About a year ago, a young scholar posed a question to a popular listserv of internet scholars called “cyberprofs.” He wanted a recommendation for a book on the capacity of law and policy to influence technology in furtherance of the public interest. Typically lively, the cyberprofs listserv was quiet for a spell. Eventually, an established scholar recommended Lawrence Tribe’s *Channeling Technology Through Law*. Others chimed in to agree, and that seemed to be the end of the matter.

The exchange surprised me. *Channeling Technology Through Law* was published in 1973 and has never been updated. The book focused on the establishment of a federal agency—the Office of Technology Assessment—that no longer exists. The years since 1973 have seen, among other developments, a multi-billion-fold increase in computational power. Even the field of cyberlaw, the study of law’s interaction with the internet, feels outdated and limited in an age of artificial intelligence and gene-editing.

Society itself has undergone profound social, cultural, and economic transformation. In particular, assumptions about what or who mattered to technology policy is, or should be, dramatically different today. To channel twenty-first century technology using tools developed in the 1970s risks the same mistake as science fiction that envisions technological change without a concomitant change to social mores—the autonomous commuter plane to Mars still staffed by stewardesses in short skirts.

We should update the logics and tools of technology assessment for the twenty-first century. But more than this, scholars, students, and policymakers deserve a fully developed methodology for understanding and reacting to contemporary technology and its social impacts. We need a big new book on law and technology.

Technology plays a central role in contemporary society. In the United States and elsewhere, technological innovation is a key source of military and economic advantage. The technology sector furnishes five of the five largest American companies by market capitalization. And yet the field of law and technology remains poorly defined. Law and technology scholars tend to congregate, if at all, around adjacent fields such as intellectual property or information privacy law or around specific technologies such as the internet or robotics.
There are a number of potential explanations for why law and technology has failed to cohere as a discipline. Some readers may be familiar with Frank Easterbrook’s infamous address at the inaugural cyberlaw conference at University of Chicago. Facing a gathering of self-identified internet scholars, Easterbrook confidently asserted that there is no more need for a law of cyberspace than for a law of the horse. If you don’t recognize this bit of cyberlaw lore, perhaps you recall Oliver Wendell Holmes, Jr.’s story of the Vermont justice of the peace who couldn’t find a statute concerning the damaging of churns, specifically, and so gave a verdict for the defendant. The idea being that general principles of law are perfectly capable of resolving disputes irrespective of the technical particulars.

A related rationale for law and technology’s lack of cohesion has to do with the very pervasiveness of technology across all aspects of contemporary life. Is the 1958 Hart-Fuller debate an early example of law and technology scholarship because an aspect of the disagreement turned on vehicles in the park? Many contemporary discussions, from health law to criminal procedure, feature artifacts of some kind. This presents law and technology with a definitional problem: If every legal issue that touches technology somehow falls within law and technology, then perhaps nothing does.

I am a law professor who has researched law and technology for over a decade. I have worked with every branch of the federal government, testified twice before the United States Senate, and founded a multimillion-dollar interdisciplinary lab. I serve on the program committees of the leading conferences in my field. I’m increasingly of the view that the principle reason law and technology has yet to cohere as a field is the lack of an explicit, rigorous, and consistent methodology. Which is precisely what I mean to furnish with the proposed book.

In ways understandable, the lack of a cohesive approach in law and technology has a number of negative consequences within and beyond academia. It certainly does no favors to tech law professors themselves. Law schools that perceive a need to hire faculty in law and economics, for example, or health law or intellectual property often do not see a similar need to hire in law and technology, despite the latter’s incontrovertible societal significant. Even were law schools to begin to perceive law

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1 H.L.A. Hart postulated that law consists of easy or “core” cases and harder cases at the penumbra, offering “no vehicles in the park” as an example of the former. Lon Fuller, in reply, asked whether a World War II memorial containing an army jeep would violate this rule. See Lon L. Fuller, Positivism and Fidelity to Law – A Reply to Professor Hart, 71 Harvard Law Review 630, 661-69 (1958).

2 There are of course books and articles most everyone in the field has read and thought about. But common texts do not amount to a methodology. There have also been laudable efforts to help unify tech policy through the establishment of a journal, such as computer and political scientist Latanya Sweeney’s Journal of Technology Science for students.
and technology to be an important specialization, it would not be clear who counts as a scholar and who does not.³

More importantly, the lack of a rigorous, programmatic approach hampers law and technology research itself. As there is no explicit method on offer, each law and technology project feels sui generis. A series of papers about the same topic (privacy) or technology (robots) may talk to one another. But generally speaking, each scholar approaches his or her subject matter anew. If there are common approaches—and I will argue that there are—they remain unstated. Further, the absence of an explicit method means that the study of law and technology itself doesn’t improve. Every application of a methodology is both a source of knowledge about the world and an opportunity to refine our tools of discovery. We pay a steep opportunity cost by tackling each puzzle afresh.

What is true for academics is truer still for policymakers and their staff. Work in tech policy long enough and you will field your share of calls from staffers whose boss has read a news article or spoken to a constituent concerned over this or that emerging technology. Hill staffers are talented and motivated, but have no place to begin when it comes to understanding the societal impacts of new technologies. To an even greater extent than academics, government and even industry policymakers are fighting the fires of new technology without a theory of firefighting.

Part I: Law and Technology As Methodology

So what would it take to develop a coherent approach to law and technology? What would meet the needs not only of academics and sophisticated students, interested in discourse and theory, but of policymakers and others interested in applying these insights and analyses in practice?

A satisfactory account of law and technology must begin with the difficult task of defining the scope and purpose of the field. The first part of the proposed manuscript will answer a series of key questions: What is technology? Why should legal scholars study technology separately from other aspects of society? And what are the ends of technology law or policy?

None of these questions are easily answered. Looking to a long-standing literature on the philosophy of technology, my book will introduce and defend a definition of technology that emphasizes the artifact, i.e., the instantiation of human will in a physical or digital object. I will distinguish technology from technique, in the sense of systems of production or organization, as well as science, in the sense of the systematized exploration of natural and physical phenomena. This emphasis on

³ Brian Leiter, an American law professors and philosopher who likes to rank institutions and people, publishes a list of the most highly cited scholars in “intellectual property and cyberlaw,” with no definition of the latter. The result is that even highly cited scholars who identify as law and technology nowhere appear in Leiter’s influential rankings.
technology as human object—the train, the software program, the space station—helps limit the project’s scope as well as inform its analysis, while simultaneously acknowledging the complex interrelation between the various concepts.

My book will explain why we should study law and technology. First, I will explore the unique role that technology plays in society. Winston Churchill once said that he could take over the world if he had access to British officers, Canadian troops, and American equipment. Technology’s influence on human events spans the globe and extends back thousands of years.

Second, I intend to defend and justify the unity of law and technology as a field. The book will draw from the experiences of other disciplines—everything from animal law to science and technology studies (STS)—that have developed into distinct area of studies based around particular topics or lenses. These efforts are still unfolding and have not been uniformly successful. Nevertheless, the establishment of scholarly communities around particular topics or methods has been generative. And a book that synthesizes and structures existing approaches can act as a catalyst; STS for example, caught fire in the wake of Thomas Kuhn’s now famous *The Structure of Scientific Revolutions*.

For law and technology to constitute a thick methodology, rather than merely a coherent area of study, it must also articulate a set of shared epistemic and normative assumptions. Given the plurality and diversity of voices in the burgeoning field, those shared assumptions are not glaringly obvious. The next part of the book will explore the common ground upon which law and technology as methodology can be built.

I will begin by acknowledging the strong normative orientation of legal scholarship as a whole. As Robin West argues, legal scholarship concerns itself not only with what the law is, but what it should be. Many law and technology scholars share this commitment, such that a satisfactory methodology for the field must provide a transparent account for the role of normativity. The book will argue that law and technology as a field must make room for prescription without discounting analyses meant to foster wiser deliberation by government or society without preconception.

Law and technology scholars may disagree on whether scholarship itself should prescribe. Some hail from disciplines that eschew normativity. And yet there is widespread agreement, if not outright consensus, around the idea that law and technology themselves hold a common and primary goal: that of human flourishing.

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4 The book may discuss non-human tools as well, such as animal tools. In general, I anticipate that tools by tools (e.g., by artificial intelligence) will still come under the rubric of human object, given that a human created the original machine.

The book will accordingly mine various conceptions of human flourishing—a research project already underway—and develop a conception that resonates with the broadest contours of the law and technology field.

Having explored the nature of technology, and the ends of law and technology scholarship, my book will turn to the question of methods. If a *methodology* represents an intellectual framework and set of commitments within which the production of knowledge develops, then a *method* describes a specific technique or procedure within that methodology. Methodology and method are distinct but interconnected. Shifts in methods may result or reflect changes in methodology, as when political science or sociology begins to emphasize quantitative methods over qualitative ones.

Law and technology scholarship does not self-consciously employ a formal set of methods. But when one looks closely, there are one or more common approaches. Perhaps the most popular is what I will call the substitution approach. On this account, new technologies often upset assumptions animating law and legal institutions. Law and technology scholars diagnose the assumptions upended by technology and propose substitutes—legal, technical, or otherwise—that restore the status quo.

The substitution approach to law and technology represents an unintended legacy of Lawrence Lessig. The ascendance of the commercial internet in the 1990s, which appeared to stand apart from existing social structures, led early theorists to predict an end of the sovereign state. Lessig—who, like Tribe, was a constitutional law scholar who turned his attention for a time to technology—famously rejected this premise. He predicted instead that our collective mediation by technology would shepherd in an era of exquisite control as governments and firms employ their new levers of power.

Lessig developed two crucial ideas that continue to guide contemporary law and technology analysis. First, Lessig postulated that law comprises just one of the four “modalities” of regulation available to powerful institutions—markets, norms, and architecture also secure means to exert control over a population. Even if a virtual or geographically dispersed community cannot be reached by statutes or court orders, it can be governed by the software, hardware, and networks that constitute their underlying architecture. Second, Lessig understood the interaction between law and cyberspace as a function of “latent ambiguities,” i.e., legal puzzles revealed

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6 For a draft paper that seeks to group approaches to cyberlaw scholarship, with an emphasis on privacy, see Meg Leta Jones & Karen Levy, Methods to Our Madness: An Interdisciplinary Reflection on 10 Years of Privacy Scholarship, manuscript on file with author. This exercise proved difficult because law and technology scholars—and indeed, legal academics in general—seldom state their methods.

only when a change in technology alters human habits and capabilities. Thus, for example, Lessig asked if a government computer virus programmed only to reveal unlawful material could constitute a search for purpose of the Fourth Amendment.

Although less remarked than Lessig’s mantra that “code is law,” the notion that new technologies reveal latent legal ambiguities informed a generation of legal scholars, myself included. Countless papers in law and technology proceed with the understanding that the role of the law is to identify the ways new technology disrupts prior practice and legal commitments and proposes legal and technical means to reintroduce the values that were lost in the process. Thus, for example, contemporary debates around the use of algorithms by courts and agencies begin with the observation that decisions once made by judges or officials are now being made by automated systems, with negative consequences for due process. The law therefore must reintroduce the safeguards that algorithms have replaced.

Note how the substitution approach is simultaneously progressive and conservative. The approach feels progressive, in that scholars seem to view technological advancements as inevitable. At the same time, the substitution approach can be understood as conservative, in that it envisions the role of law—and by extension the legal scholar—as restoring the status quo ex ante. The goal is to reproduce safeguards, expectations, and promises in existence before technologic change.

There is an important alternative to the substitution approach. Rather than explore how to restore the status quo in light of technological disruption, this approach takes sufficiently transformative technology as an invitation to inventory human values. This work, which I’m calling the ends-affordance approach, asks what new affordances technology brings and then assesses the human ends permitted by the new affordances. Such scholarship asks, for example, whether the internet affords novel opportunities for Habermasean civic participation or whether autonomous transportation affords an opportunity to restore the centrality of public transportation. This alternate approach is wider than substitution in that it understands technology not (only) as a source of disruption of the status quo, but a means to rethink it.

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8 Lawrence Lessig, Code And Other Laws of Cyberspace (1999).


11 Kate Crawford and Ryan Calo, There is a blind spot in AI research, Nature 538, 311–313 (October 2016).
While perceptible to the close student of law and technology, these approaches less methods so much as common habits or tendencies. To be sure, the predominant substitution approach has yielded important insights across a range of contexts. Nonetheless, the approach remains informal, uneven, and piecemeal. Its adherents make choices that they do not acknowledge, let alone defend, including (1) the choice of a particular, sometimes arbitrary instantiation of a technology to analyze and (2) the decision to focus on a specific set of legal commitments that the technology allegedly disrupts. Neither the substitution nor ends-affordance approaches particularly distinguish between the task of governing technology and the technology’s impact upon governance.

The ultimate consequence of proceeding piecemeal and without formal attention to method is that each individual contribution to law and technology feels sui generis. Few linkages can be made between law and technology projects, even those touching on the same technologies. Larger themes, patterns, and opportunities remain obscure.

Part II: Toward A Law and Technology Method

The second part of the proposed book has the ambitious aim of laying out a method by which to analyze the law and policy dimensions of emerging technology. The method certainly draws from, and thereby hopes to reflect, existing approaches. But it develops, extends, and enhances those approaches in key ways.

The method makes its starting assumptions explicit and lays out a series of steps in roughly four stages that scholars, students, or policymakers could follow in their exploration of any given technology. The method is original to the author but incorporates the work of the University of Washington Tech Policy Lab as well as its sister labs within the University of Washington Information School and Allen School of Computer Science and Engineering.

There are several advantages to approaching law and technology methodically rather than piecemeal. First, a common method or set of tools helps unify the field—much as law and economics brings coherence to cost-benefit or incentive-based approaches in legal scholarship. Second, a common method provides a shared starting place: neither legal scholarship nor policy analysis will be forced to reinvent the wheel each time. Third, it provides a common benchmark. Competing approaches must be at least as rigorous and express as the method on offer. Fourth, and importantly, a common method will give students, scholars, and interested policymakers something to critique. Offering a common method provides a target for critique and, hopefully, improvement or alternative.

A full treatment of the stages and steps of the proposed method would not be efficient at the proposal stage but, in brief, they are as follows:

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12 As the late Justice Antonin Scalia was fond of saying, it takes a theory to beat a theory.
0. **Significance.** Presumably law and technology scholarship could focus on the interaction between any technology and the legal system. A threshold question asks the reader to reflect critically on why she or he has selected the particular technology for analysis and offers various criteria and factors that help signal the maturity and likely impact of technology—for example, significant military investment. In some instances, the impetus for examining a given technology will arrive exogenously, as when a member of Congress tasks a staffer with examining a new technology in response to pressure from constituents. In others, it is a choice to be defended.

1. **Definition.** The purpose of this stage is to precisely define the technology under examination with specific emphasis on distinguishing it from previous and constituent technologies. Developing an accurate or at least defensible mental model of a technology is surprisingly difficult and yet critical to conducting a rigorous analysis. Often technology is defined too broadly (e.g., artificial intelligence) for meaningful engagement or else commentators conflate a particular, contingent instantiation for the technology itself. Definitions can be idiosyncratic and contested; regardless, they must be concretely stated up front to define the precise scope of inquiry.

2. **Envisioning.** Armed with an explicitly scoped and technically grounded definition, this stage thinks through what the technology under examination changes about human experience. What human capabilities does a new technology enable or foreclose? Is the change incremental, such that we are free to analogize to previous techniques, or does it represent a sea change? To lend structure to an admittedly complex and multifaceted inquiry, this stage draws from James Gibson’s theory of affordances.\(^{13}\) Affordance theory understands technological change as a function of altering an organism’s perception of the environment by changing the environment’s capacity to afford opportunity or harm. The stage also draws from a variety of sources and techniques, from scenario planning to science fiction, to help anticipate the potential paths of technology and envision their societal effects.

3. **Legal Analysis.** Assuming a well-defined technical scope and, more ambitiously, a concrete sense of the way new technology alters human affordances, this stage explores what these changes mean for law. The stage envisions three potential levels of analysis: (1) at the level of rule or doctrine (e.g., proximate causation), (2) at the level of context (e.g., the trial), and (3) at the level of system (e.g., administrative law or law as a whole). The stage also differentiates between two potential modes of analysis, namely, “serial substitution” and “inventory of ends,” depending on the extent to which the technology’s new affordances depart from previous experience.

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Serial substitution proceeds by examining technical disruption one rule or context at a time. It is a valid mode of analysis, especially if the scholar acknowledges and defends his or her choices. An inventory of ends examines the goals of law in a particular context without preconception. For example, it might look systematically at the goals of civil or criminal procedure without initial reference to technology. As Mireille Hildebrandt provocatively observes, law itself is based roughly on the affordances of the printing press. Each significant development in technology arguably invites us to conduct an inventory of the ends of law and examine whether those ends can be met differently or even require reexamination. Such an analysis yields different sorts of answers than serial substitution.

4. **Levers of Change.** A final stage focuses on normative considerations, solutions, and problem solving in light of technical change. Using the frameworks of Tribe and Lessig as points of departure, this stage discusses the various mechanisms by which law and policy can promote human flourishing in the face of technical change. Levers include everything from new rules or precedents to thoughtful government procurement. Special attention is given to rhetorical choices, which tend to be undertheorized in contemporary law and technology discourse.

This stage examines not only how to intervene, but if and when. The dynamic, iterative nature of technology presents a puzzle for law. Respond too early, and we risk “getting it wrong” in the sense of intervening on the basis of an incorrect mental model of the technology or arbitrarily stifling the technology’s development. Too late, and we confront path dependencies and reliance interests, and wrack up delays in justice and other avoidable harms. Using examples such a nuclear power, robotics, and the internet, this stage describes criteria for regulation and restraint at various points in the development process. In so doing, the book will furnish a nuanced response to the “permissionless innovation” framework that pervades much technology policy thinking in the United States.

Critically, the question of if and when to intervene reveals the fault lines in the methodology of law and technology itself. We might agree that it is appropriate for society to intervene when technology, left undirected, will undermine rather than promote human flourishing. The fourth step discusses factors and criteria that various law and technology camps employ in making this assessment.

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14 Mireille Hildebrandt, Smart Technologies and the End(s) of Law: Novel Entanglements of Law and Technology (2015).

Avoiding Missteps. As an additional input, the book will draw from research at the University of Washington Tech Policy Lab that looks at common pitfalls of tech policy and research, with particular emphasis on the ways technological can negatively impact the vulnerable or marginalized. The book will discuss the work of our Diverse Voices initiative in helping to ensure that non-mainstream voices are reflected in policy analyses and recommendations as well as our Tech Policy Breakdowns project, which furnishes categories of evidence that tech policy has broken down as well as common mechanisms behind breakdown.

The basic methodology I have outlined is novel but also grounded in the tacit assumptions and actual habits of the existing literature. On offer is both an idealized version of well-worn approaches—one that requires adherents to interrogate, and explicitly document, each choice within a complex analysis—as well new tools better suited to blue sky inquiries into the possibilities afforded by revolutionary technology. Woven throughout these stages is a set of shared theoretical commitments regarding the role of law and the nature of technology as special kind of fact about the world.

Part III: Application

No matter how intriguing or sophisticated the thinking on offer proves to be, the skeptical reader may not be satisfied with a theory of law and technology without seeing it applied in practice. Thus, a significant and final portion of the proposed manuscript will be devoted to the analysis of past, present, and future technology. A series of chapters will explore policymaking failures and successes involving select transformative technologies of the nineteenth, twentieth, and twenty-first century through the lens of this newly articulated account.

This part of the book will begin with trains. Much has been written about the ways in which the introduction of trains in Europe and the United States helped remake Western statutory, administrative, and common law. But as with contemporary work in law and technology, no explicit method of analysis has been deployed. The first chapter of the final part will apply the methodology developed in the prior two thirds of the book to one of the singularly transformative technology of modern America. The chapter will contrast certain wise decisions by policymakers in the first several decades of rail transport with more recent policies that have shepherded the train’s decline.

Subsequent chapters will apply the law and technology methodology to nuclear power, genetic engineering, and robotics and artificial intelligence. At least one chapter will be devoted to a technology that has yet to come to fruition. I have tentatively selected weather control, i.e., the capacity of technology to affect local weather patterns, as the subject of prospective analysis. Each application will proceed stage-by-stage in an effort to evidence the value of an explicit and
consistent method. A final chapter will tie the analysis together by showing commonalities across the applications and identifying areas for future study.

**Audience**

My aim for this book is to reach self-identified law and technology scholars as well as aspiring academics and students interested in law and technology as a discipline. Part textbook, part punching-bag, my hope would be to catalyze conversation around the potential for a rigorous and consistent methodology through which to analyze technology’s intersection with law. My strong intuition is that a stage-by-stage description of how to approach the legal ramifications of technology will also appeal to policymakers confronted with increasing external pressure to respond to technological intervention. Thus, an important secondary audience is officials at all levels of government and their staff.

**Related Titles**

Relatively few manuscripts concern themselves with the formal study of law and technology. Books such as Lessig’s *Code and Other Laws of Cyberspace*, Yochai Benkler’s *The Wealth of Networks*, Jonathan Zittrain’s *The Future of the Internet (and How to Stop It)*, and Julie Cohen’s *Configuring the Networked Self* richly explore the legal and normative consequences of particular technologies such as the internet. Works such as Barbara van Schewick’s *Internet Architecture and Innovation* or Brett Frischmann’s *Infrastructure* meticulously study how changes to underlying technical structures affect innovation and other values. Mireille Hildebrandt’s *Smart Technologies and the End(s) of Law* explores how mechanisms of governance shift with technology. But no book since Tribe’s *Channeling Technology Through Law*, which was published 45 years ago and concerned the establishment of a federal body that no longer exists, has attempted to develop a general approach to law and technology. It feels like high time to update Tribe’s important work and to reintroduce the centrality of method in law and technology.

**About the Author**

This project leverages my years of interdisciplinary research into technology law and policy and the hundreds of experiences I have had advising policymakers about technology at all levels.

I have worked on law and technology in some capacity for over a decade. After clerking for a federal appellate judge, I worked in the D.C. office of the law firm Covington & Burling, representing large technology companies. I then served as a fellow and later research director at the Stanford Center for Internet and Society. In 2012, I joined the faculty of the University of Washington where I co-founded an interdisciplinary unit—the Tech Policy Lab—dedicated to helping policymakers, broadly construed, make more wise and inclusive tech policy. The Lab has attracted
in excess of five million dollars in research support as of this writing and includes students and faculty from six disciplines.

Over the past four years I have hosted or advised the Obama White House, the Office of the Secretary of Defense, the Department of Homeland Security, the Directors of the CIA and NSA, U.S. Senators and Members of Congress, the Congressional Research Service, the U.S. Court of Appeals for the Ninth Circuit, the Federal Trade Commission, and many other institutions, politicians, officials, and diplomats. I testified before the U.S. Senate about drones in 2013 and again about augmented reality in 2017. In 2016, I testified before the Bundestag (German Parliament) about robotics and artificial intelligence.

I have closely studied both individual technologies and the process of policymaking itself. I am the author of dozens of law review articles, essays, and white papers about law and technology. For example, I have a comment in the journal *Nature*, an interview in the journal *Science*, and articles in the University of Chicago, Columbia, and California Law Reviews. I have been quoted about technology law hundreds of times in the mainstream media, including by NPR, the *New York Times*, and the *Wall Street Journal*.

I am an affiliate scholar at the Stanford Center for Internet and Society and the Yale Information Society Project. I serve on the advisory boards or program committees of several leading interdisciplinary non-profits, journals, and conferences, including the Electronic Frontier Foundation, the Center for Democracy and Technology, the Journal of Technology Science, We Robot, Privacy Law Scholars Conference, Fairness, Accountability, and Transparency (FAT*), the Electronic Privacy Information Center, the AI Now Institute, and R Street.