

Course Title: CUSP-GX 6004, Advanced Topics in Urban Informatics - Data Driven Methods for Policy Evaluation

Credits: 3

Instructor: Ravi Shroff

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Office: Kimball Hall (246 Greene St), #202W

Office Hours: By appointment

Location: 45 West 4th Street, Room B02

Meeting: Thursdays, 6:00-8:20pm (1/30 to 5/7)

Description:

The growing use of data-centric technologies is transforming many aspects of public policy in the United States. These technologies affect the scale and nature of data that can be collected, enabling new approaches for evaluating policies both retrospectively and prospectively; for detecting discriminatory practices; and for auditing and designing “fair” algorithmic systems, among other applications. While modern computational and statistical methods offer the promise of increased efficiency, equity, and transparency, their use also raises complex legal, social, and ethical questions. In this course, we will discuss the use of such methods in a variety of applications, focusing on examples from criminal justice, and will examine the relationships between law, public policy, and data. The course will involve lectures, readings and class discussion, paper presentations, and a data-intensive semester-long project.

Prerequisites:

Students should have some prior knowledge of statistics and programming (at the level of CUSP-GX 5002, or either APSTA-GE.2003 or STAT-GB 2301 together with APSTA-GE.2352), and supervised machine learning (at the level of the first four chapters of [An Introduction to Statistical Learning](#)), but no previous domain knowledge will be assumed. Please contact the instructor if you are concerned about whether your background is sufficient to prepare you for this course.

Format: We will meet for between 120 and 140 minutes per week. The format of each meeting will include both lectures and student presentations. Students should expect to actively participate in each class and complete assigned readings on schedule.

Requirements:

Grading will be based on three types of assessment:

- 1) Students will be expected to attend all classes, complete assigned reading on time, and engage in class discussion. Students are expected to arrive on time, and to stay for the entire duration of the class. Students should not use laptops and cell phones during class, except with permission. Participation will be worth **20%** of the final grade.
- 2) Students will select an academic paper that is related to the theme of the course, give an in-class presentation summarizing the paper, and lead a short discussion (30 minutes for

presentation and discussion). Detailed guidelines and a list of potential papers will be provided. This paper presentation will be worth **20%** of the final grade.

3) Students will work in small groups (1-3 people) on a semester-long data-intensive project empirically evaluating a policy or practice. Students will have considerable latitude in the choice and scope of project, and may incorporate dynamic visualization tools, analyses of relevant law, and a variety of technical methods. Detailed guidelines will be provided, but all students must:

- I. Use data (through, e.g., collection, analysis, manipulation, or visualization) in a meaningful way in their evaluation. An extensive list of online datasets (primarily related to criminal justice) will be provided.
- II. Meet with the instructor to discuss the initial project proposal in the third week of class, submit the initial project proposal for instructor approval by the fourth week of class, and finalize the proposal, if necessary, by the fifth week. After the fifth week, teams must send the instructor a short weekly summary of activity on the project, including, if applicable, what each team member's contribution was.
- III. Give a final presentation on the last day of class.
- IV. Write a final report.

The final project will be worth **60%** of the course grade, divided as follows:

10% - timely submission of project proposal and regular weekly updates

20% - final presentation

30% - final report

Students who work in teams must submit a short note explaining each member's contribution to the final project, and may receive individual grades. Project expectations (e.g., final report length) will be scaled according to the number of team members.

Grading Scheme:

Specific grading criteria for each type of assignment above will be provided. The following table will be used to convert numerical grades to letter grades, although final letter grades assigned will depend on the distribution of final numeric grades in the class:

A	92.5 – 100
A-	89.5 – 92.5
B+	86.5 – 89.5
B	82.5 – 86.5
B-	79.5 – 82.5
C+	76.5 – 79.5
C	72.5 – 76.5
C-	69.5 – 72.5
D+	66.5 – 69.5
D	62.5 – 66.5
F	0 – 62.5

Required Readings/Text:

There is no required textbook for this course. Required papers are:

- 1) *A large-scale analysis of racial disparities in police stops across the United States* (Pierson, et al., [forthcoming 2020](#))
- 2) *Using sentence enhancements to distinguish between deterrence and incapacitation* (Kessler, Levitt [JLE 1999](#))
- 3) *Do harsher prison conditions reduce recidivism? A discontinuity-based approach* (Chen, Shapiro [ALER 2007](#))
- 4) *Precinct or prejudice? Understanding racial disparities in New York City's stop-and-frisk policy* (Goel, et al. [AOAS 2016](#))
- 5) *The consequences of disparate policing: evaluating stop and frisk as a modality of urban policing* (Huq, [Minn. Law. Rev 2017](#))
- 6) *General deterrent effects of police patrol in crime "hot spots": A randomized controlled trial* (Sherman, Weisburd, [Justice Quarterly 1995](#))
- 7) *Keeping Score: Predictive Analytics in Policing* (Fitzpatrick, et al. [ARC 2019](#))
- 8) *Randomized Controlled Field Trials of Predictive Policing* (Mohler, et al., [JASA 2015](#))
- 9) *Simple rules for complex decisions* (Jung, et al. [Working paper 2020](#))
- 10) *Judging discriminatory intent* (Huq, [Cornell L. Rev. 2018](#))
- 11) *An analysis of the New York City Police Department's "stop-and-frisk" policy in the context of claims of racial bias* (Gelman, et al. [JASA 2007](#))
- 12) *Omitted and included variable bias in tests for disparate impact* (Jung, et al. [Working paper 2020](#))
- 13) *Outcome tests of racial disparities in police practices* (Ayres, [Justice Res. Policy 2002](#))
- 14) *The problem of infra-marginality in outcome tests for discrimination* (Simoiu, et al, [AOAS 2017](#))
- 15) *Are Emily and Greg more employable than Lakisha and Jamal?* (Bertrand, Mullainathan, [AER 2004](#))
- 16) *Testing for racial profiling in traffic stops from behind a veil of darkness* (Grogger, et al. [JASA 2006](#))
- 17) *A few bad apples? Racial bias in policing* (Goncalves, Mello, [Working paper 2020](#))
- 18) *The accuracy, equity, and jurisprudence of criminal risk assessment* (Goel, et al. [Book chapter 2020](#))
- 19) *The measure and mismeasure of fairness: a critical review of fair machine learning* (Corbett-Davies, Goel, [Working paper 2020](#))
- 20) *Dissecting racial bias in an algorithm used to manage the health of populations* (Obermeyer, et al. [Science 2019](#))
- 21) *Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification* (Buolamwini, Gebru [FAT* 2018](#))

Recommended Reading:

- A) *Natural experiments in the social sciences* (Dunning, 2013)

B) *Data analysis using regression and multilevel/hierarchical models* (Gelman/Hill, 2007)

Course Outline [subject to change]:

Week	Subject	Topics	Reading (papers)
1 (1/30)	Introduction	Three examples; course logistics	
2 (2/6)	Evidence-based policy	Basic causal inference; sentence enhancements; recidivism	1, 2, 3
3 (2/13)	Stop-and-frisk: evaluating constitutionality	Fourth amendment; <i>Terry v. Ohio</i> ; <i>Alabama v. White</i> ; <i>Florida v. J.L.</i> ; <i>United States v. Sokolow</i> ; stop-and-frisk in NYC	4, 5
4 (2/20)	Predictive policing	Place-based and person-based predictive policing	6, 7, 8
5 (2/27)	Pretrial detention; risk assessment; policy construction	Introduction; concerns and benefits; legality; policy construction and simple rules	18, 9
6 (3/5)	Offline policy evaluation	Response surface modeling; sensitivity analysis approaches	9
7 (3/12)	Discrimination I: Introduction	Fourteenth amendment; historical context; strict/intermediate scrutiny; discriminatory intent and impact	10
(3/19)	SPRING BREAK		
8 (3/26)	Discrimination II: Regression-based approaches	Benchmark tests and “risk-adjusted” regression	11, 12
9 (4/2)	NO LECTURE	Progress meeting for final project	
10 (4/9)	Discrimination III: Outcome and threshold tests	Outcome tests and threshold tests	13, 14
11 (4/16)	Discrimination IV: Other approaches	Audit tests; veil-of-darkness tests; bunching estimation	15, 16, 17
12 (4/23)	Algorithmic fairness I	Notions of fairness; biased labels and predictors	19
13 (4/30)	Algorithmic fairness II	Examples from gender classification, healthcare, and others	20, 21
14 (5/7)	Final project presentations		

Academic Integrity:

All students are responsible for understanding and complying with the New York University's policies on academic integrity. A copy of this policy for the Steinhardt school is available at: http://steinhardt.nyu.edu/policies/academic_integrity.

Students with Disabilities:

Students with physical or learning disabilities are required to register with the Moses Center for Students with Disabilities, 726 Broadway, 2nd Floor, (212-998-4980 and online at <http://www.nyu.edu/csd>) and are required to present a letter from the Center to the instructor at the start of the semester in order to be considered for appropriate accommodation.