fighting to protect our election workers as the backbone of the electoral system. Without election workers we would be unable to host elections and get results to the public in a timely fashion. In this article we explore the developing technology, laws to protect and uphold our democratic institutions, and how we increase accessibility to the voters.

[1] The Honorable Francisco "Cisco" Aguilar was elected as Nevada Secretary of State in 2022 and assumed office on January 2, 2023. Prior to being elected, Secretary Aguilar served twelve years as General Counsel for Agassi Graf, the management company for Andre Agassi and Stefanie Graf, and the Andre Agassi Foundation for Education. The Secretary also served as Special Counsel to the Chancellor of the Nevada System of Higher Education, Jim Rogers, and as a lawyer for the parent company of the Las Vegas and Reno NBC affiliates. Secretary Aguilar is the Founding Chairman of Cristo Rey St. Viator College Preparatory High School, which provides an innovative work-study program designed to prepare students for future careers.

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INTRODUCTION

In 2024, all eyes are on Nevada – as a battleground state, Nevada will decide who the next President is.[2] While the spotlight will be on us this year, the work to increase the security and transparency of our elections occurs year-round, even in off-election years. The staff in my office and across election offices in Nevada have been working tirelessly since the canvass of the 2022 General Election to prepare for 2024. Elections are critical infrastructure in our country,[3] and it's imperative we ensure that our technology and elections law keep up with the demands of the voter.

I came into office in January 2023 after working in the private sector for most of my career, and I've approached the Secretary of State's Office as a technology company – along with elections, this office is also the first stop of business registration and financial investment security.[4] Everything we do must be secure and transparent to assure voters that their voice and their vote matters. Nevada runs some of the most secure and accessible elections in the country, and there's no widespread fraud here or across the country and that will continue with the steps we are taking to improve our technology and elections processes.[5]

Elections are a big target right now for disinformation and cyberattacks.[6] When we look at the technology we use to run elections

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[2] Kyle Kondik, *Electoral College Ratings: Expect Another Highly Competitive Election*, UVA CENTER FOR POLITICS – SABATO'S CRYSTAL BALL (Jun. 29, 2023), https://centerforpolitics.org/crystalball/articles/electoral-college-ratings-expect-another-highly-competitive-election/.

[3] *Elections – Critical Infrastructure*, U.S. ELEC. ASSIST. COMM. (Mar. 11, 2022), https://www.eac.gov/election-officials/elections-critical-infrastructure.

[4] *About The Office*, NV SEC. OF STATE (last visited Feb. 6, 2024), https://www.nvsos.gov/sos/sos-information/office-facts/about-the-office#:~:text=The%20Secretary%20of%20State%20is,government%2C%20as%20prescribed%20by%20law.

[5] Stephanie Becker & Paul LeBlanc, *Nevada secretary of state finds no 'evidentiary support' for GOP election fraud claims*, CNN (Apr. 22, 2021), https://www.cnn.com/2021/04/22/politics/barbara-cegavske-nevada-gop-voting-2020-election/index.html.

[6] John Sakellariadis, *From election hero to zero: George official's dismissal of security audit could mean trouble in 2024*, POLITICO (Jun. 23, 2023), https://www.politico.com/news/2023/06/23/brad-raffensperger-georgia-dominion-voting-00103298).

and increasing accessibility to the ballot box, security (physical and cyber) is at the forefront of every discussion.[7]

I. Voter Registration and Elections Management Solution, changing how we do elections in Nevada

The Nevada Secretary of State's Office is currently undertaking a major technology upgrade, our Voter Registration and Elections Management Solution, or ("VREMS").[8] This project moves the state to a centralized voter registration database and brings consistency to all counties with one elections management solution instead of 17 different ones, managed by each county. VREMS was passed unanimously by the Nevada legislature in 2021[9] and in the 2023 legislative session when I took office, we requested $30 million for the speedy implementation to ensure this system is in place for the 2024 election.[10] The legislature approved this funding and we've been full speed ahead since.[11]

Nevada was previously one of the few states that still had a "bottom-up" voter registration database – meaning each county had their own standalone database and different election management systems.[12] This means that to access the latest voter registration numbers and other election's data, we often have to request each individual county send us the information and manually compile it.[13] This is a huge administrative burden and allows for human error.

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[7] *See* Ryan Ketcham, *What Nevada Leaders are Doing to Keep Your Vote Safe This Election Season*, KTVN CHANNEL 13 LAS VEGAS (Jan. 10, 2024), https://www.ktnv.com/news/what-nevada-leaders-are-doing-to-keep-your-vote-safe-this-election-season.

[8] *Voter Registration & Election Management Solution Project*, NV SEC. OF STATE (last visited Feb. 6, 2024), https://www.nvsos.gov/sos/elections/vrems-project.

[9] A.B. 422, 2021 Leg. 21st Sess. (Nev. 2021) *available at* https://www.leg.state.nv.us/App/NELIS/REL/81st2021/Bill/8054/Text.

[10] Taylor Avery, *Nevada's Centralized Voter Database to Cost $30 million*, LAS VEGAS REVIEW JOURNAL (Mar. 6, 2023), https://lasvegassun.com/news/2023/feb/26/secretary-of-state-seeks-30m-to-create-state-run-v/.

[11] *Id.*

[12] Sean Golonka, *Transition to state-led, top-down voter database delayed, expected later than 2024*, THE NEVADA INDEPENDENT (Apr. 12, 2022), https://thenevadaindependent.com/article/transition-to-state-led-top-down-voter-database-delayed-expected-later-than-2024.

[13] *See id.*

VREMS will transition all of our counties to the same system, creating more consistent elections processes across Nevada and increasing security of electronic communications between the counties, the Secretary of State's Office and other state agencies vital to running our elections.

For example, Nevada is a very transient state – not only with people moving in and out of the state, but people moving county to county.[14] Currently, if a person moves from Southern Nevada to Northern Nevada and updates their Driver's License, they will be registered to vote in the county they moved to through our Automatic Voter Registration system.[15] Because each county manages their own voter registration database, that person's voter registration in Southern Nevada may not be canceled immediately, unless the voter cancels it themselves.[16] With VREMS, we will have the centralized voter registration database and will be able to identify immediately when a person re-registers to vote in another county.[17] This will build confidence for voters by ensuring that all mail ballots go to the correct addresses and creating a more comprehensive voter history.[18] It will also increase our transparency and help us keep our voter rolls clean, which is important to many voters.[19]

Another aspect of the VREMS project that's very important to voters: the timeliness of elections results.[20] Improving our technology alleviates administrative burden across all aspects of the electoral

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[14] *See* Timothy Pratt, *Census report: Nevada most transient state*, LAS VEGAS SUN (Sept. 24, 2003), https://lasvegassun.com/news/2003/sep/24/census-report-nevada-most-transient-state/.
[15] Nev. Rev. Stat. § 293.5737 (2018).
[16] *See Voter Registration Verification Process*, NV SEC. OF STATE, https://www.nvsos.gov/sos/elections/voters/registering-to-vote/voter-registration-verification-process (last visited Feb. 6, 2024).
[17] Josh Meny, *Secretary of State puts $30-Million toward Election System Overhaul*, 2NEWS NEVADA (Jul. 12, 2023), https://www.2news.com/news/secretary-of-state-puts-30-million-toward-election-system-overhaul/article_836f7288-2115-11ee-9a45-23abd65c34b0.html.
[18] *Id.*
[19] *See Transparency*, NAT. DEM. INSTIT. (Dec. 13, 2013), https://www.ndi.org/e-voting-guide/transparency.
[20] April Corbin Girnus, *Top election official says new legislation will improve system, expand access to NV voters*, NEVADA CURRENT (Jul. 11, 2023), https://nevadacurrent.com/2023/07/11/top-election-official-says-new-legislation-will-improve-system-expand-access-to-nv-voters/.

process and frees up time for staff to process ballots and tabulate results.

The Elections Division and I have been working with the counties to ensure that they have the capacity to count votes in a timely manner – with the VREMS project speeding up processes on the front-end, as well as the physical voting machines and staff needed to intake the ballots we receive on election night.[21] In 2022, Clark County had 95% of votes on-hand and Washoe had 97% on election night.[22] Nevada is a deeply purple state, and we will never be able to call all of our elections on election night, but if we can increase the capacity, within our technology and our staff, to process the ballots we do have, the voters can have access to the data they expect from us.[23]

This also touches on an extremely important feature of the VREMS project – the safety and security of our staff.[24] In recent years, election workers have faced increased scrutiny and harassment from the public, just for doing their jobs.[25] Through the VREMS project, each poll worker who is checking voters in to cast their ballots will have what we call a 'poll pad.' It allows them to check voters in, register them to vote if they aren't yet, and it also allows them to send messages to their team leader or to the central county elections leaders. If there's someone at a polling location that is causing disruption, the poll worker can send a message to their point-of-contact alerting them of the situation, without escalating it. The human component of our technology must always be at the forefront of our discussions.

I could continue to go on about VREMS, but I'll mention just one more part of the project I'm excited about – during Early Voting and on Election Day, my Office will have access to a dashboard that shows

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[21] *See id.*
[22] *See generally* April Corbin Girnus, et al, *It took until Election Night but Republicans and Democrats finally agreed on something: Be patient*, NEVADA CURRENT (Nov. 9, 2022) https://nevadacurrent.com/2022/11/09/it-took-until-election-night-but-republicans-and-democrats-finally-agreed-on-something-be-patient/.
[23] *See* Kondick, *supra* note 2.
[24] *See* Shakeria Hawkins, *Nevada counties enforce security measures for poll workers ahead of 2022 Midterm Election*, KTVN CHANNEL 13 LAS VEGAS (Nov. 24, 2022), https://www.ktnv.com/nevada-counties-enforce-security-measures-for-poll-workers-ahead-of-2022-midterm-election.
[25] *Id.*

average wait times at all polling locations, how many people have voted so far that day, and any issues a polling location might be experiencing, all in real-time. This is a huge stride for our office and for the counties – we will be able to respond to voters immediately when they have questions and we will be able to identify issues at a much quicker pace.

II. Making elections more accessible to voters

Nevada's elections are truly some of the most accessible in the country.[26] Our state utilizes universal mail ballots, so every voter receives a ballot in the mail unless they opt-out, there are generous early voting periods and voters can register to vote up until the close of polls.[27] Nevada also offers electronic voting and voter registration through Nevada's Effective Absentee System for Elections (EASE) for military and overseas voters, Nevadans with disabilities and tribal communities within our state.[28] Security must remain at the forefront of these decisions as we continue to increase accessibility across the State.

A. Universal mail ballot for active voters

In 2021, as the COVID-19 pandemic continued to impact the country, the Nevada legislature passed a law establishing universal mail ballots for all active registered voters.[29] Our state immediately saw the positive impacts of this legislation.[30] Thanks to the work of tribal governments and Nevada's county clerks, this increased access saw turnout in Native communities jump by 25% in the 2020 election.[31] Before the passage of universal mail ballots, tribal voters

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[26] *Elections Performance Index*, MASS. INST. TECH. (last accessed: Feb. 6, 2024), https://elections.mit.edu/#/data/rank.
[27] A.B. 4, 2020 Leg., 32nd Spec. Sess. (Nev. 2020).
[28] *See* Barbara Cegavske, *EASE: Effective Absentee System for Elections*, NV SEC. OF STATE (last accessed: Feb. 6, 2024), https://www.nvsos.gov/sos/home/showpublisheddocument/3489/636524711635630000.
[29] A.B. 4, 2020 Leg., 32nd Spec. Sess. (Nev. 2020).
[30] Zachary Roth, *States that send a mail ballot to every voter really do increase turnout, scholars find*, NEVADA CURRENT (Oct. 6, 2023), https://nevadacurrent.com/2023/10/06/states-that-send-a-mail-ballot-to-every-voter-really-do-increase-turnout-scholars-find/.
[31] Jennifer Solis, *Nevada tribes taking advantage of improved voting access*, NEVADA CURRENT (Mar. 3, 2022), https://nevadacurrent.com/2022/03/31/nevada-tribes-taking-advantage-of-improved-voting-access/.

were often forced to travel hundreds of miles to vote.[32] In Nevada, this could mean driving through snow, rain or windstorms during the general election period.[33]

Understanding democracy, researching who you're voting for and what ballot questions mean is already hard enough – these additional barriers were blocking out an entire community. As Nevada voters become more accustomed to mail ballots, it has become the preferred voting method for most Nevadans.[34] When this law was enacted, a number of agencies had to ensure the technology was secure and prepared to print, mail and track every ballot. That meant collaboration with the United States Postal Service for the increase in mail ballots going out, and with the county Clerks/Registrars to prepare voting machines to intake a larger number of ballots by mail and increase capacity for the signature verification process.[35]

Every mail ballot has a single-use barcode on it that are specific to that voter to prevent duplication and support ballot tracking.[36] If someone votes by mail and then tries to vote in person, our voter management system will catch whichever ballot is received first and discount the other ballot.[37] Our office then notifies the Office of the

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[32] *See id.*

[33] *See* Steven Shepard, *Election weather: Snow heading for Nevada as tropical storm bears down on Florida*, POLITICO (Nov. 7, 2022), https://www.politico.com/news/2022/11/07/election-weather-snow-nevada-storm-florida-00065558.

[34] *See 2022 Unofficial Statewide General Election Results*, NV SEC. OF STATE (last visited Feb. 6, 2024), https://www.nvsos.gov/SOSelectionPages/results/2022StateWideGeneral/VoterTurnout.aspx.

[35] *See Vote Turnout*, NV SEC. OF STATE (last accessed Feb. 6, 2024), https://silverstateelection.nv.gov/vote-turnout/. (Voter turnout comparisons after legislators approved universal mail ballots:

a) 2018 general election mail ballots submitted by voters: 87,658
b) 2020 general election mail ballots submitted by voters: 671,906
c) Additional information: https://silverstateelection.nv.gov/vote-turnout/).

[36] Joey Lovato, *New online tracking service allows Nevada voters to check the status of mail-in ballots*, THE NEVADA INDEPENDENT (Sept. 22, 2022), https://thenevadaindependent.com/article/new-online-tracking-service-allows-nevada-voters-to-check-the-status-of-mail-in-ballots.

[37] Mark Robison, *Nevada's Secretary of State Aguilar: 'It's impossible with the new system to double vote'*, RENO GAZETTE JOURNAL (Jan. 25, 2024),

Nevada Attorney General for further investigation; voting twice or even attempting to vote twice is illegal.[38]

B. Striving for increasing voter participation

Before I became elected, I spent decades of my life working in education. It taught me about what's important to kids and young adults, and how to get them engaged and excited about their schooling, jobs and community. As part of that work, I founded a workforce-focused college preparatory high school in one of North Las Vegas' most vulnerable communities – the student body is 85% Latino and 10% Black. Before the 2020 presidential election, I talked to these kids and asked them if their parents were planning to vote. They told me no. They told me their vote doesn't matter, and people don't care what they think. I decided to run for Secretary of State because I knew this mindset had to change. Our vulnerable and historically marginalized communities can and have the ability to decide crucial elections – and their voices are some of the most important. But if we want them to participate in our democracy, we have to meet them where they're at. In an age where you can order a pizza from your phone and track the pizza from the second your order is received to the time it's on your doorstep – people want to know why they don't have that same level of accessibility and information in every aspect of their lives. Government has adapted to the online world in some ways, like allowing you to pay certain fees or taxes, or register to vote.[39] Government should also explore ways to extend that access to the full voting experience, meeting the digital generation where they're at.

C. Access to the ballot and cybersecurity

One of the ways we are already doing that is through Nevada's Effective Absentee System for Elections (EASE) online application.[40] It integrates voter registration and offers a method of electronic ballot

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https://www.rgj.com/story/news/politics/elections/2024/01/25/5-questions-for-top-nevada-officials-about-election-concerns/72344722007/.

[38] *See* NEV. REV. STAT. § 293.780 (2023). (The statute which in part states, "A person who is entitled to vote shall not vote or attempt to vote more than once at the same election. Any person who votes or attempts to vote twice at the same election is guilty of a category D felony and shall be punished as provided in NRS 193.130.").

[39] *Electronic Payment Acceptance*, NV STATE TREASURER (last visited Feb. 6, 2024), https://www.nevadatreasurer.gov/Merch/home/.

[40] *See Effective Absentee System for* Elections, NV SEC. OF STATE (last visited Feb. 6, 2024) https://www.nvsos.gov/ease/easepages/overview.aspx; *see also* NEV. REV. STAT. § 293D (2023).

deliver (among several methods).[41] This was created for military and overseas voters but has since been expanded by legislative action to provide access to disabled voters and tribal voters.[42] There are several important security checks and balances to EASE.[43] If you use it to cast your ballot online, with your cell phone for example, it is transmitted to the county via secure FTP connection.[44] The county then creates a printed duplicate of the ballot and puts it through the same process as other physical ballot to ensure that there is no risk of fraud or duplication.[45] This combination of physical and cybersecurity is vital to our process, and the EASE system represents the kind of success we can have when government focuses on innovation and problem-solving, and I've made a pledge to expand it as much as possible.[46]

There is always room for improvement in security and there will always be threats as we are a high-level office with a lot of eyes on us, no matter what method of voting is used. Addressing cybersecurity concerns is an ever-moving target, as technology moves so fast and there are new tools, and potential threats, nearly every day.[47] This is why partnerships are so crucial in being aware of the latest threats and addressing them as soon as possible.

While our IT staff continues to go through high-level cybersecurity training, our elections staff is collaborating with federal, state and county partners to ensure safeguards are in place for data sharing.[48] This team does great work to audit vulnerabilities and strengths within these systems.[49] The Secretary of State's Office works alongside the Department of Homeland Security's Cybersecurity and Infrastructure

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[41] *Id.*
[42] *See* Pratt, *supra* note 14.
[43] *See* Cegavske, *supra* note 28.
[44] *Id.*
[45] *Id.*
[46] *Id.*
[47] *See* Christina A. Cassidy, *Election Officials See a Range of Threats in 2024, From Hostile Countries to Conspiracy Theorists*, ASSOCIATED PRESS (Dec. 28, 2023, 9:20 AM), https://apnews.com/article/election-security-2024-threats-cybersecurity-russia-69b130e9896a8e8a229b7a668000183f.
[48] *See* Jessica Hill, *5 steps Nevada Officials are Taking to Keep 2024 Elections Secure*, LAS VEGAS REVIEW JOURNAL (Jan. 10, 2024, 7:06 PM), https://www.reviewjournal.com/news/politics-and-government/nevada/5-steps-nevada-officials-are-taking-to-keep-2024-elections-secure-2979548/.
[49] *Id.*

Security Agency (CISA)[50] to identify risks and receive in-state support.[51]

Recently, CISA made the Nevada Secretary of State's Office aware of a report that argued Georgia's Dominion voting machines are vulnerable and at high-risk of hacking.[52] Immediately, our elections staff were able to identify that the issues raised in that report cannot happen in Nevada for a number of reasons: While 15 of Nevada's 17 counties use Dominion voting machines, none use the specific Dominion machines or version of the Democracy suite discussed in the report, and our physical and cybersecurity measures, along with our required processes and procedures, would either prevent or identify any manipulation before it happened.[53]

The issues identified, if exploited, would have been caught through the simple use of the Voter Verifiable Paper Audit Trail (VVPAT), which are on all Dominion voting machines in Nevada.[54] I have seen the VVPAT process in-person, during pre-election Logic and Accuracy tests conducted on every machine before every election, and there are several redundancies to ensure that each step is safeguarded against any attempt to tamper with it.[55] Each machine is secured and has limited access to only authorized personnel for very specific reasons – any attempt at interference would be identified.[56] If there is ever any kind of issue with a machine or a question about its chain of custody or

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[50] *See* Christian Vasquez, *Collaboration between CISA, Cyber Command thwarted dangerous cyberattacks, officials said*, CYBERSCOOP (Apr. 24, 2023), https://cyberscoop.com/information-sharing-cisa-cyber-commands-rsa-conference/.
[51] *See* CISA, *Election Security* (last accessed Feb. 6, 2024), https://www.cisa.gov/topics/election-security.
[52] *See* Mark Robison, *Election 2024: No, Nevada's Dominions voting machines cannot be hacked with a ballpoint pen*, RENO GAZETTE JOURNAL (Feb. 1, 2024), https://www.rgj.com/story/news/politics/elections/2024/02/01/nevada-dominion-voting-machines-cannot-be-hacked/72426616007/.
[53] *See Voting System*, NV SEC. OF STATE (last visited Feb. 6, 2024), https://www.nvsos.gov/sos/elections/election-resources/voting-system.
[54] *ImageCastX*, DOMINION VOTING (last visited Feb. 6. 2024), https://www.dominionvoting.com/download/imagecast/?wpdmdl=67327&masterkey=5f106e2e66bee.
[55] *See generally Post-Election Audits*, NAT. CONF. OF STATE LEG., https://www.ncsl.org/elections-and-campaigns/post-election-audits (Sept. 22, 2022).
[56] *See* Research Division Staff, *Election Security: Nevada's 2020 General Election*, LEG. COUNS. BUR. (Oct. 2020) 1, 8 https://www.leg.state.nv.us/Division/Research/Documents/ElectionSecurity2020NevadaGeneralElection.pdf.

security, then the machine is not used during an election and would be set aside.[57]

The other two counties who do not use Dominion use Election Systems & Software – these two systems are slightly different in appearance for voters and have variances in some of the back-end processing, but still undergo the intricate verification and testing procedures to ensure security.[58]

This specificity is a part of every process in every machine used for elections. There is strict compliance with numerous federal and state cybersecurity guidelines, as well as a number of security initiatives taken on by our office to expand upon security, including the establishment of the Election Integrity Task Force.[59] This Task Force is compiled of federal, state and local law enforcement and gathers on Election Day to address cybersecurity concerns in real-time and any other potential violations of Nevada's elections law that may come up as citizens exercise their right to vote.[60]

III. Election workers are the unsung heroes of democracy

I would be remiss if I didn't mention how critical our election workers are to every step of this process; from implementing security measures, to ensuring voting machines work properly on election day, to making voters aware of their rights and options for voting. But there's a major shortage in our elections workforce.[61] In a regional case study, Issue One found that half of the 76 million Americans who live in the western United States have a new chief local election official since the 2020 presidential election.[62] In Nevada, 11 of our 17 top county election officials are new since the 2020 Presidential

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[57] *Id.*
[58] *See Voting System Testing and Security*, NEV. SEC. OF STATE, https://www.nvsos.gov/sos/elections/election-resources/voting-system (Sep. 2024).
[59] *See* Ketcham, *supra* note 7.
[60] *Id.*
[61] Ines Kagubare, *US faces election worker shortage ahead of midterms due to rise in threats*, THE HILL (Oct. 2, 2022), https://thehill.com/policy/cybersecurity/3669329-us-faces-election-worker-shortage-ahead-of-midterms-due-to-rise-in-threats/.
[62] Cory Combs, *New Report from Issue One highlights the High Cost of High Turnover as Election Officials Leave Their Positions in Record Numbers*, ISSUE ONE (Sep. 26, 2023), https://issueone.org/press/new-report-from-issue-one-highlights-the-high-cost-of-high-election-official-turnover/#:~:text=New%20research%20from%20Issue%20One,by%20death%20threats%20and%20harassment.

election, and there's even more turnover amongst elections staff in these offices.[63]

Poll volunteers and election workers are the unsung heroes of our democracy.[64] The future of accessible, safe and transparent elections, and accountability within the process, depends on us creating strategic plans now that will support these workers and build a strong foundation at every level of our electoral process.[65] Our office is looking at a number of strategic approaches for long-term solutions for this workforce shortage to build a pipeline of election workers. My background as a lawyer has been instrumental in my first year as Secretary of State. Election law is nuanced and can be overwhelming for some just starting their career in the elections space.[66] It's also very heavily scrutinized.[67] Misinformation about elections – shared both unknowingly or maliciously – has been rampant, and attacks on workers have led to a decrease in individuals willing to help administer our elections.[68]

The Nevada Attorney General, Aaron Ford, and I believe there's a sensible solution to this problem: Providing Continuing Legal Education credit to lawyers who volunteer to work the polls.[69]

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[63] Gabe Stern, *Elections Head in Nevada's Lone Swing County Resigns, Underscoring Election Turnover in Key State*, ASSOCIATED PRESS (Jan. 2, 2024), https://apnews.com/article/jamie-rodriguez-washoe-county-nevada-elections-ce90f1749d345042f6013f822c78a78e.

[64] *See* Lysia McFarlane, *What Drives Philly Poll Workers to Show Up Year After Year? Hint: It's not the money*, TECHNICAL.LY (Sep. 15, 2022), https://technical.ly/civic-news/what-drives-philly-poll-workers-democracy-day/.

[65] *See* Sean Golonka, *Nevada's Election Worker Turnover Second Highest Among Western States, Report Finds*, THE NEVADA INDEPENDENT (Sep. 26, 2023), https://thenevadaindependent.com/article/nevadas-election-worker-turnover-second-highest-among-western-states-report-finds.

[66] *See* Lisa Marshall Manheim, *Election Law and Election Subversion*, 132 YALE L.J. F. 312, 351 (2022).

[67] *See* Pooja Salhotra, *Conspiracy Theorists and 16-hour Days: Inside the Stress Elections Officials Face Ahead of the Midterms*, THE TEXAS TRIBUNE (Oct. 4, 2022), https://www.texastribune.org/2022/10/04/texas-elections-administrators-2022/.

[68] Jacob Fischler, *State and Local Election Workers Quitting Amid Abuse, Officials tell U.S. Senate Panel*, MISSOURI INDEPENDENT (Nov. 2, 2023), https://missouriindependent.com/2023/11/02/state-and-local-election-workers-quitting-amid-abuse-officials-tell-u-s-senate-panel/.

[69] Robison, *supra* note 52.

Lawyers in Nevada are required to complete 13 hours of Continuing Legal Education (CLE) each year to maintain their license to practice law.[70] Often, this is done in a classroom setting or online, discussing legal theory.[71] This program would give lawyers hands-on experience with how federal, state and local laws are implemented; a first-hand look at our democratic process; and the opportunity to connect directly with everyday Nevadans.[72]

With incentive to work the polls, lawyers could help increase transparency and trust within the community that our elections are safe and secure, answer questions about how technology is incorporated in that process.[73] It would also alleviate burden on volunteers and election workers.

I encourage all the lawyers reading this article now to explore volunteering at the polls – and consider taking a step to becoming a full-time election worker. Your expertise in the law would be truly invaluable to our democracy.

Conclusion

While we create methods to strengthen the election worker pipeline, it cannot be understated how valuable our new election workers are.[74] We have more people coming into the elections space, dedicated to democracy and their civic duties, who are rife with ideas to make our elections safer, more accessible, and more transparent. We need to be proactive instead of reactive to the technological space regarding elections. It's an exciting time to work on innovative strategies and now is the time to move state government into the modern age.

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[70] *Board of Continuing Legal Education*, STATE BAR OF NV (last accessed Feb. 7, 2024), https://nvbar.org/licensing-compliance/mcle/.
[71] Lucy Endel Bassli, *The Legal Education Gap*, LEGAL BUSINESS WORLD (Jan. 21, 2019), https://www.legalbusinessworld.com/post/2019/01/21/the-legal-education-gap.
[72] *See* Robison, *supra* note 52.
[73] Hill, *supra* note 48.
[74] Rebekah Caruthers, *Election Workers are One of the Backbones of America's Democracy*, NBC NEWS (July 4, 2022), https://www.nbcnews.com/think/opinion/july-fourth-reminds-us-election-workers-backbones-us-democracy-rcna36439.

Analyzing the Primary and Attendant Risks of GAI-Based Natural Language Processing Models in Legal Research

Dr. Alvin Hoi-Chung Hung[75]

Abstract

The use of generative artificial intelligence (GAI) for natural language processing (NLP) is an emerging technology that can potentially revolutionize legal research with its powerful ability to understand and analyze complex data for in-depth analysis. GAI-based NLP can assist researchers in conducting comprehensive and accurate legal investigations more efficiently by helping them identify relevant case laws and other sources of legal information, synthesize large amounts of research data, and analyze complex legal issues. The language model can also aid in developing more targeted and effective legal research strategies and assist in drafting legal documents. Its ability to learn and adapt to user feedback can facilitate continuous improvement in legal research methods, ultimately leading to more informed and well-reasoned legal analysis and decisions. Unfortunately, the derivative and generative works developed by GAI-based NLP may also cause serious problems in legal research. GAI-based NLP may impose significant primary and attendant risks in its derived contents regarding accuracy and reliability, as well as the possibility of plagiarism and copyright infringement. Overall, GAI-based NLP has both opportunities and risks to influence the direction and methodology of research efforts, offering unprecedented challenges to legal researchers.

Keywords

Generative Artificial Intelligence (GAI); Natural language processing (NLP); Legal research; Recurrent neural network.

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INTRODUCTION

The significance of rigorous legal research in the operations and implications of artificial intelligence (AI) becomes more imminent with the emergence of AI-based natural language models. These AI-driven advancements represent a remarkable technological leap, particularly in writing-related fields, offering unparalleled performance, adaptability, and user-friendliness.[76] However, as this technology becomes increasingly prevalent, its potential societal and ethical implications come to the forefront. The responsible and informed development of AI mandates a comprehensive understanding of existing legal frameworks, potential regulation gaps, and the creation of new laws where necessary.[77] Legal research plays a pivotal role in addressing concerns related to intellectual property rights, privacy infringements, accountability for AI-generated content, and bias mitigation. Without diligent legal research to guide the evolution of AI, unintended negative consequences might overshadow these innovations' transformative benefits. Therefore, an intricate grasp of the legal landscape is indispensable to harness the full potential of AI while safeguarding the rights and interests of individuals and communities alike.

This article is written to inform legal researchers about the latest developments regarding emerging AI technology in generating natural language content. This new AI model, commonly known as natural language processing (NLP) based on generative artificial intelligence (GAI) or GAI-based NLP, is an innovative language generative model that leverages advanced AI capabilities to generate contextually relevant responses to user inquiries.[78] In light of the potential challenges of using this new technology in helping legal research, this article investigates the various aspects of risks incurred when using such a language model to generate relevant content of natural language to help legal research. It can potentially aid in the synthesis and analysis of legal sources and case law, thereby enhancing, to a great extent, the efficacy and efficiency of conducting more comprehensive and targeted legal research. Moreover, its capacity to perform continuous learning and

[76] *See* Dinesh Kalla & Nathan Smith, *Study and Analysis of Chat GPT and its Impact on Different Fields of Study*, 8 Intl. J. of Innov. Sci. Res. Technol. 827–33 (2023).
[77] *Id.*
[78] Yaqing Si, et al., *Research and Implementation of Data Extraction Method Based on NLP*, *in* INT'L CONF. ON ANTI-COUNTER'ING, SEC., IDENTIF., ASID 11–5 (IEEE, 2020).

adaptation based on user feedback can also contribute to developing and refining legal research methodologies and practices.[79]

GAI is a class of advanced AI models endowed with the capacity to generate digital media such as images, videos, and text. While this technology can demonstrate impressive functionality, its outputs may not be entirely reliable for several reasons. Primarily, GAI functions by learning from large amounts of data. Consequently, any prejudiced attributes of the training dataset taint the AI's outputs.[80] If the dataset is biased, the system's produced output is also subject to bias. This challenge irritates the authenticity of the AI-generated output, thus rendering it unreliable. Next, GAI risks accidentally producing biased or objectionable content while pursuing novel content. This unintended consequence may occur regardless of the initial intention, leading to ethical considerations that challenge the trustworthiness of the content.[81] In addition, the outputs produced by GAI can be complex and challenging to explain or comprehend. This complexity may undermine the ability of users to verify the output's reliability, accuracy, or veracity, thus creating a credibility dilemma.

Furthermore, as the human element introduces an aspect of potential unreliability to General Artificial Intelligence (GAI), instances of inaccurate output may arise from unintentional human errors in the training data or the programming itself.[82] Such occurrences can undermine the system's trustworthiness and potentially lead to privacy and security breaches. This concern gains heightened significance in light of a Senate hearing held on 16 May 2023, wherein Sam Altman, the CEO of OpenAI, not only advocated for the regulation of AI but also

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[79] *See* Aras Bozkurt, *Generative artificial intelligence (AI) powered conversational education agent: The inevitable paradigm shift*, 18 ASIAN J. OF DIST. ED. 198–204 (2023).

[80] Yihan Cao, et al., *A Comprehensive Survey of AI-Generated Content (AIGC): A History of Generative AI from GAN to ChatGPT*, 37 J. ACM 111.1 (Aug. 2018) https://browse.arxiv.org/pdf/2303.04226.pdf.

[81] *See* Hui Liu, et al., *Towards Explainable NLP: A Generative Explanation Framework for Text Classification*, ARXIV (Jun. 11, 2019), https://browse.arxiv.org/pdf/1811.00196.pdf.

[82] See Michael Chui, et al., *Generative AI is here: How tools like ChatGPT could change your business*, QUANTUM BLACK: AI BY MCKINSEY, Dec. 2022, http://xn--xgs50bs55a.com/PDF/%E5%83%8FChatGPT%E8%BF%99%E6%A0%B7%E7%9A%84%E5%B7%A5%E5%85%B7%E5%A6%82%E4%BD%95%E6%94%B9%E5%8F%98%E4%BD%A0%E7%9A%84%E4%BC%81%E4%B8%9A.pdf.

outlined specific areas necessitating immediate attention.[83] These areas encompass the prevention of AI-generated misinformation during elections, the assurance of transparent information dissemination to users, and the proactive measures to thwart the malicious exploitation of AI for harmful purposes.[84] Altman also highlighted the potential dangers of AI technology and remarked that if AI systems go astray, the consequences could be catastrophic.[85] He expressed concern about the capability of AI models to stimulate voter disinformation before the 2024 election, and he recommended the establishment of a federal agency to regulate AI firms' activities and issue licenses for AI products that would comply with regulations. However, such regulations should not impede the innovative activities of smaller companies, open-source models, or researchers. In addition, Altman suggested a two-tier system based on a complex categorization of AI programs, where tighter regulation would be applied to those programs with specific and potentially harmful capabilities.[86] He proposed that the U.S., a global leader in AI, could enforce worldwide standards by imposing effective regulations on the microprocessors used to train and run AI systems, particularly the largest manufacturers. However, it is critical to ensure that such regulations do not result in corporate concentration that limits the success of start-up firms or stifles innovation in the growing open-source AI software community.

The current study echoes Altman's concerns and highlights the potential limitations when using GAI-based NLP in legal research, rendering its outputs less trustworthy and necessitating cautious and informed use in potentially sensitive applications. It has six parts. Part I briefly explains the history and background of GAI and NLP, as well as various models and versions of GAI-based NLP. Part II presents the case of ChatGPT as a popular form of GAI-based NLP by reviewing its rapid development in the past few years. The third part investigates the legal issues related to GAI-based NLP, while Part IV reviews the challenges of gai to legal researchers. Part V analyzes the potential hazards of attendant risks posed by GAI-based NLP in legal research. The last part

[83] OpenAI is the company that offers ChatGPT and GPI-4.
[84] *See* Cecilia Kang, *OpenAI's Sam Altman Urges A.I. Regulation in Senate Hearing*, N.Y. TIMES (May 16, 2023), https://www.nytimes.com/2023/05/16/technology/openai-altman-artificial-intelligence-regulation.html.
[85] *Id.*
[86] *Id.*

provides recommendations to improve the operations of GAI-based NLP in assisting and supporting legal research more effectively and precisely.

I. BASICS OF GAI-BASED NLP

GAI technology offers immense potentialities for academic research. GAI models are trained on a dataset of real-world examples to generate similar but new data.[87] For example, a GAI model could be trained on a dataset of cat photos to generate new cat images that could have come from the same dataset. However, its risks to academic integrity must be promptly addressed. Collaborative endeavors are indispensable to establishing ethical and legal frameworks, ensuring the generated content's originality and authenticity, and safeguarding intellectual property rights.[88] Through these measures, GAI technology, when applied to the generated content of natural language, can create substantial value in academic research while preserving the integrity of the academic outputs. Divergent from other AI-based language models, which predict the next word or phrase in a sentence, generative language models fabricate entire sentences or paragraphs based on input or prompts.[89] GAI-based NLP models use multilayered statistical algorithms and neural networks to examine patterns found in comprehensive natural language text data sets, for instance, books, articles, and websites. These patterns are then utilized to produce novel text content akin in tone and composition to the training data.

The mechanics of GAI center on the models of technical neural networks capable of machine learning similar to the cognitive processes of biological systems.[90] In a nutshell, the training phase of GAI requires the implementation of algorithms that consume vast quantities of data selected to reflect the domain of interest. Such data can include a range

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[87] Nan Cao, et al., *AI-Sketcher: A Deep Generative Model for Producing High-Quality Sketches*, 33 PROC. OF THE CONF. ON A.I., 2564, 2564–71 (2019).
[88] Karen Renaud, et al, *From ChatGPT to HackGPT: Meeting the Cybersecurity Threat of Generative AI*, MIT SLOAN MANAG. REV., https://sloanreview.mit.edu/article/from-chatgpt-to-hackgpt-meeting-the-cybersecurity-threat-of-generative-ai/ (Apr. 18, 2023).
[89] Chaoning Zhang, et al., *One Small Step for Generative AI, One Giant Leap for AGI: A Complete Survey on ChatGPT in AIGC Era*, ARXIV, (Apr. 4, 2023) https://arxiv.org/pdf/2304.06488.pdf.
[90] *See* Erik Brynjolfsson, et al., *Generative AI at Work*, NAT'L. BUREAU OF ECON. RSCH, (Nov. 2023) https://www.nber.org/system/files/working_papers/w31161/w31161.pdf.

of modalities, including text, code, graphics, and other relevant content. After accumulating the training data, the GAI model performs pattern and correlation analyses to identify underlying rules within the content. As the model progresses, it continually tunes its parameters to enhance the authenticity and sophistication of the generated content. Accordingly, a continuous iteration of learning and data processing ensues, culminating in increasingly refined and verisimilar outputs as the quantity of generated content continues to mount.

As GAI-based NLP is a new AI model, it is imperative to clarify some important issues regarding its distinct features and characteristics as distinguished from other AI models and concepts before a close look at its potential risks occurs. They are discussed in the following paragraphs.

A. Generative artificial intelligence (GAI)

GAI algorithms learn from training data exemplifying their desired output to function effectively.[91] By analyzing the patterns and structures within the training data, GAI models can produce novel content possessing similarities with the original input data, appearing genuine and human-like.[92] GAI's operation is predicated on machine learning processes inspired by neural networks in the human brain. The training of the GAI model involves collecting vast amounts of data that serve as the basis for learning. This includes relevant forms of content, such as text, code, or graphics.[93] Once the training data is gathered, the AI model studies the patterns and relationships within the data, comprehending the underlying rules regulating the content. The AI model persistently fine-tunes its parameters as it learns, improving its capacity to simulate human-generated content.[94] With every piece of content the AI model generates, its outputs become more sophisticated and convincing.

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[91] Philipp Hacker, et al., *Regulating ChatGPT and other Large Generative AI Models*, RESEARCHGATE, (Feb. 5, 2023), https://www.researchgate.net/publication/368304862_Regulating_ChatGPT_and_other_Large_Generative_AI_Models.

[92] Rowan T. Hughes, et al., *Generative Adversarial Networks–Enabled Human–Artificial Intelligence Collaborative a\Applications for Creative and Design Industries: A Systematic Review of Current Approaches and Trends*, 4 FRONTIERS IN A.I., Apr. 28, 2021, at 1, 10.

[93] David Foster, GENERATIVE DEEP LEARNING (2nd ed. 2023).

[94] *Id.*

GAI models are applicable in several fields, including NLP, speech recognition, machine translation, and text classification.[95] Such models can be utilized in the legal arena to scrutinize voluminous legal documents, such as court opinions and contracts, to discover patterns and insights that may shape legal research and decision-making. Notably, GAI models are not infallible and may occasionally make errors or produce biased outputs. To this end, it is critical to exercise caution while evaluating the results obtained from these models and to use them ethically and responsibly.

For further clarification of the GAI models, there is another AI model, artificial general intelligence (AGI), which differs from GAI, although the names of these two distinct models are sometimes inappropriately used interchangeably.[96] It is important to note that GAI and AGI, while related, encompass distinct aspects of AI. GAI focuses on the "generative" dimension, involving the creation of novel content such as audio, images, or text based on input data provided earlier. On the other hand, AGI embodies a more "general" purpose of AI, encompassing problem-solving, learning, language processing, and a wide array of cognitive abilities.[97]

B. Natural language processing (NLP)

Natural language refers to human language, in contrast to machine language.[98] The application of NLP constitutes a significant research domain within the broader realm of AI, which allows machines to comprehend and generate human language. This entails the development of algorithms that elucidate the semantics, syntax, and contextual nuances observed in human communication in conjunction with its complex cultural and social constructs. NLP encompasses a range of techniques, including machine learning, statistical models, and rule-based systems, that facilitate the analysis and amalgamation of language, whether in the form of texts, speeches, or images. Through the application of NLP, AI has given rise to intelligent systems such as virtual assistants, chatbots, and knowledge management platforms,

[95] Deep Ganguli, et al., *Predictability and Surprise in Large Generative Models,* ARXIV, (Oct. 3, 2022), https://arxiv.org/abs/2202.07785.
[96] *See* Lin Zhao, et al., *When Brain-Inspired AI Meets AGI*, ARXIV (Mar. 28, 2023), https://browse.arxiv.org/pdf/2303.15935.pdf.
[97] Ehsan Latif, et al., *Artificial General Intelligence (AGI) for Education*, ARXIV 1, 3-4 (May 15, 2023), https://browse.arxiv.org/pdf/2304.12479.pdf.
[98] *See* Terry Winograd, Understanding Natural Language, 3 COGN. PSYCH. 1–931 (1972).

capable of engaging in natural language interactions with users, contributing to human productivity, and augmenting decision-making processes.[99] Given that machines' ability to comprehend and process human language is a requisite for developing intelligent systems reflecting human-like communication, the pivotal role of GAI-based NLP in advancing AI cannot be overstated.

GAI-based NLP entails applying GAI techniques for NLP purposes, where the AI tool or system is not explicitly designed or programmed for natural language tasks. GAI-based NLP refers to techniques that involve AI methods purposely designed or optimized for language understanding, conversation generation, and text summarization. Its suitability depends on the specific task and context in which they are applied.

C. Technologies to support GAI-based NLP

The field of GAI has revolutionized how natural language content is produced. The various processes and techniques used to generate content using GAI strive to replicate the complexity and nuance evident in human language production despite the challenges of creating a machine that can understand and produce the subtle nuances of language.

One of the primary techniques used to generate natural language content is recurrent neural networks (RNNs).[100] These networks are designed to explore the temporal dependencies in language sequences, allowing the machine to synthesize a sequence of text based on the patterns and relationships inherent in the training dataset. Using RNNs in combination with other deep learning techniques can produce a machine capable of producing sophisticated, linguistically-rich content. Another common method for generating natural language content is using Markov chains, statistical models that help predict the probability of the next word in a sequence.[101] The machine can learn the likelihood

[99] Anupam Bhardwaj, Pooja Khanna, & Sachin Kumar, *Generative Model for NLP Applications Based on Component Extraction*, 167 PROCEDIA COMP. SCI., 918–31 (2020).
[100] Larry R. Medsker & L. C. Jain, *Recurrent Neural Networks*, 5 DES. AND APP'S 64–67 (2000).
[101] *See* Qingyou Yan, et al., *Many-Objective Charging Optimization for Electric Vehicles Considering Demand Response and Multi-Uncertainties Based on Markov Chain and Information Gap Decision Theory*, 78 SUS. CITIES AND SOC. (Mar. 2022), https://www.sciencedirect.com/science/article/abs/pii/S221067072100915X.

of word combinations, sentence structures, and grammatical rules by training a Markov chain on large text datasets. This technique is particularly useful for generating text that has a coherent and logical structure but may lack the rhetorical or informative brilliance seen in more human-like natural language. Similarly, the development of generative adversarial networks (GANs), which involve two neural nets that compete against each other, one to generate new content and the other to differentiate it from original works, has also improved the quality of AI-generated natural language content.[102] The adversarial approach of GANs allows for more natural and real-world examples because they capture the subtleties of human language and their specific contexts.

While the abovementioned techniques have allowed significant progress toward machine-generated natural language content, challenges must be addressed. One such issue is the ability of GAI models to generate content that not only meets standards of consistency and cohesiveness but also reflects the desired tone, emotion, and information conveyed.[103] Current GAI models still struggle with maintaining coherence over long stretches of text or offering truly informative insights on topics.

D. Common models of GAI-based NLP

GAI is rapidly advancing, with attention being garnered among content creators, and big tech companies such as Amazon, Microsoft, and Google, among others, have launched their own GAI models.[104] Depending on the application, GAI models may require input prompts that steer the AI towards producing a desired result. Significant examples of GAI tools encompass ChatGPT and DALL-E 2, tailored to address specific problems and applications.[105] These GAI models include transformer-based models,[106] generative adversarial

[102] Alankrita Aggarwal, Mamta Mittal, & Gopi Battineni, *Generative Adversarial Network: An Overview of Theory and Applications*, 1 INT'L J. OF INF. MAN. DATA INSIGHTS (Apr. 2021).
[103] *See* Yun Luo, et al., *Data Augmentation for Enhancing EEG-based Emotion Recognition with Deep Generative Models*, 17 J. OF NEURAL ENG. (2020).
[104] Sangeetha Gunasekar, et al., *AI-enables product purchase on Amazon: what are the consumers saying?*, 25 FORESIGHT 185–93 (Apr. 25, 2022).
[105] *See* Gary Marcus, Ernest Davis, & Scott Aaronson, *A very preliminary analysis of DALL-E 2*, ARXIV (2022), https://browse.arxiv.org/pdf/2204.13807.pdf.
[106] *See*, Anthony Gillioz, et al., *Overview of the Transformer-based Models for NLP Tasks*, *in* 2020 15TH CONF. ON COMPUT. SCI. AND INFO. SYS. (FEDCSIS) 179, 179–83

networks,[107] variational autoencoders,[108] and multimodal models[109] that can accept diverse input data types, including text, image, and audio. They are differentiated based on their underlying architecture and problem-solving approach concerning specific application domains. These models exhibit varying degrees of sophistication depending on the data type they operate. Some prominent GAI models include transformer-based models, generative adversarial networks, variational autoencoders, and multimodal models.

As a specific transformer-based model, a GAI-based NLP model is proficient in generating natural language. These AI language models are renowned for their efficacy in generating coherent and realistic text based on prompts. One of the most prominent models is OpenAI's ChatGPT, which utilizes deep learning techniques in language modeling.[110] This model of ChatGPT has undergone extensive training on extensive datasets of real-world text, thus enabling it to generate high-quality text proficiently. Another prominent model is Google's BERT, a bidirectional Transformer model that utilizes an extensive

(Transformer-based models such as OpenAI's ChatGPT and GPT-3.5 are neural networks specifically designed for natural language processing. These models are trained on large datasets to learn the relationships between sequential data types such as words and sentences. Such models excellently perform text-generation tasks because they can encode context to understand the sequence of words in a sentence.)

[107] *See* Zhengwei Wang, et al., *Generative Adversarial Networks in Computer Vision: A Survey and Taxonomy,* 54 ACM COMPUTING SURVEYS (CSUR) 1, 1–38 (Feb. 2021) (Generative adversarial networks (GAN), on the other hand, are composed of two neural networks -- the generator that produces data and the discriminator that assesses the quality and authenticity of the generated data. The generator learns from interactions with the discriminator, and over time, both networks train to accomplish their role better, leading to more realistic and authentic outputs.)

[108] *See* Ruoqi Wei & Ausif Mahmood, *Recent Advances in Variational Autoencoders With Representation Learning for Biomedical Informatics: A Survey*, 9 IEEE ACCESS 4939, 4939–56 (2021) (Variational autoencoders (VAEs) consist of an encoder that transforms the input data, such as images or text, into a more compact form. This reduction in size makes it easier to process and analyze data. The decoder then converts this encoded data into something resembling the input data, generating creative and authentic output.).

[109] Multimodal models can regulate multiple types of input data, including text, audio, and images. Such models combine various modalities to create more complex and refined outputs. Examples of multimodal models include DALL-E 2 and OpenAI's GPT-4, which can classify and generate outputs based on both image and text inputs.

[110] Elisa L. Hill-Yardin, et al., *A Chat (GPT) about the future of scientific publishing*, BRAIN, BEHAV., AND IMMUNITY (Mar. 1, 2023).

corpus of training data to generate natural language.[111] This AI model is particularly adept at understanding the intricacies and subtleties of language, enabling it to craft text that is highly pertinent to the input prompt. Microsoft's Turing NLG is another natural language generation platform that relies on advanced techniques, such as deep neural networks, to generate text that rivals human-like characteristics. This platform can be trained on a diverse array of data sources and is equipped to generate text in multiple languages.

Another model, the CUAD (Contract Understanding Atticus Dataset), is a valuable resource for legal researchers scrutinizing contracts.[112] It showcases a substantial collection of over 13,000 annotations meticulously crafted by seasoned legal experts.[113] The primary objective is to illuminate critical aspects of the contract that warrant examination by legal professionals. Westlaw Edge[114] is a cutting-edge legal research platform that adopts sophisticated AI technology to deliver a suite of features tailored to the needs of modern legal researchers.[115] These features include, but are not limited to, litigation analytics, statutory interpretation tools, citation analysis, and natural language inquiries. They work together to facilitate optimal research outcomes for legal practitioners. ROSS Intelligence is an AI-powered legal research assistant that employs advanced natural language processing techniques to identify and respond to natural language inquiries.[116] It can locate and present up-to-date case law relevant to the query by leveraging its comprehensive search capability. Furthermore, it possesses the unique ability to generate succinct summaries of intricate legal issues, which can be of immense value to

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[111] SUDHARSAN RAVICHANDIRAN, GETTING STARTED WITH GOOGLE BERT: BUILD AND TRAIN STATE-OF-THE-ART NATURAL LANGUAGE PROCESSING MODELS USING BERT 316 (2021).
[112] Luciano Lorenti, et al., *CUAD-Mo: Continuous Unsupervised Anomaly Detection on Machining Operations*, *in* 2022 IEEE CONF. ON CONTROL TECH. AND APPLICATIONS (CCTA), 881–86.
[113] Dan Hendrycks et al., *CUAD: An Expert-Annotated NPL Dataset for Legal Contract Review*, ARXIV (Nov. 8, 2021), https://arxiv.org/pdf/2103.06268.pdf.
[114] Aamir S. Abdullah, *Westlaw's Key Number System*, 51 COLO. LAW. 8, 9 (2022).
[115] *See Looking for the right AI for legal research?*, THOMSON REUTERS (Aug. 23, 2023), https://legal.thomsonreuters.com/en/insights/articles/best-ai-for-legal-research.
[116] Shannon Flynn, *How Natural Language Processing (NLP) AI Is Used in Law,* LAW TECH. TODAY (June 9, 2021), https://www.lawtechnologytoday.org/2021/06/how-natural-language-processing-nlp-ai-is-used-in-law/.

legal researchers. Another noteworthy model is Hugging Face's EleutherAI, an open-source language model that generates natural language text.[117] The model depends on deep learning techniques and has been designed to facilitate flexibility and customization in generating text for specific tasks or domains. These AI models are just a few examples of the long array of GAI models proficiently generating natural language text.

II. CHATGPT AS A POPULAR FORM OF GAI-BASED NLP

ChatGPT (Chat Generative Pre-trained Transformer) is a specific form of GAI-based NLP trained on large datasets of human language and can be used to generate new text or converse with human users in a natural-sounding way.[118] It was developed by a private company called Open AI.[119] ChatGPT can provide intelligent, automated responses to user queries by using machine learning algorithms and NLP techniques to understand the context and intent of the input message and generate a relevant and appropriate response.[120]

ChatGPT involves training the AI on large data sets to recognize patterns and generate new content based on those patterns.[121] It is used in applications such as chatbots, virtual assistants, and customer service chat interfaces, where it can provide users with quick and personalized responses to their queries and requests.[122] The system can also be adapted to various domains, professions, and industries for customized solutions and services.

A. What is "Chat" in ChatGPT?

Within the framework of GPT language models, a "chat" serves as a colloquial exchange or discourse involving at least two participants,

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[117] Siddharth Karamcheti and Laurel Orr, *Mistral - A journey towards reproducible language model training*, CTR. FOR RSCH. ON FOUND. MODELS, https://crfm.stanford.edu/2021/08/26/mistral.html (Last visited Oct. 21, 2023).
[118] Brady D. Lund and Ting Wang, *Chatting about ChatGPT: how may AI and GPT impact academia and libraries?*, 40.3 LIBR. HI TECH. NEWS 26, 26-29 (2023).
[119] Konstantinos I. Roumeliotis and Nikolaos D. Tselikas, *ChatGPT and Open-AI Models: A Preliminary Review,* 15.6 FUTURE INTERNET 1, 1-24 (2023).
[120] *Id.* at 13.
[121] Tira Nur Fitria, *Artificial intelligence (AI) technology in OpenAI ChatGPT application: A review of ChatGPT in writing English essay*, 12 ELT FORUM: J. OF ENG. LANGUAGE TEACHING 44, 44-58 (2023).
[122] Bharati Rathore, *Future of AI & Generation Alpha: ChatGPT beyond Boundaries*, 12 EDUZONE: INT'L PEER REV./REF. MULTIDISCIPLINARY J. 63, 63-68 (2023).

leveraging NLP and machine learning algorithms to generate human-like responses to user inputs.[123] This technology has the potential to revolutionize various communication and service industries, improving efficiency and enhancing user experience. The primary objective of "chat" in ChatGPT lies in generating responses of a human-like nature to textual prompts comprising questions or statements, with the language model simulating a natural dialogue with a human interlocutor.

Typically, ChatGPT models undergo training on expansive conversational datasets, for example, customer service transcripts or social media interactions, facilitating the acquisition of knowledge regarding patterns and structures of natural language conversations. During inference, the model synthesizes responses, drawing on input prompts and the acquired intelligence related to standard reaction models in similar contexts. The inherent capacity of GPT-based language models to emulate human language patterns renders them optimally apt to create responses to user inputs in chatbot applications. These automated systems function in numerous domains, from customer service and virtual assistants to social media messaging platforms, and provide users with efficient and expeditious support. Hence, the "chat" dimension of ChatGPT constitutes the indispensable conversational interface that minimizes the communication gap between users and chatbots by allowing users to interact with a humanized linguistic interface and receive responses that the language model algorithmically generates.

The quality of chat generated by ChatGPT models tends to fluctuate based on features such as the size and caliber of the training data, as well as the intricacies and sophistication of the model architecture and training mechanism. A few ChatGPT models of this nature are meant for domains or particular use cases compared to others that are more generic and capable of accommodating diverse subjects and styles for conversation.

B. What is "GPT" in ChatGPT?

Generative Pre-trained Transformer (GPT) is a type of neural network used in natural language processing. It is a language generation model pre-trained on large amounts of text data, such as books, articles,

[123] Robert W. McGee, *Is Chat GPT biased against conservatives? An empirical study*, SSRN ELEC. J. (Feb. 17, 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4359405.

and web pages.[124] The pre-training process is unsupervised, meaning that the model learns to recognize patterns in the text independently. The GPT model is based on the transformer architecture, allowing it to process long text sequences effectively. It can learn contextual relationships between words, including synonyms, antonyms, and other contextual associations. After pre-training, the GPT model can be fine-tuned on specific language tasks, such as language translation, question answering, and language generation. For example, the fine-tuned GPT model can be given a set of prompts and generate novel text using the learned patterns and associations. The success of GPT has led to the development of larger and more powerful language models, from GPT-1 to the latest version of GPI-4, capable of generating even more impressive language output.

ChatGPT is a very popular example of GAI-based NLP, which involves GAI algorithms specifically designed and trained for NLP tasks such as text generation, dialogue modeling, and machine translation. It is a type of neural network architecture that uses unsupervised learning to pre-train a language model and fine-tune it for various NLP applications. In other words, ChatGPT is an AI chatbot that uses a GAI-based NLP technique to chat with users and simulate natural language conversations. It pre-trains on vast textual data to learn patterns and relationships between words and phrases and then fine-tunes this knowledge for specific conversation flows and dialogue contexts. This way, it can generate human-like responses to user queries and maintain a coherent and engaging conversation.

C. Historical development of ChatGPT

ChatGPT is a conversational language model built with a deep learning algorithm trained on a massive corpus of text data.[125] It can generate a significant amount of content resembling human speech and thought patterns and has been employed to answer questions and generate text in various domains, including intellectual property law. In the context of patent law, ChatGPT presents an intriguing challenge in terms of how it affects patent law.[126]

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[124] Xiao Liu, et al., *GPT Understands, Too*, ARXIV:2103.10385 (2021).
[125] Alejandro Guadalupe, et al. *Effect of Chat GPT on the digitized learning process of university students*, 33 J. OF NAMIBIAN STUD.: HIST. POL. CULTURE 1, 1-15 (2023).
[126] *See* Elisa L. Hill-Yardin, et al., *A Chat (GPT) about the future of scientific publishing*, 110 BRAIN, BEHAV., AND IMMUNITY 152, 152–53 (2023).

One aspect in which ChatGPT can greatly influence patent law is the area of patentability.[127] ChatGPT's ability to generate text that resembles human thought and speech patterns can be leveraged to create patent applications more efficiently and cost-effectively.[128] This means that innovations previously considered ineligible for patent protection due to a lack of resources, or inadequate drafting skills can gain patent protection by leveraging ChatGPT in the application drafting process. Moreover, ChatGPT can also assist in the patent infringement detection process. It can scour the internet and identify patent infringement issues, thereby alerting patent owners to potential infringement situations. This could lead to increased patent litigation as patent owners leverage ChatGPT-generated data to identify infringements and seek recompense for infringements that may have gone unnoticed or untended. In addition, ChatGPT can also affect patent law in the area of patent examination. ChatGPT can assist patent examiners in better understanding the nuances of patent applications and identifying innovative solutions to common problems examiners face. This could lead to the issuance of high-quality patents, ultimately benefiting the public by increasing innovation and stimulating economic growth.

1. GPT-1

GPT-1 was the first-generation AI language model introduced in 2018 with 117 million parameters, making it much smaller than later versions of GPT.[129] It was trained using a dataset of web pages scraped from the internet and additional texts from books and other written materials.

2. GPT-2

While GPT-1 was an impressive language model for its time, GPT-2 built upon its predecessor with a much larger model size and training dataset, leading to improved language generation and processing capabilities.[130] GPT-2 was released in 2019 and had 1.5

[127] Ralf Krestel, et al., *A survey on deep learning for patent analysis,* 65 WORLD PATENT INFO. 1, 8 (2021).
[128] Dinesh Kalla & Nathan Smith, *Study and Analysis of Chat GPT and its Impact on Different Fields of Study*, 8.3 INT'L J. OF INNOVATIVE SCI. AND RSCH. TECH. 827, 827-33 (2023).
[129] *See* Simon Welch, *Comparative studies on the human glutamate-pyruvate transaminase phenotypes—GPT 1, GPT 2-1, GPT 2*. HUMANGENETIK 30, 238, 237-249 (1975).
[130] Randall Reed, *The Theology of GPT-2: Religion and Artificial Intelligence*, 15.11 RELIGION COMPASS 1 *passim* (2021).

billion parameters, more than ten times larger than GPT-1.[131] This larger model size allowed GPT-2 to make more accurate predictions and produce a more coherent text. While GPT-1 demonstrated strong performance in language tasks at the time of its release, it was somewhat limited by its size and capabilities. GPT-2, with its much larger model size, demonstrated significant improvements in language processing tasks such as language generation, question-answering, and translation. GPT-2 has shown the ability to generate coherent and realistic language, including news articles, poetry, and even complete novels. GPT-2 was trained using a much larger and more diverse dataset, which included texts from books, Wikipedia, the Common Crawl dataset, and more.[132]

3. GPT-3

GPT-3 was introduced in May 2020 and has 175 billion parameters with exceptional performance in NLP tasks such as language translation, question-answering, and text generation.[133] GPT-3 uses few-shot learning, allowing quick adaptation to new tasks with minimal data available.[134] The training process for GPT-3 involved massive data from various sources, including written texts, speeches, and more. The method used in the GPT-3 training involves algorithms that iteratively refine the language model's parameters. GPT-3 has been used in various applications, including chatbots, language generation for creative writing and marketing, and language processing for digital assistants. While there are no announced plans for GPT-4's application yet, it is expected to continue GPT's work in improving the language model's capabilities to a wider range of applications. GPT-3 has several applications, such as language translation, content creation, chatbots, and even coding assistance. Its ability to understand and generate natural language has also made it useful for summarizing large bodies of text, answering questions, and completing sentences.[135] One of the most impressive features of GPT-3 is that it can generate completely

[131] Jonah Zitelli, *345M-GPT-2 After James Wright: Can AI Generate Convincing Contemporary Poetry?*, KENYON UNIV. (2020), https://digital.kenyon.edu/cgi/viewcontent.cgi?article=1018&context=dh_iphs_prog.
[132] Judith van Stegeren & Jakub Myśliwiec, *Fine-tuning GPT-2 on annotated RPG quests for NPC dialogue generation*, PROC. OF THE 16TH INT'L CONF. ON THE FOUND. OF DIGIT. GAMES 1, 2 (2021).
[133] Robert Dale, *GPT-3: What's it good for?*, 27.1 NAT. LANGUAGE ENG'G 113, 115 (2021).
[134] Min Zhang and Juntao Li, *A commentary of GPT-3 in MIT Technology Review 2021*, 1.6 FUNDAMENTAL RSCH. 831, 831 (2021).
[135] Dale, *supra* note 59.

new and coherent text based on minimal prompts. This has created new possibilities in virtual assistants, automated content creation, and more. Despite its many advancements, GPT-3 is still a relatively new technology with many potential implications and limitations that need to be considered. ChatGPT is based on the GPT-3 model, a state-of-the-art AI language model developed by OpenAI.[136] It is built upon a neural network architecture called a "transformer" and trained on a massive corpus of text data, allowing it to generate human-like text with remarkable accuracy.

4. GPT-4

The latest version of GPT is GPT-4, released on 14 March 2023. This latest version of GPT constitutes a powerful language model originating from OpenAI, serving as the fourth iteration of the GPT models.[137] It was pre-programmed to accomplish next-token predictions, incorporating sources of public data and third-party licensed information. Regarding the model size, GPT-4 is substantially larger than GPT-3, with a much higher number of parameters. This makes it possible for GPT-4 to process and create content that is more precise and richer in context. GPT-4 uses a lot of training data to improve their ability to understand and create natural language.[138] It has been trained on an even bigger set of data, which means it can understand and make more accurate and relevant content. GPT-4 exhibits improved natural language understanding compared to GPT-3. It is better at understanding context and can interpret complex sentences more accurately. This improvement allows GPT-4 to outperform GPT-3 in tasks like sentiment analysis, question-answering, and text classification. Regarding natural language generation, GPT-4 has a clear edge over GPT-3. GPT-4 can generate longer, more coherent, and contextually accurate content than GPT-3. This makes GPT-4 more suitable for content creation, translation, and summarization tasks.

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[136] Zhe Liu, et al, *Chatting with GPT-3 for Zero-Shot Human-Like Mobile Automated GUI Testing,* ARXIV:2305.09434V1 [CS.SE] (May 16, 2023).
[137] Katharine Sanderson, *GPT-4 is here: what scientists think*, 615 *Nature* 773–79 (2023).
[138] Kevin Roose, *GPT-4 Is Exciting and Scary*, THE N.Y. TIMES (Mar. 19, 2023), https://www.nytimes.com/2023/03/15/technology/gpt-4-artificial-intelligence-openai.html.

III. LEGAL ISSUES OF GAI-based NLP

As an AI language model, GAI may generate text potentially infringing intellectual property rights. For example, if a user prompts GAI to generate content similar to an existing copyrighted work without permission, it may result in copyright infringement.[139] Copyright Laws protect original works of authorship, such as books, music, films, and computer software, from being reproduced or distributed without permission. Additionally, GAI's ability to generate content that closely mimics human language may raise concerns about patent and trademark infringement or misrepresentation of a brand's identity. Trademark laws govern the protection of company logos and trademarks, which prevent others from using these marks to advertise their products or services falsely. If GAI generates text that resembles a company's name or products, it could confuse consumers and harm the brand's reputation.

Chatbots like GAI may raise concerns about data ownership and privacy. If GAI collects data from its interactions with users, this information can potentially be used for commercial purposes, which could lead to legal issues with regard to data protection and ownership. Therefore, GAI must operate within the boundaries of privacy laws and implement measures to protect user data and privacy. This includes obtaining necessary permissions for generating content similar to existing works and ensuring that user interactions with the chatbot are secure and compliant with data protection regulations such as GDPR and CCPA.

A. Copyright laws

GAI-based NLP has the potential to significantly impact copyright law in a variety of ways, ranging from patentability to infringement detection and patent examination.[140] The potential benefits of GAI-based NLP are significant, but the full implications of its influence on copyright law remain to be seen. Copyright laws relevant to GAI may include the Copyright Act of 1976 and the Digital Millennium Copyright Act (DMCA). These laws govern the use,

[139] *See* Bernt Hugenholtz & João Pedro Quintais, *Copyright and artificial creation: does EU copyright law protect AI-assisted output?* 52.9 IIC-INT'L REV. OF INTELL. PROP. AND COMPETITION L. 1190–216 (2021).
[140] Anushka Sail, *Chat GPT and Intell. Prop. Rights*, SSRN (2023), https://ssrn.com/abstract=4445275.

distribution, and protection of copyrighted materials in digital and physical formats. Additionally, GAI must ensure that any images, text, or other materials used on its platform are properly licensed and do not infringe on existing copyrights.

1. Copyright Act of 1976

The Copyright Act of 1976 is a U.S. law that governs copyright policies and procedures. The act provides a framework for protecting copyrighted works, such as literary, musical, and artistic creations, by outlining copyright owners' rights.[141] Copyright law in the U.S. has its roots in British and European law. In 1710, Britain enacted the Statute of Anne, which established the legal right for authors to have control over the reproduction of their work.[142] This statute was a model for early American copyright law established in 1790. The first US copyright law, the Copyright Act of 1790, protected works such as maps, charts, and books.[143] The law required authors to register their work with the federal government to receive copyright protection. The registration process and duration of protection were later expanded in the Copyright Act of 1831. The 1909 Copyright Act established a revision of US copyright law that covered works such as music, photographs and plays.[144] This law included protection for the creators of works for a term of 28 years with the option to renew for an additional 28 years. In 1976, the Copyright Act was revised again, expanding the scope of protectable works to include software, graphics, and sound recordings, among others, and making copyright automatic and the registration process simplified.[145] Copyright protection under the law ranged from 50 to 75 years, depending on the type of work.

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[141] Barbara Ringer, *First Thoughts on the Copyright Act of 1976*, 22 NYL SCH. L. REV. 477 (1976).
[142] Iliana Tsiota, *The Evolution of U.S. Originality in Copyright Law and a Comparison with the E.U.,* INT'L HELLENIC UNIV. (Jan. 2023), https://repository.ihu.edu.gr/xmlui/bitstream/handle/11544/30177/i.tsiota_alam_18-04-2023.pdf?sequence=1.
[143] Rochelle Cooper Dreyfuss, *The creative employee and the Copyright Act of 1976,* 54.2 THE UNIV. OF CHI. L. REV. 590, (1987).
[144] *See* Raine Odom, *Caught by the Act: Does the Copyright Act of 1909 Pose Legal Disasters for Modern Music?*, 21 UIC REV. INTELL. PROP. L. 292 (2022).
[145] *See generrally* Shujie Feng and Fang Fang, *Live broadcasting of sporting events: a trigger to the revolutionary reform of Chinese copyright law by transforming the condition of originality,* 12.3 QUEEN MARY J. OF INTELL. PROP. 400 (2022).

There are several aspects in which the Copyright Act of 1976 is relevant to the operation of GAI. Firstly, GAI is an online platform that allows users to create and share content, including text, images, and videos. The Copyright Act of 1976 covers all types of copyrighted works, including those published online. Therefore, any content users share on GAI subject to copyright protection should comply with the Act's provisions. This means that GAI should not allow users to share copyrighted material without the copyright owner's permission. Secondly, the Copyright Act of 1976 grants copyright owners the exclusive right to reproduce, distribute, and display their copyrighted works.[146] Therefore, GAI should respect the copyrights of content creators and take steps to prevent users from infringing on those rights. This could include implementing mechanisms to detect and prevent the sharing of copyrighted materials without permission or using content recognition technology to identify and remove infringing material. Lastly, the Copyright Act of 1976 outlines statutory damages for copyright infringement, and if GAI is found to have contributed to or benefitted from copyright infringement on the platform, it may be liable for these statutory damages.[147] Therefore, GAI must take appropriate actions to prevent copyright infringement on the platform and avoid potential legal issues.

2. Digital Millennium Copyright Act (DMCA)

In 1998, another amendment to the Copyright Act was passed, the Digital Millennium Copyright Act (DMCA).[148] The DMCA created new legal protections for digital works and included provisions that addressed digital rights management, online piracy, and "safe harbor" protections for internet service providers.[149] In recent years, there has been debate about copyright law in relation to digital media, fair use, and the balance of interests between creators and the public. The US Supreme Court has ruled on several high-profile cases involving fair use, software copyrights, and the legality of file-sharing networks. The DMCA provides a framework for protecting copyrighted materials on the Internet. It is relevant to GAI as it protects against liability for

[146] *See generally* David Saunders, AUTHORSHIP AND COPYRIGHT, (Taylor & Francis, 1st ed. 1992) (eBook published Feb. 27, 2023).
[147] Michael D. Murray, *Generative and AI Authored Artworks and Copyright Law,* 45 HASTINGS COMM. & ENT. L.J. 27-35 (2023).
[148] Digital Millennium Copyright Act, H.R. 2281, 105th Congress, 112-18 (1998).
[149] *Cf.* Jacqueline Lipton, *The law of unintended consequences: The Digital Millennium Copyright Act and interoperability*, 62 WASH. & LEE L. REV. 487, 487–98 (2005).

copyright infringement on its platform. Under the DMCA, GAI can qualify for safe harbor from copyright infringement liability by following certain procedures. If GAI receives any notice from a copyright owner claiming that a user has posted infringing content, GAI should remove the infringing content promptly upon receipt of the notice. This process is called a "takedown notice," allowing GAI to avoid infringement liability on its platform.[150] Additionally, GAI is required to have a designated agent to receive DMCA notices from copyright owners. The agent's contact information should be publicly available on the GAI website, and GAI must provide a way for copyright owners to submit a DMCA takedown request easily. The DMCA is relevant to GAI because it provides a legal framework for protecting copyrighted materials on the internet and offers a safe harbor from liability for copyright infringement, provided that GAI responds to DMCA notices promptly and appropriately.[151]

The influence of GAI-based NLP on copyright law presents both opportunities and challenges that must be carefully evaluated in legal and academic circles.[152] The technology has enormous potential to help generate creative works, identify potential infringement, and enhance artistic expression. However, its ease of use, high adaptability, and ability to mimic original works of authorship mean that it has the potential to raise legal questions about copyright infringement and intellectual property protection. One area in which GAI-based NLP may affect copyright law is in the production of creative works that may potentially infringe on copyrighted material. GAI-based NLP can generate text and other creative works that resemble existing copyrighted content and may sometimes raise questions regarding copyright infringement. Therefore, the use of GAI-based NLP will likely require a careful assessment of copyright law and may result in debates surrounding the legality of such works. Another potentially significant impact of GAI-based NLP on copyright law is the ease with which it can copy and reproduce content. While copyright law seeks to protect original works of authorship, GAI-based NLP can easily

[150] Jeffrey Cobia, *The Digital Millennium Copyright Act Takedown Notice Procedure: Misuses, Abuses, and Shortcomings of the Process*, 10.1 MINNESOTA J. L., SCI. & TECH. 387, 387–98 (2009).
[151] Charles W. Hazelwood Jr., *Fair Use and the Takedown/Put Back Provisions of the Digital Millennium Copyright Act*, 50 IDEA 307, 307–16 (2010).
[152] *See* Carys J. Craig, *The AI-Copyright Challenge: Tech-Neutrality, Authorship, and the Public Interest*, RSCH. HANDBOOK ON INTELL. PROP. AND ARTIFICIAL INTEL. 134, 134–55 (Edward Elgar Publishing, 2022).

reproduce such work in large quantities, which could potentially pose problems for copyright protection.[153] As such, it may be necessary to develop new legal measures to protect original works against the ease with which they can be replicated using tools like GAI-based NLP. Furthermore, GAI-based NLP may also be leveraged to help identify instances of copyright infringement. Its ability to generate text across huge quantities of data could possibly lead to the development of algorithms to detect copyright infringement.[154] This technology could help better enforce existing copyright laws while enhancing the protection of copyrighted works.

B. Trademark laws

Trademark laws in the U.S. refer to the legal framework governing trademark registration, protection, and enforcement.[155] A trademark is any word, phrase, symbol, or design that distinguishes the source of a product or service from those of others in the marketplace.[156] In the U.S., trademark law is primarily governed by the Lanham Act, which was enacted in 1946.[157] The Lanham Act provides extensive protection for trademarks registered with the U.S. Patent and Trademark Office (USPTO).[158] To register a trademark, the applicant must apply with the USPTO, which evaluates the application to ensure that the proposed mark is eligible for trademark protection and does not infringe on the rights of others.

Once registered, trademark owners have the exclusive right to use their mark in connection with the goods or services specified in the

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[153] Margot E. Kaminski, *Authorship, Disrupted: AI Authors in Copyright and First Amendment Law*, 51 U.C. DAVIS L. REV. 589, 589–602 (2017).
[154] *See* Dong Zhang, *Should ChatGPT and Bard Share Revenue with Their Data Providers? A New Business Model for the AI Era*, CORNELL UNIV. ARXIV:2305.02555VI, (May 4, 2023) https://arxiv.org/abs/2305.02555v1.
[155] *See generally* Laura A. Heymann, *The Reasonable Person in Trademark Law*, 52 ST. LOUIS UNIV. L. J. 781, 781–95 (2007).
[156] *See* Jane C. Ginsburg, *The Right to Claim Authorship in US Copyright and Trademarks Law*, 41 HOUS. L. REV. 263, 264-76 (2004).
[157] *See generally* Marketa Trimble, *US Law of Geographical Trademarks, "Google Effects," Historical Developments, and US International Obligations: Proposal for Changes to the Lanham Act*, 112 TRADEMARK REP. 706, 708-18 (2022).
[158] *See* Naira Rezende Simmons, *Putting Yourself in the Shoes of a Patent Examiner: Overview of the United States Patent and Trademark Office (USPTO) Patent Examiner Production (Count) System*, 17 J. MARSHALL REV. INTEL. PROP. L. 32, 33-41 (2017)..

registration.[159] The trademark owner may also take legal action to prevent others from using a confusingly similar mark. This protection extends to registered and unregistered trademarks, although the protection afforded to unregistered marks is generally more limited. Trademark law also allows the cancellation of registered trademarks that have been abandoned or have become generic. A trademark is considered abandoned if the owner stops using the mark in commerce for an extended period. It is considered generic if it has become synonymous with a particular product or service and no longer functions as a source identifier.

One way in which GAI-based NLP may affect trademark law is through the generation of text and logos that may resemble registered trademarks. GAI-based NLP's ability to generate large volumes of targeted marketing and promotional material could potentially lead to inadvertent infringement of registered trademarks. As a result, it may be necessary to develop new legal measures to address this issue and protect the intellectual property rights of trademark holders. Furthermore, GAI-based NLP can be programmed to develop and create original logos or brand marks. While this may enable companies to quickly and affordably establish distinctive trademarks for their businesses, it may also lead to the development of unauthorized or infringing marks.[160] The ability of GAI-based NLP to generate new logos or designs that resemble existing trademarks could potentially lead to disputes and legal challenges, necessitating new legal frameworks to regulate the use of this technology in the creation of trademarks. Additionally, GAI-based NLP can conduct deep-dive analyses of trademark databases, which could facilitate better identification and protection of trademarks.[161] The technology's ability to scan vast amounts of data could help to identify potential trademark infringement and prioritize cases for legal action.[162]

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[159] Keith Aoki, *Authors, Inventors and Trademark Owners: Private Intellectual Property and the Public Domain - Part I*, 18 COLUM.-VLA J.L. & ARTS 1, 1-12 (1993).

[160] *See generally* Yogesh K. Dwivedi, et al., *"So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy*, 71 INT'L J. INFO. MGMT. 2, 2-63 (2023).

[161] *See* Robert Hoffman, et al., *Explaining Explanation, Part 4: A Deep Dive on Deep Nets*, 33 IEEE INTELLIGENT SYS. 87, 87-95 (2018).

[162] *See* Farid Rahimi & Amin Talebi Bezmin Abadi, *ChatGPT and Publication Ethics*, 54 ARCHIVES OF MED. RSCH. 272, 272-274 (2023).

GAI-based NLP has the potential to revolutionize the field of trademark law with its ability to create and analyze trademarks and logos.[163] However, its ease of use and adaptability would mean that it could lead to challenges regarding the protection of intellectual property rights. To effectively address these issues, new legal frameworks may need to be developed to establish guidelines for creating, using, and protecting trademarks generated using this innovative technology.

C. Privacy laws

Adopting GAI-based NLP models into various business practices poses serious implications for privacy law, particularly in data protection and handling personal information.[164] A critical concern surrounding GAI-based NLP models is the unintentional disclosure of sensitive personal information during conversations. When a GAI-based NLP model undertakes training on a dataset consisting of personally identifiable information (PII) like names, addresses, or phone numbers, there lies an inherent risk of the model generating responses containing this classified information, either willingly or inadvertently. Thus, organizations utilizing GAI-based NLP models in customer service or similar settings must exercise additional caution to ensure appropriate personal data handling. This may involve employing techniques, including data masking or anonymization, combined with adequate training and testing of the model to minimize the possibility of data exposure.[165]

Moreover, GAI-based NLP models could also be subject to data protection regulations such as the General Data Protection Regulation (GDPR) in the European Union or the California Consumer Privacy Act (CCPA) in the U.S. These regulatory frameworks necessitate organizations to obtain explicit consent from users before sourcing and

[163] *See* Hamidreza Habibollahi & Michael Pecht, *Artificial Intelligence Trends Based on the Patents Granted by the United States Patent and Trademark Office*, 8 IEEE ACCESS 81633, 81633-43 (2020)..

[164] *See* Brady Lund et al.*, Information Literacy, Data Literacy, Privacy Literacy, and ChatGPT: Technology Literacies Align with Perspectives on Emerging Technology Adoption within Communities*, SSRN ELEC. J., https://doi.org/10.2139/ssrn.4324580 (2023).

[165] *See* Pawel Korzynski et al., *Generative artificial intelligence as a new context for management theories: analysis of ChatGPT*, 31 CENT. EUR. MGMT. J. 3, 3-13 (2023).

processing their personal information.[166] Regulations like these also mandate that companies provide users access, control, and deletion abilities for their data upon request. The impact of GAI-based NLP on privacy law is undeniably influenced by several factors, like specific use cases and the implementation of measures to safeguard personal data. As with any technological innovation that involves collecting and processing sensitive data, organizations must exhibit awareness of the potential risks involved and undertake appropriate measures to ensure compliance with relevant data protection legislation.

IV. THE BENEFITS OF GAI-BASED NLP TO LEGAL RESEARCHERS

GAI-based NLP offers legal researchers a transformative tool that expedites research, bolsters accuracy, and empowers them to make more informed and effective legal decisions, given the indispensable request of legal researchers for trustworthy, accurate, and comprehensive information to develop their arguments. The precision and dependability of natural language contents generated by GAI are pivotal for legal researchers. The potential benefits resulting from easily accessed AI-generated content could have dire consequences, especially when considering the time and efforts involved.[167] However, legal scholars must exercise prudence when relying on AI-generated content and supplement the outputs with expert analysis and human verification to ensure the fidelity and accuracy of their research.

A. Conducting legal research efficiently

Efficient legal research enables attorneys and legal professionals to provide the highest quality legal services. Legal researchers must possess specific skills and aptitudes to excel in their field. Presented below are key proficiencies and capabilities that legal researchers necessitate:

First, legal researchers must demonstrate a profound comprehension of the law and the legal system. Typically, they possess a law degree or other advanced legal education and diligently stay

[166] Eric Goldman, *An Introduction to the California Consumer Privacy Act (CCPA)*, SANTA CLARA UNIV. L. STUDIES RSCH. PAPER 1, 5 (2020), https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=3211013.
[167] *See* Terry Hutchinson & Nigel Duncan, *Defining and Describing what we Do: Doctrinal Legal Research*, 17.1 DEAKIN L. REV. 83, 83-119 (2012).

abreast of legal developments and alterations in the legal landscape.[168] Second, proficient research skills constitute a vital asset for legal researchers as they adeptly navigate diverse sources and databases to retrieve pertinent information. Moreover, they must possess the capacity to scrutinize and amalgamate this information to construct cogent legal arguments and draw conclusive determinations.[169] Third, legal researchers must exhibit exemplary writing and communication skills. They must adeptly articulate their findings and arguments, employing lucid and persuasive prose with legal terminology and conventions. This necessitates effective communication with an array of stakeholders, including clients, attorneys, judges, and fellow legal professionals.

In addition, engaging in critical thinking and analysis is indispensable for legal researchers. They must demonstrate a capacity to cogitate critically and evaluate intricate legal matters, adroitly weighing multiple perspectives and competing arguments.[170] Proficiency in identifying and assessing legal precedents and analogies and applying legal principles and rules to specific cases and scenarios is indispensable. Moreover, legal researchers must display unwavering attention to detail. Their meticulousness is paramount; even the slightest errors or omissions can yield significant legal consequences. They must be astute in detecting inconsistencies or gaps within legal arguments and evidence and ensure the inclusion of all relevant information in their research. Finally, time management and organizational skills are imperative for legal researchers, given their frequent engagement in simultaneous projects under stringent time constraints. They must prioritize tasks effectively and manage their time and resources judiciously.

To conduct research with efficacy, it is imperative to precisely delineate the legal question at hand and identify the pertinent sources of law, encompassing statutes, regulations, case law, and scholarly literature for references.[171] Sophisticated legal research methods necessitate a profound comprehension of legal language, enabling

[168] Paul Chynoweth, *Legal Research*, ADVANCED RESEARCH METHODS IN THE BUILT ENVIRONMENT 28-37 (Andrew Knight & les Ruddock ed., 2008).
[169] Christopher McCrudden, *Legal Theory and the Social Sciences*, OXFORD LEGAL STUD. RESCH. PAPER NO. 33/2006, 632, 633-35 (2006).
[170] Edwina L. Rissland et al., *AI and Law: A Fruitful Synergy*, 150.1-2 ARTIFICIAL INTEL. 1, 3, 5(2003).
[171] Harry Surden, *Artificial Intelligence and Law: An Overview*, 35 GA. ST. U. L. REV. 1306, 1325-30 (2019).

practitioners to recognize and interpret intricate legal concepts and principles. Advanced technological tools, such as AI and natural language processing, have emerged as invaluable assets in the realm of legal research. These tools facilitate greater efficiency by streamlining the data collection and analysis process.[172] Their utilization mitigates the risk of errors, reduces the time expended on arduous tasks, and culminates in more accurate and comprehensive results. Furthermore, collaboration with fellow legal professionals, including implementing peer review processes, is critical in fostering efficient legal research. Such collaboration encourages the development of innovative and effective approaches to legal predicaments.

In essence, the efficient conduct of legal research necessitates a confluence of advanced technological tools, formidable analytical skills, and collaborative endeavors to engender successful outcomes in the practice of law. The deployment of metrics such as perplexity and burstiness, bolstered by sophisticated NLP models, verifies the research system's efficacy and accuracy.

B. Major attributes of GAI for helping legal research

GAI possesses several key attributes that make it highly valuable for legal research and related applications. These attributes include its ability to process natural language text, understand context and meaning, analyze legal documents, extract relevant information, comprehend legal terminology and context, and provide accurate responses by differentiating between legal concepts.[173] Additionally, GAI can process legal documents in multiple languages, making it a valuable tool for cross-border legal research and enabling easier access to legal information for professionals without specialized technical training. In summary, GAI can efficiently assist in legal research by identifying relevant legal information, summarizing legal cases, and generating insights to support legal decision-making.

The use of GAI-based NLP in legal research offers several advantages. Legal research chatbots created through GAI-based NLP models can enhance the assistance provided to legal professionals, as they can be trained on large databases of legal documents to retrieve

[172] Bruce G. Buchanan & Thomas E. Headrick, *Some Speculation About Artificial Intelligence and Legal Reasoning*, 23 STAN. L. REV. 40, 41 (1970).
[173] Surden, *supra* note 97 at 1315-31.

relevant information quickly.[174] These models can recognize and process natural language queries, allowing non-experts to access legal research by asking questions in plain language.[175] Predictive analytics powered by GAI-based NLP can analyze legal documents and predict outcomes based on past cases or trends, aiding legal professionals in making informed decisions and preparing for legal proceedings. Furthermore, GAI-based NLP models can be employed in document analysis to identify pertinent information within legal documents, reducing the time and effort required for manual analysis.

It is important to note that while GAI-based NLP can be a valuable resource, it should not replace professional discretion or legal advice. Legal research chatbots and other applications of GAI-based NLP should serve as aids to support legal professionals rather than substitutes for human expertise.[176] Organizations utilizing GAI-based NLP for legal research must comply with relevant data protection regulations and ensure the secure and confidential handling of sensitive legal information. The research on GAI-based NLP aims to develop AI systems capable of interpreting and generating natural language in the legal domain. This includes understanding legal terminology, contracts, statutes, case law decisions, and other legal documents.

The advantages of using GAI-based NLP in legal research are diverse. One notable advantage is its ability to expedite the discovery of relevant information for legal professionals by efficiently searching extensive databases using natural language queries[177]. Another advantage is the automation of manual tasks, such as document summarization, sentiment analysis, topic modeling, attribute and relation extraction, document relevance scoring, outcome prediction, and question answering, leading to increased efficiency. GAI-based

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[174] Anja Oskamp et al., *AI and Law: What About the Future?*, 3 ARTIFICIAL INTEL. AND L. 209, 209-15 (1995).
[175] Fadel M. Megahed et al., *How Generative AI Models such as ChatGPT can be (Mis)Used in SPC Practice, Education, and Research? An Exploratory Study*, ARXIV 1, 3-4 (Feb. 16, 2023), https://doi.org/10.48550/arXiv.2302.10916.
[176] Edwina L. Rissland, *Artificial Intelligence and Law: Stepping Stones to a Model of Legal Reasoning*, 99 YALE LAW J. 1957, 1957-81, *reprinted in* THE PHILOSOPHIES OF LEGAL REASONING 223, 223-48 (Scott Brewer ed. Routledge 1998).
[177] Dominik K. Kanbach et al., *The GenAI is Out of the Bottle: Generative Artificial Intelligence from a Business Model Innovation Perspective*, REV. OF MANAGERIAL SCI. 1-32 (Sept. 13, 2023), https://link.springer.com/article/10.1007/s11846-023-00696-z.

NLP also reduces operational costs, minimizes human error, and improves workload allocation. Furthermore, GAI-based NLP has the potential to enhance the quality of legal services by providing customized advice and insights through natural language interactions. However, challenges still need to be addressed, including dealing with the complexities and ambiguities of legal language, managing the diversity and variability of legal sources, and addressing the ethical and social implications of using AI in the legal field. Despite these challenges, GAI-based NLP offers substantial promise for innovation and advancement in the legal sector.

C. Evaluation metrics of AI-based Language generating models

GAI-based language models have become an increasingly popular tool for analyzing, generating, and manipulating textual content. However, assessing their efficacy and accuracy requires the application of sophisticated, quantitative linguistic metrics. A combination of quantitative linguistic metrics, such as perplexity, burstiness, efficacy, precision, and reliability, can be used to evaluate the effectiveness and accuracy of an AI-based language model[178]. Consequently, through such comprehensive evaluations, improvements in AI-based text processing and language model generation can be made.

1. Perplexity

One such metric is perplexity, which is used to evaluate the predictive ability of a language model in analyzing a given text.[179] A lower perplexity score indicates a superior capacity for predicting the next word in the sequence and better comprehension of the underlying language. Perplexity also indicates how well a model can differentiate between grammatically correct and incorrect sentences. Perplexity is a metric used to evaluate the ability of a language model to predict the next word in a sequence. It measures how well the model can estimate

[178] Tarik Dogru et al., *Generative artificial intelligence in the hospitality and tourism industry: Developing a framework for future research*, J. OF HOSPITALITY & TOURISM RSCH. (2023), https://doi.org/10.1177/10963480231188663.
[179] Young Yun Na et al., *Is Your Chatbot Perplexing?: Confident Personalized Conversational Agent for Consistent Chit-Chat Dialogue*, 2 PROCEEDINGS OF THE 13TH INTERNATIONAL CONFERENCE ON AGENTS AND ARTIFICIAL INTELLIGENCE 1226, 1229 (2021).

the probability of the next word based on the previous words.[180] A lower perplexity score indicates that the model predicts the next word better and understands the language better. GAI has a very low perplexity score, which means it is very good at predicting the next word in a given sequence. In fact, perplexity tracks the accuracy of the language model in predicting the progression of words in a provided document or sentence.[181] Its score represents the ability of the model to predict the forthcoming word in a sequence, thereby underscoring its capacity to decode the language. In the context of an AI-based language model, lower perplexity scores signal greater competencies in language comprehension.[182]

2. Burstiness

Burstiness is a metric used to evaluate the ability of a language model to generate coherent and diverse responses.[183] This metric gauges the frequency of word usage in a given text or corpus, thereby enabling the identification of the most common and significant words or phrases in a language. By identifying these patterns, burstiness metrics help optimize the AI model for improved language prediction capabilities. It also measures the tendency of the model to generate sequences of words that are either highly repetitive or highly diverse. A higher burstiness score indicates that the model generates more diverse and interesting responses. GAI has a relatively high burstiness score, meaning it can generate a wide range of responses, some novel and interesting, but others may be repetitive or nonsensical. Burstiness characterizes the frequency of specific word usage in a document or corpus. Burstiness metrics attending AI-based language models can flag the most recurrently used words, further used to hone the system's ability to recognize the most salient and frequently occurring words in a given language.[184] Further, observations culled from burstiness metrics can

[180] John Horgan, *From complexity to perplexity*, 272 SCIENTIFIC AMERICAN 104, 104-09 (1995).
[181] Dietrich Klakow & Jochen Peters*, Testing the correlation of word error rate and perplexity*, 38 SPEECH COMMUNICATION 19, 19-20 (2002).
[182] Yun Na, *supra* note 105, at 1229.
[183] Geli Fei et al., *Exploiting burstiness in reviews for review spammer detection*, 1 PROCEEDINGS OF THE INTERNATIONAL AAAI CONFERENCE ON WEB AND SOCIAL MEDIA 175, 176 (2013).
[184] Juliette Stehlé et al*., Dynamical and bursty interactions in social networks*, 81 PHYSICAL REV. E.1, 1-5 (2010).

reveal patterns in the document's language and structure, thereby enabling a comprehensive performance optimization of the AI model.

3. Efficacy, precision, and reliability

The contents produced by GAI may not be fully trustworthy because the use of GAI allows for the creation of digital media such as images, videos, and text through the processing of vast amounts of data.[185] However, the reliability and accuracy of the content produced by GAI may be questioned, given several potential factors. Precision and reliability measures are often used in evaluating AI-based language models.[186] Precision measures the proportion of accurate predictions generated by the language model, while reliability assesses the model's capability to identify the relevant data correctly.[187] Combining precision and reliability measures indicates the model's overall accuracy in recognizing patterns and predicting outcomes.

The outputs obtained from GAI may display bias. This results from the technology relying on a particular dataset for training. If the dataset used for training is biased, the outputs generated by the AI may also be biased, which could cause accusations that the contents produced are inaccurate. It is also important to note that GAI can lead to unintended consequences. This can happen, especially when the system is trained using inaccurate or limited data. As a result, the contents generated may contain errors that render the outputs inappropriate or even unethical, thereby undermining the reliability of the AI system itself. GAI can be challenging to understand, interpret, and verify the reliability of the contents created by GAI, which may have significant implications for users seeking specific outcomes. This presents a particular issue for those tasked with verifying the accuracy of outputs generated by the AI system.

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[185] *See generally* Simone Grassini, *Shaping the Future of Education: Exploring the Potential Consequences of AI and ChatGPT in Educational Settings*, 13.7 EDUCATION SCIENCES 692, 692-714 (2023).
[186] Zheng Zhang et al., *Temporal burstiness and collaborative camouflage aware fraud detection,* 60.2 INFO. PROCESSING & MGMT., March 2023, at 1, 12-14.
[187] *See* Gerta Bardhoshi & Bradley T. Erford, *Processes and procedures for estimating score reliability and precision*, 50 MEAS. & EVAL. IN COUNS. & DEV. 256, 256-63 (2017).

Finally, errors may result from how information is collected, analyzed, and processed during data collection.[188] If human errors occur during this process and are then included in the GAI's programming, there is the potential for the AI to generate inaccurate content, leading to even more doubt in its reliability and trustworthiness. To some extent, it can be concluded that the accuracy and reliability of output generated by GAI are highly dependent on several factors, such as the dataset, the conditions under which it is trained, the quality of the programming, and human errors. The limitations arising from these factors may reduce confidence in the GAI for certain applications.

D. Contributions of GAI-based NLP to legal research

GAI-based NLP has the potential to make significant contributions to the field of legal research, offering a range of valuable capabilities. One of the most important examples is that GAI can provide invaluable assistance to legal researchers in pursuing relevant information. By leveraging its advanced algorithms and language processing capabilities, GAI can effectively aid researchers in identifying pertinent legal precedents, opinions, academic articles, and other relevant sources pertaining to copyright laws.[189] This streamlined approach to information retrieval can save researchers considerable time and effort. Another contribution of GAI is its capacity to generate machine-readable legal research documents tailored to the specific needs of researchers.[190] These documents may include statistics, professional reports, legal cases, contracts, licenses, and agreements. By automating the creation of such documents, GAI enables researchers to access comprehensive and up-to-date information customized to their research objectives.[191]

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[188] *See generally* Stuart Armstrong et al., *The errors, insights and lessons of famous AI predictions – and what they mean for the future*, 26 J. EXPERIMENTAL & THEORETICAL A.I. 1, 317-42 (2014).

[189] Lin Yi-Lun et al., *The new frontier of AI research: Generative adversarial networks*, 44 ACTA AUTOMATICA SINICA 588, 588-605 (2018).

[190] Milda Norkute et al., *Towards explainable AI: Assessing the usefulness and impact of added explainability features in legal document summarization*, EXTENDED ABSTRACTS OF THE 2021 CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS, May 2021 at 1, 1-2.

[191] Mary E. Rasenberger, *Artificial Intelligence and The Future of Literary Works*, *in* THE ROUTLEDGE COMPANION TO COPYRIGHT AND CREATIVITY IN THE 21ST CENTURY 322, 322-23 (Michelle Bogre & Nancy Wolff eds., 2020).

A further capability of GAI lies in its ability to automatically summarize lengthy and intricate legal research documents. This feature proves especially valuable when dealing with complex materials such as survey reports and court opinions. By generating concise summaries, GAI assists researchers in swiftly identifying key points and arguments, facilitating a more efficient and focused approach to their work. Moreover, GAI can play a crucial role in contextualizing legal concepts. This entails providing additional insights and contextual information on legal concepts in the context of prevailing laws. Take, for instance, the concept of "fair use" in copyright law. While it allows for the use of copyrighted material without permission or payment under certain circumstances, its exact definition can be elusive, making it challenging for researchers to determine its application on a case-by-case basis.[192] Here, GAI can assist by offering additional information, such as case law examples that illustrate how "fair use" has been applied in different contexts.[193] Additionally, GAI can guide on applying the concept to specific situations, aiding researchers in determining whether a particular use of copyrighted material qualifies as "fair use" or constitutes copyright infringement.[194] Similar contextualization efforts can benefit other legal concepts related to copyright law, including "derivative works," "infringement," and "licensing." By supplying enhanced context, definitions, and illustrative examples, GAI empowers legal professionals to understand these concepts better, facilitating their accurate application in their work.[195]

In summary, GAI-based NLP offers a range of valuable contributions to legal research. These include assisting in information retrieval, generating tailored research documents, offering automatic summarization of complex materials, and contextualizing legal concepts. By harnessing the power of GAI, legal professionals can enhance the efficiency and efficacy of their research endeavors, ultimately contributing to advancements in the field.

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[192] Stephen McJohn & Ian McJohn, *Fair use and machine learning*, 12 N.E. U. L. REV. 99, 111-20 (2020).
[193] Benjamin L.W. Sobel, *Artificial Intelligence's Fair Use Crisis.,* 41 Colum. J.L. & Arts 45, 54 (2017).
[194] Peter Henderson et al., *Foundation Models and Fair Use*, 1, 26-34 (STANFORD L. & ECON. Olin, Working Paper No. 584, 2023).
[195] *See* Andrew W. Torrance & Bill Tomlinson, *Training Is Everything: Artificial Intelligence, Copyright, and Fair Training*, DICKINSON L. REV. 1, (forthcoming 2024).

V. PRIMARY AND ATTENDANT RISKS (PAR) OF GAI-BASED NLP IN LEGAL RESEARCH

The use of GAI-based NLP in legal research has the potential to usher in a new era of legal scholarship. However, it is not without risks. Overreliance on GAI-based methodologies can, to some extent, undermine the fundamental principles of the justice system. These risks, also known as primary and attendant risks (PAR), refer to the potential primary and extended negative outcomes or hazards that may arise from a specific activity, decision, or circumstance.

A primary risk, or a core or principal risk, is the fundamental and central risk associated with a specific activity, situation, or event.[196] Initially used in the study of insurance, attendant risks, alternatively labeled as affiliated risks or concomitant risks, arise as a consequence of insuring a primary risk.[197] It manifests in intimate interrelation with the principal risk, materializing due to the intrinsic essence of the undertaken endeavor.[198] Attendant risks are context-dependent and can span different domains of human endeavors, such as business operations, medical procedures, or personal conduct.[199] They can stem from various factors, including the nature of the insured event, implications of third-parties, the terms and conditions of the insurance policy, and external factors that influence the occurrence of the primary risk.

Machine-based data processing enables the synthesis and analysis of complex data sets but simultaneously introduces ethical and epistemological challenges.[200] Recent advancements in AI technology have further compounded PAR, as sophisticated algorithms can now generate synthetic content that closely resembles human-produced material, blurring the line between authenticity and fabrication. In the context of AI tools, PAR can include economic, legal, environmental,

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[196] *See* Larry Hirschhorn, *The Primary Risk*, 52 HUMAN RELATIONS 5 (1999).
[197] *See* Josh A. Goldstein et al., *Generative Language Models and Automated Influence Operations: Emerging Threats and Potential Mitigations*, ARXIV (Jan. 10, 2023), https://arxiv.org/pdf/2301.04246.pdf.
[198] Xiaoge Zhang, et al., *Towards Risk-aware Artificial Intelligence and Machine Learning Systems: An Overview*, 159 DECISION SUPPORT SYSTEMS 1 (2022).
[199] Aaron Mannes, *Governance, Risk, and Artificial intelligence*, 41 A.I. MAGAZINE 61–69 (2020).
[200] *See generally* Santiago Marco and Agustín Gutierrez-Galvez, *Signal and Data Processing for Machine Olfaction and Chemical Sensing: A Review*, 12 INST. OF ELECTRIC AND ELECTRONICS ENGINEERS 3189, 3189–214 (2012).

and social risks. Economic risks may result from financial transactions, leading to losses or bankruptcy. Legal risks may arise from non-compliance with laws and regulations, resulting in penalties or legal action. Environmental risks stem from activities that harm the environment, leading to degradation or climate change. Social risks involve actions that damage interpersonal relationships and moral standing, such as a loss of trust or a damaged reputation. Identifying and assessing these attendant risks is crucial to minimize their potential negative consequences.[201] This process may involve conducting risk assessments, implementing risk management strategies, and taking preventative measures to reduce probable negative outcomes.

Regarding GAI-based NLP's content generation capability, PAR in academic research include concerns about synthesized content's authenticity and originality, plagiarism due to reliance on pre-existing information, and the dissemination of fabricated or harmful content.[202] These risks can undermine the credibility and legitimacy of academic research and impede scientific progress. Additionally, GAI technology poses risks related to intellectual property rights, academic integrity, and the propagation of disinformation. Sequence modeling algorithms' limitations, which rely on prior knowledge to create new content, can undermine originality and infringe on intellectual property rights. The inability to differentiate between machine-generated and human-produced content can spread disinformation, affecting the validity and reliability of academic research.[203] Therefore, engaging in careful consideration and international dialogue is crucial to establishing a comprehensive regulatory framework that addresses these risks while maximizing the potential benefits of GAI technology in academic research. This necessitates collaboration among researchers, policymakers, and stakeholders from various fields to create ethical and legal regulations that ensure the responsible use of GAI technology and uphold academic integrity.

Using GAI-based NLP in legal research entails a critical risk of algorithms reproducing and amplifying existing biases found in legal

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[201] Andrei Kucharavy et al., *Fundamentals of Generative Large Language Models and Perspectives in Cyber-Defense*, ARXIV (Mar. 21, 2023), https://arxiv.org/pdf/2303.12132.pdf.
[202] Mannes, *supra* note 125.
[203] Jamie J. Baker, *2018 A Legal Research Odyssey: Artificial Intelligence as Disruptor*, 110 LAW LIB. J. 5, 5-23 (2018).

texts. NLP algorithms trained on legal materials may struggle to differentiate between opinion and facts, perpetuating structural inequalities.[204] Furthermore, the dehumanizing aspect of GAI systems presents a risk in the legal field. Legal texts often contain nuanced meanings, colloquial phrases, and symbolic references without apparent logical consistency, posing challenges for GAI-based methodologies that may struggle to comprehend such complexities.[205] Consequently, GAI-driven legal research may overlook crucial pattern recognition that only humans can interpret.[206] The reliance on GAI-based NLP also raises ethical concerns regarding system accountability. Who should be responsible for errors when these newly-established technological solutions fail within the established legal system? Additionally, transparency concerns arise regarding the black-box nature of these systems' current operations.

GAI that produces erroneous or unreliable information may compromise the quality of the legal researcher's work, cause reputational damage, and potentially lead to malpractice lawsuits.[207] Legal scholars who depend on GAI outputs without proper scrutiny and fact-checking may end up disseminating flawed or unsound statements, resulting in far-reaching legal ramifications. The proliferation of GAI has ushered in potential hazards that warrant the amendment of extant copyright laws in the U.S. to address the escalating complexity of the matter. One of the salient dangers that AI technology poses is the rise of copyright infringement, which emerges when a product created by an AI is suspected of being an unauthorized copy of another work.[208] Moreover, legal research demands a profound knowledge of legal principles, jargon, and historical contexts that the GAI may not adequately understand. The language models employed in AI systems may not possess the ability to discern the subtleties of legal language, which is often convoluted and intricate for non-specialists to grasp.

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[204] *See* Corinne Cath, *Governing Artificial Intelligence: Ethical, Legal and Technical Opportunities and Challenges*, 376 PHIL. TRANSACTIONS OF THE ROYAL SOC'Y A: MATHEMATICAL, PHYSICAL AND ENG'G SCIENCES 1 (2018).
[205] Livio Robaldo et al., *Introduction for Artificial Intelligence and Law: Special Issue "Natural Language Processing for Legal Texts"*, 27 A.I. AND L. 113, 113–15, (2019).
[206] *Id.*
[207] Xinyue Shen, et al., *In ChatGPT We Trust? Measuring and Characterizing the Reliability of ChatGPT*, ARXIV, Oct. 5, 2023, https://arxiv.org/pdf/2304.08979.pdf.
[208] Jessica L. Gillotte, *Copyright Infringement in AI-Generated Artworks*, 53 UC DAVIS L. REV. 2655, 2669 (2019).

Furthermore, AI systems for generating legal content are prone to innate biases and inaccuracies. AI algorithms can be trained on datasets that are skewed or incomplete, resulting in the production of biased outputs.[209]

Policymakers and legal stakeholders must proceed cautiously, acknowledging the limitations of GAI-driven solutions and investing in new systems that mitigate these risks while promoting human understanding and nuance.[210] The system's generated responses may lack accuracy, leading to the provision of incorrect information. This issue can arise when the model is trained on incomplete or biased data, reflecting these shortcomings in its composition. These limitations must be carefully considered when using GAI-based NLP in legal research, and alternative approaches should be explored to ensure the information's accuracy, reliability, and objectivity.

A. PAR in the legal research methodology

AI-based language models face several challenges when applied to the legal domain, which hinders their accuracy and reliability in supporting legal research. One fundamental issue is their dependence on training data that may not adequately capture the intricacies of legal language.[211] Legal discourse is characterized by specialized terminology and phrasing that deviate from everyday language, resulting in potential errors and inaccuracies when AI models lack proper training on legal texts or fine-tuning for legal language.[212] Complicating matters further, legal language is highly context-dependent, with words and phrases carrying distinct connotations within specific legal contexts. For example, the term "consideration" assumes a particular legal meaning in contract law that diverges from its colloquial usage.[213] Consequently, AI-based language models may struggle to identify and interpret the legal context in which terms and concepts are employed, leading to reduced precision in their output.

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[209] Drew Roselli, Jeanna Matthews & Nisha Talagala, *Managing Bias in AI*, *in* COMPANION PROC. OF THE 2019 WORLD WIDE WEB CONF., https://dl.acm.org/doi/10.1145/3308560.3317590.
[210] David Krause, *Mitigating Risks for Financial Firms Using Generative AI Tools*, SSRN (May 18, 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4452600.
[211] Kalyan Veeramachaneni, et al., *AI^2: Training a Big Data Machine to Defend*, IEEE, 2016, https://feihu.eng.ua.edu/NSF_BD_lec10.pdf.
[212] Krause, *supra* note 136.
[213] Melvin Aron Eisenberg, *Principles of Consideration*, 67 CORNELL L. REV. 640, 641 (1982).

Even when AI models comprehend legal concepts accurately, they may fall short in providing the depth of sophisticated analysis required by legal researchers.[214] Legal research demands intricate legal analysis that involves the application of concepts to specific factual scenarios, necessitating a nuanced understanding of the legal context and the ability to assess the relevance and significance of diverse legal authorities. Furthermore, using AI-based language models in legal research raises ethical and legal concerns. Considerations such as data protection, privacy, accuracy, and transparency of AI-generated content must be carefully addressed to ensure adherence to ethical and legal principles.[215] Legal researchers must exercise caution, deploying AI-based language models judiciously and responsibly in accordance with ethical and legal standards.

In addition to the methodological challenges, several research-related concerns can limit the effectiveness of AI-based language models in supporting legal academic research. First, AI-based language models often operate as "black boxes," making it challenging to understand their decision-making processes. This lack of transparency impedes replicating and verifying AI-assisted legal research outcomes. Second, assessing the performance of AI-based language models for legal research can be complex. Determining the relevance, accuracy, and utility of the recommendations provided by the AI system is challenging. Moreover, differing opinions on what constitutes a "good" recommendation in legal research make it difficult to objectively evaluate the performance of AI systems. Third, AI-based language models are designed to assist with specific tasks such as document analysis, legal research, or contract analysis. However, their scope may be constrained, and they may be unable to support more intricate legal tasks that necessitate human judgment and reasoning. Fourth, AI-based language models cannot replace human legal researchers entirely. Human oversight is indispensable to ensure the accuracy and reliability of the recommendations generated by AI systems.[216] Finally, AI-based language models are trained on specific datasets and may not generalize

[214] Katie Atkinson, et al., *Explanation in AI and Law: Past, Present and Future*, 289 A.I. 1, 15 (2020).
[215] John Charles, *AI and Law Enf't*, 13 IEEE INTELLIGENT SYS. 77, 79 (1998).
[216] Sakiko Fukuda-Parr & Elizabeth Gibbons, *Emerging Consensus on 'Ethical AI': Human Rights Critique of Stakeholder Guidelines*, 12 GLOB. POL'Y, LONDON SCH. OF ECON. AND POL. SCI. 32, 44 (2021).

well to new datasets or legal contexts. This limitation restricts the application of AI-assisted legal research to specific legal cases or jurisdictions.

It should be noted that while AI-based language models possess the potential to enhance legal academic research, research-related issues such as transparency, evaluation, scope, human oversight, and generalizability must be carefully addressed to ensure their effectiveness and reliability in the legal domain.

B. PAR of plagiarism

GAI-based NLP can generate new and unique content automatically without human involvement. This innovation has significant implications for the prevalence of plagiarism in academic research, particularly concerning online academic publications and research articles. With the widespread availability and use of GAI, the potential for the unethical use of such technology to plagiarize academic work is growing considerably.[217]

Firstly, GAI-based NLP can produce written content that mimics academic researchers' writing style and tone, which could potentially be a risk factor in fostering plagiarism.[218] This could occur when academic researchers intentionally or unintentionally incorporate previously generated content into their own work without proper attribution or citation.[219] This risks their final output being papered with near-carbon copy information, reflecting a knowledge base not uniquely derived from their own academic experiences and hard work.

Secondly, the easy and instantaneous access to information that GAI provides makes it more efficient to accumulate data and process it unnaturally without the customary critical ordering of information that distinguishes original research from a pure compilation of data. With this, researchers may be tempted to rely heavily on GAI-generated content to prepare academic works, resulting in less critical thinking and

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[217] Nassim Dehouche, *Plagiarism in the Age of Massive Generative Pre-Trained Transformers (GPT-3)*, 21 ETHICS IN SCI. AND ENV'T POL. 17, 18 (2021).
[218] Michael R. King and ChatGPT, *A Conversation on Artificial Intelligence, Chatbots, and Plagiarism in Higher Education*, 16 CELLULAR AND MOLECULAR BIOENGINEERING 1, 2 (2023).
[219] Amnuay Kleebayoon & Viroj Wiwanitkit, *Artificial Intelligence, Chatbots, Plagiarism and Basic Honesty: Comment*, 16 CELLULAR AND MOLECULAR BIOENGINEERING 173, 174 (2023).

a tendency to miss out on interpreting raw data within their field's specialized knowledge and expertise.[220] This can result in a proliferation of plagiarized works lacking original thought and submission for grading without genuine confidence in the quality of the material presented.

Thirdly, the AI models may produce text resembling pre-existing legal texts, such as academic articles or court cases. Such generated text could violate plagiarism standards without appropriate attribution to the original source.[221] By converging the content of legal texts, such as court cases or academic articles, AI models may generate summaries that closely mirror the original text.[222] If such summaries are not correctly attributed to their source, this can constitute plagiarism. In addition, the algorithmic nature of AI models renders them susceptible to incorrectly citing or referencing legal texts. These errors could result in an incomplete or incorrect source attribution, which could be considered plagiarism.

Lastly, the risk of plagiarism posed by GAI can also be exacerbated by the ease of access to digital information and the rising dependence on online resources in academic research.[223] With AI-generated content already approved and available, academic researchers and students can be easily swayed by its apparent quality and brevity and risk failing to conduct proper research for their work. This creates an environment prone to unethical behavior and a general reluctance to take the hard-earned academic paths of conducting comprehensive research projects to generate unique insights and contributions to an academic field.

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[220] Ronald Yu & Gabriele Spina Alì, *What's Inside the Black Box? AI Challenges for Lawyers and Researchers*, 19 LEGAL INFO. MGMT. 2, 13 (2019).
[221] Soleh Hasan Wahid & Anjar Kususiyanah. *The Relevance of the Usage of Artificial Intelligence and Machine Learning in Legal Analysis (An Analysis of Legal Provisions in the National Sharia Council Fatwa and Financial Services Authority Regulation Using Plagiarism Checker and ATLAS.ti)*, 584 ADVANCES IN SOCIAL SCIENCE, EDUCATION AND HUMANITIES RESEARCH 927 (2020).
[222] *Id.*
[223] Dehouche, *supra* note 143.

C. PAR of a lack of legal reasoning in AI technology

Legal language is highly technical and intricate, encompassing specialized terms and phrasing unique to the legal domain.[224] Insufficient or inadequate training data may lead to inaccuracies and errors in AI-based language model outputs. Consequently, legal scholars may encounter obstacles when using AI-based language models in their research, especially when seeking precise interpretations of legal concepts.[225] Additionally, legal language is inherently context-dependent, with the meaning of words and phrases varying depending on the specific legal context in which they are used. This presents a notable legal challenge for AI-based language models, as they may not be designed to discern the subtleties and intricacies of legal language. As a result, AI-based language models may generate flawed interpretations of legal concepts, potentially leading to legal complications in academic research. Furthermore, legal academic research often necessitates intricate legal reasoning, including applying legal concepts to specific factual scenarios.[226] However, AI-based language models may not be capable of offering the nuanced and sophisticated analysis required for such research. This is due to the necessity for a more advanced understanding of the legal context, coupled with the ability to evaluate the relevance and weight of varied legal authorities. Consequently, legal scholars may experience legal dilemmas when employing AI-based language models in their research, particularly when attempting to furnish detailed legal analyses.

D. PAR of AI technology

The potential of AI-based language models to assist in legal academic research is hindered by several technical challenges. The inadequacy of domain-specific knowledge poses a significant obstacle both directly and indirectly. Legal academic research requires a deep understanding of legal concepts, precedents, and specialized terminology. However, AI-based language models often lack domain-specific knowledge to accurately comprehend legal language and provide relevant recommendations. Efforts are underway to develop

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[224] Philipp Hacker, Andreas Engel & Marco Mauer, *Regulating ChatGPT and Other Large Generative AI Models*, ARXIV (May 12, 2023), *https://arxiv.org/pdf/2302.02337.pdf*.

[225] Andrew Katz, Umair Shakir & Ben Chambers, *The Utility of Large Language Models and Generative AI for Education Research*, ARXIV (May 29, 2023), https://arxiv.org/pdf/2305.18125.

[226] Qichao Wang et al., *Attention Paper: How Generative AI Reshapes Digital Shadow Industry?*, ARXIV (May 26, 2023), https://arxiv.org/pdf/2305.18346.

machine learning models that can effectively understand and reason about legal concepts.[227]

Moreover, the limited availability of high-quality training data hampers the training process. Legal language is highly specialized, making obtaining sufficient quality training data difficult. This scarcity of training data can lead to poor model performance and inaccurate recommendations. Moreover, the issue of bias in training data is a crucial concern. AI systems are prone to inheriting biases from the data used to train them. In legal research, where language and concepts are influenced by social, cultural, and historical factors, biased recommendations can result in erroneous decisions and legal conclusions.

Additionally, a lack of interpretability of AI models poses challenges in legal research.[228] The complex algorithms employed by AI models make it difficult to understand the reasoning behind their recommendations. In legal settings, it is essential to comprehend how the AI system arrived at its suggestions to assess their reliability and accuracy. Without interpretability, evaluating the suggested solutions becomes challenging. Lastly, legal and ethical considerations further complicate the use of AI systems in legal academic research.[229] Legal research involves handling sensitive and confidential information that requires careful management. AI systems may lack a comprehensive understanding of such information's legal and ethical aspects, potentially leading to legal and ethical complications. These technical challenges must be addressed to ensure their efficacy and dependability.

E. Social PAR in biased data input

AI-based language models may exacerbate pre-existing social inequalities by perpetuating biases in the training data.[230] Legal language is intricate, encompassing specific phraseology and terminology unique to the legal profession. However, inadequate or

[227] ETHEM ALPAYDIN, MACHINE LEARNING: THE NEW AI (2016).
[228] Mohammad Ennab & Hamid Mcheick. *Designing an Interpretability-Based Model to Explain the Artificial Intelligence Algorithms in Healthcare*, 12 DIAGNOSTICS, 1557 (2022).
[229] Sunnie S.Y. Kim, et al., *HIVE: Evaluating the Human Interpretability of Visual Explanations*, *13672 LNCS 280,* (2022).
[230] Bo Cowgill, et al., *Biased Programmers? Or Biased Data? A Field Experiment in Operationalizing AI Ethics*, (Proceedings of the 21st ACM Conference on Economics and Computation, 2020), https://arxiv.org/pdf/2012.02394.pdf.

inappropriate training data may result in inaccuracies and errors in the outputs generated by AI-based language models.[231] Consequently, legal scholars may encounter obstacles when using AI-based language models in their research, especially when addressing social justice issues.

Moreover, AI-based language models may lack transparency, impeding legal scholars' capacity to evaluate the accuracy and reliability of their outputs.[232] This absence of transparency may create social difficulties by undermining legal academic research's integrity. Furthermore, the opacity of AI-based language models may lead to difficulties in evaluating whether these models may be perpetuating biases or generating accurate outputs. Furthermore, using AI-based language models in legal academic research raises several ethical considerations, especially data privacy and security concerns.[233] Legal scholars must employ AI-based language models responsibly and ethically, considering various direct and indirect potential social consequences.

F. PAR of copyright infringement of derivative work

In the GAI-based NLP, derivative works refer to new creations based on pre-existing works protected by copyright.[234] These original works can take various forms, such as books, paintings, photographs, movies, or musical compositions, all of which have been fixed in a tangible form. Derivative works are formed when individuals introduce original creative elements or transform existing works into new forms.[235] Examples include translations, adaptations, abridgments, compilations, and other works that build upon pre-existing materials. Permission from the copyright owner is typically required to create a

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[231] Jungang Xu, Hui Li & Shilong Zhou, *An Overview of Deep Generative Models*, 32 IETE TECH. REV. 131 (2015).
[232] Chelsea Finn et al., *A Connection Between Generative Adversarial Networks, Inverse Reinforcement Learning, and Energy-Based Models*, ARXIV (Nov. 25, 2016), *https://arxiv.org/pdf/1611.03852.pdf.*
[233] Lars-Erik Casper Ferm, Sara Quach & Park Thaichon, *Data Privacy and Artificial Intelligence (AI): How AI Collects Data and Its Impact on Data Privacy*, A.I. FOR MKTG. MGMT. 163, 163–74 (Park Thiachon and Sara Quach ed., 2022).
[234] Daniel J. Gervais, *AI Derivatives: The Application to the Derivative Work Right to Literary and Artistic Productions of AI Machines*, 52 SETON HALL L. REV. 1111, 1111–16 (2021).
[235] Francis M. Nevins Jr., *The Doctrine of Copyright Ambush: Limitations on the Free Use of Public Domain Derivative Works*, 25 ST. LOUIS U.L.J. 58, 58–72 (1981).

derivative work lawfully. This permission is typically granted through a license or agreement that outlines specific rights for using the original work in a particular manner. Creating a derivative work without permission from the copyright owner can constitute copyright infringement.[236] The copyright owner holds the exclusive right to create or authorize the creation of derivative works based on their original work. Any unauthorized derivative work may infringe upon the copyright owner's exclusive right to control the use of their work. Derivative works may also be eligible for copyright protection, but only to the extent that they involve original creative expression. While the underlying copyright in the original work remains with the original copyright owner, the creator of the derivative work may have copyright protection for their own added original creative expression.

When GAI generates derivative works, copyright infringement is possible if they are created without permission or authorization from the copyright owner. GAI utilizes pre-existing text and information to generate new content, and if the original content is protected by copyright, the derivative work produced by GAI could infringe upon that copyright. For instance, if GAI uses a copyrighted story or article to generate new content, the resulting derivative work could infringe upon the original copyright. Similarly, if GAI generates content that incorporates copyrighted images, music, or other creative works without permission from the copyright owner, the derivative work may be considered an infringement.[237]

It is essential to note that copyright law necessitates permission from the original copyright holder before creating any derivative work that substantially draws from the original or impacts the potential market for the original work. Merely acknowledging the source or providing attribution is insufficient to avoid damages associated with copyright infringement. To prevent copyright infringement, GAI should solely utilize materials in the public domain or possess proper licenses, such as a Creative Commons license, for usage. Additionally, seeking permission from copyright holders and obtaining appropriate licenses before incorporating copyrighted content into GAI's algorithms can help mitigate potential legal issues related to copyright infringement.

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[236] *See* George Hurlburt, *What If Ethics Got in the Way of Generative AI?*, 25.2 IT PROFESSIONAL 4, 4–6 (2023).
[237] *See* Tijn Van Der Zant et al. PHILOSOPHY AND THEORY OF ARTIFICIAL INTELLIGENCE 107, 107-20 (Vincent C. Müller ed., 2013).

Derivative works involve artistic expressions that derive inspiration from pre-existing works through translations, adaptations, or remixes.[238] These creations incorporate elements from their sources while transforming. On the other hand, generative works are entirely original expressions generated by artists themselves, whether through paintings, sculptures, or musical compositions.[239]

The fundamental distinction between derivative and generative works lies in the level of originality present in their creations. While derivative works may incorporate novel features, they are inherently rooted in established works, whereas generative works exemplify pure expressions of the artist's imagination and creativity.[240] Furthermore, legal implications differ between the two categories. Obtaining authorization or consent from the copyright owner is often required for utilizing derivative works. In contrast, generative works are not bound by such requirements as they are not tied to any pre-existing material.

G. PAR of misinformation in politics

GAI-based NLP is anticipated to impact the forthcoming U.S. election in 2024 profoundly. As a highly advanced AI language model, GAI can generate human-like text, which provides it with significant potential to influence the election.[241]

First and foremost, GAI's ability to generate convincing and comprehensive political content may contribute to spreading misinformation on social media platforms.[242] This can occur in fabricated or exaggerated news stories, which could influence public

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[238] *See* Jason M. Lodge et al., *Mapping Out a Research Agenda for Generative Artificial Intelligence in Tertiary Education*, 39.1 AUSTRALASIAN J. OF EDUC. TECH. 1, 1–8 (2023).
[239] *See* Eva Cetinic & James She, *Understanding and Creating Art with AI: Review and Outlook*, 18.2 ACM TRANSACTIONS ON MULTIMEDIA COMPUTING, COMMC'N AND APPLICATIONS 1, 1–22 (2022).
[240] *See* Nanna Inie et al., *Designing Participatory AI: Creative Professionals' Worries and Expectations about Generative AI*, EXTENDED ABSTRACTS OF THE 2023 CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 1, 1-8 (2023).
[241] *See* Christopher Thissen, *AI and the US election*, 30.10 INTERSEC: THE J. OF INT'L. SEC. 8, 8–10 (2020).
[242] *See* João Paulo Meneses, *Deepfakes and the 2020 US Elections: What (Did Not) Happen*, ARXIV PREPRINT ARXIV:2101.09092 (2021).

opinion on candidates, policies, and election-related issues.[243] Such misinformation can lead to a polarization of the electorate, as well as a proliferation of fake news in the public domain. In addition, GAI can be utilized to develop targeted political advertisements.[244] catering to specific voter segments with various messages. These advertisements may be highly persuasive due to their customized nature, resulting in potentially significant campaign advantages. By tapping into the vast data resources available, GAI can create personalized advertisements tailored to individual users based on their online histories and interests.

Overall, the influence of GAI on the US election cannot be understated. The development of sophisticated political content, coupled with the tailored advertising opportunities the model offers, presents an immense potential to sway public opinion and enhance the electoral prospects of candidates.[245] As such, regulatory bodies and social media platforms must be attuned to GAI's influence and take proactive measures to regulate its impact on the political sphere.[246]

In summary, using AI-based generative language models for legal academic research can present many copyright problems, including but not limited to infringement, reproduction of copyrighted materials, derivative works, and fair use.[247] It is imperative for researchers to seek permission from copyright holders or to establish that their use of copyrighted materials complies with the regulations on fair use. Additionally, organizations and institutions should implement

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[243] Md Safiullah & Neha Parveen, *Big Data, Artificial Intelligence and Machine Learning: A Paradigm Shift in Election Campaigns*, *in* THE NEW ADVANCED SOCIETY: ARTIFICIAL INTELLIGENCE AND INDUSTRIAL INTERNET OF THINGS PARADIGM 247, 247–61 (Sandeep Kumar Panda, Ramesh Kumar Mohapatra, Subhrakanta Panda, S. Balamurugan eds. 2022).

[244] Sarah R. Kreps, et al.*, All the News That's Fit to Fabricate: AI-Generated Text as a Tool of Media Misinformation*, 9 J. OF EXP. POL. SCI. 104, 104–117 (2022).

[245] *See* Karl Manheim & Lyric Kaplan, *Artificial Intelligence: Risks to Privacy and Democracy*, 21 YALE J.L. & TECH. 106, 106–88 (2019).

[246] Patrick A. Assibong, et al., *The Politics of Artificial Intelligence Behaviour and Human Rights Violation Issues in the 2016 US Presidential Elections: An Appraisal*, *in* 2 DATA MANAGEMENT, ANALYTICS AND INNOVATION: Proceedings of ICDMAI 2019 1, 5-10 (2020).

[247] *See* Shaina Raza, *Automatic Fake News Detection in Political Platforms- A Transformer-Based Approach*, PROC.OF THE 4TH WORKSHOP ON CHALLENGES AND APPLICATIONS OF AUTO. EXTRACTION OF SOCIO-POL. EVENTS FROM TEXT (CASE 2021*)* 68-78 (2021), https://aclanthology.org/2021.case-1.10/.

policies to address copyright matters related to using AI systems in legal research.

VI. RECOMMENDATIONS FOR IMPROVING GAI-BASED NLP

GAI represents a rapidly evolving technology that poses serious legal challenges to copyright laws in the U.S. and globally. With increasing development in this field, copyright laws must be adapted to ensure protection for all works generated by such technological advancements while also ensuring that existing copyrighted material is respected and protected.

Accordingly, proactive measures are requisite to avert these threats from coming to fruition. This necessitates the establishment of ethical and legal guidelines that foster genuine and authentic content while adhering to intellectual property rights. Moreover, those who utilize GAI technology in academic research must accept responsibility for certifying the originality of the synthesized content. Such responsibility includes incorporating best practices for identifying and forestalling plagiarism, which may entail adopting algorithms that recognize similarities with pre-existing academic literature.

Furthermore, the amalgamation of GAI technology in academic research must align with broader moral considerations. This engrosses ensuring that the produced synthetic content does not cause damage to society, such as by perpetuating fake news or espousing dangerous or discriminating concepts.[248] Additionally, it is critical to ensure that emerging GAI technologies are developed transparently, allowing for scrutinization and evaluation adhering to moral standards.

A. What the European Union has done

The emergence of OpenAI's AI-powered ChatGPT prompted the European Commission to draft the Artificial Intelligence Act (AI Act) to regulate the advancing field of AI.[249] With substantial investment and growing popularity, this technology warranted regulatory measures. The

[248] *See* Andrea Renda, *Artificial Intelligence. Ethics, Governance and Policy Challenges*, CEPS CTR. FOR EUROPEAN POL'Y STUD. 1, 32, 65 (2019).
[249] Natali Helberger & Nicholas Diakopoulos, *ChatGPT and the AI Act*, INTERNET POL'Y REV (Feb. 16, 2023), https://policyreview.info/essay/chatgpt-and-ai-act?trk=public_post_comment-text.

draft AI Act has progressed to the trilogue stage, where EU lawmakers and member states will deliberate and finalize the bill's details.[250]

The EU's proposed AI Act represents a significant step as the first comprehensive regulation of AI by a major regulatory body worldwide. The legislation introduces a classification system for AI tools based on their perceived risk levels, ranging from minimal to limited, high, and unacceptable risks. Areas of concern include biometric surveillance, the dissemination of misinformation, and the use of discriminatory language.[251] The draft legislation categorizes AI applications into three risk groups, with the first group encompassing applications and systems that pose an unacceptable risk and will be prohibited under the law. The second group pertains to high-risk applications subject to specific legal requirements, such as CV-scanning tools for ranking job applicants. Finally, applications not falling under the high-risk or prohibited categories lack explicit regulations, allowing for more interpretive flexibility.[252]

While high-risk tools will not be banned, stringent transparency requirements will be imposed on their operators. AI applications profoundly impact daily life, including predicting engaging online content, collecting and interpreting facial data for targeted advertisements, enforcing laws, and assisting in medical diagnoses and treatments. Consequently, the influence of AI applications extends across numerous scenarios. Furthermore, the proposal mandates that companies utilizing GAI tools like GAI-based NLP disclose any copyrighted material employed in developing their systems. This early agreement within the EU sets the stage for potentially groundbreaking legislation that comprehensively governs this technology.

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[250] *See E.g.*, Mauritz Kop, *EU Artificial Intelligence Act: The European Approach to AI,* 2 STANFORD-VIENNA TRANSATLANTIC TECH. L. F., TRANSATLANTIC ANTITRUST AND IPR DEV., STANFORD UNIV. 1, 10 (2021), https://law.stanford.edu/publications/eu-artificial-intelligence-act-the-european-approach-to-ai/.

[251] Tambiama André Madiega, *Artificial Intelligence Act*, EUROPEAN PARLIAMENT: EUROPEAN PARLIAMENTARY RSCH SERV. 1, 2-10 (2021), https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf.

[252] Martin Ebers, et al., *The European Commission's Proposal for an Artificial Intelligence Act—A Critical Assessment by Members of the Robotics and AI Law Society (RAILS),* 4.4 MULTIDISCIPLINARY SCI. J. 589-603 (2021).

Initiated in 2020 by the European Commission in response to the surge of investment and popularity following OpenAI's AI-powered chatbot, ChatGPT, the AI Act is currently in the trilogue stage, where EU lawmakers and member states will finalize the bill's details. Similar to the far-reaching impact of the EU's General Data Protection Regulation (GDPR) enacted in 2018, the EU AI Act has the potential to become a global standard for assessing AI's overall positive or negative impact.[253] The EU AI regulation has already exerted international influence, as demonstrated by Brazil's adoption of legislation based on the EU's framework. Nonetheless, the bill awaits approval in Brazil's Senate. However, the proposed EU AI Act has limitations that hinder its ability to promote AI's positive aspects, necessitating legislation improvements.[254] For instance, the ban on law enforcement agencies' use of facial recognition technology is limited to specific circumstances, such as delayed image capture or use in missing child searches. The legislation requires greater flexibility to identify potentially risky AI applications previously unforeseen as "high-risk" after two years.[255]

In line with the initial EU agreement, companies utilizing GAI tools, including ChatGPT, must disclose any copyrighted materials incorporated in their systems. This agreement can establish the world's first comprehensive set of laws governing this technology. The proposed legislation categorizes AI tools based on perceived risk levels, encompassing minimal, limited, high, and unacceptable risks. Areas of concern include biometric surveillance, the dissemination of misinformation, and the use of discriminatory language. While high-risk technologies will not be prohibited, their operators will be required to maintain high transparency in their operations.

B. The use of GAI for legal researchers

Legal researchers are advised to adopt a systematic approach when harnessing GAI-based NLP models. As a preliminary step, it is paramount to meticulously define a well-articulated and specific research question. This prerequisite ensures the pertinence and precision

[253] Kop, *supra* note 176, at 5, 10.
[254] Rostam J. Neuwirth, *Prohibited Artificial Intelligence Practices in the Proposed EU Artificial Intelligence Act (AIA)*, 48 COMPUT. L. & SEC. REV. 1-14 (2023).
[255] Jerome De Cooman, *Humpty Dumpty and High-Risk AI Systems: The Ratione Materiae Dimension of the Proposal for an EU Artificial Intelligence Act,* 6 MKT. & COMPETITION L. REV. 49-62 (2022).

of the generated findings.[256] Moreover, due regard must be given to various factors, including the research's ambit and the relevant legal jurisdictions, to ensure comprehensive and accurate outcomes.

Of equal significance is the astute selection of an appropriate GAI-based NLP model. Given the divergent proficiencies and limitations exhibited by distinct GAI language models, judiciously opting for a model that is aptly attuned to the research question and meticulously trained on pertinent legal information becomes imperative.[257] Training the GAI-based NLP model using germane legal data, encompassing case law, statutes, regulations, and other salient legal documents, significantly augments the levels of precision and relevance. Referring to the generation of outcomes by the GAI-based NLP model, legal researchers must prudently appraise these findings. This may entail corroborating the results with alternative sources of information or consulting legal experts when warranted. Meticulous scrutiny of the accuracy and relevance of the generated outcomes is pivotal to ensuring the integrity and dependability of the ensuing research findings.[258]

Several salient factors necessitate consideration to optimize the efficiency and efficacy of legal research employing GAI-based NLP. Given the dynamic nature of GAI-based NLP models, vigilant and continual monitoring is indispensable to maintain the requisite levels of accuracy and relevance. Hence, legal researchers must diligently assess the performance of these models and make requisite adjustments to sustain their accuracy and pertinence. However, it is imperative to underscore that while GAI-based NLP models undeniably furnish valuable assistance to legal researchers, they should not be viewed as a panacea for replacing human expertise.[259] Legal researchers must exercise their acumen and discernment to evaluate the outputs furnished by GAI-based NLP models and render informed decisions predicated on

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[256] Yihan Cao, et al., *A Comprehensive Survey of AI-Generated Content (AIGC): A History of Generative AI from GAN to Chatgpt.*, 37 J. ACM. NO. 4, Article 111,111:1-111:44 (2018).
[257] Hui Liu, Qingyu Yin & William Yang Wang, *Towards Explainable NLP: A Generative Explanation Framework for Text Classification,* ARXIV PREPRINT ARXIV:1811.00196 (2018).
[258] Philipp Hacker, et al., *Regulating ChatGPT and other Large Generative AI Models*, 3 (FAccT '23, Working Paper, Verrsion May 12, 2023), ARXIV:2302.02337.
[259] Francesca Larosa et al., *Halting generative AI advancements may slow down progress in climate research*, NATURE CLIMATE CHANGE 497, 497 (2023).

the presented data. Legal researchers can proficiently harness GAI technology by embracing a systematic framework, diligently monitoring performance, and adroitly amalgamating human expertise with the outputs proffered by GAI-based NLP models.

VII. Improving the GAI's architecture to identify copyright material and plagiarism

Enhancing the architecture of GAI to identify copyright material and prevent plagiarism effectively requires implementing various measures. These measures can optimize GAI performance and minimize unauthorized copyright infringement and plagiarism. The following strategies can be employed.

Firstly, it is crucial to ensure that GAI is trained using properly attributed data. Since GAI heavily relies on a substantial corpus of text, it is essential to accurately source and attribute the texts.[260] Utilizing public domain data or appropriately licensed data can help prevent copyright infringement. Secondly, content filtering protocols should be established to identify and flag potentially plagiarized or infringing content. This can be achieved by employing sophisticated content filtering mechanisms that effectively scrutinize generated content. A combination of automated learning algorithms and manual review can enhance the accuracy of the filtering process. Thirdly, transparent usage guidelines should be developed to promote the ethical use of GAI, specifically addressing issues related to copyright and plagiarism. These guidelines should clearly define acceptable operating parameters for GAI and guide proper citation and ethical codes of conduct adherence.[261] Fourthly, incorporating human oversight strategies is essential. This can involve introducing human intervention in the design and operation of GAI. Manual inspection of generated content and the implementation of "human-in-the-loop" frameworks can aid in identifying potential infringements and ensuring the verification of generated content. Lastly, regular surveillance and monitoring activities should be conducted to detect any instances of infringement or plagiarism. Regular evaluations of the GAI system's usage and the content it produces can help identify potential issues at an early stage, enabling swift corrective actions.

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[260] DAVID FOSTER, GENERATIVE DEEP LEARNING (O'Reilly Media, Inc., 2022).

[261] *See* Jennifer Haase & Paul HP Hanel, Artificial muses: Generative Artificial Intelligence Chatbots Have Risen to Human-Level Creativity 11 (Mar. 21, 2023) (unpublished manuscript) (ARXIV:2303.12003).

The rise of GAI-based NLP has brought about significant risks related to copyright law. These risks necessitate attention and modifications to address the increasing complexity of the issue.[262] GAI has the potential to create original works that may be subject to copyright protection. However, the ambiguous origin of such works poses a substantial risk of copyright infringement. Currently, copyright laws primarily protect works created by human authors, with little consideration given to the role of AI in creative endeavors. To address the risks associated with GAI, amendments to copyright laws, including the Copyright Act and the Digital Millennium Copyright Act, are required. These reforms should recognize the contribution of AI systems to generating creative material and clarify the ownership of such works. One possible solution is to expand the definition of "author" to include AI-generated works.[263] This would allow the owners of AI systems to hold the copyright to the content produced by the system. Granting legal ownership to AI system owners answers the question of who holds the copyright. Furthermore, lawmakers could establish laws restricting the unfair use of AI owners' works in potential copyright infringement cases. Instead of solely relying on liability for infringement, alternative approaches such as fair use or system-based remedies should be considered.[264]

The risks associated with GAI necessitate modifications to copyright laws, including the Copyright Act, Digital Millennium Copyright Act, and related legislation. These modifications should incorporate provisions that account for the role of AI in generating creative works. Developing a framework that balances the interests of human authors and AI-generated content requires collaboration among stakeholders to ensure a fair and effective legal environment.

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[262] Krause, *supra* note 136.

[263] Yang Xiao, *Decoding Authorship: Is There Really no Place for an Algorithmic Author Under Copyright Law?*, 54(1) IIC-INT'L REV. OF INTELL. PROP. AND COMPETITION L. at 5-25 (2023), https://www.westlaw.com/Document/IDFC2FA90A68211EDBE2AAFDDE3E5A0BC/View/FullText.html?transitionType=Default&contextData=(sc.Default)&VR=3.0&RS=cblt1.0.

[264] Edward W. Felten, *A skeptical view of DRM and fair use*, 46.4 COMM'N OF THE ACM 56, 59 (2003).

A. Reforming copyright laws

Given the increasing risks posed by AI-based NLP, it becomes imperative to implement measures that address these associated challenges.[265] One effective solution is to enhance the existing copyright framework, primarily through amendments to the DMCA, designed to combat copyright infringement in the digital domain.

The Copyright Act is a well-established federal statute that forms the foundation of copyright law in the U.S. It grants creators exclusive rights to control the reproduction, distribution, performance, and display of their works while outlining legal remedies for copyright infringement. The Copyright Act applies to a wide range of creative works, encompassing literature, music, visual arts, audiovisual works, computer software, and architectural designs. On the other hand, the DMCA, enacted in 1998, was specifically designed to address challenges posed by digital technologies. It equips copyright owners with tools to control and protect their works in the online environment, including provisions for removing infringing materials from websites and penalties for circumventing technological measures that safeguard copyrighted content. Additionally, the DMCA establishes a "safe harbor" provision, which shields internet service providers and online intermediaries from liability for hosting user-posted infringing content as long as they comply with specified notice-and-takedown procedures and other requirements.[266]

While the Copyright Act and the DMCA share a common objective of safeguarding copyright owners' interests, they diverge in their focus and legal strategies.[267] The Copyright Act provides a general framework for copyright protection across various creative fields, while the DMCA specifically targets online infringement and offers copyright holders specific tools and safeguards to protect their works in the digital

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[265] Jan Homolak, *Opportunities and risks of ChatGPT in medicine, science, and academic publishing: a modern Promethean dilemma*, 64.1 CROATIAN MED. J. 1, 1 (Feb. 2023).

[266] Christopher S. Reed, *The DMCA Safe Harbor: Policy and Practice Divided*, *in* THE ROUTLEDGE COMPANION TO COPYRIGHT AND CREATIVITY IN THE 21ST CENTURY 293, 293–97 (Michelle Bogre & Wolff eds., 2020).

[267] *See generally* Glynn S. Lunney Jr, *The death of copyright: Digital Technology, Private Copying, and the Digital. Millennium Copyright Act*, 87 VA. L. REV. 813, 813–920 (2001).

realm.[268] To effectively manage the growing threats posed by AI in the field of NLP, urgent measures are needed to enhance existing laws and regulations. One potential solution involves strengthening the DMCA by introducing statutory provisions that address technological challenges to copyright protection, utilizing effective countermeasures to combat copyright infringement in the digital domain.[269] Reforms to the DMCA should consider the advancements brought about by AI, establishing a legal framework governing the ownership and usage of AI-generated works.[270] One possible improvement is extending the "notice-and-takedown" provision of the DMCA to include AI-based detection mechanisms, facilitating the removal of copyright-infringing material from online platforms.[271]

Another area for DMCA reform is revising the "safe harbor" clause to adapt to the unique challenges presented by AI-generated content. This may entail developing explicit regulations that define the responsibilities of online platforms and AI system owners in managing copyright protection for generated products.[272] Furthermore, the DMCA can provide a platform for research and development efforts to address AI-based creativity's social, ethical, and legal challenges, leading to guidelines that offer guidance on issues arising from AI-generated content. By reforming the DMCA, the legal framework can be adapted to effectively manage the risks associated with AI, aligning it with the evolving legal, social, and technological landscape. This entails implementing innovative reforms such as integrating AI-based detection mechanisms, modifying the "safe harbor" clause, and promoting

[268] *See generally* Ross Drath, *Hotfile, Megaupload, and the Future of Copyright on the Internet: What Can Cyberlockers Tells Us about DMCA Reform*, 12 J. MARSHALL REV. INTELL. PROP. L. 206, 206-241 (2012).
[269] *See E.g.,* Blake E. Reid, Submission for the Record Regarding DMCA Reform, 1–2(Dec. 1, 2020) (Univ. of Colo. L. Legal Stud., Research Paper No. 21-3), https://dx.doi.org/10.2139/ssrn.3740897..
[270] Dalisi Otero, *Confronting Nonconsensual Pornography with Federal Criminalization and a "Notice-and-Takedown" Provision*, 70 UNIV. MIAMI L. REV. 585, 585–609 (2015).
[271] Jennifer M. Urban, Joe Karaganis & Brianna Schofield, Notice and takedown in everyday practice (Mar. 24, 2017) (Univ. of Cal. Berkeley Pub. L. Research Paper No. 2755628), https://papers.ssrn.com/sol3/papers.cfm? abstract_id=2755628.
[272] Jerry Jie Hua, *Establishing Certainty of Internet Service. Provider Liability and Safe Harbor Regulation.*, 9 NAT'L TAIWAN UNIV. L. REV. 1, 1–45 (2014).

research initiatives to address the unique legal issues arising from AI in the creative sector.[273]

In summary, enhancing the DMCA provides a mechanism for managing the risks associated with AI and shaping the legal framework to govern the ownership and usage of AI-generated works. This can be achieved through reforms such as implementing AI-based detection mechanisms within the "notice-and-takedown" provision and revising the "safe harbor" clause to account for the challenges introduced by AI-generated content.

CONCLUDING REMARKS

GAI-based NLP is a cutting-edge conversational language model that utilizes deep learning algorithms to generate human-like text and thought patterns. The technology has already gained widespread application in numerous domains and has the potential to revolutionize the field of legal research.

From the legal research perspective, GAI-based NLP can contribute to activities such as drafting academic manuscripts and legal documents and creating legal briefs. For instance, a generative language model can be trained on a data set of legal documents, like contracts and court opinions, and subsequently utilized to generate new contracts or briefs based on specific criteria. Nevertheless, it is critical to note that AI-based generative language models can be fallible and sometimes produce inadequate or biased results. It is thus imperative to scrutinize with care the results generated by these models and ensure that they are employed responsibly and ethically. It is equally important to consider the legality and enforceability of AI-generated legal documents as this may create doubts that need careful evaluation before putting the documents into practice.[274]

In conclusion, while GAI-based NLP may be suitable for ordinary tasks, it may not be the best tool for legal research, given its

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[273] *See, e.g.*, Aditi Gupta et al., *Enabling qualitative research data sharing using a natural language processing pipeline for deidentification: Moving beyond HIPAA Safe Harbor identifiers*, 4.3 JAMIA OPEN ooab069, 1-10 (2021) https://doi.org/10.1093/jamiaopen/ooab069.

[274] Chris Stokel-Walker & Richard Van Noorden, *The promise and peril of generative AI*, 614 NATURE 214, 215 (2023) https://www.nature.com/articles/d41586-023-00340-6.pdf.

prevailing limitations. The complex nature of legal language and the need for precise and reliable information make it difficult for GAI-based NLP to handle, given the present state of technology such as GPT-4. As such, legal researchers are better off relying on more specialized and advanced approached based on their own expertise and experience to get the job done. The implications of copyright infringement and risks of plagiarism when operationalizing GAI-based NLP in legal research are not to be underestimated. However, by implementing appropriate preventive measures, researchers can steer clear of any ramifications and develop innovative, authentic, and informed research.

TOKE(N)S: The Juncture of Cryptocurrency and Cannabis in a Blooming Ecosystem – Their Joint Utilization as Best Buds to Blunt Legal and Societal Stresses

Elliot Malin, MPA[275]

Abstract

As society starts to embrace the legalization of cannabis, there exists a conflict between federal and state laws. Congress enacted the Controlled Substances Act to regulate and forbid certain narcotics. However, many states have opted to ignore the Supremacy Clause and this federal law by enacting regimes that legalize or decriminalize the use of cannabis for medical and recreational purposes. In doing so, they have created policy consternation regarding the banking of revenue derived from state-level legal cannabis transactions. These state actions have coincided with the invention and rise of blockchain technology. Blockchain is the system that allows cryptocurrency to exist through a decentralized ledger that efficiently and transparently records transactions and information. Furthermore, stablecoin, a specific type of cryptocurrency that alleviates uncertainty by pegging to a commodity, has come to fruition. This note explores the nexus between the legalization of cannabis in the states and the need for a safe and secure method to transact cannabis. Alleviating issues for the businesses, consumers, and states that seek to bank their tax revenue. As more states embrace legalization, adopting a closed-loop stablecoin can enhance security, stabilize taxable revenue predictability, and increase transparency.

[275] Syracuse University, College of Law, Juris Doctor expected 2024. I want to extend my gratitude to Professor Graves for his help, encouragement, and dedication in assisting with this note. I also want to express my appreciation for Syracuse University, College of Law, for creating the JDi program that gave me this opportunity.

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I. Introduction

Business is blooming, and so are the tax coffers of the states that have legalized or decriminalized marijuana in contravention of federal law.[276] With the inaction by Congress to update the law on marijuana, states are left to fend for themselves and figure it out as they go.[277] Unfortunately for the states, they and the businesses they helped create through the promulgation of their laws are forced to fight with the federally regulated banking system to deposit their revenue safely.[278]

All of this coincided with the rise of blockchain technology and the boom of cryptocurrency.[279] There have been several attempts at regulating cryptocurrency as an asset, investment, or security.[280] State investment into the blockchain space as an evolving technology has been paralleling this at the federal level, creating dual regulatory schemes.[281] The Uniform Law Commission is working to pass uniformity through competing states, such as Nevada, for example.[282] Further, as society embraces this technology and the cryptocurrency that comes along with it, there are opportunities for digital technology to take the forefront in the consumer and government spaces.[283]

The question becomes: what is the nexus between these two evolving issues? As states continue to legalize or decriminalize, the demand continues for safe and legal banking schemes for the revenues

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[276] Robert T. Hoban & Raushanah A. Patterson, *Sprung From Night into the Sun: An Examination of Colorado's Marijuana Regulatory Framework Since Legalization,* 8 Ky. J. Equine Agric. & Nat. Resources L., 225, 281 (2015).
[277] Steven W. Bender, *Joint Reform?: The Interplay of State, Federal, and Hemispheric Regulation of Recreational Marijuana and the Failed War on Drugs*, 6 Alb. Gov't L. Rev. 259, 393 (2013).
[278] Andrew Bloomfield, *Taking it to the Bank: The Need for a Federal Legislative Safe Harbor for Financial Institutions Offering Services to State-Legal Marijuana-Related Businesses*, 35 J. Civ. Rts. & Econ. Dev. 1, 11 (2022).
[279] Kimberly Rust, *Block-chain Reaction: Why Development of Blockchain is at the Heart of Legal Technology of Tomorrow*, 19 Legal Information Management 58, (2019).
[280] Michael L. D'Ambrosio, *Virtual Currency Regulation: From the Shadows of the Internet to the Floor of Congress*, 19 Wake Forest J. Bus. & Intell. Prop. L. 249, 257–74 (2019).
[281] Pierluigi Matera, *Delaware's Dominance, Wyoming's Dare: New Challenge, Same Outcome?*, 27 Fordham J. Corp. & Fin. L. 73, 79 (2022).
[282] *See* S.B. 195, 2019 Leg., 80th Sess. (Nev. 2019).
[283] Robert C. Hockett, *The Capital Commons: Digital Money and Citizens' Finance in a Productive Commercial Republic*, 39 Rev. Banking & Fin. L. 345, 391 (2019).

derived from cannabis.[284] Not only is this an issue for the businesses blooming in the industry but also for the states that have to transact the tax revenue they receive from these businesses.[285] A solution to this problem must exist to transact better and to keep the industry and community safe from nefarious actors.

This note aims to delve into the changing landscape of both the cannabis policy and the blockchain ecosystem by offering a solution to the banking problems that plague state-level legal cannabis businesses due to federal law through a stablecoin cryptocurrency. Further, the note will explore potential complications with the use of cryptocurrency in transacting within the cannabis market, especially when viewing the anti-money laundering statutes within the United States regulatory schemes. Throughout this note, the terms "cannabis" and "marijuana" will be used interchangeably based on each respective state or jurisdictional agency that has legalized or regulated it.

II. Federalism and Cannabis

Congress has the authority to regulate controlled substances under the Commerce Clause, meaning it requires that it touch on some aspect of interstate commerce and the authority granted under the Constitution.[286] Under the Supremacy Clause of the U.S. Constitution, Congress' regulations of controlled substances are supreme to those of the states.[287] Congress passed the Comprehensive Drug Abuse Prevention and Control Act of 1970, also known as the Controlled Substances Act ("CSA"), which created a 'schedule' to control and regulate substances.[288] The CSA classifies various substances into these schedules based on their potential for use, currently approved medical treatments in the United States, and the established safety mechanisms to prevent abuse or lack thereof.[289] The schedules are ranked based on their level of perceived danger, with Schedule I being the most dangerous and Schedule V being the least.[290] Congress

[284] Bloomfield, *supra* note 4.
[285] *See* Julie Anderson Hill, *Banks, Marijuana, and Federalism*, 65 CASE W. RES. 597, 601 (2015).
[286] U.S. CONST. art. I, § 8, cl. 3; *See Gonzalez v. Raich,* 545 U.S. 1, 15 (2015).
[287] U.S. CONST. art. IV, cl. 2.
[288] Comprehensive Drug Abuse Prevention and Control Act of 1970, 21 U.S.C. §§ 801–971.
[289] 21 U.S.C. § 812.
[290] Ira P. Robbins, *Guns N' Ganja: How Federalism Criminalizes the Lawful Use of Marijuana*, 51 U.C. DAVIS L. REV. 1783, 1790–91 (2018).

deemed cannabis, otherwise known as marijuana, was deemed highly dangerous and thus classified as a Schedule I narcotic within this statutory scheme.[291] The Supreme Court upheld the CSA and the authority of Congress to regulate cannabis and other controlled substances in *Gonzalez v. Raich,* where they determined that there was enough impact on interstate commerce to warrant the reach of authority.[292]

Although initially it was Congress that passed the CSA into law, the addition, removal, or transfer of substances from the different classifications by either Congress or the Attorney General of the United States.[293] Congress's ability to change the schedule can only be done through the legislative process, while the Attorney General can do so unilaterally.[294] Since cannabis' classification and criminalization, there have been attempts to de-schedule and legalize it.[295] Under the CSA and the authority of the Supremacy Clause, states have been preempted from their ability to regulate cannabis within section 903 of the Act.[296] However, this preemption did not grant sole authority to the federal government in regulating and enforcing controlled substances laws.[297] This was due to the states' enhanced capabilities in local enforcement and their close mirroring of the CSA.[298]

As mentioned, since the original enactment of the CSA and other subsequent mechanisms aimed at controlling cannabis, there have been multiple attempts within Congress to de-schedule cannabis and regulate cannabis outside of the CSA, most recently with the States Reform Act ("SRA").[299] The SRA is an initiative championed by Rep. Nancy Mace, a Republican from South Carolina, intending to strike cannabis out of the various federal statutes dealing with the regulation of narcotics.[300] Further, it would give the states the authority to

[291] 21 U.S.C. § 812.
[292] *Gonzalez v. Raich*, 545 U.S. 1, 32 (2005).
[293] Robbins, *supra* note 16.
[294] *Id.* at 1792.
[295] *Id.* at 1791.
[296] Robert A. Mikos, *Preemption Under the Controlled Substances Act*, 16 J. Health Care L. & Pol'y 5, 11–12 (2013).
[297] *Id.*
[298] *Id.*
[299] States Reform Act, 117 H.R. 5977 § 101 (2021).
[300] *Id.*

regulate cannabis as they see fit.[301] Another recent attempt at reform was the Marijuana Opportunity Reinvestment and Expungement Act of 2020 ("MORE Act"), introduced to the House of Representatives by Rep. Jerry Nadler of New York alongside 120 members of the House, one of whom was Republican Rep. Matt Gaetz of Florida.[302] Section 3 of the MORE Act operated to de-schedule cannabis.[303] Furthermore, the MORE Act would have automatically expunged certain juvenile non-violent criminal cannabis convictions, allowed others to petition the courts for the same, and to have their records sealed.[304] Ultimately, both the SRA and MORE Act failed to advance into law.[305] However, the introduction of both bills shows a bipartisan effort and desire to change cannabis laws in the United States and to de-schedule it.

With Congress unable to pass legislative guidance, states have found difficulty in regulatory schemes, as evidenced in *Ne. Patients Grp. v. Me. Dep't of Admin. & Fin. Servs.*, where Maine implemented a system that prohibited out-of-state residents from being owners or directors of medical marijuana companies within the state.[306] Maine's prohibition of out-of-state owners and directors was found to be a violation of the dormant Commerce Clause of the Constitution as determined in prior cases by the Supreme Court.[307] Moreover, while Congress has barred the Department of Justice from using funds to intervene in states that have legalized or decriminalized the possession of marijuana, confusion still surrounds where federal policy stands on marijuana, with laws on the books that criminalize these practices while not enforcing them.[308] Significantly, this is evidenced when the executive changes frequently and takes differing courses regarding marijuana policy and criminalization at the federal level.[309]

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[301] *Id.*
[302] Marijuana Opportunity Reinvestment and Expungement Act of 2020, 116 H.R. 3884, 116th Cong. (2020).
[303] *Id.* at § 3.
[304] *Id.* at § 10.
[305] *See* States Reform Act, H.R. 5977, 117th Cong. § 101 (2021); *see also* H.R. 3884.
[306] *Ne. Patients Grp. v. Me. Dep't of Admin & Fin. Servs.*, 544 F. Supp. 3d 177, 180 (D. Me. 2021).
[307] *Id.* at 185.
[308] *Id.* at 182–83.
[309] Mike Shuster & Robert Bird, *Legal Strategy During Legal Uncertainty: The Case of Cannabis Regulation*, 26 STAN. J.L. BUS. & FIN. 362, 369 (2021).

III. Evolution of Cannabis Laws in the States

Starting in 1996, California kicked off what is seen today as the movement of medical marijuana at the state level with the passage of Proposition 215.[310] Since the passage of Prop. 215, thirty-six other states have followed suit; fifteen states have legalized marijuana, and twenty-six have decriminalized it either fully or partially.[311] While the states have been moving towards legalization or decriminalization, cannabis is still federally illegal, and yet in these states, cannabis businesses are blooming.[312] Where states have legalized the use of cannabis, complications have arisen from this opposing dichotomy of state and federal laws, as shown in various attempts by the federal government to enforce federal law in California.[313]

In the 2000 election, Colorado voters passed Amendment 20 to the Colorado Constitution to allow for the sale of medical marijuana.[314] By 2009 the Colorado marijuana industry was exploding with an increase in patient card applications and 250 new dispensaries around the state.[315] The Colorado legislature passed HB-1284 in 2010, which legalized marijuana dispensary, cultivation, and edible manufacturing businesses for medicinal purposes.[316] Between 2009 and 2010, there was an increase of 340 percent in dispensaries statewide, growing from 250 to 1,100.[317] By 2012 Colorado voters again passed a constitutional amendment with Amendment 64, legalizing recreational marijuana for adult users over the age of 21.[318] Amendment 64 led to the need for Colorado to implement a regulatory and tax structure to meet the industry and state's demands so they could fully realize their potential.[319] Within its first year in operation, Colorado's marijuana industry had brought in about $700 million to the state coffers through its tax structure.[320]

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[310] *Id.* at 400.
[311] Oliver Roberts, *The New Federalism Frontier In Marijuana Legalization and Decriminalization*, 73 S.C. L. Rev. 319, 322 (2021).
[312] H. Justin Pace, *The "Free Market" for Marijuana: A Sober Clear-Eyed Analysis of Marijuana Policy,* 24 Lewis & Clark L. Rev. 1219, 1221 (2020).
[313] *See Marin Alliance for Med. Marijuana v. Holder*, No. C 11-05349 SBA, 2012 U.S. Dist. LEXIS 96283, at *2 (N.D. Cal. July 10, 2012).
[314] Hoban & Patterson, *supra* note 2, at 230.
[315] *Id.* at 231.
[316] *Id.*
[317] *Id.*
[318] *Id.* at 232.
[319] Hoban & Patterson, *supra* note 2, at 232-33.
[320] *Id.* at 281.

Before Colorado, Washington state had created a system for the legal consumption of marijuana for medical patients in 1998.[321] In 2012 Washington became one of the first states to legalize the recreational use of marijuana through the passage of a voter referendum known as Initiative 502.[322] While marijuana was legalized in Washington state, prohibitions that cause confusion and strife remain.[323] However, the state has also seen an extreme increase in tax revenue through its marijuana industries, with about $336 million in the 2017-19 biennium.[324]

In 2014 Oregon legalized the use and possession of recreational marijuana following the direction of Colorado and Washington.[325] By legalizing the marijuana industry, Oregon benefitted from additional tax revenue, which funds education, law enforcement, and drug prevention throughout the state.[326] Alongside Oregon, Alaska passed Measure 2 in 2014, which legalized the recreational use of marijuana.[327]

While some states have chosen to legalize marijuana, others have taken another similar approach: decriminalization.[328] At varying levels, states such as California, Connecticut, Maine, Maryland, Massachusetts, Minnesota, Mississippi, Nebraska, Nevada, New York, North Carolina, Ohio, Rhode Island, and Vermont have taken steps to decriminalize possession of marijuana.[329]

IV. Banking and Cannabis Regulations

While marijuana businesses are embraced by the states that have created the opportunity for them to exist and thrive, they have found systematic problems for their industry when interacting with federally

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[321] Silvia Irimescu, *Legalizing Marijuana: State and Federal Issues: How Government Stagnation Hinders Legal Evolution and Harms a Nation,* 50 GONZ. L. REV. 241, 255 (2015).
[322] *Id.*
[323] *See id.* at 255–56.
[324] Frank Robison, *Going Green: Legal Considerations for Marijuana Investors and Entrepreneurs*, 6 AM. U. BUS. L. REV. 57, 65 (2016).
[325] Irimescu, *supra* note 47, at 257.
[326] *Id.*
[327] *Id.* at 258.
[328] *See id.* at 260–61.
[329] *Id.* at 261.

regulated sectors, such as the banking system.[330] Because of federal law and regulations, banks have largely refused to accept accounts from marijuana businesses or transact marijuana funds, even when procured in a manner that would be 'legal' in that state.[331] Private banks often point to federal law as their reason for refusing to do this business, with banks such as Wells Fargo having closed accounts of these state-level legal businesses.[332] Federal money laundering statutes prohibit any cannabis transaction within the banking service industry, even though these businesses are permitted to operate within the state.[333]

Furthermore, banks often operate within the Federal Reserve with a "master account" within the system, meaning that this master account allows nationwide payment and settlement services to a banking institution.[334] Access to the Federal Reserve can be crucial to offer services to potential and existing customers, from the processing of checks to electronic payment processing.[335] However, for a bank to belong to the Federal Reserve system, there are requirements that they must meet with each of their clients; specifically a condition that they maintain policy procedures to monitor and observe compliance with the Bank Secrecy Act ("BSA").[336] The BSA aims to prevent money laundering through banking institutions by requiring these banks to design and implement standardized compliance programs.[337] It also requires that the bank file "suspicious activity reports" ("SARs") to the Financial Crimes Enforcement Network ("FinCEN") for any transaction that involves $10,000 or more in cash, and any activity that is deemed to be suspicious of violating federal law involving $5,000 or

[330] *See* Pace, *supra* note 38.
[331] *See* Hill, *supra* note 11, at 600.
[332] *Id.*
[333] Katherine P. Franck, *Cannabis Reform: High on the Banking Agenda*, 24 N.C. Banking Inst. 163, 167 (2020).
[334] David Bronfein, *Maryland State Bank: The Responsible Solution for Fostering the Growth of Maryland's Medical Cannabis Program*, 47 U. Balt. L. F. 28, 36 (2016).
[335] *Id.*
[336] *Id.* at 37.
[337] *Id.*

more.[338] As a result, this puts every legitimate marijuana business at-risk along with the bank in every transaction.[339]

Due to the lack of banking options, legal marijuana businesses must operate on a nearly pure cash transactional basis.[340] These business owners are often forced to carry large amounts of cash with no security to pay their taxes or expenses.[341] Thus, business owners and businesses face dire situations relating to personal safety and their investments such as robberies and thefts.[342] Other issues will persist for the banks if they do accept funds received from marijuana businesses as well, such as criminal and civil forfeiture laws that permit the seizing of assets by federal officials.[343] Further, because of the lack of banking options, there is a rampant opportunity for mistrust between government and businesses and evasion of taxes due to the state.[344] When cash-based businesses cannot interact with the banking system the ability to audit is severely compromised, which perpetuates the opportunity for tax fraud to occur.[345]

Congress attempted to rectify tax evasion with the Secure and Fair Enforcement Banking Act of 2019 ("SAFE Act"), which would have increased access to the banking system for legal and legitimate cannabis businesses.[346] The bill would have created protections that addressed many of the fears banks held on transacting marijuana money: violations of federal law that could lead to the seizure of assets.[347] The bill passed the House but ultimately failed to make it

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[338] Suzanne K. Daigle, Note, *Legal Impediments to Banking Services for Recreational Cannabusinesses: Comparing Oregon to Canada*, 21 OR. REV. INT'L L. 215, 229 (2020).
[339] *Id.* at 230.
[340] Lizbelle Taveras, Developments in Banking Law, *Remedying the Underbanked Cannabis Industry: Prospects of Federal Banking Reform*, 39 REV. BANKING & FIN. L. 147, 148 (2019).
[341] *See id.*
[342] *Id.*
[343] Franck, *supra* note 59.
[344] Robison, *supra* note 50, at 62.
[345] Elizabeth D. McErlean, Note, *The Real Green Issue Regarding Recreational Marijuana: Federal Tax and Banking Laws in Need of Reform*, 64 DEPAUL L. REV. 1079, 1103 (2015).
[346] Secure and Fair Enforcement Banking Act of 2019, H.R. 1595, 116th Cong. (2019).
[347] *Id.* at § 2.

through the Senate and into law, consequently, the industry was left needing an alternative to traditional financial systems.[348]

With the Department of Justice not enforcing federal law and regulations, states moving toward legalization or decriminalization, and a lack of access to the federal banking system, other options for these state-legal businesses need to exist to bank their revenue safely.[349]

V. Evolution of Blockchain Technology and Regulation

In 2008, Satoshi Nakamoto published a whitepaper titled: "Bitcoin: A Peer-to-Peer Electronic Cash System."[350] Nakamoto's whitepaper advocated establishing a virtual deregulated exchange that allowed individuals to trade and transact with no central verifying authority.[351] These transactions would self-regulate through a ledger, independently verifying each transaction, leaving the banking system out of the equation.[352] This ledger is known today as a blockchain.[353]

Blockchain technology works through the verification of various "nodes" that are distributed among computers around the world that link together to form a network.[354] The term "blockchain" describes the characteristics of the technology that lumps data and information into a block, and as the block fills, a new one is created and is chained to the old, thus the term: "blockchain."[355]

Virtual currencies are different from the digital currencies that banking institutions utilize.[356] The significant difference between the two is that the consumer must trust the value of the virtual currency, and central regulatory authorities have no ability or power to issue

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[348] *Id.* at § 16.
[349] *See Ne. Patients Grp. V. Me. Dep't of Admin & Fin. Servs.*, 544 F. Supp. 3d 177, 183–85 (D. Me. 2021); *see also* Taveras, *supra* note 66.
[350] D'Ambrosio, *supra* note 6, at 252.
[351] *Id.*
[352] *Id.*
[353] *Id.*
[354] Carol R. Goforth, *The Case for Preempting State Money Transmission Laws for Crypto-based Businesses*, 73 Ark. L. Rev. 301, 307–08 (2020).
[355] *Id.*
[356] Jake DeLeers, *Clean Slate: Why Pennsylvania Should Enact Favorable Virtual Currency and Blockchain Law*, 126 Penn St. L. Rev. 547, 550 (2022).

it.[357] Federally, Congress has yet to pass legislation that would guide the regulatory process, which has led to multiple administrative agencies attempting to give guidance with no clear direction.[358] Many of these administrative agencies have largely failed to determine cryptocurrency's place within their authority and, as a result, have enacted regulations overlapping those of other agencies creating a subversive power struggle.[359] However, a few agencies, such as the Securities and Exchange Commission ("SEC"), have found a definitive role in their regulatory reach.[360]

With the rise of this new technology, states have started to regulate and foster its growth and development within their local economies.[361] Wyoming, for example, has aggressively sought to cultivate this space as a form of economic development and market segmentation.[362] In 2018, Wyoming passed its Utility Token Bill that exempted digital crypto assets or "utility tokens" from the state's securities laws.[363] Wyoming's law followed Nevada's legislation in 2017 that prohibited local jurisdictions from taxing and regulating blockchain technology.[364] Wyoming then established a select committee in their legislature designated to study and promote legislation that would increase Wyoming's competitive advantage in blockchain technology.[365]

Nevada thus responded with a slew of bills in the 2019 session, starting with a regulatory sandbox bill that allowed companies to begin their development without paying for licensure to attract more developing companies to Nevada.[366] These sandboxes are a unique way for states to attract startup companies in their research and development phase by lowering the cost to the business as it builds its product and gets to market.[367] Next, Nevada passed legislation

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[357] *Id.*
[358] *Id.* at 552.
[359] *Id.*
[360] *See id.* at 553.
[361] Matera, *supra* note 7, at 79.
[362] *Id.*
[363] *Id.* at 125; *see also* WYO. STAT. ANN. § 34-29-106 (LexisNexis 2022).
[364] *See* S.B. 398, 2017 Leg., 79th Sess. (Nev. 2017); *see also* NEV. REV. STAT. ANN. § 268.0979 (LexisNexis 2021).
[365] WYO. STAT. ANN. § 28-11-701 (LexisNexis 2022).
[366] *See* S.B. 161, 2019 Leg., 80th Sess. (Nev. 2019).
[367] *See id.*

recognizing a public blockchain, the use of the blockchain for public records and electronic contracts, and allowed those that stored intellectual property on the blockchain to retain their rights.[368] Along with that, Nevada passed legislation recognizing the use of a blockchain to communicate and store business records.[369] Finally, Nevada passed legislation that defined virtual currencies created from a blockchain as intangible personal property to exempt them from property taxes.[370]

Other legislatures have failed to regulate or pass policies stimulating blockchain and cryptocurrency cultivation within their states.[371] New Jersey, for example, tried to institute the Virtual Currency and Blockchain Regulation Act that would have followed what Nevada did in making cryptocurrency recognized as personal, intangible property.[372] The bill also would have allowed blockchain companies to register in New Jersey as "decentralized autonomous organizations" ("DAOs") under the state's limited liability corporation laws.[373] Contrarily, states like Vermont and Wyoming have successfully passed legislation that creates DAOs under state law.[374]

As blockchain technology matures, there will be a continued evolution of the statutory and regulatory framework throughout the states and federally to meet the changing needs of the industry.

VI. Transacting with Cryptocurrency

The future use of cryptocurrency will allow for a secure, safe, and efficient ecosystem that can compete with the current fiat within modern banking systems.[375] Fiat currencies have legal value but are not necessarily backed by another commodity.[376] Using cryptocurrency

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[368] *See* S.B. 162, 2019 Leg., 80th Sess. (Nev. 2019).
[369] *See* S.B. 163, 2019 Leg., 80th Sess. (Nev. 2019).
[370] *See* S.B. 164, 2019 Leg., 80th Sess. (Nev. 2019).
[371] *See* Virtual Currency and Blockchain Regulation Act, S.B. 4163, 2020 Leg., 219th Sess. (N.J. 2021) (failed to advance into law).
[372] *Id.*
[373] *Id.*
[374] *See* Wyo. Stat. Ann. §§ 17-31-101–17-31-115 (Lexis Advance through 2022 Budget Session. Subject to Revision by LSO); *see also* Vt. Stat. Ann. tit., 11 §§ 4171–4176 (2017) (Lexis Advance through the end of the 2021 (Adj. Sess.), including legislative updates through December 31, 2022).
[375] Hockett, *supra* note 9, at 354.
[376] J.S. Nelson, *Cryptocommunity Currencies*, 105 Cornell L. Rev. 909, 947–48 (2020).

can create economic stability and predictability that will protect consumers.[377] Furthermore, there is potential for expansion of access to the financial system through cryptocurrency.[378] Every traditional transaction occurs through a centralized system mediated by financial institutions (banks) and their associations.[379] For consumers to access cryptocurrency, they must have a digital wallet to store and safeguard their currency on the respective blockchain ledger.[380] Each wallet has both a public and private key associated with it.[381] A sender uses a public key to send cryptocurrency to a receiver's account, and authorizes the transaction with a private key.[382]

Another positive of transacting with cryptocurrency is the ability to negate counterfeit currency introduction into the ecosystem.[383] Because each token is on the chain and the chain records every transaction, there is a zero percent chance that someone can enter into the chain and introduce fraudulent transactions and information.[384] It also negates the ability to double-spend the currency, a problem prevalent in traditional credit and banking, due to the time it takes for a transaction to post.[385] The phenomenon of double-spending occurs when a consumer puts fiat currency into their account, and the bank then lends it out, so while it shows that there is money in the account, the bank itself has spent the money on other transactions.[386] Double banking can be good in a typical economy, allowing for economic growth and spreading wealth through access to opportunity to those who can afford a bank loan.[387]

A. The Value of Predictability Through Stablecoin

Volatility has been a problem for cryptocurrency due to aversion to new technology, regulatory uncertainty, scammers, and

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377 Hockett, *supra* note 9, at 350.
378 Mehrsa Baradaran, *Banking on Democracy*, 98 WASH U.L. REV. 353 (2020).
379 *Id.* at 357.
380 Dennis Chu, *Broker-Dealers for Virtual Currency: Regulating Cryptocurrency Wallets and Exchanges*, 118 COLUM. L. REV. 2323, 2328 (2018).
381 *Kleiman v. Wright*, No. 18-CV-80176, 2018 U.S. Dist. LEXIS 216417, at *3 (S.D. Fla. Dec. 27, 2018).
382 *Id.*
383 Catherine Martin Christopher, *The Bridging Model: Exploring the Roles of Trust and Enforcement in Banking, Bitcoin, and the Blockchain*, 17 NEV. L.J. 139, 147 (2016).
384 *Id.*
385 *Id.*
386 *Id.*
387 *Id.* at 148.

behavior tendencies.[388] That volatility created a limitation of use for cryptocurrency's application within society.[389] Because of this volatility and limitation emerged stablecoin, a cryptocurrency that offered predictability and viability through its stable nature.[390] With the creation of this predictability, stablecoins took off and became a global market phenomenon, gaining market growth of nearly 700 percent by 2018.[391]

Typically, stablecoins are tethered to an asset or basket of assets that have a stable value.[392] Often, the asset to which the stablecoin is tied to is the United States Dollar ("USD"), but a stablecoin can also be linked to other assets or tied to a consumer price index ("CPI").[393] Tying the stablecoin to one of these assets is called a "peg" and allows for flexibility with the asset.[394] They can also peg to other digital assets that would operate as collateral for the value of the stablecoin to ensure its viability and stability.[395] Finally, they can be uncollateralized, where the stablecoin uses an algorithm to stabilize and maintain the coin's value; for this to be effective, it requires a static supply to give in to market demands to sustain the stability of the coin.[396]

Using stablecoins within U.S. financial markets requires these companies to first obtain access to the market.[397] Access to markets has already been granted in Nevada and Wyoming.[398] With their legislatures creating ease of access to their respective markets.[399] Stablecoins create opportunities to adopt an alternative to the standard fiat monetary system in markets, especially for exchanging goods that

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[388] Marco Dell'Erba, *Stablecoins in Cryptoeconomics: From Initial Coin Offerings to Central Bank Digital Currencies*, 22 N.Y.U. J. Legis. & Pub. Pol'y 1, 3–4 (2019).
[389] *Id.*
[390] *Id.* at 5.
[391] *Id.*
[392] Jess Chang, *How to Build a Stablecoin: Certainty, Finality, and Stability Through Commercial Law Principles*, 17 Berkeley Bus. L.J. 320, 322 (2020).
[393] Craig Calcaterra, et al., *Stable Cryptocurrencies: First Order Principles*, 3 Stan. J. Blockchain L. & Pol'y 62, 70–71 (2020).
[394] *Id.*
[395] Dell'Erba *supra* note 114, at 11.
[396] *Id.*
[397] Lissa L. Broome, *Banking on Blockchain*, 21 N.C. J.L. & Tech. 169, 181 (2019).
[398] *See supra* note 8; *see also supra* note 86.
[399] *Id.*

cannot be done in dollars.[400] With the adoption of stablecoins and cryptocurrency, the transaction speed can be dramatically increased and physical time reduced through a near-instantaneous transfer of funds and information while reducing the cost to consumers and businesses.[401] Furthermore, using a stablecoin on a public ledger allows for greater transaction transparency, as it can be seen by all who can view the blockchain.[402] With increased transparency and stability, there is an opportunity for markets to enter into an area of predictability that will allow stablecoins better access to the market.

VII. State Solutions to Banking Cannabis Tax Revenue: Nevada

Nevada voters passed two consecutive ballot measures in 1998 and 2000 that forced the legislature to enact legislation to legalize medical cannabis.[403] Nevadans then passed Question 2 on November 8, 2016, decriminalizing marijuana for recreational use.[404] With this newfound industry, there remained a federally illegal narcotic that the state was now regulating as a legal substance, and with that came the consequences of uncertain banking and regulatory frameworks - and how to bank that tax revenue.[405]

To remedy this problem, Zach Conine, Nevada State Treasurer, introduced A.B. 466 in the 2019 legislative session.[406] This bill created a pilot program for a closed-loop payment processing system for financial transactions relating to cannabis in Nevada that will expire on June 30, 2023.[407] This system aims to create a way for Nevada's cannabis establishments to quickly engage in financial transactions in a "… safe and efficient manner."[408] To that extent, it sought to create a safer environment for cannabis establishments by not forcing them to

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[400] Dell'Erba *supra* note 114, at 17.
[401] Craig Calcaterra et al., *The Rise of Fintech: Stable Cryptocurrencies*, 61 WASH. U. J.L. & POL'Y 193, 209 (2020).
[402] *Id.* at 212.
[403] *Nevada Defelonizes Pot Possession State Eliminates Jail, Criminal Record for Minor Offenders; Medical Marijuana for Seriously* Ill, NORML (June 7, 2001), https://norml.org/news/2001/06/07/nevada-defelonizes-pot-possessionstate-eliminates-jail-criminal-record-for-minor-offenders-legalizes-medical-marijuana-for-seriously-ill, (last visited Oct. 26, 2022).
[404] *See Adult-Use Cannabis*, STATE OF NEVADA - CANNABIS COMPLIANCE BOARD (last visited Oct. 26, 2022), https://ccb.nv.gov/nevada-cannabis-program/.
[405] *See* Bloomfield, *supra* note 4.
[406] *See* A.B. 466, 2019 Leg., 80th Sess. (Nev. 2019).
[407] *See id.*; *see also* NEV. REV. STAT. ANN. § 226.300 (LexisNexis 2021).
[408] *Id.*

carry large amounts of cash.[409] As noted, cannabis businesses have primarily been cash-based businesses, leaving them in a dangerous position with excessive amounts of cash carried from place to place to do business.[410] The law also created a way for these businesses to pay their taxes through the closed-loop payment system instead of taking cash to the state offices.[411] Previously, Nevada, like many states, had issues regarding receiving cannabis tax revenue and banking that revenue because of the federal regulations in place on banking revenue derived from cannabis.[412]

Nevada's law requires that all accounts created by the state allow for the use of this system.[413] Further, it prevents the transaction of cannabis to minors and across state lines to ensure that businesses remain compliant with the law.[414] Another prevention that the law aims to accomplish is to stop the illicit cannabis trade through the legal system and to stop the use of lawful transactions as a cover for other illegal activities.[415]

With the program's implementation, the state required the businesses participating in the pilot program to lease a cash vault that would be secured and cash transported by armored vehicle once it reached the specified capacity.[416] That would then operate similarly to a "casino chip," where they would put money in for the token, go through the process, and be able to withdraw as cash when done with the entire process.[417] This means that on one side, the business would put cash into the vault and at the same time receive a token for that value.[418] Next, the token would be used to purchase goods and transacted within the system from other users. [419] From there, the final user of the token could request redemption, where the system would

[409] *See* Nev. Rev. Stat. Ann. § 226.300(2) (LexisNexis 2021).
[410] Taveras, *supra* note 66.
[411] *See id.*
[412] Robison, *supra* note 50, at 61–2.
[413] *See* Nev. Rev. Stat. Ann. § 226.300(3) (LexisNexis 2021).
[414] *See* Adult-Use Cannabis, *supra* note 130; *see also* § 226.300(3).
[415] *See* § 226.300(3).
[416] Zach Conine, *Marijuana Banking Closed-loop Payment Processing System*, Nevada Treasurer 1, 8 https://www.nevadatreasurer.gov/uploadedFiles/treasurernvgov/content/PublicInfo/AB466Presentation.pdf (last visited Sept. 22, 2023).
[417] *Id.* at 6.
[418] *Id.* at 8.
[419] *Id.*

then verify the user's identity within the closed-loop system, and the token would be redeemed for cash.[420]

Through this closed loop-system, the state was able to implement a process that made it safer for the transaction of cannabis and the transportation of the profits of those transactions.[421] It further allowed the state to find a way to bank the revenue safely and transparently that ensured compliance with Nevada cannabis laws and regulations.[422] With the closed-loop system established the way it was through a tie to the cash value of the dollar that went in, it created a stablecoin scenario that was easily pegged, put on the ledger, and transacted.[423] While this is not a typical stablecoin or cryptocurrency, it acted similarly and helped alleviate the state's concerns. It also created an opportunity for business owners to forgo the typical reliance on heavy cash counts by instituting vaults and armored carriers.

VIII. Possible Complications with the Juncture of Cannabis and Cryptocurrency

There are potential legal issues for the use of cannabis and cryptocurrency, such as the complications of the difference with traditional financial markets and the need for them to act in a way that is similar to those financial markets.[424] Further, their status as a cryptocurrency creates other potential complications within the regulatory framework if not adequately applied.[425]

When Congress passed the BSA to combat money laundering through the banking industry for criminal activity, there was no concept of a digital currency of the likes of cryptocurrency.[426] In conjunction with the passage of the BSA, Congress enacted the Money Laundering Control Act of 1968 ("MLCA"), which, like the BSA, sought to combat the disguising and transaction of money produced through illicit means.[427]

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[420] *Id.*
[421] Conine, *supra* note 142.
[422] *See* § 226.300(2).
[423] *See* Calcaterra, *supra* note 119.
[424] Chang, *supra* note 118, at 328.
[425] *Id.* at 328–29.
[426] *See* Bronfein, *supra* note 60, at 37.
[427] Catherine Martin Christopher, *Whack-a-Mole: Why Prosecuting Digital Currency Exchanges Won't Stop Online Money Laundering*, 18 LEWIS & CLARK L. REV. 1, 3–4 (2014).

The MLCA targets financial transactions that conceal the proceeds of "specified unlawful activities."[428] These unlawful activities include the transaction of drugs that are deemed illegal under federal law.[429] Violation of the MLCA can carry stiff criminal penalties, including up to twenty years in prison and a fine of $500,000.[430] As discussed, while states have decriminalized or legalized cannabis, it remains federally a Schedule I narcotic and illegal, creating the possibility of running afoul of the MLCA.[431]

The MLCA coincides with the BSA, which requires banking institutions to establish prevention mechanisms and submit reports with FinCEN for cash transactions of $10,000 or more, as well as for any suspicious activity that might violate federal laws, involving transactions of $5,000 or more.[432] Consequences of not complying with the BSA are not limited to the customer transacting the illicit funds; they can also be incurred by the employee of the financial institution that transmits the money for failure to comply with federal law.[433] The consequences for an employee that violates these regulations can be up to one year in prison and a fine of $1,000.[434] As for the financial institution itself, it can have all its assets involved in said transaction, real or personal, seized as a consequence of the employee's actions.[435]

Further, cryptocurrency systems that operate as a means of transmitting currency for the purchase of goods and services can be required to register as a money-transmitting service with the federal government.[436] Even though cryptocurrency is treated as personal property by the Internal Revenue Service ("IRS"), they have disclosure requirements for the transaction of cryptocurrencies for tax purposes.[437] For Bitcoin, the IRS can view the public ledger and see

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[428] *Id.*
[429] *Id.*
[430] *Id.*
[431] *See* Robbins, *supra* note 16.
[432] *See* Daigle, *supra* note 64.
[433] Christopher, *supra* note 153, at 8.
[434] *Id.*
[435] *Id.*
[436] Allison M. Lovell, *Avoiding Liability: Changing the Regulatory Structure of Cryptocurrencies to Better Ensure Legal Use*, 104 Iowa L. Rev. 927, 938 (2019).
[437] *Id.* at 937.

when individuals fail to report purchases and transfers of the cryptocurrency.[438] With these additional requirements, there is also the need to ensure that consumers are not laundering through cryptocurrency for illicit transactions.

As a decentralized self-regulated currency option, consumers and cryptocurrency companies often overlook the reporting and requirements.[439] When no information is required to obtain the cryptocurrency, it can lend itself to being utilized to launder money through the system after the purchase of or use of illegal means.[440] Those that intend to utilize cryptocurrency to launder money can obtain a crypto wallet quickly and move funds through that with relative ease, even keeping it on their mobile phone or computer system.[441] Once the wallet has been created, it takes little identifying information for the individual to use that system; a fake name or email address can give them access with little to no problems.[442]

With that ease of access to surreptitiously sourced wallets, bad actors can cause legal issues for those in the cryptocurrency market. Therefore, it is vital that those in the space use caution when dealing with potential money laundering schemes. However, to address these concerns, there is a high likelihood of increased transparency surrounding transactions because of the nature of the blockchain basis for cryptocurrency.[443] Further, to combat money laundering through the use of cryptocurrency, there are safeguards in place that will aid in fighting illicit actors.[444] These safeguards already exist within the currency exchanges and providers within the network are working to ensure compliance with anti-money laundering laws.[445]

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[438] *Id.*
[439] *See* Mitchell Hyman, *Bitcoin ATM, A Criminal's Laundromat for Cleaning Money*, 27 ST. THOMAS L. REV. 296 (2015).
[440] *Id.* at 297.
[441] *Id.* at 301.
[442] *Id.* at 302.
[443] *See* Garry Gabison, *Policy Considerations for the Blockchain Technology Public and Private Applications*, 19 SMU SCI. & TECH. L. REV. 327, 346 (2016).
[444] *See id.* at 349.
[445] *Id.*

Conclusion: Looking Toward the Future of Cannabis and Cryptocurrency

With the rise of decriminalized and legalized cannabis throughout the country, there is a desire and a demand for an easy and safe way to transact cannabis products. This developing industry has a long way to go to get to a point where transactions are easy and can be done not on a cash basis. While federal laws and regulations remain in place that makes cannabis a Schedule I narcotic, there is hope that this may change in the future.[446] Attempts have been made in Congress to do just that, but unfortunately, they have fallen short thus far.[447] Furthermore, due to executive branch turnover, the need for Congressional action to legalize is even more paramount to establishing a vibrant and blooming marketspace.[448] When it does, it will create a new era for the industry. Nevertheless, until that happens, opportunities must be in place that allow these businesses to transact safely and compliantly with all applicable laws and regulations.

Specifically, the lack of banking resources has created massive concerns for the industry.[449] Business owners fear for their physical safety as they are forced to transport large sums in cash, and for their economic interests in the situation they are accidentally swept up as the government attempts to fight money.[450] Without an established banking system, these issues will not be resolved and will persist. Further leading to potential violence and the loss of taxable revenue from state coffers.[451]

A solution is to allow a cannabis-specific cryptocurrency, a stablecoin tied to real dollars, to be put into a closed-loop payment processing system.[452] A solution is to allow a cannabis-specific cryptocurrency, a stable-coin tied to real dollars, to be put into a closed-loop payment processing system like the pilot program established in Nevada.[453] By establishing this system, users can transact safely, from the business owners to the end user, the

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[446] *See* H.R. 5977, *see also* H.R. 3884.
[447] *Id.*
[448] *See* Shuster & Bird, *supra* note 35.
[449] *See* Taveras, *supra* note 66.
[450] *Id.*
[451] *Id.*
[452] *See* A.B. 466, 2019 Leg. 80th Sess. (Nev. 2019).
[453] *Id.*

consumer, and the state.[454] Further, it allows for securing fiat currency through a vault system guarded and transported by armored vehicles and guards.[455] Instituting this closed-loop stablecoin will lead to an increase in taxable dollars coming into state coffers, accountability for the industry, and better oversight from the regulatory agencies in each state.[456]

Concerns will persist regarding money laundering and running afoul of federal regulations once a permanent banking solution exists after de-scheduling occurs.[457] A closed-loop stablecoin system like the one created in Nevada can create a path forward that negates the plethora of federal concerns with cryptocurrency and will allow for an increase in safety controls in the developing industry.[458] By having this through each state and working with the businesses that the state regulates, each party will have a better path in the transaction. While cryptocurrency and cannabis seem "on the surface completely different in outlook and philosophy," they "share significant elements."[459] They "both have been essentially conservative, changing only as often as need for change is perceived, and then only to the extent necessary to remove the need for further change."[460] But, change is good, it can lead to further development and advancement for society. Challenging the mentality of opposing change will help us create solutions for the future.[461] The utilization of these coins will help advance society and create a safer infrastructure for all users.

Cannabis and cryptocurrency are blooming as society moves to the future. It is time for society to embrace the positives to ensure the safety and accountability of a developing industry. Like the casino chip, consumers can use the token to provide protection and accountability for cannabis in the states as they bud into vibrant ecosystems.[462]

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[454] *See* Conine, *supra* note 142.
[455] *See* NEV. REV. STAT. ANN. § 226.300 (2019)(expired July 1, 2023).
[456] *See* Conine, *supra* note 142.
[457] *See* Hyman, *supra* note 165.
[458] *See* Conine, *supra* note 142.
[459] Editors, *The Common Law Origins of the Infield Fly Rule*, 123 U. Pa. L. Rev. 1474, 1481 (1975).
[460] *Id.*
[461] *See id.*
[462] *See* Conine, *supra* note 142.

Remote Proctoring Nightmares: Does Privacy Exist Anymore?

Nicole R. Cooper[463]

ABSTRACT

On January 18, 2020, the first COVID-19 case hit the United States.[464] It wasn't long before coronavirus started to spread all over the United States, pushing the states to implement shutdowns to prevent the spread of COVID-19.[465] These shutdowns forced most of the schools to transition to remote learning. However, many schools were unprepared to enforce the best practices for this type of instruction. Online learning soon brought many challenges to students all throughout the United States.

It is undeniable that the COVID-19 pandemic will have many long terms effects on society. This Note will focus on the effects the pandemic had on the privacy rights of many students. From being forced to have cameras on, to invasive online proctored exams, privacy issues have never been more prevalent. With not much legal recourse available to students and their families pertaining to these difficult situations, this Note is hoping to provide some insight for schools and universities to implement new strategies to get away from intrusive remote proctoring services.

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[463] Syracuse University, College of Law, Juris Doctor expected 2024.

[464] *CDC Museum COVID-19 Timeline*, CTR. FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/museum/timeline/covid19.html#:~:text=January%2020%2C%202020,respond%20to%20the%20emerging%20outbreak (last reviewed Mar. 15, 2023).

[465] *See id.* (referencing the Feb. 25, 2020 date).

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INTRODUCTION

As of March 11, 2020, the World Health Organization declared COVID-19 a pandemic changing the world forever.[466] With this declaration, many states issued stay-at-home orders forcing schools to move online. As of spring 2020, most schools transitioned to distance learning. According to the National Center for Education Statistics, during this period, "77 percent of public schools moved to online distance learning and 84 percent of college students reported having some or all classes moved to online-only instruction."[467] While some individuals may have enjoyed this transition to distance learning and may even preferred it to in-person classes, there were some alarming situations that came from this transition.

PANDEMIC PRIVACY PROBLEMS

A. Application of School Policies into Private Homes

Privacy is one of the most important things we have in today's world. Your home is the place that you would expect to be the ultimate place of privacy. However, the pandemic completely changed that expectation. One of the biggest issues in online school is the requirement of having cameras on during classes and exams. This allows classmates and faculty members to see inside students' homes. This requirement is an attempt to emulate being in person but to also make it easier for students to pay attention. However, requiring cameras to be on at all times created a host of concerns including privacy and discipline issues within the schools.

There were two incidents that made national headlines where school discipline policies extended into students' homes. In the case of 9-year-old Ka'Mauri Harrison, he was suspended for six days by his school.[468] While Ka'Mauri was taking an online diagnostic assessment with his camera on, he picked up a BB gun that his younger brother had tripped over and moved it.[469] He was unaware that the BB gun was in view of the camera.[470] His teacher was unable to get his attention because he had muted the computer to take the assessment.[471] Since the

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[466] *See id.* (referring to the Mar. 11, 2020 date).
[467] *U.S. Education in the Time of COVID*, NAT'L CTR. FOR EDUC. STAT, https://nces.ed.gov/surveys/annualreports/topical-studies/covid/ (last visited Feb. 28, 2023).
[468] *Harrison v. Jefferson Par. Sch. Bd.*, 502 F. Supp. 3d 1088, 1093 (E.D. La. 2020).
[469] *Id.* at 1091.
[470] *Id.*
[471] *Id.* at 1092.

teacher thought she had seen a real gun, she reported the incident to the school's principal, which led to a six-day suspension for Ka'Mauri.[472] The school claims that he was suspended for violating the Jefferson Parish School System's policy against possessing "weapons prohibited under federal law."[473] The Harrison family was never given the option to appeal the suspension as the school claimed that the right to appeal only attaches to expulsions and not suspensions.[474]

Isaiah Elliot's story was the second of this kind to make national news. Isaiah is a 12-year-old boy with disabilities from Colorado.[475] He was suspended for five days and questioned at his home by police for displaying a neon green toy gun during his online schooling.[476] The teacher told the principal that she assumed the gun he was waiving around was just a toy gun, which Isaiah's mother also confirmed by email.[477] Despite all this, the police still showed up to Isaiah's home, warning that "he could have faced criminal charges for '[i]nterference with the staff, faculty, or students of educational institutions.'"[478]

A third story that did not receive as much attention but was factually similar happened to 12-year-old middle school student, Cole Mayer. Cole was in his remote learning class when he stood up, and revealed a gun behind his bed.[479] The teacher screenshotted the image and the school in turn dispatched the police to the Mayer home to investigate the situation.[480] The gun was later determined to be a pellet gun, so the officers did not write up a report.[481] However, it did result in a 10-day suspension for Cole after initially considering to expel him.[482]

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[472] *Id.* at 1092-93.
[473] *Harrison*, 502 F. Supp. 3d at 1092.
[474] *Id.* at 1093.
[475] *The Zoom-to-Prison Pipeline*, HARV. C. R. C.L. L. REV. AMICUS BLOG (Oct. 27, 2020), https://journals.law.harvard.edu/crcl/the-zoom-to-prison-pipeline/.
[476] *Id.*
[477] *Id.*
[478] *Id.*
[479] Joshua Dunn, *What Teachers Spy in Homes Over Zoom Winds Up in Court: Visible Guns, Trump Banners Get Students in Trouble*, 21(3) EDUC. NEXT 6, 6 (2021), https://www.educationnext.org/wp-content/uploads/2022/01/ednext_XXI_3_legalbeat.pdf.
[480] *Id.*
[481] *Id.*
[482] *Id.*

Allowing schools to extend their policies into the private homes of their students is clearly an intrusive form of authority. As students expose the inside of their homes to their classmates and teachers, their family's lives are on display. Not only do students have to worry about every item that is in their background of their camera, but having police show up at your home would undoubtedly traumatize students. Although safety is usually the number one priority of schools, calling the police to a student's home for violating a school's policy in their own home seems like a stretch of authority.

B. Online Proctoring Issues

One of the most intrusive technologies that became popular during the pandemic was the use of proctoring surveillance apps. There are many online proctoring apps such as Proctorio, ProctorU, Honorlock, Examity, and Proctor360, that schools and universities around the country have used. Online proctored exams allow examiners to supervise the assessment process in real time.[483] ProctorEdu states that the main goal of this software is to "prevent cheating and to safeguard academic integrity while conducting online testing."[484] There are five main ways of remote proctoring: lockdown browser, recorded proctoring, automated proctoring, blending online proctoring, and lastly, live remote proctoring.[485] These apps record patterns of keystrokes, eye-tracking, and body movements. For example, the eye-tracking is to make sure students don't look off screen too much where they might have prepared answers hidden off screen.[486] With this function, stress levels increase as students are afraid of getting flagged for cheating if they move or look around too much. Arguably the most invasive proctoring system however is the live proctoring. Here, a human examiner watches and listens to the test-taker through real-time audio and video.

The process of even getting to the exam created stress for many individuals as well. First, you have to verify your identity. The system

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[483] Anton Skshidlevsky, *What Is Online Proctoring: Complete Guide,* PROCTOREDU (Sept. 1, 2022), https://proctoredu.com/blog/tpost/8dagtym3n1-how-do-online-proctored-exams-work.
[484] *Id.*
[485] *Id.*
[486] Jason Kelley and Lindsay Oliver, *Proctoring Apps Subject Students to Unnecessary Surveillance*, ELEC. FRONTIER FOUND. (Aug. 20, 2020), https://www.eff.org/deeplinks/2020/08/proctoring-apps-subject-students-unnecessary-surveillance.

will take a photo of you and then you have to verify that you are the test-taker by showing the examiner your ID.[487] Usually the last step before getting to the exam is by performing a room scan. The purpose of these room scans is to check that your test space complies with your exam administrator's requirements.[488] The room scan typically requires a test-taker to scan all walls within the room, show the ground below and beside them, their desk area, and even hold up a mirror to the camera to show that there are not any cheating supplements attached to their computer/computer screen.

One incident that stands out is the case of Tara Duncan. Tara Duncan was taking an online exam through Pearson Education. After asking to use the restroom during her online exam several times, the proctor told her she could go only if she took her computer with her.[489] The proctor told her that if she did not keep her camera and microphone on while in the restroom, she would fail the exam.[490] Out of fear of failing her exam, Duncan believed she had no other choice but to comply with the proctor. In turn, she sued Pearson Education.[491] It is undeniable that there are many other stories like this that have caused students severe emotional trauma. How far are schools willing to go to prioritize academic integrity over students' right to privacy?

Privacy issues are only the beginning when it comes to using online proctoring services. These services require access to technology that not all students are guaranteed to have, can discriminate against students of color and students with disabilities, have data security concerns, and more.[492] Students of color have trouble even accessing their exams because the software is unreliable in detecting them through

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[487] *ID Verification and Authentication*, HONORLOCK https://honorlock.com/id-verification-and-authentication/ (last visited Feb. 28, 2023).
[488] *Id.*
[489] Hailey Martin, Article, *Unconstitutional Room Scans? The Fourth Amendment in the Digital Age*, 91 U. CIN. L. REV. (2023).
[490] *Id.*
[491] *Id.*
[492] Sarah Silverman et. al., *What Happens When You Close the Door on Remote Proctoring? Moving Toward Authentic Assessments with a People-Centered Approach*, 39 TO IMPROVE THE ACADEMY 115, 115 (Spring 2021), https://quod.lib.umich.edu/cgi/p/pod/dod-idx/what-happens-when-you-close-the-door-on-remote-proctoring.pdf?c=tia;idno=17063888.0039.308;format=pdf.

facial recognition and similar technologies.[493] As for students with disabilities, the software might flag involuntary spasms, such as those associated with Tourette's or cerebral palsy.[494] Lastly, a proctoring service had to suspend its services because of a data breach, and the company was not sure how the breach affected the students' data.[495] This is only a fraction of the issues that come with online proctoring.

C. Room Scans

a. Ogletree v. Cleveland State University

This next story is what sparked the inspiration for this Note. This story could possibly change the requirement of online proctoring software forever. Aaron Ogletree, a chemistry student at Cleveland State University attended classes online. This is because during the spring 2021 semester, Cleveland State required students to complete and pass a "Daily Health Assessment" to be able to attend a class in-person on campus.[496] Due to Ogletree's various health issues that impacted his immune system and put him at risk of the COVID pandemic, he could not pass these "Daily Health Assessments" and was therefore not permitted on campus.[497]

On February 17, 2021, Ogletree was scheduled to take a chemistry exam at home.[498] Two hours before his exam, Cleveland State Testing Services emailed him to inform him that the proctor would be "checking your ID, your surroundings and your materials."[499] Ogletree responded to this email explaining that he "[had] confidential settlement documents in the form of late arriving 1099s scattered about [his] work area and there was not enough time to secure them."[500] Immediately

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[493] Deborah R. Yoder-Himes et. al, *Racial, Skin Tone, and Sex Disparities in Automated Proctoring Software*, 7 FRONT. EDUC. 1, 1 (Sept. 2022), https://www.frontiersin.org/articles/10.3389/feduc.2022.881449/full.
[494] Lydia X. Z, Brown, *How Automated Test Proctoring Software Discriminates Against Disabled Student*, CTR. FOR DEMOCRACY & TECH. (Nov. 16, 2020) https://cdt.org/insights/how-automated-test-proctoring-software-discriminates-against-disabled-students/.
[495] *FAQs – Security Incident on 13 October 2020*, PROCTORTRACK, (Oct. 17, 2020, 8:41 PM), https://www.proctortrack.com/blog/announcement/faqs-security-incident-on-13-october-2020/.
[496] Ogletree v. Cleveland State, No. 1:21-cv-00500, 2022 WL 3581569, at *2 (N.D. Ohio Aug. 22, 2022).
[497] *Id.*
[498] *Id.* at 3.
[499] *Id.*
[500] *Id.*

prior to beginning his exam, the proctor instructed Ogletree to conduct a scan of his bedroom, which he did.[501]

The room scan lasted under a minute, likely no longer than ten to twenty seconds, during which the proctor saw no tax documents or medications.[502] Both the room scan and chemistry test were video recorded, which was then retained by Cleveland State's third-party vendor.[503] Cleveland State maintains that access to these recordings is strictly controlled, and accordingly, there have been no known data breaches involving remote exam recordings.[504] Based on these facts, Ogletree alleges that Cleveland State violated his rights under the Fourth Amendment and moved for summary judgment.[505]

b. Fourth Amendment in Ogletree

In the court's analysis on this case, it first had to determine if remote virtual room scans qualify as searches within the meaning of the Fourth Amendment.[506] A Fourth Amendment search "occurs when the government violates a subjective expectation of privacy that society recognizes as reasonable."[507] Ogletree contends that the remote scans do constitute a Fourth Amendment search because "students have a subjective expectation of privacy in their homes, and especially in their bedrooms, and society recognizes that expectation as reasonable."[508] Cleveland State University argues that Ogletree's subjective expectation of privacy was not objectively reasonable because room scans are "standard industry wide practice" and students usually agree to their use.[509] The court rejected Cleveland State University's argument and held that the Fourth Amendment applies to the virtual room scans.[510]

However, the court had to address the next issue of whether the search was unreasonable. To determine if a search meets the reasonableness standard, the intrusion on the individual's Fourth Amendment interests is balanced against legitimate governmental

[501] *Ogletree*, 2022 WL 3581569, at *3.
[502] *Id.*
[503] *Id.*
[504] *Id.*
[505] *Id.*
[506] *Ogletree*, 2022 WL 3581569, at *4.
[507] *See* Katz v. United States, 389 U.S. 347, 361 (1967).
[508] *Ogletree*, 2022 WL 3581569, at *4.
[509] *Id.*
[510] *Id.* at 7.

interest.[511] Traditionally, reasonableness requires a warrant which relies on probable cause; however, a reasonable search can still occur without probable cause.[512] As ruled in *New Jersey v. T.L.O.*, a student can be searched if school officials have reasonable suspicion, not probable cause.[513]

Therefore, students in public schools have a lower reasonable expectation of privacy in order to allow the faculty to facilitate safety concerns.[514] This exception is called the special needs exception, which is applicable when the government has "special needs, beyond the normal need for law enforcement."[515] Here, public schools are considered a government entity and fall under this exception. To determine when the special needs exception applies, courts consider (1) nature of the privacy interest affected; (2) the character of the intrusion; (3) the nature and immediacy of the government concern; and (4) the efficacy of the means of addressing the concern.[516]

For the first factor, the nature of the privacy interest affected, the court states that "it is well-settled that the home lies at the core of the Fourth Amendment's protections."[517] While this intrusion was not physical, the same principles apply to a visual intrusion conducted through remote technology.[518] On the second factor, the court discussed how Ogletree's options in taking the exam were limited between his health issues and that he could not attend in-person classes.[519] However, the court admits that the scan at issue was minimally intrusive and that the student could have taken steps to protect his privacy to ensure the confidential materials were hidden.[520] Even with the scan being minimally intrusive, the court determined that the "Fourth Amendment's protection of the home has never been tied to measurement of the quality or quantity of information obtained."[521]

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[511] *Id.*
[512] *Id.*
[513] New Jersey v. T.L.O., 469 U.S. 325, 326 (1985).
[514] *New Jersey*, 469 U.S. at 348 (Powell, J., concurring).
[515] *Ogletree*, 2022 WL 3581569, at *8.
[516] *Id.*
[517] *Id.*
[518] *See* Kyllo v. United States, 533 U.S. 27, 34 (2001).
[519] *Ogletree*, 2022 WL 3581569, at *2, 8.
[520] *Id.* at *8.
[521] *See Kyllo*, 533 U.S. at 37.

The court then held that third factor of governmental interests weighs in favor of Cleveland State in which they argued that room scans ensure fairness and integrity.[522] For the fourth and final factor, the court determined that this factor weighed in Ogletree's favor since Cleveland State did not offer much argument or evidence to support the efficacy of room scans and that there are other safeguards the University could put in place to preserve test integrity other than room scans.[523] Ogletree argued that room scans do little to stop students from cheating and there are plenty of other ways for students to cheat.[524] With three out of the four factors weighing in favor of the student, the court held that Ogletree's privacy interest in his home outweighs Cleveland State's interests in scanning his room.[525]

The court determined that Cleveland State's practice of conducting room scans was unreasonable under the Fourth Amendment and Cleveland State could no longer require Ogletree to perform any more rooms scans.[526] However, the court also declined to extend this injunction to other students and universities, stating it "would be overly broad and is unnecessary to provide Mr. Ogletree the relief to which he is entitled."[527] While Ogletree is the first student to sue for his right to privacy being violated under the Fourth Amendment through an unreasonable video search, it is likely that many lawsuits will follow from the widespread use of cameras not only in education but also in remote work.

REACTIONS FROM PROCTORING SERVICES

Ogletree sparked conversations all around the nation as it was the very first case of its kind to tackle student privacy issues with the use of proctoring services under the Fourth Amendment. Respondus, an online proctoring service named in the *Ogletree* case, released a statement and what the ruling meant for their services after this decision was released. Respondus stated:

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[522] *Ogletree*, 2022 WL 3581569, at *9.
[523] *Id.* at 9.
[524] *Id.*
[525] *Id.*
[526] *Id.*
[527] Peter Hayes, *Cleveland State Student Wins Court Ban on Dorm Room Exam Scans*, BLOOMBERG LAW (Dec. 21, 2022, 12:27 PM), https://news.bloomberglaw.com/litigation/cleveland-state-student-wins-court-ban-on-dorm-room-exam-scans.

> "[T]he decision was issued from the United States District Court in Ohio, which means it is not binding on other district or appellate courts in the United States. This decision relied on a very fact dependent inquiry and therefore we do not believe this is a landmark ruling relating to remote proctoring technologies."[528]

Honorlock was the second online proctoring service mentioned in the Ogletree lawsuit. They released a statement as well. Honorlock states that although they were named in the matter, it was "simply because Cleveland State University had multiple proctoring solutions."[529] They also stated that "the ruling does not apply to any other exams beyond this specific case. This ruling allows CSU to conduct room scans legally."[530]

A third proctoring service called Proctorio also released a statement after decision was released called "striking a balance." Their statement was a more detailed statement on how this decision affects their services and how they plan to approach this decision. First, it states that any university or institution who contracts with them has full discretion to use or not use any of their remote proctoring features.[531] They also provided that they have actually moved away from the concept of room scans to something they called a "Desk Scan." This desk scan "will periodically ask the test taker to show a 360-degree view of their exam environment", providing "insight as to what is on the test taker's desk or if there are other individuals in the room."[532]

Proctorio feels this is a more "targeted approach that balances the student's very real concern about protecting the privacy of their personal space."[533] Proctorio is setting a standard that other proctoring services

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[528] *Our Take on the Ogletree Ruling*, RESPONDUS, https://web.respondus.com/ogletree/ (last visited March 19, 2024).
[529] *Room Scans FAQs*, HONORLOCK (Jan. 12, 2023), https://honorlock.com/room-scans-faq/.
[530] *Id.*
[531] *Striking a Balance*, PROCTORIO (Aug. 24, 2022), https://proctorio.com/about/blog/striking-a-balance.
[532] *Proctorio Settings Overview*, PROCTORIO (Feb. 2021), https://gato-docs.its.txst.edu/jcr:c0cafb17-98ab-4d12-bdd1-e7e80e76c39a/Proctorio%20Exam%20Admin%20Guide%20-%20Settings%20Overview.pdf.
[533] *Striking a Balance*, s*upra* note 69.

should follow. There absolutely should be a balance between preserving academic integrity and students' privacy, and by listening to your users and their concerns, we can start moving in the right direction.

BENEFITS TO REMOTE PROCTORING

There are some benefits to remote proctoring but most of these benefits are made for the universities and institutions that implement them, not the test takers. For test-takers, the only benefits these services seem to provide are convenience and flexibility. Test takers don't need to travel to actual test centers, and in most cases, they can choose when to take the exam.[534] This means remote proctoring makes education and examinations more accessible. With this feature, test-takers can take exams anywhere or from the comfort of their own home at any time.[535] The rest of the benefits are more tailored to the universities that use them but they are important to know to consider why universities and institutions prefer these methods over in-person assessments. Most of them have to deal with serving academic integrity.

Remote proctoring services decrease the chances of cheating that could make exams unfair for students through a few features. First, many proctoring services have either a lockdown browser or browse security. With a lockdown browser, the student has complete restricted access to the internet. They can only access their exam within the software and has no other access to anything on their computer. With browse security, the test taker can only take the exam on one screen, forcing them to unplug any other monitors.[536] Also with lockdown browsing, test takers are unable to copy and paste and take screenshots which prevents them from sharing or transferring that information while taking the exam.[537]

Next, there are also steps to verify a test-taker's identity to make sure no one is taking an exam for someone else. This is done by having the student provide a photo of their ID and then a picture is taken of

[534] Tyler Stike, *Top 10 Benefits of Online Proctoring*, HONORLOCK (Jun. 14, 2021), https://honorlock.com/blog/top-10-benefits-of-online-proctoring/.
[535] Skshidlevsky, *supra* note 21.
[536] *Browser-locking to Protect You and Your Test Takers,* PROCTORIO, https://proctorio.com/products/lock-down (last visited Jan. 7, 2024).
[537] *Id.*

them to make sure to photos match. This is usually done before the exam starts and once the verification is completed, the exam will begin.[538]

Another feature that prevents cheating is the use of tracking where the test-taker is monitored through audio, video, and camera. During the exam, the individual is either watched by a live proctor or recorded to see if they engage in any suspicious activity.[539] This can include looking off screen at documents that may not be allowed for the exam or talking to someone in the room. Lastly, a huge benefit to online proctoring is that it is cost-efficient for educational institutions since there is no need for examination centers and physical proctors, which can cut administrative costs.[540]

These benefits are clearly tailored to educators trying to preserve academic integrity and prevent cheating. However, these services could be more foolproof and there are loopholes around them. As the plaintiff in *Ogletree* argued, room scans do little to stop students from cheating and there are plenty of other ways to cheat.[541] The online proctoring company, ProctorU, said their percentage of cheating during the height of the pandemic jumped to 8 percent, compared to 1 percent before the pandemic.[542] Also, according to a study done by publishing and digital education company, Wiley, 93% of instructors think students are more likely to cheat online than in person.[543] Online proctoring services may provide educators with the comfort that they are preventing cheating but the benefits do not outweigh the invasive practices that the students have to go through. Students need to voice their concerns because without them schools will continue to use these services.

STUDENT ACTION

With that being said, students have started to voice their concerns. From being wrongly accused of cheating, locked out of exams for verification issues, and forced to have someone see inside the privacy

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[538] Skshidlevsky, *supra* note 21.
[539] *6 Benefits of Deploying Online Proctoring Tools for K-12 Exams*, PROCTORDIY (Jan. 25, 2022, 5:32 PM), https://proctordiy.com/blog/6-benefits-of-deploying-online-proctoring-tools-for-k-12-exams.
[540] Skshidlevsky, s*upra* note 21.
[541] *Ogletree*, 2022 WL 3581569, at *9.
[542] Derek Newton, *Another problem with shifting education online: cheating*, HECHINGER REPORT (Aug. 07, 2020), https://hechingerreport.org/another-problem-with-shifting-education-online-cheating/.
[543] *Id.*

of their own home, it is no surprise that students are starting to push back against these technologies. By November 2020, more than 60,000 students across the U.S. signed petitions calling on their colleges to stop using automated proctoring tools.[544] In fact, according to a data analysis done by YR Media, 79 Change.org petitions against virtual proctoring software in the US have been launched across 28 states. Also, of those 79 petitions, privacy was mentioned in 72 of the 79 petitions.[545] YR Media is a national network of young journalists and artists collaborating with peers across the country and media professionals to create impactful content.[546]

For example, at the University of Texas at Dallas, a petition to stop using Honorlock received over 6,300 signatures.[547] The petition claims that the app can collect "your face, driver's license, and network information," and calls the use of it a "blatant violation of our privacy as students."[548] Students at Florida International University also petitioned their school to stop using Honorlock gathering over 7,200 signatures.[549] The petition states that Honorlock collects a lot of data from the test-takers and that the program is allowed to keep the information for up to 1-2 years, in some cases.[550] It is likely that we will see many more lawsuits and petitions unfold in the coming months/years of students refusing to be subjected to these intrusive apps.

IMPROVEMENTS IN PRIVACY

While there are still many advancements to be made, there have been a few changes that are a step in the right direction in protecting students' privacy. For example, Colorado Governor Jared Polis signed a

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[544] Jeffrey Young, *Pushback Is Growing Against Automated Proctoring Services. But So Is Their Use*, EDSURGE (Nov. 13, 2020), https://www.edsurge.com/news/2020-11-13-pushback-is-growing-against-automated-proctoring-services-but-so-is-their-use.

[545] Zoe Harwood, *Has Virtual Proctoring Gone Too Far?*, YR INTERACTIVE, https://interactive.yr.media/has-virtual-proctoring-gone-too-far/ (last visited Mar. 18, 2023).

[546] *About YR Media*, YR MEDIA, https://yr.media/about-yr/ (last visited Jan. 7, 2023).

[547] Jason Kelley, *Students Are Pushing Back Against Proctoring Surveillance Apps*, ELEC. FRONTIER FOUND., (Sept. 25, 2020), https://www.eff.org/deeplinks/2020/09/students-are-pushing-back-against-proctoring-surveillance-apps.

[548] *Id.*

[549] *Id.*

[550] *Id.*

billed called, "Isaiah's Law" which states that "for the purposes of online instruction – a student's home is not legally the same as school property."[551] This law was signed into effect on May 28, 2020 after the traumatic event that happened to Isaiah Elliot where a teacher called the police to his house after he displayed a toy gun in his camera during online learning.[552] This law states that "if a student who is participating in online instruction is suspended or expelled on or after March 23, 2020…the school that suspends or expels that student shall revoke the suspension or expulsion and expunge the suspension or expulsion from the student's record."[553] This law is a great example of protecting student privacy over a school's overreach of authority into a student's home.

Online learning has diminished since the COVID-19 pandemic has slowed down, however, this law will still save many students from the trauma that Isaiah endured. Online learning provides a convenient alternative to students when they cannot be physically in school. Therefore, laws like "Isaiah's Law" are important to pass since online learning is not going away anytime soon. While an apology in Isaiah's situation may not fix the issue, a law like this will make sure it doesn't happen to any other student and other states should follow in Colorado's footsteps.

There are some universities who have chosen to ditch all or parts of these invasive online proctoring practices after listening to their students' concerns.[554] For example, the University of Illinois Urban-Champaign (UIUC) discontinued its use of Proctorio after its summer 2021 term after almost a year of complaints and concerns over privacy, discrimination, and accessibility.[555] In a UIUC email, the administration

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[551] Ryan Warner, *A Year After Sending Cops To A Kid's Home, A Colorado Springs School District Apologizes*, CPR NEWS (Sept. 10, 2021, 6:11 PM), https://www.cpr.org/2021/09/10/a-year-after-sending-cops-to-a-kids-home-a-colorado-springs-school-district-apologizes/.

[552] *The Zoom-to-Prison Pipeline*, *supra* note 13.

[553] *House Bill 21-1056*, COLORADO GEN. ASSEMBLY, https://leg.colorado.gov/sites/default/files/2021a_1059_signed.pdf (last visited Mar. 19, 2023).

[554] *Protect Student Privacy: Ban EProctoring*, BAN EPROCTORING, https://www.baneproctoring.com/ (last visited Mar. 8, 2023).

[555] Monica Chin, *University Will Stop Using Controversial Remote-Testing Software Following Student Outcry*, THE VERGE, (Jan. 29, 2021), https://www.theverge.com/2021/1/28/22254631/university-of-illinois-urbana-champaign-proctorio-online-test-proctoring-privacy.

stated that they "take these concerns seriously" and that many instructors have opted for alternative forms of assessment that do not require remote proctoring and recommend that other instructors should also consider these alternative methods.[556]

Instructors at UC Berkeley were barred from proctoring exams online for the remainder of the spring 2020 semester after the administration decided that the online proctoring services do not satisfy the university's "policies related to privacy and access for people with disabilities."[557] Miami University in Ohio also made some changes to their use of Proctorio. After the *Ogletree* decision was released, Miami announced that they "[W]ill no longer include the room scan as a selectable option within our remote proctoring software. This change has already been universally applied by our online proctoring provider and room scans are no longer available for use."[558] They also suggested alternative testing methods that don't involve online proctoring services which will be discussed in this Note.

UIUC, UC Berkeley, and Miami are not the only universities to stop using online proctoring services.[559] Others should take after these universities to see how they too can protect their students' privacy. There are many alternatives that don't require as invasive practices that these online proctoring services perform.

Lastly, a big win for law students is that the National Conference of Bar Examiners (NCBE) announced that the bar exam would start to be made available only in an in-person format in some jurisdictions.[560]

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[556] Allison Kushner, *Newsletter*, UNIV. OF ILLINOIS URBANA-CHAMPAIGN, https://emails.illinois.edu/newsletter/38/1970177238.html (last visited Mar. 8, 2023).
[557] Olivia Buccieri, *Online Exam Proctoring No Longer Allowed for UC Berkeley Classes*, THE DAILY CALIFORNIAN (Apr. 5, 2020), https://www.dailycal.org/2020/04/05/online-exam-proctoring-no-longer-allowed-for-uc-berkeley-classes.
[558] *Proctorio Room Scanning: What the Policy Update Means for Your Assessments*, MIAMI UNIV. (Dec. 2022), https://sites.miamioh.edu/teach-online/proctorio-room-scanning-what-the-policy-update-means-for-your-assessments/.
[559] *See Protect Student Privacy: Ban EProctoring*, *supra* note 92. This website lists other universities that are and are not using online proctoring services.
[560] Debra Cassens Weiss, *Online Bar Exams Axed by NCBE Beginning Next Year*, ABA J. (Jun. 3, 2021, 1:04 PM CDT), https://www.abajournal.com/news/article/online-bar-exams-axed-by-ncbe-beginning-next-

The director of test development at NCBE recognized that online bar examinations were a "valuable stopgap" during the pandemic, but "[R]emote exams create challenges for exam security and uniformity, and for this reason, we have consistently advocated for in-person testing as the best option whenever possible."[561] This is huge for bar exam takers, as many candidates faced technical issues with their bar exams during the remote October 2020 exam and July 2021 exam.[562] "An NCBE spokesperson told the ABA Journal they had not heard of any tech issues at in-person testing sites."[563] This is proof that remote exams lead to many more issues than in-person exams, even beyond privacy issues.

LAWS PROTECTING STUDENT PRIVACY

As clear by the stories laid out before, the students and their families may want to pursue legal action against the schools and online proctoring services. There are two primary federal laws applicable to remote learning. However, these laws mostly pertain to the collection of student data and do not provide much protection or legal recourse for students and families subjected to these intrusive technology practices, but they are still important to be aware of.

First, the Family Educational Rights and Privacy Act (FERPA) is a federal law that protects students' privacy. FERPA "affords parents the right to have access to their children's education records, the right to seek to have the records amended, and the right to have some control over the disclosure of personally identifiable information from the education records."[564] However, the exceptions to this law overshadow this right. Under the school official exception, schools may share student information without consent as long as it "furthers a legitimate

year#:~:text=Law%20grads%20taking%20bar%20exams,2022%2C%20Law.com%20reports.

[561] *Id.*

[562] Stephanie F. Ward, *Technical Problems Again Plague Remote Bar Examinees, Who Blame Software Provider*, ABA J. (Aug. 5, 2021, 11:27 AM CDT), https://www.abajournal.com/web/article/technical-problems-again-plague-remote-bar-examinees-who-blame-software-provider.

[563] *Id.*

[564] *What is FERPA?,* US DEP'T OF EDUC. https://studentprivacy.ed.gov/faq/what-ferpa#:~:text=The%20Family%20Educational%20Rights%20and,identifiable%20information%20from%20the%20education, (last visited Mar. 19, 2023).

educational interest."[565] The standard for a legitimate educational interest is very low and schools used preserving academic integrity as their interest to pass that standard during the pandemic.[566]

If this standard is not met, schools would have to prepare consent forms for parents. Concerns of FERPA during the pandemic pertained more to the issues of releasing details if a student had COVID, contact tracing, and online services collecting personal biometric data and what parents can do with that data. While this issue is also a huge concern, it is clear that the scope of FERPA is limited in covering privacy issues of seeing into your home, so that students and parents would have little recourse and/or protection under this federal law.

The Children's Online Privacy Protection Act of 1998 (COPPA) "imposes certain requirements on operators of websites or online services directed to children under 13 years of age, and on operators of other websites or online services that have actual knowledge that they are collecting personal information online from a child under 13 years of age."[567] This law had major implications for schools using technologies like Zoom to facilitate classes.

The rule requires websites and any online service providers to transparently communicate their privacy policies to parents and take reasonable steps to maintain the confidentiality of children's information.[568] This law would shift the burden to companies like Zoom. This is another important law that families should be aware of to make sure that the online service their children are using are in compliance with data collecting. However, it also does not help with the current issue of invasion of privacy. With not many laws pertaining to the invasive nature of technologies used during distance learning, what can students do?

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[565] Elana Zeide, Article: *Big Proctor: The Cautionary Tale of Pandemic Online Proctoring*, 3 NOTRE DAME J. EMERGING TECH. 74, 104-05 (2022).
[566] *Id.*
[567] *Children's Online Privacy Protection Rule ("COPPA")*, FED. TRADE COMM'N, https://www.ftc.gov/legal-library/browse/rules/childrens-online-privacy-protection-rule-coppa (last visited Mar. 19, 2023).
[568] *Children's Online Privacy Protection Rule: A Six-Step Compliance Plan for Your Business*, FED. TRADE COMM'N, https://www.ftc.gov/business-guidance/resources/childrens-online-privacy-protection-rule-six-step-compliance-plan-your-business (last visited Mar. 20, 2024).

ALTERNATIVE ASSESSMENTS/SOLUTIONS

While there may not be much legal action, this Note is hoping to provide some insight for schools and universities to implement new strategies to get away from invasive remote proctoring services. Students can also take steps to protect their own privacy. There is no simple solution for finding a perfect balance between preserving academic integrity and protecting students' privacy, but there are actions that can be taken. Online proctoring services are not the only option available to universities and institutions.

A. Students

First, there are strategies that students can take to protect themselves if they are subjected to online proctoring services such as Proctorio. First, a solution that may have been able to protect individuals like Ka'mauri Harrison, Isaiah Elliot, and Cole Mayer is that if you are required to have your camera on during school, you should use the blurring feature or put up a green screen feature. These features will not allow individuals to see the items around you or behind you. Zoom utilizes virtual backgrounds to "provide you with more privacy or a consistent and professional look for a presentation."[569]

Students can also protect their privacy by prepping the room they are planning to take their exams in or have their zoom class. If you have important documents with personal information on them, you should try your best to hide those documents until after your exam is over. If you also have items that could be deemed suspicious, you should take them down to prevent you from being exposed to any discipline actions. This option may not be available for all students depending on their living situations, but for those who can engage in these practices, should be proactive in protecting themselves.

Students can also go to a neutral site for their online classes and exams if home is not the best environment. A neutral site could be a library or an empty classroom. However, when COVID first hit the US, this option was not available as most schools and public places were closed due to stay-at-home orders.[570] Now, if students can find a quiet place where they don't have to worry about their personal items being

[569] *Changing Your Virtual Background Image*, ZOOM, https://support.zoom.us/hc/en-us/articles/210707503-Virtual-Background (last visited Mar. 20, 2024).
[570] *CDC Museum COVID-19 Timeline*, *supra* note 2.

seen or loud noises in the background, then this may be a good solution as well.

If schools are going to require students to have their cameras on, perform a room scan, be recorded during their exams, and more, there are actions that students can take to protect themselves. However, just because they are required to partake in these assessment features, does not mean it is normal or should continue to be practiced. Teachers, schools, universities, and institutions can implement other strategies that don't require an invasion on students' privacy. Student privacy and safety should be put first over any other issue regarding education, but especially academic integrity.

B. Educators

While some may think that this issue is no longer prevalent with the slowing down of the COVID-19 pandemic, there are still many institutions and universities that employ these practices. For example, the Law School Admission Test (LSAT) continues to provide the exam in an online, live, remote-proctored format and it does not look that will change anytime soon.[571] Many universities still use these services for their end-of-year final exams or for students in their online programs.[572]

For professors that aren't willing to offer alternative assessments, they should alert students that they use these online proctoring services in their classroom. Once a student signs up for the class, the professor should have them sign a document that they understand and agree to using these services for their exams and those conditions. If students are aware of this, it may allow them to better prepare, get the accommodations they need, and so on. Professors should also consider only implementing select features of the proctoring services so that the exam process is less invasive. For example, they could disable the room scan.

Remote exams may seem like a simple solution, but they have many negative impacts. For example, their features can cause students more stress which can negatively impact their grades, students may not

[571] *The LSAT Advantage*, LSAC, https://www.lsac.org/lsat/about#:~:text=Registration%20is%20now%20open%20for,%2C%20live%20remote%2Dproctored%20format (last visited Mar. 10, 2023).
[572] *See Protect Student Privacy: Ban EProctoring*, *supra* note 92.

have access to the appropriate technology to take these exams, and most importantly privacy concerns.[573]

With that being said, there are alternative assessments that educators should provide to move away from remote proctoring and protect students from this invasion of privacy. Requiring students to have their cameras on for online classes is not the only way to make students participate. Teachers can require students to participate in polls, turn in daily assignments to test their knowledge of the lesson that day, and more. Just because a student does not have their camera on, does not mean that they are not paying attention.

High-stake exams are also not the only way to assess a student's learning. Instead of doing one large exam at the end of the semester, educators can create smaller assessments such as quizzes at the end of each chapter to test their knowledge of that subject. They could also implement research papers on certain topics that they would have had to study for exams. Research papers are a great way to help students write better and academic integrity can be preserved by running the papers through plagiarism checks.

Another way to boost students' skills is to create presentation assignments. Presentation assignments are important for building public speaking and professional skills that will prepare students for the real world. Presentations will help students prepare for the future by allowing them to build effective communication skills that they will likely require for their careers.

Group projects are also a good way to build effective communication skills. Some students dislike group projects because there are times where members of the group disappear and don't do their portion of the project. However, learning to communicate with the group members and adapting to frustrating challenges like that will help students navigate future similar situations that could occur in their jobs with coworkers. Having learned how to navigate a situation like this will help them become a problem solver which will look great to hiring managers. Educators should also realize this potential issue and allow students to grade their group members so that in the event someone is

[573] *Remote Assessments*, IOWA STATE UNIV., https://www.celt.iastate.edu/instructional-strategies/learning-activities/remote-assessments/ (last visited Mar. 19, 2023).

not doing their portion of the work, proper discipline and academic integrity can be preserved.

One form of exams that would not require online proctoring or room scans would be open-note exams. One way to eliminate the worry of cheating is to allow students to bring notes or textbooks with them to their exams. Professors can limit what "open-note" means for their class and that way they can make their exams as challenging as they would like. If professors want students to only use their course materials, they can implement a lockdown browser software. This feature disables a student's ability to access the internet and other apps on their computer until the exam is finished. This feature is less invasive than being tracked and watched through your own computer device.

Also, open-book/note exams are very practical for most careers. They allow students to analyze information and identify situations. With most careers, when there is a problem with a client or patient, you will have all the resources you need to figure out the solution. Timed open-book exams create those exact time-sensitive situations for students to help them prepare for the future. With closed-book exams, students just memorize for the exam and do not commit anything to their long-term memory. They do enough to pass the exam and then forget the information a few days later.

Some professors may worry that open-book exams may cause their students to not study. In law school, open-book exams mean the exams may be harder.[574] Professors can really challenge their students through open-note exams. It will require them to organize their notes, understand the material, synthesize information, and be effective with their time. This fosters a better learning challenge than any closed-book exam could create. Students will learn practical skills and tools that they will use in their life after school.

Professors and teachers should get creative when implementing different assessments. If students can find the answers to your exams by a simple Google search, maybe the exams need to be more advanced. There are many school websites that suggest alternative assessments than the ones listed here. Some other assessments are book reviews, newspaper articles, legal briefs, annotated bibliographies, or multiple-

[574] *Open-Book Exams*, CORNELL UNIV., https://lsc.cornell.edu/how-to-study/studying-for-and-taking-exams/open-book-exams/ (last visited Mar. 19, 2023).

choice questions where students explain why the answer they chose is correct.[575] Teachers can also hand out hard copy exams to lessen the odds of cheating.

CONCLUSION

Most remote proctoring service companies do not understand the extreme conditions they are putting students through. A statement from the proctoring software company, ProctorEdu shows how far these services are willing to go. ProctorEdu on a blogpost highlighting "How To Cheat on a Proctored Exam – Top 10 Innovative Student Strategies" discussed how breaks during exams can be a way for students to cheat. ProctorEdu states that "to eliminate cheating during breaks, it's advised to limit them or inform the students in advance that they must stay on camera during the entire exam without any interruptions, even for a bathroom emergency."[576]

A statement like this is very alarming and similar to the situation that happened to Tara Duncan.[577] If the test was in person, a student would likely be allowed to leave to take a bathroom break. An online exam should be no different. Not allowing a student to go to the bathroom during an exam or forcing them to keep their camera/microphone on when going to the bathroom should not be prioritized over the possibility of someone cheating on an exam.

Remote exams are still very prevalent in today's education. A lot of schools hold their finals using remote proctoring software. For students in online programs, remote exams are likely the only exams they have. For institutions like the LSAC, their remote exams don't seem to be going away anytime soon either.[578] However, with no primary privacy laws that pertain to these issues, students aren't left with many options. Students need to start speaking out and advocating for themselves as many have already done.[579] Once students start

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[575] *Alternatives to Traditional Exams and Papers*, IND. UNIV. BLOOMINGTON, https://citl.indiana.edu/teaching-resources/assessing-student-learning/alternatives-traditional-exams-papers/index.html (last visited Mar. 19, 2023).
[576] Anton Skshidlevsky, *How to Cheat on a Proctored Exam – Top 10 Innovative Student Strategies*, PROCTOREDU (Jul. 15, 2022), https://proctoredu.com/blog/tpost/y35x7azne1-how-to-cheat-on-a-proctored-exam-top-10.
[577] *See* Martin, *supra* note 27.
[578] *The LSAT Advantage*, *supra* note 109.
[579] *See* Young, *supra* note 82.

pushing back and don't agree to be subjected to these invasive technologies, schools will have to start finding alternative ways to implement their exams.

These privacy issues are a much bigger threat to society than cheating. Schools extending their policies into students' private homes and requiring them to go through harsh testing conditions is not what education should be about. According to the International Center for Academic Integrity, academic integrity, is a "commitment, even in the face of adversity, to six fundamental values: honesty, trust, fairness, respect, responsibility, and courage."[580] The trust, fairness, and respect educators have towards students has been completely thrown out the window in an attempt stop cheating. This can have serious effects on students' faith in the education system.

Hopefully, the *Ogletree* decision will carry some weight and have some implications on testing policies. Public schools, acting as government entities, may have to completely ban their use of room scans. This would be a great win for students. Many schools have already made this change and it proves that room scans or even remote proctoring as a whole, are not needed to preserve academic integrity when taking online exams.[581] There are other, less invasive measures to take.

This Note hopes that the *Ogletree* decision will help bring justice for students such as Ka'Mauri Harrison, Isaiah Elliot, Cole Mayer, and Tara Duncan. For these students, their privacy and safety were not made a priority. Students must have privacy protections in their homes, even when using technology for educational purposes. Schools need to revisit their testing policies and make a change soon. This ruling will hopefully give students the push they need to fight back against these invasive technologies and practices.

[580] *To Build a Culture of Integrity*, INT'L CTR FOR ACAD. INTEGRITY, https://academicintegrity.org/ (last visited Mar. 22, 2023).
[581] *See Protect Student Privacy: Ban EProctoring*, *supra* note 92.

Adapting Trade Secret Laws and Strategy to Promote Biomedical Research Collaborations

Renee Kakareka-Sanchez[582]

Abstract

Scientists at Universities and other public research institutions often collaborate with industry corporations to study and/or commercialize new biomedical advancements. Although these sponsors make up only a modest percent of total research funding, they provide billions of dollars per year in funding and are essential for getting new innovations into the hands of the public.

Intellectual property, especially patents and trade secrets, are essential to commercialization of these advancements. However, trade secrecy's requirement of reasonable steps to maintain secrecy may directly conflict with disseminating research results under current trade secret laws. Current laws also do not account for the level of disclosure needed to publish scientific research versus for commercial application. Therefore, in this article, I propose changes to trade secrecy laws that may promote additional collaborations between public research institutions and industry corporations to balance the secrecy requirement with economic value.

[582] Syracuse University College of Law, J.D. Candidate, Expected Graduation 2024. I want to extend my gratitude to Professors Shubha Ghosh, Ph.D., J.D., and Luca Arnaudo, Ph.D., for their help, encouragement, and dedication in assisting with this note. Further, I would like to express my appreciation for Syracuse University, College of Law's JDinteractive program for providing me this opportunity to get an innovative legal education.

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Introduction

Scientific research is essential to expanding and improving technology and knowledge, especially in the life and health sciences.[583] However, the price tag of a well-designed and informative research study can be extremely high.[584] Although federal funding accounts for more than fifty percent (50%) of research funding for research at universities, research hospitals, and other public research centers, these opportunities are competitive and do not cover the full resource need.[585] Therefore, many researchers will partner with industry sponsors to subsidize monetary and physical resources. Nevertheless, industry corporations and public research institutions can have conflicting goals affecting their intellectual property (IP) strategy for such collaborations. Public research institutions, such as universities, have an obligation to disseminate knowledge.[586] A corporation's interest is to protect their IP rights for commercial purposes.[587] Nonetheless, research and development (R&D) inevitably produces opportunities for intellectual property to add value to any organization through exclusivity and licensed-based revenue.[588] Thus, IP strategies need to reflect the interests of both parties.

IP strategies may include securing rights to a patent, copyright, trademark, trade secret, or some combination of these. When it comes to trade secrets, however, research institutions and industry sponsors can have especially conflicting priorities, which will be the focus of

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[583] *U.S. R&D Investment*, NATIONAL SCIENCE FOUNDATION, https://ncses.nsf.gov/135/assets/0/files/ncses_usrdinvestments_onepager.pdf (last visited Mar. 3, 2023) ("53% of the growth in R&D expenditures for FY 2019 went to biological, biomedical, and health sciences").

[584] Thomas J Moore et al., *Variation in the Estimated Costs of Pivotal Clinical Benefit Trials Supporting the US Approval of New Therapeutic Agents, 2015-2017: a cross-sectional study*, BMJ OPEN 10(6): E038863 (2020).

[585] Amy Burke, et al., *U.S. and Global Research and Development, National Science Foundation*, NATIONAL SCIENCE BOARD: SCIENCE & ENGINEERING INDICATORS (Jan. 18, 2022), https://ncses.nsf.gov/pubs/nsb20221.

[586] Karla Hahn, et al., *The University's Role in the Dissemination of Research and Scholarship – A Call to Action* (2009), https://files.eric.ed.gov/fulltext/ED511357.pdf.

[587] *5 Ways to Create Value From Your Intellectual Property*, ENTREPRENEUR INDIA (Oct. 25, 2021), https://www.entrepreneur.com/en-in/news-and-trends/5-ways-to-create-value-from-your-intellectual-property/393054#:~:text=Intangible%20assets%20such%20as%20IP%20have%20been%20known%20to%20generate,creating%20multi%2Dfold%20employment%20opportunities.

[588] *See Id.*

this article. Trade secrets have three requirements: (1) information (i.e. formula, program, or device) that (2) derives "independent economic value… from not being generally known," and (3) under the circumstances, the secret is reasonably maintained.[589] The research institution's mission to disseminate knowledge may directly conflict with trade secrecy's third element, reasonable efforts to maintain secrecy. While an industry sponsor may want to maintain secrecy for commercial value, the research may reveal part of or the whole secret, thus conflicting use of trade secrecy as viable IP protection. For the public benefit, public research institutions should use caution when considering using trade secrets to protect their IP. If a trade secret strategy is agreed upon, the agreement should specify details and may strike a balance between appropriate timing of a publication (i.e., delaying publication prior to market release) and strategically choosing which information is disclosed.

Nonetheless, scientific research disclosure does not require the same level of disclosure to publish research results as a commercial application does. Therefore, moving forward the legislature should consider adapting trade secret laws as they pertain to biomedical R&D to allow for both adequate investment and collaboration in research to further scientific knowledge and bring new technology to market. The strategy I suggest is to adjust the requirements for secrecy, allowing partial disclosure of information for purpose of public benefit while maintaining protection of the remaining trade secret for economic benefit – a sort of 'waiver of disclosure.' Operational processes and legal qualifiers accompany my suggested changes to legislation and provide safeguards to protect the trade secret in a court of law while still shepherding the purpose of publishing research results to advance knowledge.

This article will explore the University's mission to disseminate knowledge, what Industry University Collaborations

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[589] Uniform Trade Secrets Act § 1(1), 14 U.L.A. 35 (1979) ("'Trade secret' means information, including a formula, pattern, compilation, program, device, method, technique, or process, that:

(i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and

(ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.").

(IUC) are and why they would be appealing to the university or public research institution. The reasoning of this appeal will be analyzed in this article through the examination of the rules of trade secret IP protections and their practical implications for universities and research institutions. This analysis will include investigating how a university may strategically balance reasonable efforts to maintain secrecy with their mission to disseminate knowledge under current trade secret laws and explore opportunities within biomedical inventions that could utilize trade secrecy. Finally, I will explain my proposed changes to legislation for biomedical trade secrets that could provide a balance between the secrecy and economic value requirements.

I. University Mission to Disseminate Knowledge

Research universities and other public research institutions are responsible for creating and disseminating new knowledge to further research and scholarship that will benefit society.[590] Research activities may be funded by federal and state governments, industry, or public and private foundations.[591] There is a "responsibility [for the institution] to ensure the broadest possible access" to their work locally, globally, and for indeterminate periods of time.[592] "[W]ithout effective and ongoing dissemination of knowledge, the efforts of researchers and scholars are wasted."[593]

The university's balance of private and public interests may "dictate how researchers and scientists negotiate the need for practical, industrial application and pure, scientific knowledge."[594] Similarly, the university's organization will affect how it approaches IP strategy.[595] There are three theoretical contemporary models of universities: pure research entities, universities as commercial entities with a public purpose, and universities as purely commercial entities, no different

[590] Hahn, *supra* note 5 at 1.
[591] *Id.*
[592] *Id.*
[593] *Id.*
[594] Shubha Ghosh, *Are Universities Special?*, 49 AKRON L. REV. 671, 673 (2016) (citing Steven Shapin, *Never Pure: Historical Studies of Science as if it Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority*, 213-14 (2010) (analyzing the dilemma facing the industrial scientist navigating the tensions between the culture of universities and that of industry)).
[595] *Id.* at 673-74.

from for-profit corporations.[596] The pure research institution is a difficult ideal to match due to resource constraints and scarcity of time and money.[597] A model in between pure research and pure commercial is a university that "pursue[s] commercial ends but for a public purpose."[598] This model theoretically provides commercialization of products and services which initiates a revenue stream that can flow back into the institution to fund additional research, fulfilling its public purpose.[599] However, this is also idealistic and universities may put funding into different, profit-building efforts such as international programs and other nontraditional initiatives.[600] Finally, a university might act no different than a for-profit corporation.[601] In practicality, all three of these models typically merge as each university balances their own priorities.[602]

A university that prioritizes a more commercial, business-like structure might favor a trade secret strategy, while a university prioritizing pure research may have a policy strictly against trade secrets. Furthermore, the Association of American Universities (AAU) recommended that institutions modify their IP policies so that the university regains a sufficient set of rights to ensure broad dissemination.[603] To understand situations where trade secrets may be an effective strategy and still allow for broad dissemination, there first needs to be an understanding as to why a university would want to partner with industry and how trade secret laws affect the IP strategy chosen for a given invention.

II. The Industry-University Collaboration

Industry-sponsored research is when a corporate sponsor, contracts with a research institution, often a university, or a specific faculty member at a research hospital, to partner on biomedical research, typically a clinical trial.[604] The trial may include an

[596] *Id.* at 676.
[597] *Id.* at 677.
[598] *Id.* at 678.
[599] Ghosh, *supra* note 13 at 678.
[600] *Id.* at 678-79.
[601] *Id.* at 679.
[602] *Id.* at 681.
[603] Hahn, *supra* note 5 at 4.
[604] *Industry-Sponsored Clinical Trials*, UNIV. OF WASH.: INST. OF TRANSLATIONAL HEALTH SCIENCES, https://www.iths.org/investigators/handbook/set-up-the-study/industry-sponsored-clinical-trials/ (last visited Mar. 3, 2023).

intervention, observation, or collection of biomedical data for a registry or repository.[605] This type of contractual structure, known as "industry-sponsored university research" is just one way an IUC may be structured.[606] Three other organizational models are the basis for these collaborations including University-to-Industry Technology Licensing, "spin-off" companies established to commercialize the technology, and less commonly, an "idea lab" model.[607] Generally, the model used is specific to the project; therefore, each of these models may be used across an institution.

Each respective model has its own benefits depending on the goal of the project. University-to-Industry Technology Licensing will develop a licensing relationship with the commercial entity, granting the right to use specific knowledge arising from university research.[608] Industry-Sponsored University Research, as discussed above, devotes expertise and resources from the university in exchange for funding from the industry sponsor. [609] For example, a clinical trial may be conducted by university hospital researchers and staff utilizing patients/participants seen at the hospital or clinic with industry funds and/or industry technology. Spin-off companies are created through cooperative efforts of private firms and "university researchers [aiming] to develop an invention" that can be commercialized.[610] Finally, an "idea lab" is a model that provides research projects administrative support and develops relationships with private industry sponsors which may lead to licensing of the research results.[611] The primary type of IUC that we will reference is the Industry-Sponsored University Research project.

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[605] *Id.*

[606] Joshua A. Newberg & Richard L. Dunn, *Keeping Secrets in the Campus Lab: Law, Values, and Rules of Engagement for Industry-University R&D Partnership*, 39 AM. BUS. L. J. 187, 200-01 (2002).

[607] *Id.*; *Innovator's Guide to Commercialization*, N.C. STATE OFF. OF RSCH. COMMERCIALIZATION (2011), https://research.ncsu.edu/commercialization/inventors-guide-to-commercialization/ (last visited Mar. 3, 2023) (providing different options for inventors at NC State University to learn about commercialization through licensing, opportunities for new ventures, patenting, partnerships, and more).

[608] Newberg & Dunn, *supra* note 25, at 201-03.

[609] *Id.* at 203.

[610] *Id.* at 204-05.

[611] *Id.* at 205-06.

A. Why Form an Industry-University Collaboration?

Although federal funds are a significant portion of university research funds, these funds have become more limited. Proportionally, federal funding for University R&D decreased from 60% in 2010 to an estimated 50% in 2019 while funding support from higher education institutions increased.[612] The percentage of university research funded by industry sponsors has remained around 6%.[613] Although this share of the funds is modest, IUCs have become more attractive to many research institutions and provide billions of dollars of research funding to research institutions across the country.[614] These types of research projects typically aim to advance research that contributes to product development and commercialization.[615] A large benefit of an industry partnership is moving research out of the lab and into the hands of those that need it, thus benefiting society.[616]

Universities may have an interest in partnering with industry to promote the dissemination and commercialization of inventions and knowledge into the market through products, services, processes and more.[617] IUCs also offer opportunities for funding of postgraduate research projects, opportunities for students to conduct applied research, to fund the building of prototypes, and gain access to expensive software systems or industry data.[618] Many Universities and research institutions have developed teams of administrative staff that assist with IUC planning and formation and others even have innovation centers that assist with obtaining IP rights and licensing with partners or incubating new companies.[619]

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[612] Burke, *supra* note 4, at 19.
[613] *Id.*
[614] *Id.*
[615] *See How Is Industry Sponsored Research Different from Government or Foundation Sponsored Research*, BOS. UNIV.: INDUS. ENGAGEMENT (Aug. 31, 2021), https://www.bu.edu/industry/2021/08/31/what-makes-industry-sponsored-research-different-from-other-sponsored-research/#:~:text=Industry%2Dsponsored%20research%20generally%20aims,the%20lab%20to%20benefit%20society.%20.
[616] *See Id.*
[617] *See* Newberg & Dunn, *supra* note 25 at 201.
[618] Corneila Malherbe, et al., *How to Tackle Research Agreements with Industry Partners*, UNIV. WORLD NEWS: AFRICA EDITION (Oct. 6, 2022), https://www.universityworldnews.com/post.php?story=20221004163333824.
[619] *Industry Sponsored Studies*, STANLEY MANNE CHILD'S RSCH INST., https://research.luriechildrens.org/en/research-resources/office-of-sponsored-

Research in response to the COVID-19 pandemic was a hot-button area for industry-sponsored research. One study found that 43.5% of clinical trials related to SARS-CoV-2 (or 2019-nCov) were industry-sponsored.[620] Furthermore, a greater proportion of non-industry sponsored COVID-19 clinical trials had been discontinued (60%), withdrawn (61.3%), or suspended (62.5%) in 2021.[621] Although discontinuations could be due to the changing landscape of the COVID-19 pandemic including vaccination rate and variant hotspots, the second leading cause for discontinuations were financial reasons, especially from non-industry sponsored studies.[622]

Moreover, the scientific developments required to develop COVID-19 vaccines originated from university and public research institutions. Breakthroughs in the mRNA technology required for the COVID-19 breakthrough took decades of investigation, many university scientists, and the licensing of patents to start-ups and biopharma companies. It took about ten years of applied R&D from BioNTech and Moderna to eventually achieve viable treatments.[623] Trade secrecy was vital to forming these collaborations and

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programs/industry-sponsored-studies/ (last visited Mar. 3, 2023) ("Resources related to industry-sponsored clinical trials research"); *About CU Innovations*, CU ANSCHUTZ: CU INNOVATIONS, https://www.cuanschutz.edu/cu-innovations (last visited Mar. 3, 2023) ("CU Innovations brings together industry partners, entrepreneurs, and investors to help CU Researchers create biomedical technology that improves the quality of life worldwide. With expertise in patents, copyrights, and licensing, CU Innovations translates discovery into impact through transparent, flexible, best practice intellectual property management services"); *Our Impact*, INNOVATION AND NEW VENTURES OFFICE: INNOVATION AND ENTREPRENEURSHIP, https://www.northwestern.edu/innovation/our-impact/northwestern-patents-startups.html (last visited Mar. 3, 2023) (describing an incubator for new companies and help obtain IP rights).

[620] Lisa Cooper et al., *COVID-19 Pandemic Response Varies by Clinical Trial Sponsor Type*, J. CLINICAL TRANSLATIONAL SCI. 1, 2 (Mar. 16, 2021), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8220021/.

[621] GlobalData Health Care, *Non-Industry Sponsored Covid-19 Trials More Likely to be Discontinued in 2021*, CLINICALTRIALS ARENA (Aug. 31, 2021), https://www.clinicaltrialsarena.com/comment/non-industry-sponsored-covid-19-clinical-trials/.

[622] *Id.* ("Non-industry sponsors are four times more likely to experience study discontinuations due to financial reasons than their industry counterparts.").

[623] Mark F. Schultz, *Trade Secrecy and COVID-19*, GENEVA NETWORK 1, 10 (Oct. 5, 2022), https://geneva-network.com/research/trade-secrecy-and-covid-19/.

successfully generating and manufacturing new biologics.[624] Accordingly, this is just one example that collaborations between public research institutions and industry are essential to biomedical developments and public health emergency response, and trade secrecy plays an important role.

B. Contracting with Industry Partners

One barrier to establishing IUCs is strategically negotiating the terms of the partnership, especially for IP.[625] Formalizing a type of Framework Research Agreement (FRA) that sets out different options for IP, treatment of confidential information, publications, and more contract details is a great way to foster long-term IUCs.[626] Industry executives are focused on the relationship from a cost perspective and therefore, a university needs to be prepared to provide and defend financial information to support the project resource requirement.[627] z.[628] An innate challenge within these relationships are the conflicting cultures between academia, being relatively "open" and the private sector being more secretive.[629] However, non-disclosure agreements typically aim at protecting trade secrets and other confidential information, not necessarily research results, maintaining that other company secrets, not pertinent to the research at hand, must remain confidential throughout the collaboration.[630]

In some cases, the university may partner with industry on research that is also federally funded. However, these types of collaborations have additional challenges given recent policies. In 2022, the White House Office of Science and Technology Policy (OSTP) announced that "federally-funded research papers and data

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[624] *Id.* at 13.
[625] Malherbe, *supra* note 37.
[626] *Id.*; *Clinical trial Contracts Overview*, STANLEY MANNE CHILDREN'S RESEARCH INSTITUTE, https://research.luriechildrens.org/globalassets/stanley-manne-research-site/research-resources/office-of-sponsored-programs/clinicaltrialcontractsoverview.pdf (last visited Mar. 3, 2023) (providing an example of a guidance document for forming contracts for Industry Sponsored Clinical Trials).
[627] Malherbe, *supra* note 37.
[628] Newberg & Dunn, *supra* note 25, at 190.
[629] *Id.* at 200.
[630] *Id.* at 212-13.

must be available to the public immediately upon publication."[631] Moreover, the Bayh-Dole Act, which we will discuss more in the next section, implicitly prohibits trade secrets developed from federally funded research. Therefore, if a project is federally funded, trade secrets are a challenging or perhaps a negligible IP strategy.

III. Trade Secrets & Industry-University Collaborations in Health Care and Biotechnology Research

In 1980, congress passed P.L. 96-517, Amendments to the Patent and Trademark Act, known as the "Bayh-Dole Act."[632] The Bayh-Dole Act was one of the first laws of the time to promote cooperative R&D between the federal government, industry, and academia.[633] This law was enacted to expand the commercialization of federally financed inventions and augment collaboration between universities and the business community to get research inventions to market.[634] The act provides universities with the intellectual property ownership for projects funded by federal funds, which allow universities to structure collaborations to "generate new goods, processes, and services for the marketplace."[635] Thus, industry and academia share costs, risks, facilities, and experience to get an invention to market.[636]

Trade Secret laws have not seen the same extensive adaptations.[637] The Bayh-Dole Act implicitly prohibits trade secrets from federally funded research by promoting disclosure and requiring the invention to be patented by either the university, government or the individual researcher.[638] Choosing patent protection specifically to support the purpose of the Bayh-Dole Act may have been a way for congressional leaders to prioritize disclosure and public

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[631] Andrea Widener, *White House mandates immediate open access by 2026*, C&EN'S BUFFERING (Aug. 29, 2022), https://cen.acs.org/policy/publishing/White-House-mandates-immediate-open/100/web/2022/08.
[632] CONGRESSIONAL RESEARCH SERVICE, RL32076, *The Bayh-Dole Act: Selected Issues in Patent Policy and the Commercialization of Technology* 1 (2012).
[633] *Id.* at 1-2.
[634] *Id.*
[635] *Id.* at 4.
[636] *Id.*
[637] David S. Levine, *What Can The Uniform Trade Secrets Act Learn from the Bayh-Dole Act?*, 33 HAMLINE L. REV. 615, 615-17 (2010).
[638] *Id.* at 621-22, 630.

dissemination.[639] Trade secrets do not allow for full open disclosure and public dissemination given that one of the requirements is maintaining secrecy.

A. Trade Secret Laws

The Uniform Trade Secrets Act (UTSA) defines a trade secret as information that...

> "(i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy."

Uniform Trade Secrets Act § 1(1), 14 U.L.A. 35 (1979).

The UTSA, which many states have adopted, codifies much of the trade secret common law with some state-specific adaptations.[640] For example, Colorado's Uniform Trade Secrets Act, defines a "Trade Secret" as part or a whole of "any scientific or technical information, design, process, procedure, formula, improvement, confidential business or financial information, listing of names, addresses, or telephone numbers, or other information relating to any business or profession."[641]

The Economic Espionage Act (EEA) also defines what a trade secret is in a very similar manner but may institute criminal liability, the main differences being the specific items listed out as "information."[642] The EAA also requires that this information has economic value from secrecy and that the owner has "taken measures to prevent the secret from becoming available to persons other than

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[639] *Id.* at 630-31.
[640] 1 Milgrim on Trade Secrets § 1.05 (2022).
[641] COLO. REV. STAT. ANN. § 7-74-102 (West 1986) (Amended 2003, effective July 2, 2004).
[642] Economic Espionage Act, 18 U.S.C. § 1839 (1996) ("[T]he term 'trade secret' means all forms and types of financial, business, scientific, technical, economic, or engineering information, including patterns, plans, compilations, program devices, formulas, designs, prototypes, methods, techniques, processes, procedures, programs, or codes, whether tangible or intangible, and whether or how stored, compiled, or memorialized physically, electronically, graphically, photographically, or in writing. . .").

those selected… to have access… for limited purposes."[643] Courts typically consider six factors to determine whether or not a trade secret exists:

> (1) the extent to which the information is known outside of complainant's business; (2) the extent to which it is known by employees and others involved in complainant's business; (3) the extent of measures taken by complainant to guard the secrecy of the information; (4) the value of the information complainant and to his competitors; (5) the amount of effort or money expended by complainant in developing the information; and (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.[644]

In the Matter of Certain Botulinum Toxin Prod., Processes for Mfg. or Relating to Same and Certain Prod. Containing Same, Inv. No. 337-TA-1145, USITC 10-11 (Jan. 01, 2021) (Public Version) https://www.itcblog.com/images/Comm_Op_in_1145.pdf (hereinafter *Botulinum Toxin Prod.*); 1 Milgrim on Trade Secrets §1.01.

Generally, any type of information with the requirements of economic value from secrecy and reasonable efforts to maintain the secret, can be considered a trade secret.[645] However, if one of those three aspects are lacking, trade secret protections may not apply.[646] Likely, the information the university and industry sponsor want to protect will qualify as "information." Largely, if the information is knowledge that comes out of working with the process, applying techniques, and being aware of the outcome, this information is more likely to be classified as "know-how" or skills that are part of the

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[643] *Id.*

[644] *In the Matter of Certain Botulinum Toxin Prod., Processes for Mfg. or Relating to Same and Certain Prod. Containing Same*, Inv. No. 337-TA-1145, USITC 10-11 (Jan. 01, 2021) (Public Version) https://www.itcblog.com/images/Comm_Op_in_1145.pdf (hereinafter *Botulinum Toxin Prod.*); 1 Milgrim on Trade Secrets §1.01.

[645] *Protecting Against the Risk of Trade Secret Exposure Arising from Biotech Industry Collaboration*, FISHER PHILLIPS (Sept. 7, 2021), https://www.fisherphillips.com/news-insights/trade-secret-exposure-arising-biotech-industry-collaboration.html.

[646] 18 U.S.C.S. § 1839 (1996).

individual's training and cannot be labeled a trade secret.[647] However, the boundaries between trade secrets and know-how are not so black and white.[648] Where specific knowledge, technique, or experience was used to develop a product with competitive advantage, what would normally be considered know-how, may be upheld as a trade secret by a court.[649] However, majority of the referenced case history pertains to manufacturing related matters, not the biomedical industry.[650] This unclear line of know-how versus trade secrets further complicates IP strategy related to biomedical technologies. Nonetheless, know-how may be included in agreements between entities to protect intellectual property, including trade-secrets.[651] Many licensing practices include know-how as its own royalty consideration.[652]

In IUCs, economic value from secrecy can be added by the industry partner investing in commercializing the research or technology. The most challenging requirement, that conflicts with a university's mission to disseminate knowledge is the reasonable efforts to maintain secrecy. Public disclosure of trade secrets through publication, even if not directed towards a technical audience, is nonetheless a disclosure for the purposes of trade secrecy.[653] Furthermore, in *Gallowhur Chemical Corp. v. Schwerdle*, the plaintiff, a chemical manufacturer, revealed aspects of their trade secrets at a chemical conference lecture and within the meeting's print circulation.[654] Plaintiff had the burden of showing that the lecture did not actually reveal the secret contrary to expert testimony.[655] The court said that even if the trade secret is only partially leaked, or

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[647] Abbott Lab'ys. v. Norse Chem. Corp., 147 N.W.2d 529, 538 (Wis. 1967); 1 Roger R. Milgrim & Eric E. Bensen, MILGRIM ON TRADE SECRETS, § 1.09 (2022).
[648] SI Handling Sys. v. Heisley, 753 F.2d 1244, 1261 (3d Cir. 1985) (quoting Van Prod. Co. v. Gen. Welding & Fabricating Co., 419 Pa. 248 at 263-64 (Pa. 1965) ("the concept of 'know-how' is also a very fuzzily defined area, used primarily as a short-hand device for stating the conclusion that a process is protectible. It covers a multitude of matters, however, which in the broad sense are not protectible, e.g., an employee's general knowledge and skill.")).
[649] Milgrim, *supra* note 66.
[650] *Id.*
[651] *See* Idx Sys. Corp. v. Epic Sys. Corp., 285 F.3d 581, 584 (7th Cir. 2002).
[652] *See id.*; *see also* 1 Eric E. Bensen & Harold Elinhorn, BENSEN ON PAT. LICENSING TRANSACTIONS, § 1.06 (2023).
[653] Wheelabrator Corp. v. Fogle, 317 F. Supp. 633, 639 (W.D. La. 1970).
[654] Gallowhur Chem. Corp. v. Schwerdle, 117 A.2d 416, 422 (N.J. Super. Ct. Ch. Div. 1955).
[655] *Id.* at 423.

"sufficiently suggestive," but done so voluntarily, they cannot expect others to maintain the complete secret.[656] Nonetheless, the owner does not have to take "every conceivable measure" to maintain secrecy.[657] If the alleged trade secret has been published and/or is commonly known in the trade and readily discernable in the field, then no trade secret exists.[658] On the other hand, courts have found that "mere showing or writing about certain manufacturing techniques" is not evidence of public disclosure of trade secrets.[659]

A court may consider Non-disclosure Agreements (NDA) as evidence of reasonable efforts to maintain secrecy, however, if the entity issuing the NDA failed to consistently indicate confidentiality, an NDA is not conclusory that a trade secret was established and other factors must be considered.[660] Courts may consider an implied relationship and corresponding duty of confidentiality based on the specific factual circumstances, such as whether or not the "other party has reason to know that the information was in fact confidential."[661] Moreover, the courts will only consider an implied relationship if there was reason for the party to know the information was intended to be confidential and the "other party to the disclosure was reasonable in inferring that the person consented to an obligation of confidentiality."[662] Disclosure of design drawings provided to a manufacturer also do not negate the trade secret since the information is necessary for the manufacturing of the product and so long as the contract also states that the information should not be divulged to other

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[656] *Id.*
[657] Houser v. Feldman, 569 F. Supp. 3d., 216, 229 (E.D. Pa 2021).
[658] Abbott Labs. v. Norse Chem. Corp., 147 N.W.2d 529, 538 (Wis. 1967).
[659] Kewanee Oil Co. v. Bicron Corp., 478 F.2d 1074, 1077 (6th Cir. 1973), *rev'd on other grounds*, 416 U.S. 470 (1974).
[660] *See* Wagner Aeronautical, Inc. v. Dotzenroth, No. 21CV0994 L AGS, 2022 U.S. Dist. LEXIS 185662, at *12-14, *22-23 (S.D. Cal. Oct. 7, 2022)(finding insufficient evidence that plaintiffs made the requisite reasonable efforts to maintain secrecy of claimed trade secrets because they did only some copies of the trade secret documents included "proprietary" stamps, whereas others "had no indicia of secrecy," and potential business partners were not bound to secrecy by an NDA).
[661] *See* Pachmayr Gun Works, Inc., v. Olin Mathieson Chem. Corp., 502 F.2d 802, 808 (9th Cir. 1974); *see also* Carr v. AutoNation, Inc., 798 F.App'x. 129, 130 (9th Cir. 2020); *see also* Direct Techs., L.L.C., v. Elec. Arts, Inc., 836 F.3d 1059, 1070 (9th Cir. 2016).
[662] RESTATEMENT (THIRD) OF UNFAIR COMPETITION §41 (AM. L. INST. 1995).

parties or used in other ways.[663] Primarily, breach of contract and breach of confidence are claimed in trade secret misappropriation civil cases.[664] Misappropriation occurs when someone uses or discloses the owner's trade secret without authorization.[665] For the aforementioned reasons, it would be advised that prior to exploring an IUC, for the safety of all parties, an NDA or other expressed confidentiality agreement should be signed before sharing confidential, proprietary information.

B. Choosing Between Trade Secrets and Patents

When it is unrealistic to keep all information secretive, the industry sponsor and university may balance both interests by utilizing other types of IP such as patents.[666] To make such a decision, several factors must be weighed including (1) the time frame of IP protection, (2) the ability to maintain the secrecy, (3) costs available to secure IP rights, and (4) robustness in remedy for the type of IP.[667] Biotechnology companies are increasingly utilizing trade secret protection because requirements are not as strict as patent law and protection can be quickly acquired for an unlimited duration.[668]

Patents give the owner a monopoly over the technology in exchange for disclosure of the invention, but it is only enforceable for up to 20 years after the patent filing date. After 20 years, the invention is dedicated to the public and can be used by anyone.[669] Sufficient disclosure requires enough information to "enable any person skilled

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[663] Ellicott Mach. Corp. v. Wiley Mfg. Co., 297 F. Supp. 1044, 1051-53 (D. Md. 1969).
[664] 1 ROGER M. MILGRAM & ERIC E. BENSON, MILGRIM ON TRADE SECRETS § 1.05 (1967).
[665] *Id.*
[666] *See* SHUBHA GHOSH, ET AL., INTELLECTUAL PROPERTY: PRIVATE RIGHTS, THE PUBLIC INTEREST, AND THE REGULATION OF CREATIVE ACTIVITY, 277 (3d ed. 2016).
[667] *Id.* at 277-78.
[668] Moore v. Regents of Univ. of California, 51 Cal. 3d 120, 171–72 (Cal. 1990) (Mosk, J., dissenting) (citing *Patent and Trade Secret Protection in University-Industry Research Relationships in Biotechnology* (1987) 24 HARV. J. ON LEGIS. 191, 218-219).
[669] Darren M. Franklin, *Choosing Between Trade Secret and Patent Protection: A Primer for Businesses*, LAW.COM (May 12, 2022) https://plus.lexis.com/api/permalink/78c7f494-3b24-43d0-acba-1dc59d4a6592/?context=1530671.

in the art to which it pertains" to use the patent.[670] On the other hand, trade secrets are kept confidential within the business but another may make, use, sell, or import the technology unless it was misappropriated from the business.[671] Therefore, there's no protection against independent invention of the technology or reverse engineering but there is no expiration date, and could last forever as long as it remains confidential within the company.

C. Strategies to Publish Research and Maintain Secrecy

If a trade secret becomes generally known, it is no longer protected.[672] Academic research publication or general publication to advance knowledge in the industry are common culprits of trade secret leaks. To avoid issues of trade secret disclosure or misappropriation while maintaining the university's ability to publish research results for new, marketable technologies, the university, researcher, and industry sponsor may discuss and agree on strategies to maintain reasonable secrecy of the information. Such strategies might include (1) appropriately timing the publication to coincide with disclosure or (2) strategically decide which information to publish.

If a company is willing to disclose the trade secret but needs to do so after a patent is filed or after the product goes to market, considering delay of publication may be a good option. They can also account for the lengthy peer review process. The peer review process for research articles can take months to complete. Many research hospitals and universities have a sort of scientific peer review process that is internal to the institution.[673] This part alone can take up to six weeks prior to submitting the article to a journal.[674] Once the article is complete it would be submitted to a journal of the investigator's

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[670] 35 U.S.C.S. § 112 (LEXIS, through Pub. L. No. 117-285 (excluding Pub. L. No.117-263)).
[671] Milgrim on Trade Secrets*, supra* note 84.
[672] *See* Botulinum Toxin Prod., Inv. No. 337-TA-1145, USITC 10-11 (Jan. 01, 2021) (Public Version) https://www.itcblog.com/images/Comm_Op_in_1145.pdf (hereinafter Botulinum Toxin Prod.) (finding that because the University of Wisconsin widely distributed the bacterial strain to other entities, the parent strain did not qualify as a trade secret); *See also* Schultz, *supra* note 42.
[673] *See Scientific Peer Review*, STANLEY MANNE CHILDREN'S RESEARCH INSTITUTE, https://research.luriechildrens.org/en/research-resources/office-of-research-development/research-advancement/scientific-peer-review/ (last visited Mar. 3, 2023).
[674] *Id.*

choosing and there are various back and forth steps for reviewers to decide if an article is appropriate for the journal, then specific reviewers are selected to review the manuscript, submitting their comments and corrections. [675] The article is returned to the authors for corrections to be resubmitted.[676] All this back and forth adds up and it could be three or more months before the article makes it in front of the public. This solution maintains the secret for a limited time while the company secures other intellectual property rights, while still disseminating information to the public.

Secondly, an entity may strategically decide which information to publish. Even if a patent application is filed, if the specific information of the trade secret is not revealed, one may still exist.[677] Trade secrecy is not an "all-or-nothing proposition," it has more nuances determined by the precise information sought to protect and the statutory definition of a trade secret.[678] The research team may also present at conferences or publish research, so long as the trade secret specifications are not "readily ascertainable" upon examination of the display or information published.[679] Furthermore, information needed to publish scientific research is typically more generic than all the specifics needed to create and commercialize a new product. Therefore, a research scientists could publish results of a study so long as the specifications of the trade secret cannot be readily ascertained from the publication. The collaborative team may agree upon specific information that can be published or disclosed in research and lecture material to both maintain the trade secret and disseminate knowledge.

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[675] Young Gyu Cho & Hyun Ah Park, *Peer Review Process in Medical Journals*, 34 KOREAN J. FAM. MED. 372,372 (2013).
[676] *Id.*
[677] *See* Life Spine, Inc. v. Aegis Spine, Inc., 8 F.4th 531, 541 (7th Cir. 2021) (deciding that the patent did not disclose precise dimensions or measurements of the components and specifications could not be "easily derived" from the patent); *see also* Broker Genius, Inc. v. Zalta, 280 F. Supp. 3d 495, 518 (S.D.N.Y. 2017)(stating that he patent application described some details of the function but left out the secrets and unique combination of features of the software); *see also* Zylon Corp. v. Medtronic, Inc., 2015 NY Slip Op 30610(U), ¶ 12 (Sup. Ct.)(reviewing the plaintiff's patents, the court determined that they did not disclose their trade secret. There was not enough evidence to show that the disclosure of the zero-fold technology also disclosed the process allegedly protected by trade secret).
[678] Life Spine, Inc., 8 F.4th at 541.
[679] *Id.*

IV. Utilizing A Trade Secret Strategy in Biomedical Research

An agreement between collaborators, the research institution and the industry sponsor may include a description of "Confidential Information and Trade Secrets" to include "research processes, production processes, computer software, methods, practices, product descriptions, technical plans, equipment designs, drawings, blueprints… and all other compilations and/or documentation."[680] Several inventions related to biomedical technology could potentially be covered under a trade secret. Although trade secrecy will likely have its advantages and disadvantages for each.

A. When to Consider a Trade Secret Strategy

Computer software and associated principles, engineering, logic, and coherence for medical technology is one opportunity to utilize trade secret law for biomedical IP strategy.[681] Although computer software could also be patented or copywritted, the inventors could strategically maintain the software for a device as a secret, while the physical and mechanical form could be patented.[682]

Chemical formulas, such as pharmaceuticals, could also be protected by trade secrecy.[683] So long as the marketed product's formula cannot be readily ascertainable, the formula may remain a trade secret.[684] However, one risk with using trade secrets for pharmaceutical drug formulas is that other companies may be able to reverse engineer or "deformulate" the chemical compound.[685]

Genetic information is another possible area to apply trade secrecy to an area of biomedical technology. However, there is some contention about keeping genomic databases secret. One point is that

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[680] RELCO, LLC v. Keller, No. A13-1633, 2014 Minn. App. Unpub. LEXIS 648, at *16-17 (June 30, 2014).
[681] *See* Jostens, Inc. v. Nat'l Comput. Sys., 318 N.W.2d 691, 698 (Minn. 1982) (citing Com-Share, Inc. v. Computer Complex, Inc., 338 F.Supp. 1229, 1234 (E.D. Mich. 1971).
[682] *See Id.* at 702 n.5 (citing Bender, *Trade Secret Protection of Software*, 38 GEO. WASH. L. REV. 909 (July 1970)).
[683] *See* Levine, *supra* note 56 at 642.
[684] *Id.* at 619; Carson Prods. Co. v. Califano, 594 F.2d 453, 456 n.3. (5th Cir. 1979) (finding that the chemical properties could not be discovered by quantitative or qualitative chemical analysis).
[685] Powder River Basin Res. Council v. Wyo. Oil & Gas Conservation Comm'n, 320 P.3d 222, 227 (Wyo. 2014).

other companies cannot learn and further develop their technology, which may create a large distribution in market share and accuracy of some genetic testing.[686] Additionally, individuals who have used testing, such as Myriad Genetics' BRCA 1/2 testing, have been kept from accessing their personal data.[687] Under 45 C.F.R. § 164.524, the Health Insurance Portability and Accountability Act ("HIPAA") Privacy Rule requires that individuals have a right to their own genetic information.[688] Therefore, companies seeking to use trade secrets for genetic information should be aware that they may be able to maintain secrecy of the whole but individuals have a right to access of their own data and may share it with whom they please.

Registries of persons gathered for human research studies have been claimed as trade secrets.[689] However, to qualify as a trade secret, the Plaintiff seeking protection of a trade secret needs to show that the registry had "economic value from not being readily ascertainable." The complainant needs to show that the registry "derived economic

[686] Sharon Begley, *As Revenue Falls, a Pioneer of Cancer Gene Testing Slams Rivals With Overblown Claims*, STAT NEWS (Nov. 29, 2016), https://www.statnews.com/2016/11/29/brca-cancer-myriad-genetic-tests/ (Myriad Genetics for BCRA 1/2 testing hold about 85% of the market share and interviews with genetic counselors, physicians, and competitors say that without this data they "miss potentially deadly mutations").

[687] Christi J. Guerrini, et al., *Myriad Take Two: Can Genomic Databases Remain Secret?*, SCIENCE (May 12, 2017), https://www.science.org/doi/10.1126/science.aal3224 (four individuals whom performed genetic testing filed a complaint with HHS); *Health Information Privacy Compl.* at 1-2 (May 19, 2016), https://www.aclu.org/sites/default/files/field_document/2016.5.19_hipaa_complaint.pdf (referencing an administrative law case, Zeughauser v. Myriad Genetics Laboratories where complainants alleged that Myriad was not providing patients access to their health data and refused to provide anything beyond a copy of their test report, thus violating the HIPAA requirement for patients to have access to their own health information).

[688] 45 C.F.R. § 164.524 (2023).

[689] Greenberg v. Miami Children's Hosp. Rsch. Inst., Inc., 264 F. Supp. 2d 1064, 1076 (S.D. Fla. 2003) (citing Unistar Corp. v. Child, 415 So. 2d 733, 734 (Fla. 3rd DCA 1982); Am. Red Cross v. Palm Beach Blood Bank, Inc., 143 F.3d 1407, 1410 (11th Cir. 1998)); Rossi v. Darden, No. 16-21199-CIV-ALTONAGA, 2016 U.S. Dist. LEXIS 195751, at *23 (S.D. Fla. July 19, 2016); EyePartner, Inc. v. Kor Media Grp. Ltd. Liab. Co., No. 4:13-10072-CIV, 2013 U.S. Dist. LEXIS 98370, at *13-14 (S.D. Fla. July 15, 2013).

value from not being generally known to others" and that they took the reasonable measures to keep the registry confidential.[690]

B. Applying Strategies to A Recent Invention

Over the past several years, an interdisciplinary team of researchers has been working diligently to develop a device of soft, flexible, wireless sensors that can be used to monitor babies in the neonatal intensive care unit (NICU) without the tangle of wires that can inhibit necessary parent-baby bonding.[691] The study was funded by several sources including a grant from the Gerber Foundation, established by Gerber Products Company and Daniel Gerber, Sr. to "enhance the quality of life of infants and young children in nutrition, care, and development."[692] The details of the agreements between the funders and the University are confidential, I do not claim to have the specific details as to what was agreed upon regarding IP rights. The remainder of this section will hypothetically assess this invention and how trade secrets could have played a role in the IP strategy; the following is only speculative as to how the strategy may have been approached.

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[690] Greenberg, 264 F. Supp. 2d at 1076 (court held that the Plaintiff did not provide enough information to show that the list derived economic value from not being generally known to others. It was not enough to "merely [state] that it had 'substantial economic value' in streamlining Matalon's research").

[691] Amanda Morris, *Groundbreaking Sensors Wirelessly Monitor Babies in the NICU*, NORTHWESTERN MEDICINE, FEINBERG SCHOOL OF MEDICINE: NEWS CENTER (Feb. 28, 2019) https://news.feinberg.northwestern.edu/2019/02/28/groundbreaking-sensors-monitor-babies-in-the-nicu-wirelessly/.

[692] *Id.* (sources of funding for this study included the Bill & Melinda Gates Foundation (PI Weese-Mayer), the Gerber Foundation (PI Weese-Mayer), the Friends of Prentice Foundation (PI Paller), the National Natural Science Foundation of China (award numbers 11402134 and 11320101001), the National Basic Research program of China (award number 2015CB351900), the National Science Foundation (award numbers 1400159, 1534120 and 1635443) and the Future Growth Engine Program (award number 10079974), funded by the Ministry of Trade, Industry & Energy in South Korea); *History of The Gerber Found.*, THE GERBER FOUND., https://www.gerberfoundation.org/history/ (last visited Mar. 3, 2023); *The Gerber Found.'s Mission*, THE GERBER FOUND., https://www.gerberfoundation.org/purpose/ (last visited Mar. 3, 2023); Ha Uk Chung, et al., *Binodal, wireless epidermal electronic systems with in-sensor analytics for neonatal intensive care*, 363 SCI. 6430 (Mar. 1, 2019) (acknowledgements).

The team has submitted several provisional patent applications throughout 2018 and 2019.[693] Northwestern University is listed as the applicant with several inventors listed on the application.[694] The invention has multiple protectable features including the plurality of sensors or configuration of sensors, the material that adheres the sensor to the baby's skin, and the software program code that gathers the information and provides it to the clinician.[695] The patent reveals much of the details about the invention, from how it is made, the mechanical components, and battery source, all the way to equations used to calculate measurements needed for the biometrics.[696] The patent even discusses the research done in the NICU and Pediatric Intensive Care Unit (PICU). On the other hand, the source code of the software that translates the information read by the mechanical device to the "computer-readable medium" may be kept secret.

A research and development industry partner, like academic scholars, may also have interest in publishing this type of research and can exercise discretion in deciding how much to publish.[697] However, they would not necessarily need to disclose all the details, such as code, for other scientists to be able to understand the research results and further knowledge in this area. As demonstrated, a combination of IP strategies can effectively accomplish the goals of both the research institution and industry sponsor. However, some adjustments to trade secret laws could allow for a better balance.

V. Suggested Changes to Trade Secret Law in Biomedical Research and Development

Commercial influences on university research present a distinct issue in biomedical research related to trade secrets and the

[693] U.S. Patent No. PCT/US2019/059190 (filled Oct. 31, 2019); *Provisional Application for Patent: Provisional Patent Application Forms*, UNITED STATES PATENT AND TRADEMARK OFFICE, https://www.uspto.gov/patents/basics/types-patent-applications/provisional-application-patent (last visited Mar. 3, 2023) ("A provisional patent application allows you to file without a formal patent claim, oath or declaration, or any information disclosure (prior art) statement." The provisional patent lasts 12 months from the date of filing and cannot be extended).
[694] *Id.*
[695] Morris, *supra* note 110; Chung, *supra* note 111; *Supra* note 112.
[696] *Supra* note 112.
[697] Newberg & Dunn, *supra* note 25 at 217.

commercialization of academic biomedical innovations.[698] IUC agreements impose a requirement for secrecy and may convey substantial funds while presenting potential conflicts of interest for the researchers who typically perform the academic research.[699] Increasing industry involvement in biomedical research has changed the public perception of university professors and academic researchers.[700] Furthermore, much of the biotechnology industry is relying on academic scientific discoveries to spearhead development of the early basic biological research needs rather than developing their own basic science laboratories.[701] Financially, this makes sense as the costs of developing, running, and regulating laboratories are very expensive.[702] Academic research benefits industry, and vice versa, commercializing the research that academicians spend years, if not decades, developing, getting new beneficial medical technology to the public. However, under the current trade secret regime, the priorities of the two entities are in conflict and current IP laws need to be fine-tuned.

One article from 1987 suggested a potential middle ground for trade secrecy in biotechnology involves three suggested modifications, acknowledging the pros and cons of each.[703] The three modifications included (1) a "relaxed secrecy requirement", (2) "elimination of the bad faith requirement," and (3) "federal trade secret law" for biotechnology research.[704]

(1) Relaxing the secrecy requirement would "permit limited disclosure" of research results while still allowing the sponsor

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[698] David E. Korn, Patent and Trade Secret Protection in University-Industry Research Relationships in Biotechnology, 24 Harv. J. on Legis. 191, 195 (1987) (citing *University/Industry Cooperation in Biotechnology: Hearings Before the Subcomm. on Investigations and Oversight and the Subcomm. on Science, Research and Technology of the House Comm. on Science and Technology*, 97TH CONG., 2ND SESS. 1 (1982) (statement of Rep. Albert Gore, Jr. (D-Tenn.), Chairman of the Subcommittee on Investigations and Oversight of the House Committee on Science and Technology); *Commercialization of Academic Biomedical Research: Hearings Before the Subcomm. on Investigations and Oversight and the Subcomm. on Science, Research and Technology of the House Comm. on Science and Technology*, 97TH CONG., 1ST SESS. 33 (1981) (statement of Dr. Paul Gray, President of Massachusetts Institute of Technology)).

[699] *See* Korn, *supra* note 117.

[700] *Id.* at 196.

[701] *Id.* at 197-98.

[702] *Id.* at 198.

[703] Korn, *supra* note 117, at 235-38.

[704] *Id.*

to protect their intellectual property as a trade secret.[705] This would allow academicians to submit and generally disclose results at scientific meetings to a limited number of people and without losing all protections.[706] However, after the disclosure, the information could not be used again, creating a conflict. This would also be contrary to the academic goal of researchers being able to extrapolate new research and innovation from the information.

(2) Eliminating the bad faith requirement as a requisite to trade secret liability could result in liability for anyone who "happens upon" a trade secret (i.e., grad student or competitor). Even if the information was acquired legally, they could be accused of trade secret misappropriation whether or not they independently discovered or reverse engineered the work.[707] Not only would this impose liability on innocent persons, but it would be contradictory to the open-access policies and have a "chilling effect on the utilization of information obtained legitimately."[708]

(3) Federal trade secret law would create consistency across biotechnology IP and offer uniformity across the country to complement current state unfair competition laws.[709] However, the question remains open whether the Patent Clause of the Constitution would allow Congress to implement such a law.[710]

The first two suggestions defy the purpose of publishing academic research. Although these suggestions would protect the commercial interests, this solution prevents any other researcher from developing additional knowledge or can have a chilling effect to be afraid of independently inventing something they do not have knowledge of existing or being disclosed and monopolizes the trade secret. I do agree, however, that some type of federal trade secret law for biotechnology would benefit and create more consistency, especially in an environment where research collaborations can span across many states.

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[705] *Id.* at 235-36.
[706] *Id.*
[707] *Id.* at 236.
[708] Korn, *supra* note 117, at 236.
[709] *Id.* at 237.
[710] *Id.*

A. Secret Keeping with Minimal Disclosure

This article proposes a pseudo 'waiver of disclosure' to utilize trade secrets to protect the intellectual property of an IUC. This proposal would adjust the balance between the secrecy requirement with economic value. Under a 'waiver of disclosure,' scientific research protected under trade secrets could be published with generality, disclosing only a limited portion of the trade secret, not enough to enable reproduction. The waiver of disclosure would have three requirements. Inspired by informed consent waiver regulations from the Health Information Portability and Accountability Act (HIPAA), discussed in more depth below, the disclosure would have three requirements: (1) provide no more than minimal risk to the economic value of the trade secret; (2) research could not be published without minimal disclosure of a trade secret; and (3) showing that disclosing specific aspects of the trade secret within the published research would have public benefit.

i. Model Human Subjects Research Regulations

Human subjects research regulations, part of HIPAA, is similar to trade secret law in that it requires a form of secrecy: secrecy of personal health information (PHI). Often, PHI is part of the information kept secret in biomedical research, including genetic information.[711] Human subject research operates under Common Rule (45 CFR Part 46 and 47, Subpart A) and the Food and Drug Administration's (FDA) human subject protection regulations (21 CFR Parts 50 and 56).[712] Under 45 CFR 164.512, there are limited circumstances where researchers can obtain a "waiver" to avoid requiring full informed consent, but they are only able to use de-identified information.[713] Biomedical researchers may obtain a waiver of authorization, or informed consent, from their Institutional Review

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[711] *Trade Secrets and Health Data Access: How Policy Plays a Role*, BAYLOR COLLEGE OF MEDICINE (May 19, 2017), https://blogs.bcm.edu/2017/05/19/trade-secrets-health-data-access-policy-plays-role/.

[712] *Research*, HHS.GOV: HEALTH INFORMATION PRIVACY, https://www.hhs.gov/hipaa/for-professionals/privacy/guidance/research/index.html (last updated Apr. 3, 2003).

[713] 45 C.F.R § 164.514 (b)(2) (2023) ("(i) The following identifiers of the individual or of relatives, employers, or household members of the individual, are removed: (A) Names; (B) All geographic subdivisions smaller than a State, including street address, city, county, precinct, zip code, and their equivalent geocodes, except for the initial three digits of a zip code if, according to the current publicly available data from the Bureau of the Census…")

Board (IRB) and privacy board in specific circumstances.[714] A waiver requires the research team to file, and get approved, specific documentation with the IRB and privacy board. [715] These documents must explain how the research use and or disclosure of PHI involves "no more than minimal risk" and, practically, the research could not be accomplished without the waiver, and the research could not be conducted without PHI.[716]

ii. No More Than Minimal Risk to Economic Value

Trade secret laws can take inspiration from these consent waiver regulations to create a 'waiver of disclosure' for trade secrets. The first requirement for a waiver, no more than minimal risk. This minimum risk would mean that how the trade secret is disclosed does not enable one to reconstruct the protected invention the way a patent disclosure would, maintaining the invention's economic value from keeping the remaining portion of the invention a secret. Patent law requires that when a patent is filed the application needs to include a description of the invention that discloses the invention to the extent that someone can make and use the invention.[717] This disclosure of trade secret for knowledge dissemination purposes, particularly to publish biomedical research, would do the opposite. Disclosure would provide little to no enablement but allow the reader to understand the methods, results, and findings of the research. The minimum disclosure would protect the core of the trade secret while providing enough information to continue to promote innovation.

iii. Publishing Research Requires Disclosure

The second requirement of the research authors, or trade secret owners, is to show why the disclosed trade secret information, is

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[714] 45 C.F.R § 164.512 (i)(1)(i) (2023) (stating that Institutional Review Boards are defined by several regulations including 10 CFR 745.107. Privacy board requirement includes (1) Has members with varying backgrounds and appropriate professional competency as necessary to review the effect of the research protocol on the individual's privacy rights and related interests; (2) include at least one member who is not affiliated with the covered entity, not affiliated with any entity conducting or sponsoring the research, and not related to any person who is affiliated with any of such entities; and (3) not have any member participating in a review of any project in which the member has a conflict of interest); U.S. Dep't of Health and Hum. Serv., *supra* note 131.

[715] 45 C.F.R § 164.512 (i)(2)(A-C) (2023).

[716] *Id.*

[717] Franklin, *supra* note 88.

required to disseminate such knowledge. Answering the question: "is the information required to understand the methods of the study or does it allow someone to understand a supposed correlation?" The published, presented, or otherwise disclosed portion of the trade secret or research would allow new research to be developed and promote continuous innovation without releasing all of the secret information required to produce the innovation and commercialize a product.

iv. Public Benefit

Finally, in response to the criticism that trade secret laws counter the public benefit of publishing biomedical research, the trade secret owner would need to show that the dissemination of this knowledge will further the biomedical industry and publication of their results will benefit the public. For example, in the case of public health emergencies, it would be beneficial according to public policy to disseminate research findings that address the public need (i.e., a vaccine to address a pandemic). The research and innovation therefore would not stay concealed under one company and could benefit more people.

v. Defenses to Misappropriation Under These Rules

The requirement of bad faith in trade secret misappropriation would not be eliminated, as suggested in the article discussed previously, but would subsequently become more relaxed. For the alleged misappropriating party to protect themselves, they would need to provide sufficient evidence that they utilized only the research and partial trade secret disclosure and that they further expanded upon the knowledge to develop their own ideas that led to further development of science that benefits the public. This change would be akin to fair use in copyright law which would aid in protecting the misappropriating party.[718]

[718] 17 U.S.C.S. § 107 (LexisNexis 2022) (The fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include— (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.).

Once a waiver of disclosure is approved, if the trade secret holder sues someone for misappropriation and the defendant argues that there was no trade secret due to disclosure, a court would require the defendant to show that they added significant development to the idea or knowledge disclosed, and their invention was not an exact replica. The trade secret holder would also have to show that the disclosed information followed the standard for a waiver of disclosure and was only minimal. Under these changes, in the *Gallowhur Chemical Corp. v. Schwerdle* case discussed previously, if the trade secret owner had only minimally disclosed the trade secret and it was required to disseminate knowledge and for public benefit, he may have been able to keep his trade secret protection and recover for misappropriation if he was able to show, the disclosure was only minimal, disclosure did not enable the invention, and had a public benefit, and the accused misappropriating party fails to show that they significantly added to the development of the idea of knowledge. A more complete example is laid out in sub-section c.

Table 1: Outline of Trade Secret Owner Proof versus Defenses

TRADE SECRET OWNER MUST SHOW FOR PROPER "WAIVER OF DISCLOSURE"	**ACCUSED MISAPPROPRIATING PART DEFENSES**
1. **Minimal Risk:** Disclosure will provide no more than minimal risk to the economic value of the trade secret 2. **Publishing:** Scientific research could not be published without minimal disclosure of a trade secret 3. **Public Benefit:** Publishing the scientific research has public benefit	1. **"Invention Plus"**: The accused party's invention added significant developed to the idea or knowledge originally disclosed by the trade secret holder. 2. Other trade secret misappropriation defenses as provided by law

vi. Factors for Court Consideration

Therefore, factors a court may consider are (1) was there "invention plus," did the alleged misappropriating party directly copy

the invention or did they sufficiently contribute their own ideas to it; (2) if there was sufficient contribution of new ideas, was there a public benefit from the initial use of the partially disclosed trade secret; and (3) the extent to which the complaining party protected their trade secret outside of the disclosure. Assuming the federal government could constitutionally institute these new laws, this solution strikes a balance between the trade secret requirement for a "reasonable effort to maintain secrecy" and "economic value" while also addressing concerns of stifling the sharing of information obtained legitimately.

B. Administrative Structure & Practical Implementation

These disclosure requirements should be accompanied by strategies to document the development of a trade secret and approval of the 'waiver of disclosure,' similar to how a provisional patent marks the filing of an invention.[719] The filing of specific documents would mark the start date of protection for that trade secret. Documents would be filed with an administrative body, either at the specific institution (similar to an IRB), with the state, the federal government, or an independent institution. The administrative body would be responsible for approving and maintaining confidential records of the waivers of disclosures. Records would include filing dates, filed documents as described below, published research articles related to that waiver, and other information related to the partial disclosure for scientific or public health purposes. The administrative body would not be responsible for adjudicating any disputes or validity issues; these would be brought to the appropriate court under the applicable rules of civil procedure.

i. Required Documentation

In order for the administrative approval and record keeping the trade secret owner would file documentation with the following information:

1. a description of the trade secret being disclosed and why it must be partially disclosed in the published research;
2. how disclosure furthers the dissemination of knowledge;
3. how the research-industry team intends to protect the remainder of the secret after partial disclosure; and

[719] 35 U.S.C.S. § 102 (LexisNexis 2022).

4. a copy of the research article, presentation, or other documentation indicating what information from the trade secret will be published.

Additionally, to protect themselves, the parties would need to file any signed confidentiality agreements between all parties as well as any applicable contracts as described in the following. As in current trade secret assessments, A similar standard to assess confidentiality and steps to maintain secrecy would be applied such as consistent use of a confidentiality mark on documents.

ii. Optional Voluntary Contract Protection

IUC agreements may include some kind of safety clause to protect the parties once a waiver of disclosure has been approved. In their agreements with one another, parties may negotiate specific terms as to how the trade secret may be used including specifying use in publishing or presenting research articles. Contracts may include specific permitted uses of disclosure and who can use or receive data during the research and development process.

Parties may also consider filing applicable licensing agreements of the trade secret for record keeping purposes and keep as evidence in case of a misappropriation claim. All these documents would be utilized to protect the research-industry team in trade secret misappropriations claims.

C. Hypothetical Invention Under the Proposed Changes

The following is a hypothetical invention describing how these laws and procedures would apply:

Academic researchers are collaborating with a corporation to design, develop, and test a new prosthetic that claims to improve running speed by decreasing energy expenditure and improving gait efficiency. The proprietary intellectual property that may exist and be protected under trade secret includes material(s) used in the prosthetic, mechanical components, fitting process, manufacturing process/technology, process of training an individual to use the new prosthetic, and design form of the prosthetic.

To inform the public of advances in their technology, the researchers would like to disclose the results of their new prosthetic compared to popular prosthetics currently on the market. In the

methods section they may discuss what tests they put the research subjects through, the compared prosthetic devices, and how they trained the research subjects to use the new device. As a description of their new prosthetic, they may reveal the general type of prosthetic (i.e. Solid Ankle Cushion Heel, Flex-Foot, or Re-Flex Vertical Shock Pylon) which is generally known. However, they may maintain secrecy on the specific type of material used, the mechanical construction, manufacturing, and design drawings. They may also reveal some information about the material but not the material itself, for instance they may reveal tensile strength, modulus of elasticity, young's modulus, or select properties that help one to understand the research results. By revealing the general structure of the prosthetic, the research team is likely only revealing information generally known to others that may obtain economic value from the invention.

To effectively inform the public why this prosthetic performed better or worse than the compared prosthetics, some details are needed to evaluate possible correlations. For the public, the benefit of disclosing this information is so future researchers and innovators can continue to evaluate ways to further improve prosthetic technology. However, before this research is published, the team would need to submit documentation with the governing body for a trade secret "waiver" indicating when the research began, what has been developed and explaining the three factors (1) no more than minimal risk to economic value, (2) why the trade secret needs to be included in the published research, and (3) public benefit. The IUC team would also file additional confidentiality agreements or other contracts between the research teams and industry sponsors as well as any applicable licensing agreements for the trade secret. The administrative body would approve these documents for a waiver of disclosure before the research is published, presented, or disclosed by any method.

Another researcher may use the information from the published research and expand upon it. Perhaps they choose a different material with similar characteristics or tweak the characteristics of the material. The alleged misappropriating party must show that they utilized the research but added significant development. They would need to provide evidence that they utilized the research to further develop a prosthetic that adapted the material revealed in the research or utilized a different prosthetic design other than what was revealed in the research. Given that the bad faith requirement would still be

applicable, other trade secrecy laws and assessment of misuse or misappropriation of information would still apply. In accordance with the current defenses for trade secret misappropriation they may provide additional evidence of independent invention. These adaptations to the trade secrecy laws would allow IUCs to publish their research results, permit another entity or researcher to further develop some of those ideas, and still protect the original invention.

Conclusion

Trade Secret strategies for collaborations between public research institutions and industry can be difficult to navigate given the conflicting priorities to disseminate knowledge and protect commercial interests. IP owners may consider strategies to protect their trade secrets such as considering the timeframe for disclosure and effectively determining which information is published. However, some adjustments to trade secret legislation, equivalent to a "waiver," could provide the required flexibility for biomedical research to effectively utilize trade secret intellectual property strategy while also disseminating sufficient knowledge for others to expand upon innovations within the industry. By requiring trade secret owners to show that there was no more than minimal risk to the economic value, reasoning regarding why part of the trade secret needed to be published with the research, and how publishing the research would benefit the public, biomedical researchers and innovators can balance the secrecy requirements with economic value of trade secrets

Privacy in the Age of Technological Innovation: Government Restrictions on Access to Sexually Invasive Spy Cameras

Michael Roy Ortizo[720]

Abstract

The rapid advancement of camera technology and the ease of access to such devices have led to a concerning rise in secret camera surveillance and the invasion of sexual privacy. This note examines the current state of privacy violations occurring primarily focus within the United States, and insight into the ongoing epidemic of hidden camera surveillance in South Korea. In response to this pressing issue, the note proposes a national register plan for the United States that restricts the sale of a specific class of cameras commonly used for invading sexual privacy. The plan requires manufacturers to embed a unique register ID in each device's metadata, make it illegal to tamper with that ID and mandate that individuals provide a compelling reason for purchasing such cameras. The note also discusses the importance of standardizing metadata policies and highlights the Embedded Metadata Manifesto as an example of an initiative advocating for the permanence of metadata. This note emphasizes the need for a multifaceted approach focusing more so on the proactive legal, technological, and cultural shifts to tackle the challenges posed by secret camera surveillance and to ensure that an individual's sexual privacy is protected. Current normative approaches to providing justice through our judicial system fall short when sexual privacy is viewed as the most important feature of privacy.

[720] Syracuse University College of Law, J.D. Candidate, Expected Graduation 2024. I would like to extend my sincerest gratitude to the Innovation law Center, the *Journal of Science and Technology Law*, my colleague Sai Krishna Bolla, and most especially Professor Lauryn P. Gouldin for sparking and supporting my deep interest in the intersection of privacy and technology.

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Introduction

Warren and Brandeis' landmark article, "The Right to Privacy," published over a hundred years ago, outlined the growing threat to personal privacy in the late 19th century. They believed that new technologies such as photography and the mass media were infringing on individual autonomy and personal liberty, making it easier for individuals' personal lives to be exposed to the public without their consent.[721] The right to privacy was seen as an essential component of individual liberty, and they outlined four distinct privacy rights: (1) the intrusion upon one's solitude or private affairs, (2) the public disclosure of embarrassing private facts, (3) publicity that places one in a false light in the public eye, and (4) the appropriation of one's name or likeness for commercial purposes.[722]

However, the rapid acceleration of innovative technologies in our current digital age has stretched current conceptions of the right to privacy to its critical mass with respect to their first and second privacy rights. It has become increasingly difficult to maintain bodily privacy in our personal lives due to the proliferation of surveillance cameras and the internet.

A person's most intimate aspects of their physical body, i.e. their sexual privacy, are easily invadable due to the ease of access facilitated by electronic commerce. The publication of such intimate photos or videos can be done so at the touch of a button. While modern legislation has provided some means to address various privacy concerns, it is still not enough to protect the intimacy associated with a person's body. Many states have addressed the issues of non-consensual images being shared online through revenge porn statutes, but these laws appear to be addressed as a reactionary measure to the perpetrator's actions. Furthermore, the lack of federal legislation on revenge porn laws and sexual privacy violations has created a patchwork of state laws that may not adequately protect victims.

To bolster the protections necessary for sexual privacy, it is imperative that the United States develop more robust preventative measures to curb the number of sexual privacy violations that are

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[721] Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193 (1890).
[722] *Id.*

currently occurring. Specific examples of the types of technology that have contributed to this issue include the prevalence of hidden cameras and the ease of online sharing of intimate photos or videos. Therefore, the case for the creation of a mandatory national register for technologies that invade a person's sexual privacy is of the utmost importance.

The proposed national register would list specific products or types of technology and be maintained by a designated authority. The registry could act as a preventative measure, requiring manufacturers to disclose the potential privacy violations that their products may cause, and provide more information to the public about the risks associated with these products. Such a registry could also provide more guidance to law enforcement agencies, as well as lawmakers in crafting effective legislation to protect sexual privacy.

The right to privacy remains a crucial component of individual liberty, and the challenges of protecting it in the digital age require a more robust and proactive approach. By creating a mandatory national register for technologies that invade a person's sexual privacy, we can take a significant step forward in protecting individuals from unwanted invasions of the most intimate aspects of their physical bodies.

I. Defining Sexual Privacy: What Is It and Why It Matters

Sexual privacy is an important aspect of an individual's personal autonomy and dignity, involving the social norms that dictate the boundaries surrounding intimate life. This includes the human body, intimate activities, personal information about sex, sexuality, and gender, and personal choices regarding the body and intimate information.

In a 2019 law review article titled "Sexual Privacy," Danielle Keats Citron provides a detailed account of what sexual privacy entails and why it is important to protect it. Sexual privacy is defined as the expectations surrounding the seclusion of physical spaces where people engage in intimate activities, such as bedrooms, dressing rooms, and restrooms.[723] It also encompasses the assumptions about the concealment of genitalia, buttocks, and female breasts in various

[723] Danielle Keats Citron, *Sexual Privacy*, 128 YALE L.J. 1792, 1880 (2019), https://www.yalelawjournal.org/article/sexual-privacy.

contexts, including the street and the home.[724] More specifically, individuals create boundaries in what contexts their bodies are "seen, recorded, photographed, or exhibited."[725]

Additionally, sexual privacy involves the presumed confidentiality of communications with intimately involved people about sex, sexual orientation, gender, sexual fantasies, or sexual experiences.[726] The idea of sexual privacy is tied to various activities, decisions, communications, thoughts, and information.[727] An expectation of privacy with respect to one's intimate life allows individuals to engage in intimate activities without fear of scrutiny or exposure.[728] It is important to protect sexual privacy for several reasons. Firstly, it allows individuals to make personal choices about their intimate lives without interference or judgment from others.[729] Secondly, it encourages people to explore their sexuality and identity without fear of retaliation or discrimination.[730] Finally, protecting sexual privacy promotes physical and emotional safety, allowing individuals to control who has access to their bodies and intimate information.[731]

Sexual privacy is an essential aspect of human dignity and autonomy that helps individuals maintain control over their bodies, intimate information, and activities.[732] People have the right to manage their sexual boundaries and express themselves sexually as they choose.[733] The non-consensual recording of intimate activities, broadcasting intimate information, and posting sexual content without consent all violate sexual-privacy interests.[734] When sexual privacy is denied, it can have significant implications for an individual's self-esteem, social identity, and ability to trust future intimate relationships.[735] Protecting sexual privacy is particularly important in

[724] *Id.*
[725] *Id.*
[726] *Id.*
[727] *Id.* at 1881.
[728] *Id.* at 1879.
[729] *Id.* at 1880.
[730] *Id.*
[731] Citron, *supra* note 3, at 1886.
[732] *Id.*
[733] *Id.*
[734] *Id.* at 1898.
[735] *Id.*

cases where there is a potential for subordination or discrimination.[736] Women and minorities are particularly vulnerable to sexual privacy invasions that result in shaming, humiliation, and exposure of their intimate information, bodies, and gender identity.[737] It can be difficult to maintain trust and intimacy with future partners after intimate communications have been weaponized.[738] In some cases, sexual-privacy violations can have severe consequences, such as the loss of employment opportunities or reputational damage.[739] It is essential to recognize that sexual privacy is not only related to intimate relationships but also encompasses the freedom to reveal one's naked body as one chooses, which is central to self-development and personal integrity.[740] Thus, any public disclosure of a person's sexual expression without their consent can interfere with their autonomy and self-respect.[741] Overall, sexual privacy is an important aspect of human dignity and autonomy that must be protected.[742] People have the right to manage their sexual boundaries and intimate information, and sexual-privacy invasions can have severe consequences.[743] To protect sexual privacy, people must have the right to manage their sexual boundaries and intimate information.

Sexual privacy is a fundamental human right that is often undervalued in the hierarchy of privacy interests.[744] However, it is "among the most significant to individuals, groups, and society", and "therefore deserves recognition and protection" in the same way as other forms of privacy.[745] Sexual privacy deserves its own protection because sexual privacy interests implicate a "'different domain of value'" from many other privacy interests.[746] However, although Citron states that sexual privacy should deserve the same protections that "health privacy, financial privacy, communication privacy, children's privacy, educational privacy, and intellectual privacy do," sexual privacy ought to be considered the highest form of privacy in

[736] Citron, *supra* note 3, at 1891.
[737] *Id.*
[738] *Id.* at 1875.
[739] *Id.* at 1927-28.
[740] *Id.* at 1899.
[741] Citron, *supra* note 3, at 1899.
[742] *Id.* at 1886.
[743] *Id.* at 1926.
[744] *Id.* at 1881.
[745] Citron, *supra* note 3, at 1881.
[746] *Id.*

the hierarchy.[747] Doing so provides necessary weights in order to tip value judgments in the face of other privacy interests. Such can be seen in cases where a person's sexual privacy is weighed against a perpetrator wishing to anonymize their acts involving the invasion of a victim's sexual privacy.

One of the most important values of sexual privacy is its role in promoting sexual autonomy and identity development.[748] Sexual autonomy refers to an individual's ability to make informed choices about their own sexual experiences without interference or coercion from others.[749] Sexual identity development is the process through which individuals come to understand and express their sexual desires and preferences.[750] Both of these values are essential to personal dignity and freedom, and sexual privacy plays a critical role in protecting them.[751]

In addition to promoting personal autonomy and identity development, sexual privacy is also essential for the protection of intimate relationships.[752] As Citron notes, intimate relationships are central to liberty, and therefore, sexual privacy plays a key role in protecting the privacy and dignity of these relationships.[753] When sexual privacy is violated, it can have devastating consequences for individuals and their relationships, leading to feelings of shame, guilt, and betrayal.[754] Moreover, sexual privacy is closely tied to issues of equality and intersectionality. Invasions of sexual privacy can have a disparate impact on marginalized communities, including women, sexual minorities, and nonwhites.[755] Nonconsensual pornography is a particularly pernicious form of sexual-privacy invasion that disproportionately affects women and sexual minorities.[756]

By recognizing the value of sexual privacy, we can help to ensure that all individuals are able to enjoy the full range of human

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[747] *Id.*
[748] *Id.* at 1881.
[749] *Id.*
[750] Citron, *supra* note 3*,* at 1881-82.
[751] *Id.*
[752] *Id.* at 1888.
[753] *Id.* at 1890.
[754] *Id.* at 1923-24.
[755] Citron, *supra* note 3*,* at 1882.
[756] *Id.*

rights and freedoms, regardless of their gender, sexuality, or race. Sexual privacy should be considered the highest form of privacy as it touches upon the very being of a person which promotes sexual autonomy, identity development, and intimate relationships. Additionally, it plays a critical role in protecting the privacy and dignity of marginalized communities. By recognizing the value of sexual privacy and taking steps to protect it, we can help to ensure that all individuals are able to live with dignity, freedom, and equality.

II. The Rise of Spy Camera Technology and Its Impact On Sexual Privacy

The increasing accessibility and affordability of hidden cameras have led to a disturbing trend of voyeurism in public spaces. The ease with which these devices can be obtained and concealed raises critical questions about the legal and ethical implications surrounding privacy invasion, particularly when it comes to sexual privacy.

Jonathan D. Silver's article, "Voyeurism takes a disturbing turn as mini cameras become more accessible," sheds light on the growing prevalence of spy technology in public restrooms and changing rooms.[757] As cameras become smaller and cheaper, the potential for misuse grows exponentially, with dire consequences for the unsuspecting victims who are recorded in their most private moments.

One of the factors contributing to this alarming trend is the affordability and availability of hidden cameras. These devices have become increasingly cheaper, with some models costing as little as $19.99.[758] This low price point makes spy technology accessible to a wider range of individuals, who may not have been able to afford such equipment in the past. As a result, the barrier to entry for engaging in voyeuristic activities has been significantly lowered, leading to the possibility of an increase in incidents involving hidden cameras.

The discreet nature of these devices also plays a significant role in their potential for misuse. Modern hidden cameras can be easily

[757] Jonathan D. Silver, *Voyeurism takes disturbing turn as mini cameras become more accessible*, TRIBLIVE (Dec. 18, 2022), https://triblive.com/local/regional/voyeurism-takes-disturbing-turn-as-mini-cameras-become-more-accessible/.
[758] *Id.*

concealed, disguised as everyday objects like alarm clocks, light bulbs, clothing hooks, or even smoke detectors.[759] This enables individuals with malicious intent to plant these cameras in various locations without arousing suspicion. Furthermore, advancements in wireless technology allow for invasive footage to be captured, stored, and even uploaded to the cloud without the perpetrator ever needing to physically retrieve the device.[760]

Silver's article recounts the chilling case of Todd Bueschen, who was charged with multiple counts of sexual abuse of children and invasion of privacy after planting a tiny, hidden camera in a public restroom.[761] The HowKow Wi-Fi-enabled camera Bueschen used was only about an inch thick and cost as little as $19.99 online.[762] Its small size and innocuous appearance made it easy to conceal beneath a sink, where it captured images of nearly two dozen children and 48 adults.[763] Cases like this have become more frequent due to the availability of inexpensive, inconspicuous cameras that can be easily hidden.

The legal landscape is struggling to keep up with these rapid advancements in spy technology. As Sascha Meinrath, a telecommunications professor who studies technology and public policy, points out, legislation is lagging behind the digital age.[764] This leaves society vulnerable to new and disturbing legal questions, such as the legality of AI-generated child pornography or the use of cameras outside bathrooms to create images of people inside.[765]

The psychological and societal implications of voyeurism are also significant. Forensic psychologist Simon Duff explains that various motivations could drive individuals to engage in voyeuristic behavior, including sexual gratification, fascination with exposure, or the thrill of risk-taking.[766] Regardless of the motivation, the impact on victims is profound, as they feel violated and betrayed.[767]

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[759] *Id.*
[760] *Id.*
[761] *Id.*
[762] Silver, *supra* note 39.
[763] *Id.*
[764] *Id.*
[765] *Id.*
[766] *Id.*
[767] Silver, *supra* note *39.*

The ever-growing availability of spy technology has given rise to significant concerns about privacy violations in both public and private spaces. The Ashley Buckle case serves as a poignant example of how the sanctity of one's own home can be breached by perpetrators who exploit the affordability and ease of use of hidden cameras.

In the Buckle case, the intrusion of privacy took place within the victim's own residence.[768] This form of voyeurism is particularly insidious, as it undermines the trust and sense of security typically associated with one's personal living space. Given that the home is a place where individuals expect complete privacy, this invasion is even more damaging, leaving victims feeling violated and unsafe.

The accessibility and affordability of hidden cameras have created a market that enables individuals with malicious intent to discreetly install these devices in others' homes. These cameras can be camouflaged as everyday household items, making them challenging to detect, even in familiar environments. Consequently, victims may remain entirely oblivious to the fact that they are being monitored and recorded during their most private moments.

The emotional and psychological consequences of this invasion of privacy are profound. Victims may grapple with feelings of violation, betrayal, and a loss of trust in their relationships.[769] The knowledge that their intimate moments have been captured on film and could potentially be shared with others only exacerbates the emotional distress and humiliation they experience.

To effectively address the issue of hidden cameras within private residences, individuals must take precautions to protect their privacy. This could include regularly inspecting their homes for unfamiliar objects, installing security systems, and exercising caution when granting others access to their living spaces. Additionally, public education campaigns designed to raise awareness about the dangers of

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[768] Stefanie Knowlton, *Victims push for tougher penalties in hidden-camera cases*, STATESMAN J. (Dec. 28, 2014, 8:16 AM), https://www.statesmanjournal.com/story/news/2014/12/28/victims-push-tougher-penalties-hidden-camera-cases/20961279/.
[769] Silver, *supra* note *39.*

spy technology and promote vigilance can empower individuals to take proactive steps against this invasive practice.

However, the onus of addressing this issue should not be placed exclusively on potential victims. Lawmakers and manufacturers must also be held accountable for establishing and enforcing regulations that limit the misuse of spy technology. This might involve implementing harsher penalties for the manufacturing, sale, or use of hidden cameras for voyeuristic purposes, or mandating that manufacturers design their products in a manner that renders them more easily detectable.

The rise of spy technology and its impact on sexual privacy in both public and private settings underscores the urgent need for a collaborative effort to tackle this growing threat. By raising awareness, instituting appropriate legal measures, and fostering a culture of respect for privacy, we can work together to safeguard the well-being and safety of all individuals. Addressing this issue in a comprehensive manner, taking into account the responsibilities of individuals, manufacturers, and lawmakers, is essential in order to ensure that privacy rights are protected in an age of rapidly advancing technology.

III. The Prevalence of Secret Camera Surveillance Internationally: A Case Study on South Korea

South Korea has faced a significant issue with secret camera surveillance, specifically targeting women in public spaces such as restrooms, hotels, and changing rooms.[770] These tiny cameras, known as spycams, capture images that are later uploaded to websites where men pay to access them.[771] Between 2013 and 2018, over 30,000 cases of hidden camera filming were reported to South Korean police.[772] These widespread privacy violations have traumatized women nationwide, prompting tens of thousands to protest under the banner "My life is not your porn" in 2018 in the capital, Seoul.[773]

[770] Amy Gunia, *'It Breaks My Heart.' Confronting the Traumatic Impact of South Korea's Spycam Problem on Women*, TIME (Mar. 7, 2022, 1:00 AM), https://time.com/6154837/open-shutters-south-korea-spycam-molka/.
[771] *Id.*
[772] *Id.*
[773] *Id.*

The South Korean government has taken some measures in response to these protests, including enacting reforms to address illegal filming.[774] However, Human Rights Watch reported in June 2021 that obtaining justice for women and girls targeted in digital sex crimes remains challenging.[775] For instance, in 2019, prosecutors dropped 43.5% of sexual digital crimes cases.[776]

In the documentary *Open Shutter*s, director Youjin Do explores the issue of spycams in South Korea through the lens of journalist Jieun Choi, who was also a victim of secret camera surveillance.[777] The film highlights the ongoing problem in South Korea, revealing that despite some progress, the issue persists. Choi's story, alongside the thousands of women affected by spycam crimes, underscores the urgent need for stronger legal and cultural measures to combat this widespread violation of privacy.

The case of South Korea serves as a cautionary example for the United States, highlighting the importance of addressing the issue of secret camera surveillance before it becomes similarly ingrained in society. Implementing a national register plan, as proposed in the previous section, could serve as a proactive measure to prevent the proliferation of such privacy violations in the United States.

IV. The Legality of Electronic Surveillance Technology in The United States

The proliferation of electronic surveillance technology, particularly spy cameras, has raised concerns about the protection of individual privacy in the United States. While hidden cameras can serve legitimate purposes, such as monitoring the safety and wellbeing of children and the elderly, they also have the potential to invade personal privacy and facilitate unauthorized surveillance. The legality of electronic surveillance technology is governed by a patchwork of federal and state laws, which vary in their scope and comprehensiveness. This section will provide a detailed examination of the legal framework surrounding electronic surveillance technology in the United States, focusing on hidden cameras, and the challenges posed by the increasing accessibility and affordability of these devices.

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[774] *Id.*
[775] Gunia, *supra* note 53.
[776] *Id.*
[777] *Id.*

At the federal level, the legality of electronic surveillance technology is primarily governed by two sets of laws: consent laws and expectation of privacy laws. Consent laws relate to the audio recording of private conversations, while expectation of privacy laws pertain to the recording of video footage in public and private settings.[778]

The one-party consent law (18 U.S.C. § 2511(2)(d)) permits the audio recording of phone calls or in-person conversations, as long as at least one of the parties involved has provided consent.[779] This means that audio-equipped security cameras can legally record conversations in which the homeowner or another consenting adult is a party. However, the legality of audio recordings can be more complex in situations involving multiple parties, some of whom may not have provided consent.

Expectation of privacy laws establish that it is generally legal to record video in public spaces, including with doorbell cameras, security cameras, and other surveillance devices.[780] The key principle underlying these laws is the reasonable expectation of privacy, which dictates that recording is prohibited in places assumed to be private, such as in bathrooms, changing rooms, locker rooms, hotel rooms, and bedrooms.[781] In the context of a homeowner's property, the expectation of privacy extends to the homeowner's bedroom, but recording in other bedrooms or private spaces without consent may be legally problematic.

State laws regarding electronic surveillance technology vary considerably across the United States, with only 15 states having specific regulations in place.[782] Some states, such as Georgia, permit the use of video surveillance cameras in both public and private settings, as long as the cameras are visible.[783] Other states such as Florida, Alabama, and Minnesota, allow hidden video surveillance in

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[778] Aliza Vigderman & Gabe Turner, *Are Security Cameras Legal?*, SEC. (Oct. 5, 2022), https://www.security.org/security-cameras/legality/.
[779] *Id.*
[780] *Id.*
[781] *Id.*
[782] *Id.*
[783] Vigderman & Turner, *supra* note 61.

non-private settings, while Tennessee, Michigan, and Utah require consent for the use of hidden cameras in private spaces.[784]

Other state including Hawaii, New Hampshire, Maine, Kansas, South Dakota, and Delaware, apply the "reasonable expectation of privacy" principle, requiring consent for hidden camera surveillance.[785] In California, it is illegal to make video recordings of confidential communications, reflecting a more specific legal approach to surveillance.[786] Arkansas, on the other hand, mandates consent for recording individuals in private spaces.[787]

In addition to state laws, some counties and cities have their own regulations regarding electronic surveillance technology, further complicating the legal landscape. Homeowners must therefore be diligent in researching and adhering to the relevant laws in their specific jurisdiction.

Hidden cameras, such as nanny cams or other concealed surveillance devices, are generally considered legal under federal and state laws, provided they comply with the expectation of privacy regulations outlined earlier.[788] While numerous how-to guides, instructional videos, and online forums offer advice on effectively hiding in-home security cameras, it is important for homeowners to consider the potential ramifications of recording guests or hired help without their knowledge or consent.

Laws regarding audio recording tend to be more stringent than those pertaining to video recording. It is therefore crucial for homeowners to remain aware of the legal distinctions between audio and video surveillance while selecting and installing security cameras in their homes.[789]

When it comes to outdoor security cameras, including video doorbells, the legal framework is generally more permissive, as these devices do not typically encroach upon the privacy expectations

[784] *Id.*
[785] *Id.*
[786] *Id.*
[787] *Id.*
[788] Vigderman & Turner, *supra* note 61.
[789] *Id.*

associated with indoor spaces.[790] Outdoor cameras can be positioned around a property, as long as they do not point directly into spaces that neighbors would consider private. It is permissible, for instance, to aim cameras at the street, front lawn, or back door, but capturing footage of a neighbor's house may lead to legal issues.[791] To avoid potential disputes, homeowners should ensure that their security cameras focus solely on their own property or public spaces.

In some jurisdictions, homeowners are required to register their security cameras and alarm systems with local or municipal governments.[792] This may include systems directly linked to local police alarms or other monitoring services. It is crucial for homeowners to familiarize themselves with the registration and permitting requirements of their specific location before installing a security system. Given the evolving nature of laws surrounding electronic surveillance technology, homeowners must remain vigilant in keeping their security systems compliant with current regulations. Installing cameras in plain sight and adhering to privacy expectations can help prevent legal action resulting from security infringement.

The increasing availability and affordability of electronic surveillance technology, particularly hidden cameras, have raised concerns about privacy protection and the potential misuse of these devices. The legal framework governing electronic surveillance in the United States consists of a complex array of federal and state laws, which differ significantly in their scope and specificity.

V. Current Government Mechanisms to Protect Sexual Privacy

Nonconsensual pornography, also known as revenge porn, involves the sharing of explicit images of individuals without their permission. This can include photos taken without the subject's knowledge or consent, as well as images taken with consent but later disseminated without the depicted person's approval.[793]

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[790] *Id.*
[791] *Id.*
[792] *Id.*
[793] *Nonconsensual Pornography (Revenge Porn) Laws in the United States*, BALLOTPEDIA (last updated Mar. 13, 2023), https://ballotpedia.org/Nonconsensual_pornography_(revenge_porn)_laws_in_the_United_States#:~:text=In%20March%202022%2C%20as%20part,images%20without%20the%20individual's%20consent.

As voyeuristic technology continues to contribute to the invasion of sexual privacy, states and the federal government have rushed to provide adequate solutions. In March 2022, the Violence Against Women Act Reauthorization Act of 2022 was passed by Congress, which for the first time included a federal law addressing nonconsensual pornography. This law allows individuals to file federal lawsuits against those who disclose intimate images without the depicted person's consent[794]. However, despite these advances, there are limitations that exist with this enactment. The Communications Decency Act (CDA), enacted in 1996, governs internet-based pornography and provides immunity to websites and service providers for user-generated content they did not co-create.[795] Section 230 of the CDA specifies that operators of internet services and websites are not to be treated as publishers of user-posted content. Consequently, websites and service providers are not legally obligated to remove nonconsensual pornography unless it breaches copyright or federal criminal laws.[796]

As of October 2023, 48 states and Washington D.C. have enacted laws that prohibit the distribution or production of nonconsensual pornography.[797] The only two states without such laws are Massachusetts and South Carolina.[798]

VI. The Inadequacies of Current Mechanisms: The Limitations Existing with Revenge Porn Laws

Despite the United States attempting to provide solutions to these issues, courts have historically grappled with the constitutionality of state revenge porn laws, with most surviving constitutional challenges. While courts have predominantly upheld the constitutionality of state revenge porn laws, their reactive nature highlights the need for more proactive measures to better protect victims' privacy and security. This section delves into the legal landscape of revenge porn laws, examining their constitutional foundations and shortcomings in effectively addressing the issue.

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[794] *Id.*
[795] *Id.*
[796] *Id.*
[797] *Id.*
[798] *Nonconsensual Pornography (Revenge Porn) Laws in the United States, supra* note 76.

State revenge porn laws typically encompass three elements: intent, knowing dissemination of the content by the perpetrator, and the absence of consent from the depicted person. Courts have employed three types of constitutional analysis for revenge porn statutes: strict scrutiny, intermediate scrutiny, and the recognition of the principles pronounced in the U.S Supreme Court case Snyder v. Phelps.[799]

Vermont, Minnesota, and Texas courts subjected their respective revenge porn laws to strict scrutiny, ultimately upholding their constitutionality.[800] These courts acknowledged the state's compelling interest in protecting the health and safety of citizens and recognized the detrimental effects victims endure as a result of nonconsensual porn dissemination, and they also identified revenge porn as a severe invasion of privacy.[801]

The Illinois court diverged from the strict scrutiny approach, applying intermediate scrutiny to its revenge porn law, due to the law being a content-neutral regulation.[802] The court underscored that the same image, if disseminated consensually, would not lead to criminal charges.[803]

The Vermont, Illinois, and Minnesota courts invoked the Snyder v. Phelps principle, emphasizing that speech on purely private matters warrants less First Amendment protection. These courts concluded that their revenge porn laws were narrowly tailored, excluding speech on public or political matters.[804]

All four courts maintained that revenge porn was not categorically exempt from First Amendment protection.[805] Though the states argued for treating revenge porn like obscenity, the courts

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[799] Chance Carter, *An Update on the Legal Landscape of Revenge Porn*, NAT'L ASS'N OF ATT'YS GEN. (Nov. 16, 2021), https://www.naag.org/attorney-general-journal/an-update-on-the-legal-landscape-of-revenge-porn/.
[800] *Id.*
[801] *Id.*
[802] *Id.*
[803] *Id.*
[804] Carter, *An Update on the Legal Landscape of Revenge Porn*.
[805] *Id.*

disagreed, asserting that nonconsensual porn was not obscene.[806] The courts also declined to establish a new categorical exemption for nonconsensual porn but recognized its potential as a candidate for such an exemption.[807]

Despite their constitutionality, current revenge porn laws fall short in effectively addressing the nonconsensual dissemination of intimate images. As reactive measures, they fail to provide sufficient peace of mind and security for victims. Once intimate images are released, the irreversible damage to victims' privacy and well-being cannot be undone. Although these laws may deter some potential perpetrators, they are incapable of completely preventing the distribution of nonconsensual porn or adequately shielding victims from its devastating consequences.

Revenge porn laws are predominantly reactive, meaning that they address the issue after the fact. This approach has its limitations, as the consequences of nonconsensual dissemination can be severe and long-lasting for the victim. The irreversible damage to the victim's privacy and emotional well-being highlights the need for more proactive measures.

While revenge porn laws may deter some potential perpetrators, they do not effectively prevent the distribution of nonconsensual porn. The global nature of the internet and the ease with which images can be shared make it difficult for laws to keep up with the rapid dissemination of intimate content. This limitation exposes the need for a more comprehensive approach to address the issue.

Current revenge porn laws fail to adequately protect victims from the devastating consequences of nonconsensual dissemination. Although some legal are available to victims, such as monetary compensation or restraining orders, these measures often fall short in addressing the emotional and psychological trauma associated with having one's intimate images disseminated without consent. Additionally, the legal process can be lengthy and expensive, further exacerbating the emotional toll on the victim.

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[806] *Id.*
[807] *Id.*

VII. Technology And the Future of Sexual Privacy: How Alterations to A Camera's Metadata Can Provide A Practical Solution To An Alarming Problem

In the digital era, the alarming issue of revenge porn has emerged as a threat to sexual privacy, prompting discussions around potential solutions to counter this growing problem. One possible approach involves implementing standardized metadata policies for images and videos that make metadata unmodifiable, thereby enabling the identification of individuals who violate sexual privacy by linking the shared material to a specific device or person. The role of metadata, its primary standards, and how alterations to metadata policies can offer a practical solution to the issue of revenge porn and safeguarding sexual privacy.

To better understand how the use of this technology can provide a proactive approach to dissuade perpetrators from engaging in voyeuristic behavior, a sufficient understanding of what metadata is necessary. Metadata is additional information stored within image and video files that encompasses a wide array of types and provides various details. Some common uses of metadata include:

1) Technical Details: Automatically generated by cameras, technical metadata provides information about the camera's manufacturer, model, and settings. It can also include the GPS location where the image was captured and the date and time it was taken.[808]
2) Descriptive Data: Manually added through imaging software, descriptive metadata consists of the photographer's name, keywords, captions, or comments. This metadata enhances an image's searchability, allowing software to index, sort, and locate photos using keywords.[809]
3) Administrative Data: Primarily added manually, administrative metadata includes information about the image's usage rights, licensing, and restrictions on reuse or copying. This data enables the sharing of image files while

[808] *What are image metadata (EXIF, IPTC, XMP)?*, NEEDEDAPPS (last visited Mar. 10, 2023), https://neededapps.com/tutorials/what-are-image-metadata-exif-iptc-xmp/.
[809] *Id.*

informing recipients of their rights without requiring additional documentation.[810]

There are three primary metadata standards: EXIF, IPTC, and XMP. Each serves a different purpose and is briefly described below:

1) EXIF Metadata: The Exchangeable Image Format (EXIF) stores information such as the date and time a photo was taken, GPS location, and camera details and settings. Most devices such as phones and digital cameras allow for this.[811]
2) XMP Metadata: The Extensible Metadata Platform (XMP) is an ISO standard that facilitates the processing and interchange of image files. XMP files store information about post-processing changes made to an image.[812]
3) IPTC Metadata: The International Press Telecommunications Council (IPTC) is a standard primarily used to store information such as titles, descriptions, keywords, photographer details, copyright restrictions, and more. IPTC metadata may be used as leverage for copyright protection.[813]

Given the various applications and types of metadata, unmodifiable metadata policies can be crucial in addressing the issue of revenge porn and sexual privacy violations. By standardizing metadata policies and preventing modifications, a clear link can be established between shared revenge porn materials and the violator's device or identity. Although proponents against the policy for permanency of metadata may argue that such a policy takes away a person's ability to remain anonymous, sexual privacy, when viewed at the top of the privacy hierarchy, allows for these considerations to be weighed in favor for the permanency of metadata.

For instance, unmodifiable EXIF metadata containing the GPS location, date, and time a photo was taken can help trace the origin of the shared material. Similarly, administrative metadata detailing usage rights and restrictions on reuse or copying can further clarify the legal implications of sharing such images or videos without consent. This

[810] *Id.*
[811] *Id.*
[812] *Id.*
[813] NEEDEDAPPS, *What are image metadata*.

information can be invaluable in holding violators accountable and deterring potential offenders.

The concept of making metadata permanent is not a new idea; it has been endorsed by various organizations and professionals in the past. A notable example is the Embedded Metadata Manifesto, an initiative created by the International Press Telecommunications Council (IPTC) with support from the American Association of Advertising Agencies (4A's) and the Association of National Advertisers (ANA).[814] The Embedded Metadata Manifesto outlines five guiding principles designed to ensure that metadata is embedded and preserved in digital media files, emphasizing the importance of metadata for identifying, describing, and tracking digital media and the need for consistency and permanence in metadata handling.[815]

Moreover, implementing standardized metadata policies can encourage cooperation among device manufacturers, software developers, and law enforcement agencies. By sharing metadata information in a consistent format, these stakeholders can collaboratively combat revenge porn and protect sexual privacy more effectively.

VIII. Holding Perpetrators Accountable: The Case for A National Register to Obtain Certain Technologies

The prevalence of technology and the internet has brought about numerous advancements in society, but with it has come the dark side of technology-facilitated sexual privacy violations. One significant concern is the use of cameras to invade an individual's sexual privacy, resulting in non-consensual sharing of intimate images or videos, commonly referred to as "revenge porn." To combat this problem, this Note proposes a national register plan for the United States that restricts the sale of specific classes of cameras, which may be used for invading sexual privacy, unless manufacturers comply with providing a register ID for each device sold as part of the metadata.

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[814] INT'L PRESS TELECOMM. COUNCIL, *About us and how to contact us, Embedded Metadata Manifesto* (last visited Mar. 12, 2023), https://www.embeddedmetadata.org/about-us-contact-us.php. (last visited Mar. 12, 2023).

[815] INT'L PRESS TELECOMM. COUNCIL, *Embedded Metadata Manifesto*, Embedded Metadata Manifesto (last visited Mar. 12, 2023), https://www.embeddedmetadata.org/embedded-metatdata-manifesto.php. (last visited Mar. 12, 2023).

This Note will outline the rationale for such a plan and its potential impact on the landscape of sexual privacy in the United States.

Under the proposed plan, the sale of a specific class of cameras deemed by Congress to have a high potential for invading sexual privacy will be restricted. Manufacturers of these cameras must provide a unique register ID for each device sold as part of the metadata. This register ID must be unmodifiable and linked to the device and its owner.

The proposed plan will make it illegal for individuals to tamper with the register ID set by the manufacturer, specifically the metadata relating to these classes of devices. Any attempt to modify, remove, or alter the register ID will be considered a criminal offense.

Individuals wishing to purchase a camera within the restricted class must provide a compelling reason for the purchase, as determined by a designated agency created by Congress. This requirement serves as a barrier to individuals intending to use such cameras for malicious purposes, such as invading another's sexual privacy.

If manufacturers fail to comply with these standards, victims of sexual privacy violations involving non-compliant devices will have a private right of action against the manufacturers. This provision holds manufacturers accountable for the technology they create and its potential misuse.

The proposed plan aims to discourage and make it difficult for perpetrators to use specific classes of cameras for invading sexual privacy. By restricting access to these cameras and requiring a compelling reason for purchase, the plan creates a hurdle for those with malicious intentions.

The plan forces manufacturers to take responsibility for the technology they create by requiring compliance with the register ID system. This ensures that devices can be tracked, and any misuse can be traced back to the source, holding both the perpetrator and the manufacturer accountable.

The national register plan presented in this Note offers a comprehensive approach to addressing the growing problem of technology-facilitated sexual privacy violations in the United States. By restricting the sale of specific classes of cameras, making tampering with register IDs illegal, requiring compelling reasons for camera purchases, and allowing a private right of action for victims, this plan serves to discourage perpetrators, hold manufacturers responsible, and facilitate legal action for victims. Implementing such a plan could significantly impact the landscape of sexual privacy and provide a viable solution to an alarming problem.

Conclusion

The proliferation of secret camera surveillance and the invasion of sexual privacy pose a significant threat to the safety and well-being of individuals in the United States and around the world. As seen in the case of South Korea, the unchecked growth of such privacy violations can lead to widespread trauma and a sense of insecurity, particularly for women. To address this pressing issue, it is crucial to establish comprehensive legal and technological frameworks that discourage the misuse of camera devices and hold manufacturers accountable for the technology they create.

The proposed national register plan for the United States aims to strike a balance between protecting privacy rights and allowing legitimate uses of camera devices. By requiring manufacturers to embed a unique register ID in the metadata of a specific class of cameras, the plan provides a reliable means of tracing violations back to the violators. Furthermore, implementing stringent regulations to prevent the tampering of metadata and ensuring that only individuals with a compelling reason can access these cameras will discourage potential perpetrators from attempting to use such devices for invasive purposes.

In addition to legal measures, fostering a cultural shift that emphasizes the importance of privacy rights and gender equality is essential for addressing the root causes of these violations. Public awareness campaigns and educational initiatives can play a vital role in changing societal attitudes toward privacy and promoting a more respectful and responsible use of technology. In conclusion, the challenges posed by secret camera surveillance and privacy invasions demand a multifaceted response encompassing legal, technological,

and cultural solutions. By adopting a proactive approach through the implementation of the national register plan and fostering a societal commitment to privacy rights and gender equality, the United States can prevent the proliferation of these violations and ensure a safer environment for all citizens.

The Terms & Conditions of the 21st Century Space Race: How Revisiting the 1974 Registration Convention Can Support International Space Exploration

Omnia A. Shedid[816]

Abstract

Space exploration is rapidly changing and advancing, yet space law and policy remains stagnant. While countries may be considering new ways to approach space exploration domestically, the same considerations are not readily offered to international laws controlling space exploration. Currently, five United Nations agreements serve as the main governing documents guiding the exploration of outer space: the "Outer Space Treaty," the "Rescue Agreement," the "Liability Convention," the "Registration Convention," and the "Moon Agreement."[817] These treaties, commonly referred to as the "five United Nations treaties on outer space," address important issues related to space activities, such as arms control in outer space, environmental safety in space, and astronaut safety, among other things.[818] However, this note focuses on the 1974 Registration Convention, resolution 3235 (XXIX), which was born out of a desire for states[819] to identify and share the objects they launched into space as well as the capabilities of those objects. The Convention, which was intended to promote accountability among the states, built upon the responsibilities that the states already had as parties to the Outer Space

[816] Syracuse University College of Law. Juris Doctorate and Master of Public Administration, expected May 2024. *Journal of Science and Technology Law*. This note is dedicated to my grandfather, Kamal, my grandmother, Elsit, my mother, Elham, my sister, Eman, and my brother, Malek. Thank you for encouraging me to dream beyond the stars.

[817] United Nations Office for Outer Space Affairs, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (last visited Feb. 22, 2024).

[818] United Nations Office for Outer Space Affairs, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (last visited Feb. 22, 2024).

[819] The terms "states," "countries," and "parties" are used interchangeably to reference entities that are involved in space exploration and recognize the Registration Convention as well as other United Nations treaties.

Treaty, the Rescue Agreement, and the Liability Convention.[820] Given political and technological changes since 1975, this note argues that the Registration Convention should be amended for three reasons: (1) the commercialization of space exploration requires increased transparency, (2) advancements in technology makes space easily accessible for non-traditional actors, increasing space traffic, and (3) resource extraction and in-space experimentation may be more efficient, and fair, with greater regulation.

[820] United Nations Office for Outer Space Affairs, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (last visited Feb. 22, 2024).

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I. The 1974 Registration Convention

In resolution 1721B, which called for "international cooperation in the peaceful uses of outer space," the United Nations General Assembly stated that the resolution was written with the belief that "the exploration and use of outer space should be only for the betterment of mankind and to the benefit of States irrespective of the state of their economic and social development."[821] The resolution, which established the United Nations Register of Objects Launched into Outer Space, was adopted in 1961.[822] At a time when there was earthly unrest, including the building of the Berlin Wall, a looming United States intervention in the Vietnam War, and the Cuban Missile Crisis, the United Nations was attempting to regulate space activities to ensure at least some cooperation during imminent conflicts. In 1974, the United Nations presented the Convention on Registration of Objects Launched into Outer Space, which presented common ground among states and provided countries "with additional means and procedures to assist in the identification of space objects."[823] The Convention also sought to reiterate and add to superseding agreements, including the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space.[824] It recognized "the common interest of all mankind in furthering the exploration and use of outer space for peaceful purposes."[825] The Convention emphasized a country's responsibility over the objects it launched into space, its duties to report data on an object before it returns to Earth, and the liabilities of "the launching States" over the damage caused by the objects that countries launch.[826] More specifically, though, the Convention called on the parties to report the objects they launched into outer space to a centralized registry.[827] The registry, which would be maintained by the Secretary-General of the United Nations, became a mechanism by which the United Nations became informed of countries' technology and goals for space exploration. A centralized recording system also allowed the United Nations to recognize the

[821] United Nations International Co-Operation in the Peaceful Uses of Outer Space, Dec. 12, 1961, G.A. Res. 1721 (XVI) (Dec. 12, 1961).
[822] *Id.*
[823] United Nations Convention on Registration of Objects Launched into Outer Space, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974).
[824] United Nations Convention on Registration of Objects Launched into Outer Space, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974), *see* Annex.
[825] *Id.*
[826] *Id.*
[827] *Id.*

improvements it needed to consider in international space law based on the activities undertaken by the countries and intergovernmental actors.[828] In other words, a register allows international law to be tailored to the activities that are, or could be, desired by countries that are undertaking space exploration.

Understanding the goal of the Convention is important in the context of modern space exploration because it demonstrates how the Convention, like the other international treaties related to space law, supports space activities. Whether it is exploration or experimentation, the registry allows countries to share their purpose in outer space, leading to a better understanding of the gaps in space law. The registry developed under the Convention is an archive of other registries developed by the states that are party to the Convention.[829] Each state party to the Convention develops their own internal registry, with conditions and maintenance requirements that it determines on its own.[830] States then report their registry, its conditions, and maintenance requirements to the Secretary-General.[831] In addition to the states' recording strategies, the United Nations imposes its own requirements, which include that a state reports an identifying designation of the space object, the location of the launch, and the general function of the object. States retain some flexibility under the Convention, though. For example, states have the option of reporting more information than what is required under the Convention, they can jointly launch an object, and they can decide among themselves which country is to report information about the object should they partner to launch one.[832]

Under the Convention, there are two ways by which it may be updated: by amendment and by a reviewing conference.[833] Any party

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[828] *Id.*
[829] United Nations Convention on Registration of Objects Launched into Outer Space art. II, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974).
[830] *Id.*
[831] United Nations Convention on Registration of Objects Launched into Outer Space art. III, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974).
[832] United Nations Convention on Registration of Objects Launched into Outer Space art. II, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974). Convention on Registration of Objects Launched into Outer Space.
[833] United Nations Convention on Registration of Objects Launched into Outer Space art. IX, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974). Convention on Registration of Objects Launched into Outer Space.

to the Convention may present an amendment for a vote.[834] If the amendment is accepted by the majority of the parties, it passes.[835] For a reviewing conference to occur, the majority of parties must agree to convene and one third of the parties to the Convention must agree that the convening be for the purpose of a reviewing conference.[836] Should a reviewing conference happen, the Convention encourages states to account for advancement in technology and methodology in tracking space objects when considering changes to the Convention.[837] Additionally, the Convention allows countries to collaborate with private actors and governmental partners. For example, international governmental organizations may report their space activities to the Register by declaring an acceptance of the rights and obligations under the Convention.[838]

II. The Registration Convention Today

In December 1958, the United Nations established a space affairs committee which later became the United Nations Office for Outer Space Affairs.[839] Among its responsibilities, the Office supports countries' understanding of international space law, while encouraging them to create domestic space law and policies that conform to international standards.[840] It also houses the United Nations Platform for Space-based Information for Disaster Management and Emergency Response, also known as UN-SPIDER, which supports countries in using data from space objects to prepare and respond to disasters.[841] But perhaps one of the Office's greatest responsibilities is overseeing the official United Nations Register established under the Convention by delegation from the Secretary-General.[842] According to the Office,

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[834] *Id.*
[835] *Id.*
[836] United Nations Convention on Registration of Objects Launched into Outer Space art. X, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974). Convention on Registration of Objects Launched into Outer Space.
[837] *Id.*
[838] United Nations Convention on Registration of Objects Launched into Outer Space, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974).
[839] United Nations Office for Outer Space Affairs, *History*, https://www.unoosa.org/oosa/en/aboutus/history/index.html (last visited Feb. 22, 2024).
[840] United Nations Office for Outer Space Affairs, *Roles and Responsibilities*, https://www.unoosa.org/oosa/en/aboutus/roles-responsibilities.html (last visited Feb. 22, 2024).
[841] *Id.*
[842] *Id.*

"approximately 87% of all satellites, probes, landers, crewed spacecraft and space station flight elements" orbiting Earth and in outer space are registered and available for public viewing through the Registry under their maintenance.[843]

In 1962, the United States was the first country to utilize the Register and reported information related to all 72 of its space objects in orbit at the time.[844] However, as of February 20, 2024, there are 75 parties and 25 signatories of the Convention.[845] Among the parties are the United States, China, the United Kingdom, Russia, Japan, India, and Canada;[846] all of which are the countries with the most satellites in space.[847] Other prominent players in space exploration include France and Germany, who are also parties to the Convention.[848]

One of the main goals of the Convention is to promote transparency among the aforementioned countries; allowing the parties to the Convention, as well as the public, to better understand one another's space capabilities.[849] As it is currently written, the Convention mandates that the following details be among the information that is reported to the Register: (1) name of the launching state; (2) the object designator or registration number; (3) the launch location; (4) orbital parameters; and (5) general function of the object.[850] However, emerging issues may be deterring the Convention from meeting its original goals and ensuring that the biggest players in

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[843] United Nations Office for Outer Space Affairs, United Nations Register of Objects Launched into Outer Space, https://www.unoosa.org/oosa/en/spaceobjectregister/index.html (last visited Feb. 22, 2024).
[844] RAM S. JAKHU ET AL., CRITICAL ISSUES RELATED TO REGISTRATION OF SPACE OBJECTS AND TRANSPARENCY OF SPACE OBJECTS, ACTA ASTRONAUTICA, 406-420 (143 ED. 2018).
[845] G.A. Res. 3235 (XXIX) (Nov. 12, 1974), U.N.T.S. Chapter XXIV. 1.
[846] *Id.*
[847] Katharina Buchholz, *The Countries with the Most Satellites In Space* [Infographic], FORBES, https://www.forbes.com/sites/katharinabuchholz/2023/04/26/the-countries-with-the-most-satellites-in-space-infographic/?sh=36689e3cce27 (Apr. 26, 2023, 12:01 PM).
[848] G.A. Res. 3235 (XXIX) (Nov. 12, 1974), U.N.T.S. Chapter XXIV. 1.
[849] Jakhu, *supra* note 29.
[850] United Nations Convention on Registration of Objects Launched into Outer Space art. IV, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974). Convention on Registration of Objects Launched into Outer Space.

space exploration are sharing outer space appropriately, while respecting the environment and one another's technologies.

III. Emerging Issues in International Space Law

In 2022, the United States spent $62 billion on space programs.[851] China is close behind, having spent more than $11 billion, followed by Japan at almost $5 billion, and France at $4 billion.[852] Understandably, this amount of spending on space activities produces a plethora of emerging issues related to space exploration and international space law. However, three specific issues could be determinative of who controls space in the future and the laws that they must abide by: the commercialization of space exploration, advancements in technology (especially advancements beyond what is reported by each country), and resource extraction from outer space. Additionally, countries have demonstrated a growing desire to weaponize outer space.[853] Revisiting the Registration Convention would provide guidance on how to regulate objects within the context of these issues and allow countries to collaborate on developing laws that can accommodate the increasing number of objects in space.

A. The Commercialization of Space

On May 30, 2020, National Aeronautics and Space Administration (NASA) astronauts Robert Behnken and Douglas Hurley boarded the Crew Dragon spacecraft on the Falcon 9 rocket.[854] The SpaceX rocket launched from NASA's Kennedy Space Center in Florida, making history as the first commercially built rocket to launch with astronauts aboard.[855] This was a significant moment in American

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[851] STATISTA RESEARCH DEPARTMENT, GOVERNMENT SPACE PROGRAM SPENDING OF THE LEADING COUNTRIES IN THE WORLD 2020-2022, https://www.statista.com/statistics/745717/global-governmental-spending-on-space-programs-leadingcountries/#:~:text=The%20United%20States%20Government%20spent,space%20expenditure%20in%20the%20world. (last visited Feb. 22, 2024).

[852] *Id.*

[853] Tim Fernholz, *How the US is Preparing to Fight and Win – A War in Space*, VOX, https://www.vox.com/the-highlight/2024/1/16/24034692/national-security-threat-russia-space-weapons-true-anamoly-china-united-states-space-war (Feb. 15, 2024, 10:19 AM).

[854] Press Release, NASA, NASA Astronauts Launch from America in Historic Test Flight of SapceX Crew Dragon (May 30, 2020), https://www.nasa.gov/news-release/nasa-astronauts-launch-from-america-in-historic-test-flight-of-spacex-crew-dragon/ (on file with author).

[855] *Id.*

and space history because it demonstrated NASA and the U.S. government's willingness to work alongside commercial rocket and spacecraft developers through public-private partnerships.[856] Since then, SpaceX has successfully conducted hundreds of commercial rocket launches, with 96 missions in 2023 alone.[857] One rocket launched and landed 19 times, validating SpaceX's capacity for building reusable and durable space technology.[858]

Global commercial launches have been rapidly increasing since 2018, with the United States' launches increasing by 152 percent from 2018 to 2022, largely driven by SpaceX launches.[859] In fact, the United States is home to the most amount of space companies. In addition to partnering with NASA and other government agencies, private space companies have provided the public with a mechanism for space tourism.[860] Although space tourism flights remain astronomically expensive with a single trip valued at least $20 million, the space tourism industry is expected to claim a market of $3 billion by 2030.[861]

The commercialization of space has influenced an increase in launches and a desire by countries to dominate in space. By 2040, it is projected that there will be $1.1 trillion worth of commercial activity in space.[862] The United States, which maintains the largest share in commercialized space activity, has committed to the "burgeoning U.S. commercial space sector," to ensure leadership in space exploration and the evolution of space law surrounding commercial space activities.[863] Revisiting the Registration Convention will support the increase in commercialized space exploration by upgrading the

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[856] *Id.*
[857] Michael Sheetz, *SpaceX Sets New Rocket Record with 96 Successful Launches in 2023*, CNBC, https://www.cnbc.com/2023/12/29/spacex-rockets-2023-launch-record.html (Dec. 29, 2023, 1:50 PM).
[858] *Id.*
[859] Mitch Semanik & Patrick Crotty, *U.S. Private Space Launch Industry is Out of this World*, U.S. INTER. TRADE COMM. (Nov. 2023), https://www.usitc.gov/publications/332/executive_briefings/ebot_us_private_space_launch_industry_is_out_of_this_world.pdf.
[860] The Universe Space Tech, *How Private Money Changed the Space Industry*, UNIVERSE MAGAZINE, https://universemagazine.com/en/how-private-money-changed-the-space-industry/ (Jul. 10, 2022).
[861] *Id.*
[862] Sarah Kreps, Avishai Melamed & Ray Jayawardhana, *The Promise and Perils of the New Space Boom*, THE BROOKINGS INSTITUTE, Nov. 2, 2022.
[863] *Id.*

reporting factors and mechanisms that states use to conform with the Convention. Private companies will only continue to develop technologies that make commercial activities, such as space tourism and private exploration, more accessible to those who can afford it. However, private companies are not the only actors in space; they join government organizations who have long dominated the field. Updates to the Registration Convention would account for additional actors in space and further promote its purpose of providing transparency surrounding space activities.

B. Advancement in Technology

The commercialization of space exploration is made possible by rapidly evolving innovations in space technology.[864] Influential emerging technology includes reusable rockets,[865] 3D printers,[866] and satellite material that is easier to make and cheaper to buy.[867] Carbon fiber and advanced composites are also making it possible to build cheaper and lighter rockets.[868] For some countries, it is about sustainability: how do you orbit Earth multiple times without wasting resources and energy? For other countries, the desperation to create more advanced technological capabilities is much more calculated: how do you use advanced technology to gain a military advantage in space and meet specific national security goals?[869]

The advancements in the way that space objects are designed and built have produced a profound domino effect. As a result of having access to and using cheaper material, more space objects are developed, creating more traffic and potential for space debris. For example, 3D printing, advanced camera technology, and expanded data storage have allowed more launches of cheaper, smaller satellites from government and non-government entities.[870] Smaller, cheaper satellites are so accessible that almost 94 percent of all spacecraft

[864] Semanik, *supra* note 44.
[865] *Id.*
[866] *Id.*
[867] Fernholz, *supra* note 38.
[868]Landry Singe & Hanna Dooley, *How Space Exploration is Fueling the Fourth Industrial Revolution*, THE BROOKINGS INSTITUTE, Mar. 28, 2023.
[869] Fernholz, *supra* note 38.
[870] Singe, *supra* note 53.

launches are those of small satellites.[871] While countries like China[872] and the United States[873] launch satellites for official government purposes, private companies, such as SpaceX, Samsung, and Boeing, launch their own satellites to test their broadband capabilities.[874] The latest technology has also allowed countries, including China and Russia, to explore and demonstrate their weapons and military capabilities in space.[875] While countries have traditionally been secretive when it comes to their military-related activities and research in space, countries with extensive space activity, including the United States, Russia, and China, have acknowledged their development and possession of systems that can interfere with or completely destroy other systems both in space and on the ground.[876] These systems range from inspector satellites, which can deploy smaller space vehicles that can orbit other satellites at much closer ranges, to missiles that can shoot down satellites in space.[877] Other spacecrafts have the capabilities to utilize robotic arms to grab and move satellites to different positional orbits.[878] Countries have attempted to mitigate technology and weapons that may pose a threat to other satellites in space. For example, under the Biden Administration, the United States called for a cessation of testing destruction, direct-ascent anti-satellite missiles, a call that was endorsed by the European Union (EU).[879] The EU also emphasized their support for a United Nations working group dedicated to monitoring and deterring space threats.[880] The "UN Open Ended Working Group on Reducing Space Threats" would consider limitations to all activities that pose threats to space exploration, including space debris, traffic, and operations that may lead to harmful physical contact between satellites.[881] A safe orbital environment is

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[871] *Id.*
[872] Michael Sheetz, *Investing in Space: How the Pentagon Sizes Up China's Military Strength in Space*, CNBC, https://www.cnbc.com/2023/10/26/investing-in-space-the-pentagon-sizes-up-chinas-military-strength.html (Oct. 26, 2023, 11:47 AM)
[873] Fernholz, *supra* note 38.
[874] Singe, *supra* note 53.
[875] Fernholz, *supra* note 38.
[876] *Id.*
[877] *Id.*
[878] *Id.*
[879] Theresa Hitchens, *EU embraces Biden Administration's Limited ASAT Test Ban as UN Meeting Looms*, BREAKING DEFENSE, https://breakingdefense.com/2023/08/eu-embraces-biden-administrations-limited-asat-test-ban-as-un-meeting-looms/ (Aug. 17, 2023, 2:48 PM).
[880] *Id.*
[881] *Id.*

imperative for successful space exploration, whether it be for commercial, experimental, or national security purposes.[882] Advancements in space technologies have allowed countries to expand their capabilities to explore and weaponize space, but these advancements also have the potential to make countries vulnerable to attacks and space vulnerable to clutter. Revisiting the Registration Convention would account for advancements in technology that produce space traffic, debris, and potential for in-space collisions. Amendments to the Convention related to specific technological advancements could produce a much safer environment. If countries are aware of the kinds of technological advancements, or are potentially limited in the kind of technology they could deploy in space, their actions may further reinforce the purpose of the Convention, leading to more transparent, open, and secure space activities.

C. Resource Extraction

Two private companies, Planetary Resources and Deep Space Industries, have introduced a new kind of resource extraction to the world: asteroid mining.[883] The organizations have identified 15,000 asteroids suitable for mining using satellites developed for that specific purpose.[884] Other private companies are following suit. Today, private companies are expanding their capabilities beyond merely identifying asteroids or other celestial objects; companies are developing technologies that allow us to extract resources from outer space. Asteroid mining in particular is an attractive endeavor because it provides the potential to procure important and rare minerals.[885]

To understand the significance of asteroid material, it is important to understand how asteroids are classified according to their elements. Asteroids can be in one of three composition classes: (1) C-type: consisting mostly of clay and silicate (the same material found in glass and sand); (2) S-type: consisting of silicate materials along with

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[882] Fernholz, *supra* note 38.
[883] Shriya Yarlagadda, *Economics of the Stars: The Future of Asteroid Mining and the Global Economy*, HARVARD INTERNATIONAL REVIEW, https://hir.harvard.edu/economics-of-the-stars/, Apr. 8, 2022.
[884] *Id.*
[885] MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *The Future of Strategic Natural Resource, Asteroids*, https://web.mit.edu/12.000/www/m2016/finalwebsite/solutions/asteroids.html (last visited Feb. 22, 2024).

nickel-iron; and (3) M-type: consisting of metals, such as nickel and iron.[886] M-type asteroids can also consist of other valuable metals, including cobalt and platinum.[887] Not only would the mining of these asteroids, especially the M-types, expand on our ability to understand life and matter beyond Earth, but it may reap financial and environmental benefits. Given the advancements in technology to create satellites with specified capabilities as well as the minerals known to be in space, it is not unusual to consider technology that would allow scientists and private companies to reach the asteroid belt. One company, Asterank, has measured the potential value of 6,000 of the asteroids closest to Earth at $1.5 trillion.[888] Then there is Psyche, an asteroid that earned its own mission from NASA in 2023.[889] Scientists estimate the value of Psyche at $10,000 quadrillion due to its metal rich composition.[890] Some scientists believe Psyche harbors gold,[891] while others believe that it is composed of iron and nickel.[892] Using radar images and Psyche's thermal inertia, NASA was able to determine that, much like the Earth's core, Psyche's core consists of significant amounts of metal, specifically 30-60 percent of the asteroid's core is a mixture of metals.[893]

Although the costs associated with asteroid mining would make it an incredibly exclusive activity, asteroid mining presents an option for companies that pursue materials that they typically must

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[886] NASA, *Asteroids: Facts*, https://science.nasa.gov/solar-system/asteroids/facts/ (last visited Feb. 22, 2024).
[887] Andy Greenspon, *Precious Metals In Peril: Can Asteroid Mining Save Us?*, HARVARD KENNETH C. GRIFFIN GRADUATE SCHOOL OF ARTS AND SCIENCES BLOG, (Oct. 25, 2016) https://sitn.hms.harvard.edu/flash/2016/precious-metals-peril-can-asteroid-mining-save-us/.
[888] Yarlagadda, *supra* note 68.
[889] Adam Mann & Vicky Stein, *The Psyche Mission: A Visit to a Metal Asteroid*, SPACE.COM (Oct. 12, 2023) https://www.space.com/psyche-mission-metal-asteroid.html.
[890] Brid-Aine Parnell, *NASA Will Reach Unique Metal Asteroid Worth $10,000 Quadrillion Four Years Early*, FORBES (May 26, 2017, 6:12 AM) https://www.forbes.com/sites/bridaineparnell/2017/05/26/nasa-psyche-mission-fast-tracked/?sh=2a27ce774ae8.
[891] Steve Gorman, *NASA Launches Spacecraft to Explore Metal-rich Asteroid Psyche*, REUTERS (Oct. 13, 2023, 1:01 PM), https://www.reuters.com/technology/space/nasa-set-launch-spacecraft-explore-metal-rich-asteroid-psyche-2023-10-13/.
[892] Parnell, *supra* note 75.
[893] NASA, *Asteroid Psyche*, https://science.nasa.gov/solar-system/asteroids/16-psyche/ (last visited Feb.22, 2024).

mine for on Earth. In addition to being more cost effective, asteroid mining may be more environmentally friendly, since it would reduce traditional mining methods that release toxic chemicals into the air, waterways, and drainage.[894] Asteroid mining would also reduce inhumane labor practices that are common in traditional mining.[895] Asteroid mining and extraction will require exuberant costs and well-developed state-of-the-art technology, though. Millions of asteroids are in the asteroid belt between Mars and Jupiter, requiring substantial travel time, technology, and energy.[896] The 15,000 near-Earth asteroids, though, are accessible for the companies and governments that have the technology.[897] Bennu is among such asteroids, from which NASA's OSIRIS-REx hopes to extract a small sample and return to Earth.[898] Besides the spacecrafts needed to reach the asteroids, technology must be capable of making contact sufficient enough to find and extract minerals. Such technologies, including remote controlled robots, would only increase if proven successful by a single company.[899] Scientists and companies must also conduct survey probes before the technology reaches an asteroid to determine the material of the asteroid, which would lead to increased space traffic as would the actual expeditions.[900] The steps required to understand asteroid composition, conduct the extraction, and transport the material back to Earth is likely to require many different technologies developed by many different government and non-governmental actors. Therefore, it is important that these technologies are accounted for in the Registration Convention. It is unlikely that resource extraction will remain an uncharted discipline in space exploration. NASA's OSIRIS-Rex is set to reach Psyche in August 2029,[901] at which point it is likely that private companies and other governments would have developed their own asteroid probes. Because a future in which asteroids become an important part of space exploration is very likely, it would benefit all actors to register objects that are used for experimentation and possible extraction.

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[894] Yarlagadda, *supra* note 68.
[895] *Id.*
[896] Alex Gilbert, *Mining in Space is Coming*, THE MILKEN INSTITUTE REVIEW (Apr. 26, 2021) https://www.milkenreview.org/articles/mining-in-space-is-coming.
[897] Greenspon, *supra* note 72.
[898] *Id.*
[899] *Id.*
[900] *Id.*
[901] Gorman, *supra* note 76.

IV. Proposed Amendments to the Registration Convention

Amendments to the Registration Convention would support both long-standing international space agreements, like the Outer Space Treaty of 1967,[902] and new multi-national alliances, like the 2020 Artemis Accords.[903] In fact, some of the issues listed above are vaguely addressed by the five treaties for space exploration and are grappled with when new alliances are formed. For example, the Outer Space Treaty prohibits any one country from claiming the Moon, but it does not prohibit any one country or private company from mining celestial bodies, such as asteroids.[904] Amendments to the Registration Convention could be the most useful way to address these emerging issues and bridge gaps in international space laws through the Convention's regulation of "space objects." Additionally, amendments can validate the efforts of the Committee on Peaceful Uses of Outer Space and other bodies dedicated to cordial space exploration established by the United Nations to govern space use and scientific advancements.[905] An updated Registration Convention would also allow for greater international cooperation by aligning the goals of the Convention to the goals of regional or continental alliances, such as the African Space Agency, which was formed in January 2023 to advance African countries' space exploration.[906] It is important to consider the reach of amendments to the Convention because it could be used to bring non-traditional actors to space exploration, inspiring more responsibility and cooperation in space activities.

Amendments to the Registration Convention can serve three purposes beyond what is already listed in the agreement: (1) accountability, (2) data collection and preservation by the United Nations, leading to more supportive international agreements on space exploration, and (3) collaboration among international governmental parties and private entities. As such, the following amendments to the

[902] United Nations, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, G.A. Res. 2222 (XXI) Dec. 19, 1996.
[903] NASA, *Artemis Accords*, https://www.nasa.gov/artemis-accords/ (last visited Feb.22, 2024).
[904] Greenspon, *supra* note 72.
[905] *Id.*
[906] African Union, Statute of the African Space Agency, Jan. 29, 2018.

Registration Convention may better serve the common interest of furthering peaceful space exploration:[907]

A. The Registration Convention should define the terms "space object," "component parts," and "launch vehicles."

In Article I, the Convention defines "space object" as one that "includes component parts of a space object as well as its launch vehicle and parts thereof."[908] The goals of the Convention and current alliances for space exploration cannot be served by inconsistent and undefined terms.[909] In order for the parties that recognize the Convention to fully respect and abide by its terms, the terms must be clear, precise, and specific. A Google search of "space object" presents results related to galaxies, stars, and the possible discovery of new planets, but it does not readily yield results related to any actual technology in space, whether it's component parts, satellites, or telescopes. To get results related to "objects" as the term is intended by the Convention, the Google search needs to be refined: "technologies in space," "space telescope," and "space exploration technology," among others. Many space technologies can technically be defined as "objects," including propulsion systems, thermal protection systems, and radiation protective technology.[910] More detailed definitions of space technologies beyond Article I's "space objects" definition would provide better guidance to parties of the Convention, but more importantly, it would force parties to the Convention to report objects that may have previously evaded what the current definition of "space objects" encompasses.

B. The Registration Convention should require annual reports to be submitted to the Office for Outer Space Affairs.

Annual reports would oblige parties to the Convention to update the Register, a critical omission of the Convention.[911] It is important that countries update the status of space objects, their purpose, and

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[907] United Nations Convention on Registration of Objects Launched into Outer Space, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974), *see* Annex.
[908] United Nations Convention on Registration of Objects Launched into Outer Space art. I, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974).
[909] HENRY R. HERTZFELD, UNSOLVED ISSUES OF COMPLIANCE WITH THE REGISTRATION CONVENTION, 8 J. OF SPACE SAFETY ENG. 238, 238 (2021).
[910] Mark A. Garcia, *Top Five Technologies Needed for a Spacecraft to Survive Deep Space*, NASA (Jul. 30, 2018) https://www.nasa.gov/missions/artemis/orion/top-five-technologies-needed-for-a-spacecraft-to-survive-deep-space/.
[911] Hertzfeld, *supra* note 94.

activities because it allows the United Nations to maintain the most recent information regarding the objects in space. It also allows the United Nations to have a record of how space exploration is evolving, which may lead to a better understanding of what amendments may be needed in other treaties, or even what other treaties, agreements, or alliances may be needed to ensure peaceful and innovative space exploration. Annual reporting would also force countries to confront their priorities in space exploration, retire technologies they may no longer need in space, and reduce space traffic. Conversely, an annual report can support countries in identifying how their space exploration compares to that of others and what technologies they may want to develop moving forward.

C. The Registration Convention should require the disclosure of public-private partnerships among commercial and non-governmental developers.

While private entities are not bound by the Convention, parties that recognize the Convention should be required to report their commercial partnerships to support transparency, help the United Nations' data collection efforts on such relationships, and allow the United Nations to anticipate the needs of international partnerships for space exploration. Relationships among governments and private companies have allowed countries to expand their space activities. Such partnerships may lead to more evenly distributed financing of projects, the development of technology that meets the goals and needs of the launching parties and expands on global research of outer space. Providing a centralized hub to track such partnerships, particularly under the United Nations, helps all parties understand funding needs, scientific breakthroughs, and gaps in space exploration. It also supports the United Nations and parties that recognize the Convention in better understanding problems that could arise among such partnerships, which may lead to more efficient and effective relationships that can account for the varying priorities, capacities, methodologies.

D. The Registration Convention should require that space objects be classified under one of three categories: military, operational, or experimental.

While a clearer definition of "space object" supports greater transparency of what kinds of objects are in space, categorizing the objects' purpose supports greater transparency of the intended goals

and function of the objects. A "military" classification recognizes the growing desire by countries to develop and deploy technologies that serve a national security or military-related purpose. Parties may not want to detail military capabilities in space, but they should be encouraged to disclose that such technologies exist so that others are aware of what objects they may encounter in space and account for such objects when developing their own technologies. Outer space belongs to all, and while it may be argued disclosure of military capabilities might pose threats to a country's security goals, undisclosed military capabilities might pose a greater hazard to space technologies and the space environment. It is not an abnormal consideration that a space object may malfunction or harm another object, therefore it is important that all countries are aware and prepared for the possibility of any potential interaction between their military-related object and one belonging to another country.

An "operational" classification would account for technologies that are designed to support earthly functions, including radio, broadband, and navigation systems. There are many everyday services that are controlled by critical space infrastructure. Such infrastructure needs to be protected, and one way to protect it is by ensuring that parties to the Convention acknowledge the existence of one another's objects. The Convention may already serve the purpose of transparency related to "operational" space technology, but an amendment requiring this classification could drive improvements to information technology, satellite communications, and other services administered by space technology.

An "experimental" classification would account for objects in space that are used to conduct research and experiments in space. A classification dedicated to objects of experimental purposes would support countries in better understanding what others are researching, provide an inventory of projects that countries or companies may collaborate on, and inspire actors to conduct research of their own that may not already be in progress.

E. The Registration Convention should require that an object's potential for debris be reported.

With an increasing number of space objects, there is an increase in debris.[912] Debris is detrimental for the environment in space, increases the traffic among objects in orbit, and presents hazards to functioning objects, including satellites that power functionalities on Earth. Every space object could arguably have potential for debris, but it is important to identify the objects that have a high potential for debris, the kind of debris, and what the party that owns the object is doing to ensure unnecessary debris. This may encourage the development of technologies that have a low potential for debris, promote accountability for debris, and reduce the risk of in-space collisions.

F. The Registration Convention should include more comprehensive liability standards to incentivize countries who do not have significant space activity to participate more in space exploration.

Space exploration is dominated by wealthy countries that are capable of developing the technology needed for adequate orbits. In addition to wealthy countries, private companies have the technology that could yield profits from space exploration and serve the countries that can afford the technology to do so. This may discourage countries who do not have the financial or technical resources to develop space technologies. Moreover, the Registration Convention supports the liability standards set forth by the Liability Convention.[913] If countries do not have the capacity to even risk being held liable for the damage that may be caused by their space objects, they will be discouraged from ratifying the Registration Convention.[914] Such countries are more likely to leave ratification to the wealthier, more technologically advanced countries, especially since the Convention allows grieved parties to settle their disputes on their own terms.[915] An amendment that balances liabilities with the right of all countries to explore space would serve the purposes of all five of the United Nations treaties on outer space. Space exploration should not be reserved for those that

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[912] Fernholz, *supra* note 38.
[913] Frans G. von der Dunk, *The Registration Convention: Background and Historical Context*, UNIVERSITY OF NEBRASKA-LINCOLN, (2003) Space, Cyber, and Telecommunications Law Program Faculty Publications. 32.
[914] *Id.*
[915] United Nations Convention on Registration of Objects Launched into Outer Space art. VI, Nov. 12, 1974, G.A. Res. 3235 (XXIX) (Nov. 12, 1974).

can afford it. A more balanced approach to liabilities could promote partnerships among countries and encourage private companies to partner with developing countries.

Conclusion

The proposed amendments to the Registration Convention would greatly support the mission of transparency and peaceful space exploration sought by the United Nations' treaties. More importantly, the amendments would encourage accountability among countries at a time when there are emerging issues that could define a single actor's dominance in space, including the commercialization of space, advancements in space technology, and potential resource extraction. Modernized agreements encourage more equitable access to space exploration and partnerships that could lead to extraordinary discoveries for humankind. It is in the international community's best interest to build upon existing agreements and accommodate for different capabilities and activities related to space exploration, ensuring that any country can have the ability and opportunity to safely land among the stars.