I. INTELLECTUAL PROPERTY

The title of this symposium is "Intellectual Property, Sustainable Development, and Endangered Species." When I was planning this event, some participants suggested that I be careful about using the term "sustainable development," while others were concerned about their limited knowledge of endangered species. Nobody, however, has raised any questions about the use of the term "intellectual property," which many have considered controversial.

Critics have identified two major problems in using the term. First, as Richard Stallman, one of the term's leading critics, has noted, it is an "unwise generalization" that is biased and confusing. By bringing together different sets of rights that originated differently, protected different subject matter, and raised different policy questions, this umbrella term encourages simplistic thinking that ignores the different characteristics and limitations of copyrights, patents, trademarks, trade secrets, and other neighboring rights.
Second, because the term includes the word "property," it glosses over the difference between abstract ideas and physical objects, thereby perpetuating the misunderstanding that one can develop property entitlements in ideas and information. As Professor Mark Lemley warned us, the property label may tempt courts, lawyers, and commentators to continue the trend of treating intellectual property just like real property.² Such temptation is even more powerful among judges in civil law countries, who are concerned that limiting intellectual property rights would raise questions of government takings of private property.³

To highlight the term’s illegitimacy, critics have traced the origin of the term to the 1960s, when the World Intellectual Property Organization (WIPO) was established.⁴ As they claimed, intellectual property did not acquire property attributes until a few decades ago, and rights holders have systematically used the term to distort and confuse policy issues,⁵ and to seize rhetorical advantages.⁶ Intellectual property rights therefore do not represent universal values. This argument is powerful, and the temptation to link the term to WIPO is simply irresistible. Even Professor William Cornish, a distinguished intellectual property scholar, could not help but make the following observation in the highly-regarded Clarendon Lectures at the University of Oxford:

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3. Thanks to Professor Carlos Correa for pointing this out.

4. As Professor Mark Lemley recounted:
   The modern use of the term “intellectual property” as a common descriptor of the field probably traces to the foundation of the World Intellectual Property Organization (WIPO) by the United Nations. Since that time, numerous groups such as the American Patent Law Association and the ABA Section on Patent, Trademark, and Copyright Law have changed their names (to the American Intellectual Property Law Association and the ABA Section on Intellectual Property Law, respectively). There were certainly uses of the term in the literature well before this time, especially on the Continent. These uses do not seem to have reflected a unified property-based approach to the separate doctrines of patent, trademark, and copyright, however.

5. See Richard M. Stallman, Did You Say “Intellectual Property”? It’s a Seductive Mirage, Free Software Foundation, at http://www.fsf.org/licensing/essays/not-ipr.xhtml (last modified Feb. 12, 2005) (noting that “the term systematically distorts and confuses these issues, and its use was and is promoted by those who gain from this confusion”).

“Intellectual property” is today a generic title for patents, copyright, trademarks, design rights, trade secrets and so forth. As an umbrella term, it became common in the 1960s with the setting up of the UN organ, the World Intellectual Property Organization (WIPO to its supplicants and its revilers). Before that, the idea of attributing the quality of property to rights over inventions, aesthetic works, and brands was looked at askance.7

While Professor Cornish may be correct in tracing the term’s common usage to WIPO, history seems to suggest that the “idea of attributing the quality of property to rights over inventions, aesthetic works, and brands”8 was not looked at askance before the creation of this specialized agency. As early as the nineteenth century, the label “literary and artistic property” had been used to denote rights in literary and artistic works, which were internationally recognized by the Berne Convention for the Protection of Literary and Artistic Works in 1886.9 Likewise, the title of the Paris Convention for the Protection of Industrial Property specifically referenced rights in industrial creations as “industrial property.”10

In the United States, for example, the use of the term can be dated back to at least the eighteenth century. As my colleague, Adam Mossoff, noted, property had been used as a basis for protecting intellectual creations in state copyright statutes enacted prior to the 1787 Constitutional Convention: “New Hampshire, to name but one example, enacted legislation to protect copyrights and other forms of intellectual property because ‘there being no property more peculiarly a man’s own than that which is produced by the labour of his mind.’”11 In addition, U.S. courts had used the term as early as the mid-nineteenth century. In the 1845 case of Davoll v. Brown,12 a District of Massachusetts Circuit Court defined intellectual property as “the labors of the mind, productions and interests as much a man’s own, and as much the fruit of his honest industry, as the wheat he cultivates, or the flocks he rears.”13

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8. Id.
12. 7 F. Cas. 197 (C.C.D. Mass. 1845). Based on searches on Lexis-Nexis and Westlaw, Davoll was the first case in U.S. history to use the term “intellectual property.”
13. Id. at 199.
The use of the property label to denote rights in intellectual creations and inventions was equally popular in continental Europe in the nineteenth century. For example, Etienne Blanc, the co-author of Code Général de la Propriété Industrielle, Littéraire et Artistique, lamented in his 1854 book that “[t]here [were] still today, even among the clearest thinkers, some who [did] not see and [did] not comprehend property unless it [was] right before their eyes in the material form of a piece of land or a house.” In addition, a Belgian author titled his article in an economics journal La Propriété des inventions est un propriété comme une autre, while a large number of French economists “refused to admit a logical difference between property in things material and in ideas.”

Based on these historical accounts, it is therefore very difficult to assert, as Professor Cornish did, that “the idea of attributing the quality of property to rights over inventions, aesthetic works, and brands was looked at askance” before the establishment of WIPO. Instead, what was “looked at askance” was perhaps the use of the combination of the words “intellectual” and “property” as a catch-all phrase to denote a large variety of disparate rights—in other words, the “intellectualizing” of property.

In two recent articles, Professors Mark Lemley and Stewart Sterk explored the problems of analogizing rights in intellectual creations and inventions to real property. Although they found problems with this analogy, they concluded that it might be difficult to abandon the term. While Professor Sterk suggested that it might be “far too late” to expunge from the copyright debate the rhetoric of property, Professor Lemley noted that
intellectual property "has come of age . . . [and] no longer needs to turn to some broader area of legal theory to seek legitimacy."21

Like Professors Lemley and Sterk, I believe "intellectual property" will remain in common usage despite the uneasy analogy. Although the term tends to encourage over-generalization of disparate rights, there is a practical need for the existence of an umbrella term. Today, "[i]ntellectual property is no longer a sleepy legal backwater, but a prime area of economic activity."22 As a result, intellectual property rights have grown beyond just copyrights, patents, trademarks, and trade secrets and now cover such areas as geographical indications, industrial designs, layout designs of integrated circuits, and plant variety protection.23 As the intellectual property system evolves, new sui generis rights24 and sector-specific protection will continue to emerge.25 An umbrella term is therefore needed to facilitate business transactions and international negotiations.

To replace the problematic term, commentators have suggested several alternatives. For example, Professor Wendy Gordon proposed to use the acronym GOLEM, which stands for "Government-Originated Legally Enforced Monopolies,"26 while others have suggested IMPs, which stands for "Imposed Monopoly Privileges."27 Richard Stallman went even further to explain why we did not need to introduce an alternative term. As he maintained, an umbrella term "is a mirage, which appears to have a coherent

21. Lemley, supra note 2, at 1096.
24. There are currently serious talks about implementing sui generis protection of databases and traditional knowledge at both the domestic and international levels.
25. See, e.g., TRIPs Agreement, supra note 23, art. 23, 33 I.L.M. at 1205 (protecting geographical indications for wines and spirits); id. art. 27(3)(b), 33 I.L.M. at 1208 (protecting plant varieties); id. art. 35, 33 I.L.M. at 1211 (protecting layout-designs or topographies of integrated circuits).
26. The acronym GOLEM originated in Jewish folklore "to identify a Frankenstein-like automaton that, although formed to assist its creator, turns into a monster when misused." Wendy Gordon, Remarks at the 2004 Work-in-Progress Intellectual Property Colloquium at Boston University School of Law (Sept. 11, 2004).
27. See Stallman, supra note 5 (discussing IMPs, GOLEMs and other suggestions to replace the term "intellectual property"); see also Tom W. Bell, Authors' Welfare: Copyright as a Statutory Mechanism for Redistributing Rights, 69 BROOK. L. REV. 229 (2003) (treating copyright as "author's welfare").
existence only because the term suggests it does." Unfortunately, Stallman’s advice is difficult to follow in today’s commodified world, and the proposed alternatives remain unfamiliar to the public.

Notwithstanding its problems, the property label has its attractions, especially if we can be “clear about what is meant when the term is used in the context of information.” Although people tend to focus on the absolute nature of property—the right to exclude in particular—real property law contains many limitations, safeguards, and obligations, such as adverse possessions, eminent domain, easements, servitudes, nuisance, zoning, irrevocable licenses, the Rule Against Perpetuities, and the waste and public trust doctrines. Recently, a number of scholars has proposed to use the limits to property to prevent the further expansion of intellectual property rights. For example, Professor James Boyle noted the importance of “look[ing] at the opposite of property with the same historical care, analytical precision, and occasional utopian romanticism that we display when looking at property.”

Professor Michael Carrier discussed the use of limits in property law to cabin intellectual property rights. Professor Jacqueline Lipton underscored the need to go beyond these limits to locate affirmative legal duties on information property holders in an effort to facilitate competing interests in their property.

II. THE INFORMATION ECOSYSTEM

In recent years, commentators have been concerned about the “one-way ratchet” of intellectual property protection. As Professor Boyle and others alerted us, we are now facing a “second enclosure movement” similar to the movement to transform the “commons” of arable land into private property.

28. Stallman, supra note 5.
30. James Boyle, Foreword: The Opposite of Property?, LAW & CONTEMP. PROBS., Winter/Spring 2003, at 1, 32. The “opposite of property” includes the “limitations, negations, inversions and correctives” of property. Id. at 31-32.
31. See Carrier, supra note 20, at 52-144.
32. See Lipton, supra note 29, at 165-89.
34. See James Boyle, Fencing Off Ideas: Enclosure and the Disappearance of the Public Domain, DAEDALUS, Spring 2002, at 13; Boyle, supra note 33; see also Yochai Benkler,
In this movement, information becomes increasingly privatized, and intellectual property continues to expand. Even worse for consumers, protection has moved upstream. Instead of protecting just the latest computer program or the biologically-engineered microorganism, intellectual property rights holders are now pushing for protection of data, proteins, and information bits.35 Thus, Professor Boyle has called for a new “politics of intellectual property.” As he explained:

[A] successful political movement needs a set of (popularizable) analytical tools which reveal common interests around which political coalitions can be built. Just as “the environment” literally disappeared as a concept in the analytical structure of private property claims, simplistic “cause and effect” science, and markets characterized by negative externalities, so too the “public domain” is disappearing, both conceptually and literally, in an intellectual property system built around the interests of the current stakeholders and the notion of the original author. In one very real sense, the environmental movement invented the environment so that farmers, consumers, hunters and birdwatchers could all discover themselves as environmentalists. Perhaps we need to invent the public domain in order to call into being the coalition that might protect it.36

Professor Boyle’s comparison of the intellectual property system to our depleting environment cannot be more appropriate. As he explained by reference to the environment movement:

The invention of the concept of “the environment” pulls together a string of otherwise disconnected issues, offers analytical insight into the blindness implicit in prior ways of thinking, and leads to perception of common interest where none was seen before. Like the environment, the public domain must be “invented” before it is saved. Like the environment, like “nature,” the public domain turns out to be a concept that is considerably more slippery than many of us realize. And, like the environment, the public domain nevertheless turns out to be useful, perhaps even necessary.37

Today, the information ecosystem is heavily depleted, and technology, information resources, and public domain materials have become the new endangered species. If we are to save the information environment, we not only need a new politics, but a new conceptual framework to reframe the public intellectual property debate.

35. See Arti K. Rai & Rebecca S. Eisenberg, Bayh-Dole Reform and the Progress of Biomedicine, LAW & CONTEMP. PROBS., Winter/Spring 2003, at 289, 289 (observing that “[t]he tradition of open science has eroded considerably over the past quarter century as proprietary claims have reached farther upstream from end products to cover fundamental discoveries that provide the knowledge base for future product development”).
37. Boyle, supra note 33, at 52.
There are at least three main reasons why the information ecosystem would provide an ideal framework. First, it reminds policymakers and commentators of the problems of the current bipolar intellectual property debate. Second, it highlights the different components of the intellectual property system and the interactions among these components. Third, it underscores the need to take a holistic perspective and consider intellectual property laws and policies as one of the many components of a larger information ecosystem.

A. The Bipolar Intellectual Property Debate

A discussion of the information ecosystem would enable us to explore issues obscured by the current bipolar intellectual property debate. Today, when people talk about intellectual property laws and policies, they tend to focus on the dichotomy between corporate and consumer interests, between the interests of developed and less developed countries, and between private and public goods. However, these dichotomies are misleading; they do not work well from the standpoint of intellectual property policy, and they tend to confuse rather than promote policy discussions.

Consider, for example, the debate concerning folklore, traditional knowledge, and indigenous practices. Those who are sympathetic to the plight of less developed countries often consider themselves low-protectionists, who favor limited protection of intellectual property. To them, it is very important to have more access to generic drugs, open source software, and non-copyright-protected textbooks. However, as far as traditional knowledge is concerned, this group often finds itself on the side of high-protectionists, along with Big Pharma and multinational agrochemical conglomerates. As much as they want to have free and open access to copyrighted and patented products, they also believe that the same free access to indigenous knowledge and materials would lead to biopiracy that could jeopardize the heritage and

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39. The high-protectionists, in contrast, favor strong protection of intellectual property rights. For the purposes of this discussion, the term “low-protectionists” also include anti-protectionists, who are against protection of intellectual property rights.
culture of indigenous communities—or worse, threaten the very survival of these communities.  

Similarly, policymakers in less developed countries often find themselves confronted with contradictory intellectual property policies. A case in point is India. Because of its booming computer software and movie industries, it is logical for policymakers in India to push for stronger protection of computer software and audiovisual works.  

(They might also be interested in facilitating the development of open source software.) However, this high-protectionist rhetoric has to be toned down dramatically when dealing with patented chemicals, protected drugs, and public health issues. Instead of stronger protection, the country will benefit from weaker protection, or even special exceptions, for pharmaceuticals, chemicals, food, and agricultural products. Thus, it is unwise for policymakers and commentators to take either a high-protectionist or low-protectionist position without considering which economic sectors are at issue.

Today, the intellectual property debate is highly polarized. Policymakers and commentators tend to fall into one of the two rival camps: the high-protectionists or the low-protectionists—or in academic parlance, the maximalists or the minimalists. While the low-protectionists emphasize the need to preserve a rich public domain and to ensure free access to, and distribution of, valuable information and raw materials, the high-protectionists query the impracticality of this position and underscore the strong need for

40. Indeed, many less developed countries are concerned about open access policies. To these countries, “free and open access [has] the tendency to suggest ‘a commons where resources are up for grabs by the most technologically advanced.’” Chander & Sunder, supra note 38, at 1356 n.131 (quoting J.M Spectar, Saving the Ice Princess: NGOs, Antarctica & International Law in the New Millennium, 23 SUFFOLK TRANSNAT'L L. REV. 57, 63 (1999)).


42. See IPR COMMISSION REPORT, supra note 41, at 20 (discussing the weaker patent protection offered to pharmaceutical products in India).

43. Indeed, the United States refused to join the Berne Convention until 1988, even though it played an instrumental role in the early development of the Paris Convention, which it ratified in 1887, more than a century before it joined the Berne Convention. See generally Peter K. Yu, Currents and Crosscurrents in the International Intellectual Property Regime, 38 LOY. L.A. L. REV. 323 (2004).

44. See Boyle, supra note 38, at 107; see also PAUL GOLDSTEIN, COPYRIGHT’S HIGHWAY: FROM GUTENBERG TO THE CELESTIAL JUKEBOX 14-15 (rev. ed. 2003) (discussing the “copyright optimists” and the “copyright pessimists”).
incentives to encourage authors and inventors to create. Some of the high-protectionists also maintain that authors and inventors deserve legal protection of their personhood and property entitlements arising from their creative or inventive labor.\textsuperscript{45}

When these two groups argue, they often talk past each other, rather than to each other.\textsuperscript{46} At times, they even accuse their rivals of being "greedy,"\textsuperscript{47} doing "evil,"\textsuperscript{48} or committing thefts\textsuperscript{49} and piracy.\textsuperscript{50} What they do not realize, or at least refuse to acknowledge, is that their positions represent two sides of the same coin. By not talking to each other, they therefore fail to work

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\item[47.] See David McGowan, \textit{Copyright Nonconsequentialism}, 69 \textit{MO. L. REV.} 1 (2004) (exploring "why those who debate copyright often seem to talk past each other").
\item[48.] See Jane C. Ginsburg, \textit{How Copyright Got a Bad Name for Itself}, 26 \textit{COLUM.-VLA J. L. \& ARTS} 61 (2002) ("I have a theory about how copyright got a bad name for itself, and I can summarize it in one word: Greed. Corporate greed and consumer greed.").
\item[49.] See Cynthia M. Ho, \textit{Attacking the Copyright Evildoers in Cyberspace}, 55 \textit{SMU L. REV.} 1561 (2002).
\item[50.] See Peter K. Yu, \textit{P2P and the Future of Private Copying}, 76 \textit{U. COLO. L. REV.} (forthcoming 2005) (discussing why the recording industry did not make the right analogy when it compared individual file-sharers to shoplifters).
\item[51.] Although copyright holders often accuse of piracy those who make copies without their authorization, piracy is in the eyes of the beholder. As Professor Peter Jaszi noted insightfully, "[o]ne might say that one nation's 'piracy' is another man's 'technology transfer.'" Peter Jaszi, \textit{A Garland of Reflections on Three International Copyright Topics}, 8 \textit{CARDOZO ARTS \& ENT. L.J.} 47, 63 (1989). Moreover, as Philippine Activist Roberto Verzola observed:

If it is a sin for the poor to steal from the rich, it must be a much bigger sin for the rich to steal from the poor. Don't rich countries pirate poor countries' best scientists, engineers, doctors, nurses and programmers? When global corporations come to operate in the Philippines, don't they pirate the best people from local firms? If it is bad for poor countries like ours to pirate the intellectual property of rich countries, isn't it a lot worse for rich countries like the US to pirate our intellectuals?

In fact, we are benign enough to take only a copy, leaving the original behind; rich countries are so greedy that they take away the originals, leaving nothing behind.

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together to create a positive dialogue that is conducive to reforming the intellectual property system.\textsuperscript{52}

A bipolar debate is particularly problematic in the intellectual property area. Unlike physical goods, intellectual property is nonexcludable and nonrivalrous in nature. "The relationship between the public domain and the restrictions around it is [therefore] a complex dynamic equilibrium, not a simplistic binary choice."\textsuperscript{53} Moreover, a debate in binary terms tends to obscure the possibilities of hybrid policy choices and regulatory schemes, as well as useful concepts like "semicommmons."\textsuperscript{54} For example, commentators have traditionally considered the public domain the "conceptual opposite" of intellectual property.\textsuperscript{55} However, as Professor Pamela Samuelson pointed out, "the public domain consists . . . of a vast and diverse assortment of contents . . . [and is] different sizes at different times and in different countries."\textsuperscript{56} The "conceptual opposite" of intellectual property, therefore, may not reflect the rich diversity of public domain materials.

In fact, some contents do not fit well in either the intellectual property or public domain category. Open source and free software, as well as materials licensed under a creative commons license, are good examples. Although the protection of these contents depends on the existence of the copyright system, they provide great flexibility for others to adapt and build

52. As Professor Samuelson explained:

To be successful, a new public-regarding politics of intellectual property must have a positive agenda of its own. It cannot just oppose whatever legislative initiatives the major content industry organizations support (although it almost certainly will need to do this as well). It should be grounded on the realization that information is not only or mainly a commodity; it is also a critically important resource and input to learning, culture, competition, innovation, and democratic discourse. Intellectual property must find a home in a broader-based information policy, and be a servant, not a master, of the information society.


53. Boyle, supra note 30, at 12.


55. See Boyle, supra note 30, at 8.

56. Samuelson, supra note 52, at 148 (footnote omitted); see also Boyle, supra note 33, at 68 (noting that "[j]ust as there are many 'properties,' so too there are many 'public domains'"); David Lange, Reimagining the Public Domain, LAW & CONTEMP. PROBS., Winter/Spring 2003, at 463, 463 (noting that "the term 'public domain' is elastic and inexact" and its definition is "a function of perspective and agenda").
on the materials without paying any royalties. In Professor Samuelson’s words, these materials are “outside the public domain in theory, but seemingly inside in effect.” Indeed, because of the hybrid nature of these contents, those who advocate low-protectionist positions have to be very careful about what policies they push for. For example, a maximalist interpretation of the General Public License ("GPL") used in open source software may ultimately create precedents that will further high-protectionist positions. Nevertheless, without such an interpretation, the GPL may not be able to achieve its original objective, i.e., to require those who redistribute software to “pass along the freedom to further copy and change it.”

B. A Multistakeholder Debate

A focus on the information ecosystem also reminds commentators and policymakers of the existence of, and interactions among, the different components of the intellectual property system. This is particularly important, as public interest organizations are often underrepresented in the legislative and policymaking processes. As the Commission on Intellectual Property Rights observed:

Too often the interests of the “producer” dominate in the evolution of IP policy, and that of the ultimate consumer is neither heard nor heeded. So policy tends to be determined more by the interests of the commercial users of the system, than by an impartial conception of the greater public good. In IPR discussions between developed and developing countries, a similar imbalance exists. The trade ministries of developed nations are mainly influenced by producer interests who see the benefit to them of stronger IP protection in their export markets, while the consumer nations, mainly the developing countries, are less able to identify and represent their own interests against those of the developed nations.

57. Samuelson, supra note 52, at 149.
58. This issue has been extensively discussed on the Section of Intellectual Property Law Panel at the 2005 AALS Annual Meeting in San Francisco. In recent years, the open source movement has inspired developments in other areas. For example, commentators are now exploring the application of the open source model to biomedical and genomic research. See, e.g., David W. Opderbeck, The Penguin's Genome, or Coase and Open Source Biotechnology, 18 HARV. J.L. & TECH. 167 (2004); Arti K. Rai, Open and Collaborative Research: A New Model for Biomedicine, in INTELLECTUAL PROPERTY RIGHTS IN FRONTIER INDUSTRIES: SOFTWARE AND BIOTECH (Robert Hahn ed., forthcoming), available at http://ssrn.com/abstract_id=574863; see also Boyle, supra note 38.
60. IPR COMMISSION REPORT, supra note 41, at 7.
To recalibrate the balance in the intellectual property system, policymakers need to include as many stakeholders as they can in the legislative and policymaking processes.\textsuperscript{61} Such recalibration is particularly important when digital materials are involved. After all, the information revolution has transformed virtually everybody into a stakeholder in the global information society. Moreover, as I pointed out elsewhere, there is a widening divide between intellectual property rights holders, who are eager to protect their interests, and users of protected contents and materials, who do not have or understand their stakes in the system.\textsuperscript{62} Until these users do, they are unlikely to be satisfied and be willing to consent to stronger protection of the rights holders.

The lack of participation is particularly acute in the traditional knowledge debate. As many scholars and indigenous rights activists have pointed out, negotiations concerning protection of traditional knowledge are often hampered by lack of participation by indigenous communities.\textsuperscript{63} Although this lack is often caused by policymakers' omissions, there remains significant reluctance in the indigenous community to participate in the negotiation process. While a number of them harbor grave concerns about further abuse, misappropriation, and exploitation of their arts and crafts, many others find it inappropriate to participate due to the secretive nature of some of their creations and practices, in particular sacred symbols and religious rituals.\textsuperscript{64}

To make things more complicated, many indigenous creations do not fit well within the Western worldview and intellectual tradition, the capitalist philosophy, or the contemporary notion of individual authorship—all of which underlie the development of the existing intellectual property system. As the Bellagio Declaration noted:

\textsuperscript{61} In the digital copyright context, for example, possible stakeholders include intellectual creators, business enterprises, libraries, educational and research institutions, government authorities, standard-setting bodies, and individual end-users.


\textsuperscript{63} See Rosemary J. Coombe, The Recognition of Indigenous Peoples' and Community Traditional Knowledge in International Law, 14 ST. THOMAS L. REV. 275, 284-85 (2001) (noting that a dialogue can only be established "when indigenous peoples are full partners in this dialogue, with full juridical standing and only when the their cultural world views, customary laws, and ecological practices are recognized as fundamental contributions to resolving local social justice concerns"); Peter K. Yu, Traditional Knowledge, Intellectual Property, and Indigenous Culture: An Introduction, 11 CARDOZO J. INT'L & COMP. L. 239, 240 (2003) (noting that negotiations on this issue are complicated by the failure to include the indigenous community in the process).

\textsuperscript{64} See Yu, supra note 63, at 244-45.
Contemporary intellectual property law is constructed around the notion of the author, the individual, solitary and original creator, and it is for this figure that its protections are reserved. Those who do not fit this model—custodians of tribal culture and medical knowledge, collectives practicing traditional artistic and music forms, or peasant cultivators of valuable seed varieties, for example—are denied intellectual property protection.\(^{65}\)

In the international intellectual property arena, the lack of participation is equally problematic. Commentators have widely criticized the Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPs Agreement") for its "coercive" and "imperialistic" nature.\(^{66}\) They also have faulted the World Trade Organization for "the lack of transparency of [its] dispute settlement proceedings, limited access by non-members to the dispute settlement panels and the Appellate Body, technical and financial difficulties confronting less developed countries in implementing their treaty obligations, and the insensitivity and undemocratic nature of the decisionmaking processes."\(^{67}\) Most recently, commentators have become concerned that bilateral and plurilateral free trade agreements will take away the autonomy of countries to tailor their intellectual property policies to local needs, interests, and goals, and to develop legal systems through experimentation with new regulatory and economic policies.\(^{68}\) Some also fear that recent

\(^{65}\) The Bellagio Declaration (Mar. 11, 1993), reprinted in Boyle, supra note 4, at 193.


developments will "roll back both substantive and strategic gains of the TRIPS Agreement for developing countries." 69

C. The Systems Approach

A better understanding of the information ecosystem would enable policymakers and commentators to take a holistic perspective when they evaluate intellectual property laws and policies. It also would remind them that these laws and policies constitute only one of the many components of the information ecosystem.

In recent years, commentators have applied the complexity theory to the field of environmental law, 70 while others have brought related insights to the information arena. 71 As of this writing, however, the complexity theory remains largely outside the standard field of inquiry among intellectual property scholars. It is therefore time for us to inject these valuable insights into the intellectual property debate. 72 As Professor J.B. Ruhl has noted:

The great lesson of dynamical systems theory for law reform, therefore, is that it is the system that counts as much as the rules, and that we cannot effectively change only one variable of that equation and expect the others to remain static. Ceteris paribus doesn't exist. Our legal institutions, however, have become prolific producers of rules of conduct, and our legal theory has focused for the most part on divining the meta-rules to explain those rules. We need some attention to the system at the structural level. 73

69. Okediji, supra note 68, at 129.
If we liken the sociolegal system to an ecosystem, and laws to species, [complexity theory will provide insight into such questions as] how will each law, with its unique historical origins and set of legal genes, respond to and be affected by the rest of the sociolegal community, and how will the sociolegal community as a whole evolve as a result of all or any of the laws doing so?
Id.
73. J.B. Ruhl, Complexity Theory as a Paradigm for the Dynamical Law-and-Society System: A Wake-Up Call for Legal Reductionism and the Modern Administrative State, 45 DUKE L.J. 849, 916-17 (1996); see also id. at 851 ("If society evolves in response to changes in law, and vice versa, then law and society must co-exist in an evolving system. Each needs the other to define itself.").
The use of the complexity theory has at least three benefits. First, it captures the complex manner in which components interact with one another in an integrated system.\textsuperscript{74} As meteorologist Edward Lorenz put it insightfully, the flap of a butterfly's wings in Brazil could set off a tornado in Texas.\textsuperscript{75} Although complex systems have governing meta-principles, we may not be able to "find them by slicing up the system into smaller parts."\textsuperscript{76} Thus, it is important for us to have a holistic perspective of the system. Such an approach also allows us to focus on the interactions among the different components and to have "a greater appreciation of the forces at play in the interaction of law and society."\textsuperscript{77}

Second, the complexity theory allows us to focus on the self-correction mechanisms within the system. In doing so, it enables us to focus on adaptiveness and explore the tipping point at which the system goes from order to chaos. As complexity theory researcher Stuart Kauffman observed: "complex systems constructed such that they are poised on the boundary between order and chaos are the ones best able to adapt by mutation and selection. Such poised systems appear to be best able to coordinate complex, flexible behavior and best able to respond to changes in their environment."\textsuperscript{78} The key question in the information age, therefore, is not whether we should have an intellectual property system (although that question is still important and worth exploring). Rather, it is how we can achieve sustainable development of intellectual property—how we can meet our current needs while preserving the potential for future generations to meet their own needs.

To some extent, the intellectual property system functions like a hydraulic system; a change in the system may be offset by an identical change in the opposite direction. Consider the copyright system, for example. It grants to rights holders exclusive rights to reproduce, adapt, distribute, perform, and display the copyrighted work. However, it also qualifies most of its rights with safeguards that protect the public domain against impoverishment. These safeguards include the originality requirement, the fair use/fair dealing privilege, the idea/expression dichotomy, durational limits of

\begin{itemize}
  \item \textsuperscript{74} Spulber \& Yoo, \textit{supra} note 71.
  \item \textsuperscript{75} Edward Lorenz "describes a Brazilian butterfly that by beating its wings creates a movement of air that by joining with other currents transforms the weather in Texas." Paul D. Carrington, \textit{Butterfly Effects: The Possibilities of Law Teaching in a Democracy}, 41 DUKE L.J. 741, 743 (1992) (quoting Edward Lorenz, \textit{Predictability: Does the Flap of a Butterfly's Wings in Brazil Set Off a Tornado in Texas?}, Address to the Annual Meeting of the American Association for the Advancement of Science, Washington, D.C. (Dec. 29, 1979)).
  \item \textsuperscript{76} Ruhl, \textit{supra} note 73, at 893.
  \item \textsuperscript{77} \textit{Id.} at 853.
  \item \textsuperscript{78} \textit{Stuart A. Kauffman, The Origins of Order} 29 (1993), \textit{quoted in} Ruhl, \textit{supra} note 73, at 891-92.
\end{itemize}
protection, and other public interest exceptions. For instance, commentators have proposed to use the fair use privilege to offset the effects of the recent copyright term extension. Others, including myself, have also underscored the need to introduce affirmative public access rights for individual end-users. As Professor Rochelle Dreyfuss reasoned, "[u]ser access did not need specific delineation when it was the background rule; only the exceptionalism of intellectual property rights required express definition. But if the new background is proprietary control, then the exceptionalism of user rights now needs to be embedded into positive law."

Third, the complexity theory highlights the interactions among different components of the system. It therefore reminds us that intellectual property policies may have spillover effects and unintended consequences. For example, commentators have discussed at length the broad, unintended consequences of the Digital Millennium Copyright Act ("DMCA"). Although the statute was initially designed to protect copyright holders, it has now been used to stifle innovation and competition over such products as

79. See, e.g., Justin Hughes, Fair Use Across Time, 50 UCLA L. REV. 775 (2003) (proposing to include in the fair use analysis "when the unauthorized use occurs in the copyright term"); Joseph P. Liu, Copyright and Time: A Proposal, 101 MIC. L. REV. 409 (2002) (proposing to "adjust the scope of copyright protection to account for the passage of time by expressly considering time as a factor in fair use analysis"); William F. Patry & Richard A. Posner, Fair Use and Statutory Reform in the Wake of Eldred, 92 CAL. L. REV. 1639 (2004) (offering to solve the access problem caused by the recent copyright term extension "by continued evolution of the judicially shaped doctrine of fair use or by a modest amendment to the Copyright Act"); cf. Ginsburg, supra note 48, at 65 (noting that the recent copyright term extension "put pressure on the system to offset the gain in years with a diminution in the scope of protection, for example, through a more vigorously implemented fair use exception, not only during the last 20 years, but perhaps throughout the copyright term").

80. See, e.g., Dreyfuss, supra note 33 (arguing for the need to use the next round of GATT negotiations to add explicit user rights to the TRIPs Agreement); see also Ruth Okediji, Toward an International Fair Use Doctrine, 39 COLUM. J. TRANSNAT'L L. 75, 87 (2000) (noting the lack of an international fair use doctrine in current international copyright law and contending that "such a doctrine is vital for effectuating traditional copyright policy in a global market for copyrighted works as well as for capitalizing on the benefits of protecting intellectual property under the free trade system"); Peter K. Yu, The Trust and Distrust of Intellectual Property Rights, 16 REVUE QUEBECOISE DE DROIT INTERNATIONAL (forthcoming 2005) (articulating the need for the international community to recognize our fundamental needs to have free, universal, sustainable, and quality access to protected information for future intellectual creations).

81. Dreyfuss, supra note 33, at 27; see also SUSAN K. SELL, PRIVATE POWER, PUBLIC LAW: THE GLOBALIZATION OF INTELLECTUAL PROPERTY RIGHTS 146 (2003) (noting the need to "highlight[] the fact that what may be granted may be taken away when such grants conflict with other important goals," such as freedom of expression or public health).

printer toner cartridges, garage door openers, electronic pets, and voting machines.\textsuperscript{83} The DMCA has also upset the historical balance between copyright interests and access to information, thus raising serious concerns about free speech, privacy, academic freedom, learning, culture, and democratic discourse.\textsuperscript{84}

In a few months, the United States Supreme Court will decide \textit{Metro-Goldwyn-Mayer Studios, Inc. v. Grokster, Ltd.}\textsuperscript{85} At issue in the case is whether the distributors of peer-to-peer file-sharing technologies should be liable for copyright infringement committed by individuals using their products. This case is important from the standpoint of ecosystem management, because it will allow the Court to revisit its earlier decision in \textit{Sony Corporation of America v. Universal City Studios, Inc.},\textsuperscript{86} which has far-reaching consequences in the technology and innovation areas.\textsuperscript{87} Although the parties disagree over whether peer-to-peer file-sharing technologies are significantly different from other copying technologies that are currently protected by \textit{Sony}, \textit{Grokster} is likely to have substantial spillover effects on many different economic sectors regardless how it is decided.\textsuperscript{88}

D. An Illustration

Although it is impossible to completely understand how the information ecosystem operates, or to ascertain all the meta-principles governing the system, we may be able to effectively manage the system without all the information. We just need to know enough, and a systems approach would enable us to acquire the needed information. As an illustration of how we can change from the binary, or perhaps adversary, approach to the systems approach, consider Article 27 of the Universal Declaration of Human Rights,

\begin{itemize}
  \item \textsuperscript{83} See Yu, \textit{supra} note 50.
  \item \textsuperscript{84} For a collection of criticisms of the DMCA, see Yu, \textit{supra} note 62, at 393 n.450.
  \item \textsuperscript{85} 380 F.3d 1154 (9th Cir.), \textit{cert. granted}, 125 S. Ct. 686 (2004).
  \item \textsuperscript{86} 464 U.S. 417 (1984).
  \item \textsuperscript{87} \textit{See} Brief Amici Curiae Sixty Intellectual Property and Technology Law Professors and the United States Public Policy Committee of the Association for Computing Machinery at 4, \textit{Metro-Goldwyn-Mayer Studios, Inc. v. Grokster, Ltd.}, 125 S. Ct. 686 (2004) (No. 04-480) (noting that \textit{Grokster} "is fundamentally about technology policy, not about file sharing or copyright infringement"); \textit{see also} Adam Candeub & Peter K. Yu, \textit{Supreme Court Shouldn't Decide Future of Internet}, \textit{Detroit News}, Mar. 29, 2005, at 9A (noting that \textit{Grokster} "touches on questions of technology and innovation"). The author has signed on to this brief.
  \item \textsuperscript{88} \textit{See} \textit{Congressional Budget Office}, U.S. CONGRESS, \textit{Preface to COPYRIGHT ISSUES IN DIGITAL MEDIA} viii (2004) (noting that "[c]hanges to copyright law . . . can have ramifications that extend beyond the concerns of producers and consumers of copyrighted material to the well-being of related sectors of the economy"), \textit{available at} http://www.cbo.gov/showdoc.cfm?index=5738&sequence=1.
\end{itemize}
which is often cited as the human rights justification for intellectual property protection. Article 27 provides:

(1) Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.
(2) Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.89

If one were to read these two provisions with a binary lens, one would say that the former covers cultural rights and the protection of the public domain, while the latter focuses on intellectual property protection. Under this reading, both articles cover very important rights and have the potential to compete with each other in achieving their objectives. To avoid conflict, one needs to reconcile the two provisions, or at least alleviate the tension between the two.

The systems approach, however, may allow us to avoid, or at least manage, the conflict. Because this approach primarily focuses on the interactions among the many components of the system, it encourages policymakers to focus on the relationship between the different components and their common goal. For example, we may read the two provisions as fulfilling two noncompeting objectives. Under this reading, individuals have both the right to enjoy the arts and share in scientific advancement and its benefits and the right to protection of their intellectual creations. Because the two provisions are related and interdependent, one could read Article 27 as providing an individual right to “enjoy the arts and to share in scientific advancement and its benefits” so that the individual can attain “protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.” One could also read it as providing an individual right to attain “protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author” so that the individual can “enjoy the arts and . . . share in scientific advancement and its benefits.”

III. SYMPOSIA

Today, the intellectual property system affects more than just technology and innovation. It touches on many other areas, such as agriculture, health, education, culture, competition, trade, and democracy. As the system

continues to evolve, it will expand and become more complex. It will also open up new opportunities while confronting new challenges. To help us better understand the dynamics within the information ecosystem, the Intellectual Property & Communications Law Program at Michigan State University College of Law, the James H. and Mary B. Quello Center for Telecommunication Management & Law in the College of Communication Arts & Sciences, and the Michigan State Law Review co-sponsored two symposia. The first, “Harnessing the Swarm: Business Strategies, Rights Management and Policy for the New Media,” was held on February 24-25, 2004, in Washington, D.C. The second, “Intellectual Property, Sustainable Development, and Endangered Species: Understanding the Dynamics of the Information Ecosystem,” was held on March 26-27, 2004, on the Michigan State University campus. These two events brought together intellectual property scholars, communications policy experts, property theorists, economists, political scientists, and policymakers. What follows are some of the papers presented at these events. I hope you will enjoy them.