April 2022

This newsletter contains an overview of recent publications concerning intellectual property issues. The abstracts included below are as written by the author(s) and are unedited.

**IP & Antitrust**

**Licensing and Collusive Behavior: A Duopoly Game**
Ted Lindblom (Göteborg University - School of Business, Economics and Law)
Aineas Mallios (University of Gothenburg)
Stefan Sjögren (University of Gothenburg - Centre for Finance - School of Business, Economics and Law)
*Working Paper*

We examine the role of licensing agreements in facilitating collusive behavior. The focus is on how technology transfer is used to influence product market behavior, market prices and quantities and the welfare effects thereof. Although collusion often leads to less production, technology sharing of non-drastic, but sufficiently large, innovations can increase welfare in an industry characterized by diseconomies of scale. We identify licensing agreements that will lead to an aggregate industry quantity output under collusion equal to or higher than that achieved under Cournot competition, making consumers indifferent to whether firms cooperate or better off, as well as to an increased producer surplus because of improved production efficiency. Most important, we show how licensing fees can be constructed so that no parties would like to deviate from a collusive equilibrium. Stability of collusion has policy implications for competition authorities as it provides an explanation for why licensing agreements are often observed in highly concentrated industries characterized by significant diseconomies of scale relative to demand.

**IP & Licensing**

**Licensing and Secrecy under Imperfect Intellectual Property Protection**
Aineas Mallios (University of Gothenburg)
*Working Paper*

I consider a technology holder that has to decide whether to file for a patent or rely on secrecy, and a competing firm that can enter the market through technology transfer or imitation. Acknowledging that imitation is uncertain, imperfect, and takes time to materialize, as well as that intellectual property protection is not absolute, I find that technology transfer will always occur if the technological efficiency to imitate is sufficiently low. This will happen regardless of the protection choice of the inventor.
Conversely, highly efficient imitation technologies will lead to imitation instead of licensing. I also consider that a trade secret might accidentally leak to the public and thus lose its economic value, thereby rendering secrecy less preferable to patenting. Additionally, the risk of leakage might also lead to more imitation than licensing. Finally, considering that the probability of leakage might increase with the number of firms practicing a secret, I suggest an increase in the attractiveness of the patent system.

IP & Litigation

The Class Action as Licensing and Reform Device
Xiyin Tang (UCLA School of Law, Yale Law School)
*Columbia Law Review, Forthcoming*

The age of digital distribution has presented two unique problems for rights clearances: first, new technologies often aggregate and disseminate large quantities of copyrighted works, which requires obtaining rights from a large number of copyright holders. Second, new technologies lower the cost of content creation, resulting in millions of new, small, individual creators, rather than a discreet set of large industry repeat players. This “long tail” of copyright holders has contributed to rising transaction costs in the digital age.

The potential of class actions in addressing this rising transaction costs problem has gone largely unexplored and underutilized. Whereas class action scholars studying the mechanism more generally have largely theorized it as a regulatory device for deterring misconduct or else a joinder device to ensure litigation efficiency, copyright scholars addressing the acute problem of rising transaction costs have either advocated for a vision of private ordering, via new licensing collectives or contractual arrangements, or else judicial and legislative interventions in the form of fair use reform, specialized rate courts, and tailored legislation.

This Article fills the chasm between two domains that are rarely in conversation with one another. By presenting an in-depth history of copyright class actions, it offers a novel view of the class action device as both an efficient legal coordinating mechanism—as a hybrid public-private licensing scheme—and as having a part to play in making substantive copyright law. Indeed, settlements in these copyright class actions have been used not just as blanket licenses for both past harms and on-going royalties, efficiently capturing all long tail copyright holders in a manner individualized negotiations could never achieve, but they have also been progenitor to landmark copyright legislation that imposed royalties on home recording devices, on digital radio, and on streaming services. And indeed, some settlements have themselves contained non-monetary components that act much like legislation in solving for long-standing problems in the copyright industry. Whereas some courts have been skeptical of the quasi-legislative nature of these agreements, this Article argues for a vision of the class action mechanism as the future and the promise of licensing-and-reform-by-litigation in an age of mass aggregation, far-flung rights, and industry and legislative gridlock.

A Statutory Anti-Anti-Suit Injunction for U.S. Patent Cases?
Jorge L. Contreras (University of Utah - S.J. Quinney College of Law)
*Working Paper*

Litigation relating to fair, reasonable and non-discriminatory (FRAND) licensing of patents essential to industry standards has recently seen a sharp increase in cross-jurisdictional competition fueled by the trend of courts in some jurisdictions (particularly China) to seek to establish FRAND royalty rates applicable around the world, and the increased use of anti-suit injunctions (ASIs) to prevent parties from pursuing parallel litigation in other jurisdictions. The proposed “Defending American Courts Act” (DACA), introduced to the U.S. Senate Judiciary Committee in March 2022, seeks to deter the use of foreign-issued ASIs in U.S. patent litigation. The DACA would effectively create a statutory national “anti-anti-
suit injunction” (AASI) that would penalize parties seeking to enforce foreign ASIs by eliminating their ability to challenge asserted patents at the Patent Trial and Appeals Board (PTAB) and establishing presumptions of willfulness, for purposes of enhancing damages under Section 284 of the Patent Act, and exceptional status, for purposes of awarding attorney fees under Section 285. While cross-jurisdictional competition in FRAND cases has created numerous litigation inefficiencies and diplomatic issues, there may be other means to address the problem of foreign ASIs. As a result, further study of these questions, as suggested by DACA itself, may be warranted before legislation is enacted.

IP & Innovation

**InnoVAE: Generative AI for Understanding Patents and Innovation**
Zhaoqi Cheng (Boston University - Questrom School of Business)
Dokyun Lee (Boston University - Questrom School of Business)
Prasanna Tambe (Wharton School, U. Pennsylvania)
*Working Paper*

A lack of interpretability limits the use of common unsupervised learning techniques (e.g., PCA, t-SNE) in contexts where they are meant to augment managerial decision-making. We develop a generative deep learning model based on a Variational AutoEncoder (“InnoVAE”) that converts unstructured patent text into an interpretable, spatial representation of innovation (“Innovation Space”). After validating the internal consistency of the model, we apply it to three decades of computing system patents to show that our approach can be used to construct economically interpretable measures—at scale—that characterize a firm’s IP portfolio from the text of its patents, such as whether a patent is a breakthrough innovation, the volume of intellectual property enclosed by a portfolio of patents, or the density of patents at a point in Innovation Space. We show that for explaining innovation outcomes, these interpretable, engineered features have explanatory power that augments and often surpasses the structured patent variables that have informed the very large and influential literature on patents and innovation. Our findings illustrate the potential of using generative methods on unstructured data to guide managerial decision-making.

**Corporate Financial Disclosures and the Market for Innovation**
Jinhwan Kim (Stanford Graduate School of Business)
Kristen Valentine (University of Georgia)
*Working Paper*

We examine the spillover effect of public firm innovation disclosures on the patent trading market. Relative to equity markets, the patent market is decentralized and rife with information frictions, yet it serves as an important mechanism through which innovations reallocate to the most productive users. Using data on patent transactions, we find that going from the 25th percentile to the 75th percentile in innovation-relevant public firm disclosures – proxied by the number of innovation-relevant sentences in 10-K filings – is linked to a 13.0% to 14.9% increase in future patent sales by other parties that likely consume these disclosures. These results are consistent with financial statement disclosures generating positive information externalities useful for trading patents. The positive link between innovation-relevant firm disclosures is stronger where information asymmetry is likely greatest (transactions between public and private firms) and where information uncertainty likely prevails (transactions between private firms) relative to transactions less likely to suffer from information frictions (transactions between public firms). We corroborate that the positive link between public firm disclosures and other parties’ patent sales is likely due to the resolution of information frictions through several cross-sectional tests, the use of proprietary patent broker data, and the plausibly exogenous implementation of Edgar by public firms. Our results speak to an important, but previously underexplored, externality of financial statement disclosures – their contribution to a well-functioning patent market.
Say More to Return Less? Disclosure Subsequent to Successful Technological Innovation
Jing He (University of Delaware)
Dongyoung Lee (McGill University - Desautels Faculty of Management)
Working Paper

This study examines voluntary disclosure after successful technological innovations and the associated cost of equity capital (COEC) consequences. We find that firms with successful technological innovations, proxied by economic and scientific values of patents, are more likely to voluntarily disclose patent information in Form 8-K filings. However, high product market competition deters firms from providing such patent information. We also find that, unlike scientific values, economic values of patents are positively associated with COEC benefits in the presence of voluntary patent disclosure. Further analysis reveals that COEC benefits are concentrated only for firms facing high product market competition. Our findings have implications for innovative firms operating in competitive environments. These firms may need to carefully weigh the capital market benefits of patent disclosure against potential proprietary information costs, especially when seeking equity financing.

IP Law & Policy

Laura G. Pedraza-Fariña (Northwestern Pritzker School of Law)
Ryan Whalen (The University of Hong Kong - Faculty of Law)
Northwestern Law & Econ Research Paper No. 22-08
Iowa Law Review, Forthcoming
University of Hong Kong Faculty of Law Research Paper No. 2022/16.

Patent law shares with tort law the presence of a central character that structures judicial decision making. Much like the reasonable person in tort law, the “person having ordinary skill in the art” (or PHOSITA) in patent law is an anchor from whose vantage point the court must determine whether an invention is obvious, set out in sufficient detail, or infringed by a competitor. This vantage point is considered so self-evident and foundational to the field, that virtually every patent textbook and judicial opinion emphasizes that doctrinal outcomes are tied to the technical perspective of the PHOSITA, not that of the judge or an ordinary observer. But court observers and legal scholars have also noted that the PHOSITA at times appears to do little work in driving doctrinal outcomes. Called at turns a “ghost,” a “mysterious” and an “enigmatic” character, the role of the PHOSITA in patent law is a bit like the curious incident of the dog in the night-time. Despite its theoretically expected central role in patent law, in some of patent law’s leading cases, it stands out for all of the work it does not do.

In this Article, we conduct the first comprehensive empirical study of the role of the PHOSITA across patent litigation. Through close readings of 700 trial and appellate court opinions as well as automated textual analysis of over 7000 cases we ask: how deeply do courts engage with factual evidence to define who the PHOSITA is? Does the identity of the PHOSITA, once established, in fact drive legal decision-making? How often does the Federal Circuit reverse District Court decisions based on incorrect factual or legal understandings of the PHOSITA? Do courts use different definitions of the PHOSITA for different doctrines?

What emerges from our empirical investigation is a deep disconnect between the centrality of the PHOSITA to patent law on paper and its empirical relevance to doctrinal outcomes. Despite its centrality to major patent law doctrines, and despite its ostensible claim to ground these doctrinal decisions in an objective reference point, the PHOSITA plays a surprisingly minor role in judicial decisions. This observation creates a paradox: as much as the PHOSITA is theorized as an outcome-determinative
reference point, it does not appear, in practice, to drive judicial decisions. We suggest two central explanations for our findings. First, judicial decisions provide little guidance on how to reconcile definitions of the PHOSITA as an empirical, real-world construct with its hypothetical (and normative) dimension. Second, courts fail to tailor the PHOSITA to the underlying normative goals of each of the different doctrines that rely on the PHOSITA as a reference point, rendering the PHOSITA a normatively empty concept. We propose a solution that develops three normatively-distinct PHOSITAs for the patent doctrines of obviousness, enablement and infringement.

**Artificial Intelligence and Intellectual Property: An Introduction**
Ryan Abbott (University of Surrey School of Law; University of California, Los Angeles - David Geffen School of Medicine)


Artificial intelligence is improving rapidly in terms of its capabilities and utility, which is going to have disruptive effects socially, economically, and legally. Among other things, advances in AI are challenging fundamental tenets of IP law by generating creative and inventive output, by using IP in new ways such as for training machine learning systems and for generating insights, by facilitating administrative processes and decision making, and even by deceiving consumers. These technological advances require us to give careful thought to how legal rules should be applied in the future if IP systems are to continue to achieve their goals. This chapter considers some of the key questions in the emerging field of AI and IP and discusses the contributions of a group of world-leading authors to how to think about AI and IP. It concludes with perspectives on AI functionally generating historically protectable sorts of works in the absence of traditional authors or inventors.

**Lucky IP**
Patrick Russell Goold (City University London, The City Law School)  
David A. Simon (Harvard Law School)  
(2022) Oxford Journal of Legal Studies  

A person naturally owns the fruits of their intellectual labor; so goes the labor argument for intellectual property. But what should happen when a creator gets ‘lucky’ – such as the photographer who is in the right place at the right time or the scientist who accidentally discovers a new drug? IP law frequently awards ownership in such cases (what we call ‘Lucky IP’). Some argue, however, that the creators in such cases do not labor sufficiently to deserve ownership, and that Lucky IP merely demonstrates that IP law is not truly concerned about labor at all.

Drawing on the philosophical literature of moral luck, we argue that this analysis is misguided. Nearly all intellectual creations involve some measure of luck and, in most cases, the creators still labor sufficiently to become the natural owners of their creations. Lucky IP does not, therefore, undermine the labor theory of IP law.

**Does a Stronger Patent System Stimulate More R&D? Yes, in Firms That Rely on Patents as an Appropriation Mechanism**
Pere Arque-Castells (University of Groningen (Innovation Management and Strategy))

*Working Paper*  

We propose a novel empirical strategy for detecting the potential effects of patent reforms on R&D investments. Our strategy builds on the insight that there is great variation in the extent to which firms rely on patents as an appropriation mechanism. Increases in patent protection should benefit those firms that rely on patents disproportionately more. We apply such insight by combining measures of industry
reliance on patent protection (IRPP) from seminal innovation surveys with the establishment of the U.S. Court of Appeals for the Federal Circuit (CAFC) in 1982, the focal pro-patent reform of interest. Using a difference-in-differences approach, we find a positive effect of stronger patent protection on the R&D investments of firms with greater reliance on patent protection. Such effect is economically significant and only arises in the post-CAFC period for firms located in regional circuits that experienced high increases in patent protection.

Copyright Law

NFTs as Decentralized Intellectual Property
Edward Lee (Chicago-Kent College of Law - Illinois Institute of Technology)
Working Paper

This Article is the first to elaborate a theory of decentralized intellectual property (De-IP) to explain the phenomenon of NFTs. This theory of De-IP provides a compelling new understanding of NFTs. Like the current movement to adopt decentralized finance (De-Fi), De-IP utilizes blockchain technology to provide an alternative, decentralized way to engage in activities that have traditionally been governed by a highly centralized regulatory system, typically involving the U.S. government and dominant industry intermediaries who operate as de facto gatekeepers. The primary vehicle for De-IP is a new technology called the non-fungible token (NFT), which consists of a computer program called a smart-contract that authenticates a virtual token on blockchain and that includes a content license setting forth the use and ownership rights (if any) that the NFT buyer receives for the content, often a copyrighted artwork, associated with the NFT. Through a combination of virtual tokens (which are new intellectual property in their own right), code, licenses, and norms, NFTs are providing a viable, decentralized alternative to the copyright system—an alternative that does not eliminate the copyright system, but instead, makes it more responsive to what artists and people want. Although critics may object that De-IP does not adequately consider the public interest in how the copyright system should be reformed, both republican theory of deliberation and the ongoing public debate about copyright on social media and in decentralized autonomous organizations (DAO) allay such concerns. Indeed, the current decentralized debate about NFTs and copyright law may be not only better for democratic deliberation, but also more responsive to the needs of authors and the public.

An Entrepreneurship Theory of Copyright
Eric Priest (University of Oregon School of Law)

The dominant utilitarian formulation of copyright incentives is preoccupied with reducing copyright’s social costs by limiting an author’s income to the precise amount necessary to incentivize production of a particular work. Under that approach, the grant of copyright is considered by many to be social waste when authors create for intrinsic reasons. This Article argues that viewing isolated “persuasion costs” as the absolute determinant of authorial deserts largely ignores the full range of authorial risks and investments and the effect of incentives across the entire copyright ecosystem. Authors are economic speculators akin to entrepreneurs; thus, entrepreneurship theory provides a richer theoretical framework for understanding copyright’s incentive function. Authors, like entrepreneurs, innovate and bear economic risk in the face of market uncertainty. Because their economic activities are speculative, authors and entrepreneurs rely on uncertain compensation via property rights in lieu of dependable salaries or wages. Further, entrepreneurial profit entitlements do not hinge on the entrepreneur’s intrinsic or extrinsic motivations; one may start a venture for intrinsic reasons and still bear substantial risk. Entrepreneurs’ risk bearing and innovation—not their motivations—trigger their profit entitlements. Although there are differences between copyright and the entrepreneur’s right to profit—most importantly that copyright is state intervention in free markets for information goods that leads to unique static and dynamic costs—these differences are not fatal to the analogy between authors and
entrepreneurs. Copyright is therefore best viewed not as an incentive for discrete acts of creation but rather as the author’s compensation for the economic value added by the risk-laden reallocation of resources toward the authorial endeavor. Copyright thus incentivizes the author and partnering intermediaries to bear the commercial risk entailed in shepherding a work from conception to a realized, marketable information good.

**Measuring Fair Use’s Market Effect**
Suneal Bedi (Indiana University - Kelley School of Business)  
W. Michael Schuster (University of Georgia - C. Herman and Mary Virginia Terry College of Business)  
*Wisconsin Law Review, Forthcoming*  

Copyright law seeks to encourage creativity and the creation of new works of authorship. To facilitate this creativity, the law allows authors to utilize portions of preexisting copyrighted materials when the new use survives a “fair use” analysis. In adjudicating the fair use question, courts apply a multifactor test which includes consideration of the new work’s market effect. This market effect consideration asks how the new work influences sales of the original. The scholarship analyzing this market effect is incomplete because this inquiry requires empirically measuring how consumers react to the third-party reuse of a copyrighted work. Thus, courts and authors are currently ill equipped to accurately forecast ex ante market effects because these empirical determinations occur only after the work has been reused—i.e., ex post to creation of the putative fair use. Building from this recognition, we provide a more robust theoretical framework for categorizing and analyzing market effects.

This Article builds from our expanded theory by empirically measuring the effect of reusing copyrighted material in subsequent works. We use a novel experimental design with one type of third-party reuse (music sampling) and find that the market reception of a new work that incorporates copyrighted material can impact perceptions about the original work (and thus, influence the original’s market). We find evidence that negative perceptions about an earlier work are created when sampled in a new work that itself is a failure. Accordingly, our study points to a negative spillover effect that may harm perceptions of the underlying copyrighted work. Because this recognition expands the foundation for courts considering a new work’s market effect, we argue that these insights are crucial to making efficient and effective fair use determinations.

**IP & Trade**

**Institutions, Development, and Patterns of Trade**
Andrea Greppi (Organisation for Economic Co-operation and Development)  
Alireza Naghavi (University of Bologna - Department of Economics)  
*CENTRO STUDI LUCA D’AGLIANO DEVELOPMENT STUDIES WORKING PAPERS 2022*  

This study investigates how easing international transactions through improved legal institutions can result in divergent trade patterns for different economies. We provide evidence that the level of development governs the relevance of intellectual property rights (IPR) institutions in determining a country’s comparative advantage. While IPR protection changes the composition of OECD exports towards IP-intensive sectors, contract enforcement is the key driver of specialization of non-OECD exports in relation-specific inputs. The findings suggest a concentration of innovation activities in the OECD, with non-OECD countries serving as potential outsourcing destinations. We exploit information on IPR reforms over time to show the robustness of our results through both an instrumental variable and a difference-in-difference approach. We extend the analysis to a bilateral framework to show that better IPR quality could nevertheless encourage technology transfer by encouraging imports of IP-intensive goods into non-OECD countries.
The Rise of Process Claims: Evidence From a Century of U.S. Patents
Bernhard Ganglmair (ZEW – Leibniz Centre for European Economic Research - Junior Research Group Competition and Innovation; Mannheim Centre for Competition and Innovation (MaCCI); University of Bonn - The Bonn Graduate School of Economics)
W. Keith Robinson (Wake Forest University School of Law)
Michael Seeligson
ZEW - Centre for European Economic Research Discussion Paper No. 22-011

We document the occurrence of process claims in granted U.S. patents over the last century. Using novel data on the type of independent patent claims, we show an increase in the annual share of process claims of about 25 percentage points (from below 10% in 1920). This rise in process intensity is not limited to a few patent classes but can be observed across a broad spectrum of technologies. Process intensity varies by applicant type: companies file more process-intense patents than individuals, and U.S. applicants file more process-intense patents than foreign applicants. We further show that patents with higher process intensity are more valuable but are not necessarily cited more often. Last, process claims are on average shorter than product claims; but this gap has narrowed since the 1970s. These patterns suggest that the patent breadth and scope of process-intense patents are overestimated when claim types are not accounted for. We conclude by describing in detail the code used to construct the claim-type data, showing results from a data-validation exercise (using close to 10,000 manually classified patent claims), and providing guidance for researchers on how to alter the classification outcome to adapt to researchers’ needs.

The Role of Asymmetric Innovation’s Sizes in Technology Licensing Under Partial Vertical Integration
Mariola Sánchez (Miguel Hernandez University of Elche)
Adrian Nerja (Miguel Hernandez University)
Working Paper

In this paper, we compare the scenarios of exclusive licenses and cross-licenses under the existence of partial vertical integration. To do this, a successive duopoly model is proposed, with two owners and two firms competing in a differentiated product market. Each technology owner has a share in one of the competing firms, so that competition is also extended to the upstream R&D sector. We propose a novel analysis where differences in the sizes of their process in innovations are allowed, extending the results in Sánchez et. al (2022). We find that the cross-licensing scenario is preferred when the size of the innovation is small; this occurs regardless of the participations in the competing companies and how many innovate. If the innovation is very large, the owners may be better off with exclusive licenses.

Specialization in a Knowledge Economy
Yueyuan Ma (University of Pennsylvania - Department of Economics)
Working Paper

Using firm-level data from the US Census Longitudinal Business Database (LBD), this paper exhibits novel evidence about a wave of specialization experienced by US firms in the 1980s and 1990s. Specifically: 1) Firms, especially innovating ones, decreased production scope, i.e., the number of industries in which they produce. 2) Small firms increased innovation relative to production while large firms increased production relative to innovation. A new hypothesis is proposed to explain these phenomena. Pro-patent reforms in the 1980s and 1990s make firms’ innovations more commodified and tradable. Trading provides another channel for firms to monetize their innovation besides production, especially when innovations are mismatched with a firm’s production. Production scope then contributes less to the value of a firm’s innovation, enabling innovation to shift to small firms with limited production
scope. To gauge the importance of the new hypothesis, an endogenous growth model is developed with potential mismatches between innovation and production. Calibrating the model to data suggests that increasing tradability of innovation output can explain 25% of the observed production scope decrease and 58% of the reallocation of innovation activities. It results in a 0.64 percent point increase in the annual economic growth rate. Using regional and firm-level differences in exposure to patent policies, difference-in-difference analysis confirms causality from the pro-patent reforms to firms’ production scope shrinkage.

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