

N O R T H W E S T E R N  
JOURNAL OF TECHNOLOGY  
AND  
INTELLECTUAL PROPERTY

**FOREWORD: LAW + COMPUTATION:  
AN ALGORITHM FOR THE RULE OF  
LAW AND JUSTICE?**

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December 2021

VOL. 19, NO. 1

## FOREWORD: LAW + COMPUTATION: AN ALGORITHM FOR THE RULE OF LAW AND JUSTICE?

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Computation is poised to transform legal services, legal systems, and the law itself. Law firms, corporate legal departments, and legal aid organizations increasingly use expert systems, Artificial Intelligence, and other computational tools to provide legal information and legal services to individuals and businesses, often automating or augmenting tasks performed by lawyers.<sup>1</sup> Courts increasingly use platforms to manage and resolve matters.<sup>2</sup> The longstanding use of algorithms in government has been supercharged by increasingly powerful computational tools.<sup>3</sup> As legal-services providers, legal systems, and governments develop computational tools to represent and apply law to factual scenarios, it leads to questions regarding the extent to which law itself can and should exist in computable forms.<sup>4</sup> Additionally, the rise of computation in the legal ecosystem and the emergence of ethical principles and law to govern the use of computational technologies together illustrate the need to reimagine the rule of law for a digital age.

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<sup>1</sup> See John O. McGinnis & Russell G. Pearce, *The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Delivery of Legal Services*, 82 FORDHAM L. REV. 3041 (2014).

<sup>2</sup> Maximilian Bulinski and J.J. Prescott, *Online Case Resolution Systems: Enhancing Access, Fairness, Accuracy, and Efficiency* (Mich. J. of Race & L., Research Paper No. 16-013, 2016), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2777059](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2777059).

<sup>3</sup> David Freeman Engstrom et al., *Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies* (NYU Sch. of L., Research Paper No. 20-54, 2020), <https://ssrn.com/abstract=3551505>.

<sup>4</sup> Daniel W. Linna Jr., *The Future of Law and Computational Technologies: Two Sides of the Same Coin* (December 6, 2019). MIT Computational L. Rep., 2019), <https://ssrn.com/abstract=3554591>; see John O. McGinnis & Steven Wasick, *Law's Algorithm*, 66 FLA. L. REV. 991 (2014); see also *Designing Accountable Software Systems*, NATIONAL SCIENCE FOUNDATION, <https://www.nsf.gov/pubs/2022/nsf22512/nsf22512.htm> [<https://perma.cc/YDG5-HMUU>] (“Whereas organizations and individuals throughout our history have been expected to comply with laws and regulations, now software systems also must be accountable and comply with them. Software systems need to be designed with legal and regulatory compliance in mind, and should be adaptable to changing laws and regulations, which themselves evolve with changing citizen expectations and social norms.”).

Making the most of computation for legal services, legal systems, and law, and understanding the benefits and risks, will require deep collaboration between computer scientists and legal experts. For this collaboration to work, legal experts will need to learn about computation and computer scientists will need to learn about law.<sup>5</sup> Experts in one domain will not need to become an expert in the other domain, but experts from each domain must learn enough to communicate with each other about values, goals, problems, and possible solutions.

With the goal of fostering collaboration between legal experts and computer scientists in mind, on February 5, 2021, the Northwestern Law and Technology Initiative (LTI) and the Northwestern Journal of Technology and Intellectual Property (JTIP) co-organized a virtual academic symposium: *Law + Computation: An Algorithm for the Rule of Law and Justice?*<sup>6</sup> The interdisciplinary symposium brought together researchers working at the intersection of law and computation to explore the effects of computation on law.

The first day of the Symposium featured a keynote address by Michigan Supreme Court Chief Justice Bridget Mary McCormack: *Courts and Computation: Opening Doors to Equality, Access, Transparency, and Efficiency*. Justice McCormack's keynote followed opening remarks from the author; Julio M. Ottino, Dean, Northwestern McCormick School of Engineering; David L. Schwartz, Law Professor and Associate Dean of Research and Intellectual Life, Northwestern Pritzker School of Law; and Jason Hartline, Professor of Computer Science, Northwestern McCormick School of Engineering. The first day of the symposium included three panel discussions. Each panel featured two moderators, one with computer science expertise and one with legal expertise, and four panelists, two from computer science and two from law. Panelists each gave a six-to-eight minute presentation after which the moderators facilitated discussion. Each panel focused on three themes: (1) technological capabilities today and in the future; (2) the impact on the rule of law and justice, including the risks and benefits of technology; and (3) the research and guidance required to chart a path to increased prosperity and justice in society with computation for legal services, legal systems, and the law. Each panelist provided an abstract and cited a representative research paper, which is identified in the footnote for each speaker below.

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<sup>5</sup> See Mireille Hildebrandt, *Understanding Law and the Rule of Law: A Plea to Augment CS Curricula*, 64 COMM. OF THE ACM 28 (2021).

<sup>6</sup> Law + Computation: An Algorithm for the Rule of Law and Justice?, NORTHWESTERN JOURNAL OF TECHNOLOGY AND INTELLECTUAL PROPERTY, <https://jtipsymposiumnorthwestern.com/> [<https://perma.cc/CSE8-QBVH>].

Panel 1 focused on computation and the delivery of legal services:

- *Opportunities and Challenges of Legal Text Analytics* - Kevin Ashley,<sup>7</sup> Law Professor, Computer Science Adjunct Professor, faculty member of Graduate Program in Intelligent Systems, University of Pittsburgh
- *Hybrid Concepts and the Four Stages of Legal Automation* - Aloni Cohen,<sup>8</sup> Postdoctoral Associate, Hariri Institute for Computing, Boston University and Boston University School of Law
- *Evaluation of Legal Technology for eDiscovery: Lessons Learned and Paths Forward* - Maura Grossman,<sup>9</sup> Computer Science Research Professor, University of Waterloo
- *Formalizing the Code* - Sarah Lawsky,<sup>10</sup> Law Professor, Northwestern Pritzker School of Law

The author, Professor Hartline, and Douglas Downey, Professor of Computer Science, Northwestern McCormick School of Engineering, moderated the first panel.

Panel 2 focused on computation and legal systems:

- *Digital Procedure* - David Engstrom,<sup>11</sup> Law Professor, Stanford Law School
- *Predicting What? Accountability for Risk Assessments* - Sorelle Friedler,<sup>12</sup> Professor of Computer Science, Haverford College

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<sup>7</sup> Kevin D. Ashley, *Automatically Extracting Meaning from Legal Texts: Opportunities and Challenges*, 35 GA. ST. U. L. REV. 1117 (2019).

<sup>8</sup> Micah Altman, Aloni Cohen, Kobbi Nissim & Alexandra Wood, *What a Hybrid Legal-Technical Analysis Teaches Us about Privacy Regulation: The Case of Singling out*, 27 B.U. J. SCI. & TECH. L. 1 (2021).

<sup>9</sup> Maura R. Grossman & Gordon V. Cormack, *Technology-Assisted Review in E-Discovery Can Be More Effective and More Efficient Than Exhaustive Manual Review*, 17 RICHMOND J.L. & TECH. 1 (2011).

<sup>10</sup> Sarah B. Lawsky, *Formalizing the Code*, 70 TAX L. REV. 377 (2017).

<sup>11</sup> David Freeman Engstrom, Daniel E. Ho, Catherine Sharkey & Mariano-Florentino Cuéllar, *Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies*, STAN. L. SCH. PUBL'NS (Jan. 31, 2020), <https://law.stanford.edu/publications/government-by-algorithm-artificial-intelligence-in-federal-administrative-agencies/> [<https://perma.cc/HN4D-GSHW>].

<sup>12</sup> Andrew D. Selbst et al., *Fairness and Abstraction in Sociotechnical Systems* (ASS'N FOR COMPUTING MACH. 2019), <https://dl.acm.org/doi/pdf/10.1145/3287560.3287598>.

- *Network-Based Algorithms* - Laura Pedraza-Fariña,<sup>13</sup> Law Professor, Northwestern Pritzker School of Law
- *Algorithms and the Justice System: Risks and Opportunities* - John Villasenor,<sup>14</sup> Electrical & Computer Engineering, Public Policy, Management, and Law Professor, UCLA

Amparo Grau, Law Professor, Northwestern Pritzker School of Law and Kristian Hammond, Professor of Computer Science, Northwestern McCormick School of Engineering, moderated the second panel.

Panel 3 focused on computation and law and regulation:

- *Technology as Law; Law as Technology: The Coming Interdisciplinary Synthesis* - Paul Gowder,<sup>15</sup> Law Professor, Northwestern Pritzker School of Law
- *'Legal by Design' or 'Legal Protection by Design'* - Mireille Hildebrandt,<sup>16</sup> Research Professor on "Interfacing Law and Technology," Vrije Universiteit Brussels (VUB)
- *Why Supercomputing Should be Subsidized, Not Regulated* - John McGinnis,<sup>17</sup> Law Professor, Northwestern Pritzker School of Law
- *The Increasing Marginal Value of Data, and Implications for Marketplaces and Personalization* - Jamie Morgenstern,<sup>18</sup> Professor of Computer Science, U. of Washington

Samir Khuller, Professor and Chair of Computer Science, Northwestern McCormick School of Engineering and Daniel B. Rodriguez, Law Professor and former dean, Northwestern Pritzker School of Law moderated the third panel.

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<sup>13</sup> Laura G. Pedraza-Farina & Ryan Whalen, A Network Theory of Patentability, 87 U. CHI. L. REV. 63 (2020).

<sup>14</sup> John Villasenor & Virginia Foggo, *Artificial Intelligence, Due Process and Criminal Sentencing*, 2020 MICH. ST. L. REV. 295 (2020).

<sup>15</sup> Paul Gowder, *Transformative Legal Technology and the Rule of Law*, 68 U. TORONTO L.J. 82 (2018).

<sup>16</sup> Mireille Hildebrandt, *'Legal by Design' or 'Legal Protection by Design'?*, L. FOR COMPUT. SCIENTISTS (Jun. 2, 2019), <https://lawforcomputerscientists.pubpub.org/pub/gfzd6k0g/release/12> [<https://perma.cc/Y6WC-VWPF>].

<sup>17</sup> McGinnis, *supra* note 4.

<sup>18</sup> ERIK LEARNED-MILLER ET AL., *FACIAL RECOGNITION TECHNOLOGIES IN THE WILD: A CALL FOR A FEDERAL OFFICE* (2020)

The second day of the Symposium consisted of a research workshop. Researchers presented their work, and a respondent provided an initial response and set the stage for questions from the other workshop participants:

- *Sneak Preview: LA, (yet another) domain-specific language for law* - Meng Weng Wong, Principal Investigator, Singapore Management University
  - Respondent: Christos Dimoulas, Professor of Computer Science, Northwestern McCormick School of Engineering
- *Catala domain specific language for law* - Liane Huttner, Law PhD student, University of Paris I: Panthéon-Sorbonne and Denis Merigoux, Computer Science PhD Student, Inria, Paris, France
  - Respondent: Christos Dimoulas, Professor of Computer Science, Northwestern McCormick School of Engineering
- *The Legislative Recipe: Syntax for Machine-Readable Legislation* - Megan Ma, Lecturer in Law and Law PhD Student, Sciences Po, France
  - Respondent: Daniel B. Rodriguez, Law Professor and former dean, Northwestern Pritzker School of Law
- *AI and Patent Offices: Challenges and Opportunities* - Enrico Bonadio, Reader, The City Law School, University of London and Luke McDonagh, Assistant Professor of Law, London School of Economics
  - Respondent: Laura Pedraza-Fariña, Law Professor, Northwestern Pritzker School of Law
- *Fiscal transformations due to AI and robotization: where do recent changes in tax administrations, procedures and legal systems lead us?* - Amparo Grau, Law Professor, Northwestern Pritzker School of Law
  - Respondent: Rita de la Feria, Law Professor, University of Leeds, School of Law
- *Legal Technology, Regulation and Access: Equality and Process Norms* - Paul Gowder, Law Professor, Northwestern Pritzker School of Law and Daniel B. Rodriguez, Law Professor and former dean, Northwestern Pritzker School of Law
  - Respondent: Daniel W. Linna Jr., Senior Lecturer and Director of Law and Technology Initiatives,

Northwestern Pritzker School of Law and McCormick  
School of Engineering

- *Using AI to Summarize Contracts: Terms and Conditions as an Example* – Daniel W. Linna Jr., Senior Lecturer and Director of Law and Technology Initiatives, Northwestern Pritzker School of Law and McCormick School of Engineering, Jiaming Song, Computer Science PhD Student, Stanford, Yi Wu, Professor of Computer Science, Tsinghua University, and Chenchen Zhang, JD Student, Northwestern Pritzker School of Law
  - Respondent: Sergio Servantez, Computer Science PhD Student, Northwestern McCormick School of Engineering

Over 800 people from over 65 countries registered for the first day of the virtual Symposium, and 502 of the registrants attended. Over 150 people registered for the virtual Research Workshop on the second day, and 98 of the registrants attended.

The author worked closely with Professor Hartline, Professor Khuller, and Professor Rodriguez to organize the Symposium. The author would also like to recognize the contributions of faculty assistant Francesca Bullerman, LTI research assistants and Northwestern Pritzker School of Law students Chandler Keller and Alex Crowley, and JTIP members and Northwestern Pritzker School of Law students Ann Herman, Daniel Machado Roca, Glen Learned, Xinsong Li, and Aishwarya Raj.

The Symposium led to the publication of the three articles in this issue of the Journal of Technology and Intellectual Property. Professor Grossman presented at the conference and published *Artificial Intelligence as Evidence* with co-authors Paul W. Grimm, United States District Court Judge, District of Maryland and Gordon V. Cormack, Professor of Computer Science, University of Waterloo. Megan Ma presented her research at the Symposium workshop and published *The Legislative Recipe: Syntax for Machine-Readable Legislation* with co-author Bryan Wilson, Fellow, MIT Connection Science. Northwestern Pritzker School of Law student and JTIP Editor in Chief Benjamin Kovach published *Ostrich with its Head in the Sand: The Law, Inventorship, & Artificial Intelligence*. Professor Grau presented her research at the Symposium workshop and will publish *Fiscal Transformations Due to AI and Robotization: Where Do Recent Changes in Tax Administrations, Procedures and Legal Systems Lead Us?* in a forthcoming addendum issue.

On behalf of the Law and Technology Initiative, the Journal of Technology and Intellectual Property, Pritzker School of Law, McCormick School of Engineering, and Northwestern University, we thank everyone who organized, supported, participated in, and attended the Symposium. We also express our appreciation to the authors who contributed to this issue and to the JTIP editors for providing substantive and stylistic edits and working with the authors to get their articles into their final form.

The Symposium, the discussions it generated, and the articles in this issue illustrate the possibilities for computer scientists and legal experts to work together to reimagine the rule of law in a digital age and conduct the research and development that will enable society to provide access to legal services and justice for everyone.



