

Law and Algorithms – Spring 2021

A joint class between Law and Computing and Data Sciences
CDS 647 / JD 673

Algorithms—those information-processing systems designed by humans, primarily in the domain of computer science and data science—reach ever more deeply into our lives, creating alternate and sometimes enhanced manifestations of social processes. In doing so, algorithms yield powerful levers for good and ill amidst a sea of unforeseen consequences.

This cross-cutting and interdisciplinary course investigates several aspects of algorithms and their impact on society and law. Specifically, the course connects concepts of proof, verifiability, privacy, security, trust, and randomness in computer science with legal concepts of autonomy, consent, governance, and liability, and examines interests at the evolving intersection of technology and the law. Through a series of case studies, we will examine the interplay between law and algorithms, including:

- when algorithms are used as an input or substitute in a law or policy process;
- when algorithms are used to independently influence or evade legal regulation;
- when the law attaches liability for algorithmic actions;
- when the law shelters or immunizes from scrutiny algorithms and their outputs; and
- when the law prohibits or places conditions on the use of algorithms.

Grades will be based on a series of assignments that correspond with each case study, to be completed collaboratively in mixed teams of law and computing/data science students.

Instructor Information:

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Instructors will be working from home when not required to be on campus, as per the University's COVID protocols. Please use email or Microsoft Teams to schedule a time to meet.

Course Websites:

For course readings: <http://aloni.net/LFA>

For class discussions and announcements: see our Microsoft Teams page

Please refer to these resources for the most recent assignments and reading material. We will try to avoid alterations to class material with less than a week's notice. If there ever are last-minute changes, we will let you know.

This course will not be using either Blackboard (for the Law students) or Piazza (for the CDS students).

Course Information

- Meetings: Thursdays, 4:20—6:20pm, Jan. 21 to April 22
- Location: BU Law Tower, Room 211 [*room subject to change*]
And on Zoom
- Credit Hours: For CDS 647: 4 Credits
For JD 673: 3 Credits

The account for the difference in credits, CDS students will each present a basic computing and data science concepts to the general class. Instructions on that assignment will follow.

For the law students, per ABA guidelines you should anticipate a workload of roughly 42.5 hours per credit for the semester, which includes both in-class and out-of-class time. For elaboration, you may consult BU Law's Credit Hour Policy.

Prerequisites

There are no course prerequisites and no formal prior knowledge of law or computer science required to participate in this course.

For law students, we ask that you come to the class with an open mind for computer science and mathematical thinking and vocabulary, and a willingness to explore the way in which algorithms practically operate in computational systems.

For CDS students, we ask that you come to the class with an open mind for understanding legal thinking and language, as well as the social aspects of information systems. While this is primarily a graduate level course, advanced undergraduate students may enroll after receiving permission from the instructors.

Course Materials

There are no required textbooks for this course. Readings will be made available through the course websites. The specific readings will be released over the course of the semester, so please refer to the website for the latest information. And because the material will change, do not read more than a week ahead without checking with us first.

For the caselaw readings we'll have this semester we are using the [OpenCasebook platform](#), which allows you to both read our excerpt of the case and click through to see what we're omitting. Unless otherwise indicated, students will be expected only to read/view the article, case excerpt, or blog post indicated, and not any other content on the site.

There may also be optional readings associated with each class day. Optional readings are, indeed, optional. We've selected them because we think they may be interesting or engaging, but you are not required to read them.

The quality of an interdisciplinary class like this really rises and falls on whether the students have done the reading, and we really appreciate the CDS students in particular changing up their usual method of

class preparation by doing a fairly high degree of advance reading before class. (We appreciate that from the law students too, of course, but it is more generally expected in legal education.) We ask that all students come to class having carefully read what is assigned and prepared to discuss the readings in class.

Technology Needs and Hybrid Classroom Expectations

By now you are all no doubt familiar with the BU “Learn from Anywhere” model and how it will play out in a seminar such as this. We also understand from informal discussions that a majority of students plan to learn from home this semester, and likely more than did in fall semester. To that end, here are some technology tips that we recommend to improve your experience:

- We recommend that you acquire *a pair of headphones* for your laptop to cut down on feedback from speakers allows you to hear other speakers better. Your headphones don’t have to be fancy—in fact, most of the headphones-related issues we’ve seen from students this year have been with AirPods and other wireless headphones.
- Find out where the microphone is on your laptop, and make sure it is free of obstructions. The microphone is usually a small hole, often located near the hinge of the laptop. If an object covers that hole it will be much more difficult for you to be heard. You can acquire an external microphone if you wish, but it’s not necessary. Using a pair of headphones with a built-in microphone works well.
- If you have a regular workspace in your apartment, we recommend that you run *an ethernet cable* to your laptop from your WiFi router. Running a wired connection from your Internet router to your laptop tend to be both faster and more stable.

If you plan to be on Zoom while also attending in person in Room 211 be sure to mute your laptop twice over – mute yourself on Zoom using the microphone icon in the Zoom app, and mute your laptop speakers. If you do not do both of these things, you risk generating feedback in the session.

Zoom sessions will be recorded to help those who might be facing some unique challenges or unforeseen issues with the hybrid learning model, but access to these recordings is *not* a substitute for the attendance requirements (described below).

We also know that the hybrid learning model brings with it some unique distractions and difficulties. We ask that whether participating in person or remotely:

- you to bring your full attention to our seminar sessions, out of respect for each other’s time; and
- you to limit your multitasking during seminar to activities related to class (reading and taking notes, sharing thoughts with the group in the Zoom chat) and to try to stay engaged in the current conversation.

If you are participating via Zoom:

- Zoom backgrounds are OK if you like, but please limit any personalized backgrounds to static (non-moving) displays, be reasonable and non-offensive.
- Do not “pin” other students’ videos on Zoom, take screenshots, or otherwise record the class.

If you plan to attend in person:

- Attend class virtually if you show even light COVID symptoms (weariness, fever, cough or other respiratory issues, nausea, etc.) or if you have any reason to believe that you have been exposed. Please err on the side of virtual attendance; we want to do all we can to protect each other.
- Follow all COVID protocols provided by Boston University and the Commonwealth of Massachusetts. Wear a mask at all times, and practice social distancing as much as is possible.

We will immediately suspend in-person teaching and move the class virtually if we ever feel that the in-class environment puts anyone at risk.

Course Objectives

The goal of this class is to help both law and computer/data sciences students to understand the importance of the other's field to their home discipline, and how law and algorithms work in concert to regulate human behavior. We specifically expect that students will:

- Learn and appreciate the complicated relationship between law and algorithmic systems, and how the two act as interrelated regulators with different systems of adjudication and affordances for human input.
- Understand the fundamental systems of law as they relate to algorithmic regulation including basics of the common law system, administrative law, legislation, and computing-relevant aspects of criminal procedure, intellectual property, anti-discrimination law, information privacy, and election law.
- Understand the fundamental systems of computing and data sciences as they relate to law and policy questions, including computational thinking, probabilities, optimization, cryptography, artificial intelligence and machine learning, secure multi-party computation, differential privacy, and risk-limiting audits.
- Examine how both law and computer/data science reinforce and counter broader powers within social systems, including how both can perpetuate or mitigate bias and discrimination in criminal, civil, and administrative systems.
- Learn how to communicate concepts from their home discipline to those working in either law or computer/data science, and how to collaborate across disciplines to achieve mutual goals and policy outcomes.

Assignments and Grading

Your performance in the above objectives will be evaluated through active participation in weekly classes, as well as in assignments that engage with our four case studies. Your grade is specifically based on the following:

1. Participation (25% of Grade)

You will be expected to have read the assigned readings each week and participate actively in class discussion with substantive contributions. You satisfy this requirement by making *at least one substantive contribution every week*, either in class or before class on the Microsoft Teams page. The in-class

substantive contribution can be spoken or raised in the Zoom chat, but it should be a meaningful and novel contribution to the discussion.

You may also participate asynchronously by making a substantive contribution to the Microsoft Teams channel, either before or after class. This is a good way to contribute if you are forced to miss a class or if you prefer written contributions to oral discussion. If you would like to weigh in ahead of class please be sure to post your comment far enough in advance that other students will have time to react to what you say.

2. Written Projects (75% of Grade, Split Evenly Across Four Assignments)

Over the course of the semester, students will complete four short projects in mixed Law/CDS teams of about four students (with each team including at least one Law and one CDS student). Because one of the goals of this course is to develop your skills at collaborating and communicating across disciplines, you should seek out as many different teammates as possible. You will not be allowed to complete more than one project with the exact same team.

As you will see, these projects will focus on one of the many “tough nuts” that we will explore in this course through our four case studies. The team will be asked to prepare a paper that identifies an issue within the general topic of the case study and suggest a legal, technological, and/or mixed legal/technological response. We will expect the project to engage with the relevant written material for the case study, conduct external research as is appropriate for the assignment, and present a response in a way that thoughtfully engages with existing literature and solutions, including any possible consequences or shortfalls in their response.

Further details on each project will follow. Subject to modification based on the pace of the course, the deadlines for each project will be:

- A. First case study (Criminal Sentencing and Recidivism) – due ***before class on February 25***
- B. Second case study (Housing, Employment, and Anti-Discrimination Law) – due ***before class on March 18***
- C. Third case study (Information Privacy) – due ***before class on April 8***
- D. Fourth case study (Election Security and Trust) – due ***before class on April 22***

Students interested in further developing their projects into a more substantial (and potentially publishable) work are welcome to discuss their goals with one of the instructors. We have had successful public papers more out of prior versions of this class. For law students, though, please note that we do not expect any of these written projects to be enough to satisfy the Law School’s upper-level writing requirement, though we can discuss how you can meet that requirement through an alternative assignment.

There is no exam for this course.

Attendance

The class will meet on Thursday afternoons from 4:20pm to 6:20pm ET in person, in Room 211, as well as remotely, on Zoom.

As noted above, an interdisciplinary class such as this depends upon the thoughtful contributions of all Law and CDS students and faculty. *You are expected to attend and participate in every class.*

That said, we are aware that unavoidable conflicts do come up, especially in these times. If one does arise, please contact one of the instructors in advance of the class so we can discuss it. We do not expect any student to miss more than one day of class absent extraordinary circumstances. We expect all students who miss a class to watch the Zoom recording afterwards.

Accommodations

Boston University is committed to equal access for all students. If you require any ability accommodations in this class, please let the Law Registrar (lawreg@bu.edu) know early in the semester so that appropriate accommodations can be made. You must provide the Law Registrar with a letter of needed accommodations prepared by Disability & Access Services. Contact information for that office is as follows: (617) 353-3658 V/TTY or access@bu.edu. All discussions and written materials will be kept confidential.

An overview of the class-by-class topics follows.

Course Topics

Please note that this is a general overview of the topics we'll have in class this year. The substance is likely to change, so *please refer to the course websites for all topics and readings.*

Introduction

- **Class 1 – Intro to Law, Intro to Algorithms (Jan. 21)**
 - We begin the class with a primer on law and legal thinking, and a primer on computer science and computational theory. For your new domain, this will serve as an exposure to the key concepts and methods within the domain. For your home domain, this will be a chance to think anew about the fundamentals of your discipline.
- **Class 2 – Tensions in Approach, Tensions in Terminology (Jan. 28)**
 - We next examine the interplay between these two fields, and why there can be so much tension at their intersection. We'll explore how the two fields take fundamentally different approaches to—and definitions of—concepts like proof, truth, security, and trust. We'll also explore how the default protections of algorithms (through the legal rights in software) complicate efforts at accountability.

Case Study 1: Criminal Sentencing and Recidivism

- **Class 3 – The COMPAS Algorithm (Feb. 4)**
 - One of the most famous law and algorithm collisions concerned an algorithm called COMPAS, which has been used in multiple states to assist courts in evaluating the likelihood that a criminal defendant will reoffend. A major exposé in *Pro Publica* revealed substantial racial bias issues in the algorithm. We'll review the COMPAS story, how the algorithm worked, and how the Supreme Court of Wisconsin approached challenges to the use of the algorithm.
- **Class 4 – The Optimization Paradox (Feb. 11)**
 - An issue that emerged from the COMPAS saga and subsequent discussion was a computational issue around optimization, and inherent tradeoffs between maximizing an algorithm's predictive value versus error rates. We'll unpack that paradox, discuss why it matters for use of algorithmic inputs in legal decisions, and explore why different uses may necessitate different optimizations.
- **Class 5 – Is There a “Right” Way to Use Algorithms in Criminal Sentencing? (Feb. 18)**
 - The errors of COMPAS were clear, but equally clear is that there will be continued calls to use such algorithms in criminal sentencing and other matters, perhaps with good reason. So, should we? What should that look like? What safeguards, limits, and standards should apply? Or should we abandon them entirely?

Case Study 2: Housing, Employment, and Anti-Discrimination Law

- **Class 6 – Artificial Intelligence and Anti-Discrimination Laws (Feb. 25)**
 - We'll begin exploring the interplay of law with more advanced forms of algorithms, specifically artificial intelligence and machine learning, through the lens of federal anti-discrimination laws. We'll explore in particular the federal Fair Housing Act, and the 2019 attempt by the Department of Housing and Urban Development to shield realtors, banks, brokers, and others in the housing market for discrimination claims based on use of automated decision-making systems.
- **Class 7 – Can Algorithms Mitigate Bias? (March 4)**
 - Humans are biased, and so some have called for greater use of computational systems and objective data to remove the bias of humans in areas like housing and employment. But, of course, humans create those algorithms, and few if any forms of data are free of deep social impacts and meanings. So are we at an impasse, or could one solve bias problems with algorithms?

No class on March 11 – Spring "Pause"

Case Study 3: Information Privacy

- **Class 8 – Security vs. Encryption (March 18)**
 - We return to how law and computer/data science treat different similar concepts differently, with a look in particular about the differences between security of information and encryption, including how encryption can be used not as a tool of privacy, but as a tool of perfect surveillance.
- **Class 9 – Conducting Analysis Over Secret Data (March 25)**
 - Many data privacy statutes—including the sectoral data privacy regimes in the United States, like HIPAA, FERPA, and the Gramm Leach Bliley Act, place heavy restrictions on a data custodian's ability to disclose data to others, and yet the data held by these custodians can be tremendously useful for a variety of social questions. Today we'll explore how you can use one advanced computational technique—secure multi-party computation—to have both privacy and insights into data, and whether this should cause us to rethink how we implement data privacy laws.
- **Class 10 – Gaining Insight from The Census (April 1)**
 - For the 24th time in our country's history, we have just completed a national census, generating many millions of pieces of information about the United States population. Out of a desire to get as truthful a set of information as possible, we place very severe restrictions on the Census Bureau releasing that information. And yet, this information is incredibly valuable (we collect it for a reason!) and so our Census Bureau and similar statistical organizations around the world have turned to a particular computational technique, differential privacy, to share information from that data without fully revealing its contents. We dig into this technique and how law should treat this form of disclosure, which can reveal individual information, but in ways that would lead its recipient to be unsure if the data is true.

Case Study 4: Election Security and Trust

- **Class 11 – Vote by Paper, Vote by Mail, Vote by Smartphone (April 8)**
 - In a democracy, so much of our law and policy comes down to votes—from electing officials, to approving ballot initiatives, to issuing jury verdicts. Today we examine the security, privacy, and accountability properties we expect out of a voting system, and how the map onto our systems of voting, both current and (maybe) future.
- **Class 12 – How Do We Trust the Vote? (April 15)**
 - Maybe you heard this one: there was a national presidential last year, and its loser of which spent months afterward calling into doubt its veracity and outcome. We look at how transparency laws and mathematical concepts like risk limiting audits combine to give all of us confidence on the outcomes of our votes, and how the legal system responds to challenges of election veracity.

Synthesis

- **Class 13 – Law and Algorithms (April 22)**
 - We'll close our class by discussing how we can intelligently address issues at the intersection of law and algorithms, and what lessons we can take from these case studies to other policy debates and problems.