

# Berk Ustun

CURRICULUM VITAE — NOVEMBER 2019

(510) 367-5162  
www.berkustun.com  
berk@seas.harvard.edu

ACADEMIC POSITIONS	<b>Harvard University</b> Postdoctoral Fellow Center for Research on Computation and Society Mentors: David C. Parkes, Flavio du Pin Calmon, Elena Glassman, Cynthia Rudin, Margo Seltzer	2017–PRESENT
RESEARCH INTERESTS	<b>Areas:</b> Machine Learning, Optimization, Human-Centered Design <b>Topics:</b> Interpretability, Algorithmic Fairness, Reliability, Accountability <b>Applications:</b> Medicine, Consumer Finance, Criminal Justice, Revenue Management	
EDUCATION	<b>Massachusetts Institute of Technology</b> PhD in Electrical Engineering and Computer Science Thesis: <a href="#">Simple Linear Classifiers via Discrete Optimization</a> Committee: Cynthia Rudin, Leslie Kaelbling, Stefanie Jegelka	2012–2017
	<b>Massachusetts Institute of Technology</b> SM in Computation for Design and Optimization Thesis: <a href="#">MCMC for Importance Sampling in Stochastic Programming</a> Advisor: Mort Webster	2010–2012
	<b>University of California, Berkeley</b> BS in Industrial Engineering and Operations Research BA in Economics	2005–2009
AWARDS & HONORS	INFORMS Innovative Applications in Analytics Award Invenia Labs Social Environmental & Economic Challenges Award, Finalist UAI Outstanding Reviewer Award INFORMS Computing Society Best Student Paper Prize INFORMS Wagner Award for Excellence in Operations Research Practice, Finalist INFORMS Innovative Applications in Analytics Award MIT Presidential Fellowship Alpha Pi Mu (IEOR Honors Society)	2019 2018 2018 2017 2017 2016 2012 2006–2009
PUBLICATIONS	<b>MACHINE LEARNING METHODS</b> 1. <a href="#">Learning Optimized Risk Scores</a> Berk Ustun, Cynthia Rudin JMLR – <i>Journal of Machine Learning Research</i> , 2019 2. <a href="#">Fairness without Harm: Decoupled Classifiers with Preference Guarantees</a> Berk Ustun, Yang Liu, David C. Parkes ICML – <i>International Conference on Machine Learning</i> , 2019 3. <a href="#">Repairing without Retraining: Avoiding Disparate Impact with Counterfactual Distributions</a> Hao Wang, Berk Ustun, Flavio du Pin Calmon ICML – <i>International Conference on Machine Learning</i> , 2019 4. <a href="#">Actionable Recourse in Linear Classification</a> Berk Ustun, Alexander Spangher, Yang Liu FAT* – <i>ACM Conference on Fairness, Accountability, and Transparency</i> , 2019	

5. [On the Direction of Discrimination: an Information-Theoretic Analysis of Disparate Impact](#)  
Hao Wang, Berk Ustun, Flavio du Pin Calmon  
*ISIT – IEEE International Symposium on Information Theory*, 2018
  6. [Optimized Risk Scores](#)  
Berk Ustun, Cynthia Rudin  
*KDD – ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 2017
  7. [Supersparse Linear Integer Models for Optimized Medical Scoring Systems](#)  
Berk Ustun, Cynthia Rudin  
*MLJ – Machine Learning*, 2015
  8. [Importance Sampling in Stochastic Programming: A Markov Chain Monte Carlo Approach](#)  
Panos Parpas, Berk Ustun, Mort Webster, Quan Kha Tran  
*INFORMS Journal of Computing*, 2015
- MACHINE LEARNING APPLICATIONS
9. [Developing an Optimal Short-Form of the PTSD Checklist for DSM-5](#)  
Kelly Zuromski, Berk Ustun, Irving Hwang, Terry Keane, Brian Marx, Murray Stein, Robert Ursano, Ronald C. Kessler  
*Depression and Anxiety*, 2019
  10. [Optimized Scoring Systems: Towards Trust in ML for Healthcare and Criminal Justice](#)  
Cynthia Rudin, Berk Ustun  
*Interfaces*, 2018
  11. [The World Health Organization Adult ADHD Self-Report Screening Scale for DSM-5](#)  
Berk Ustun, Lenard Adler, Cynthia Rudin, Stephen Faraone, Thomas Spencer, Patricia Berglund, Michael Gruber, Ronald C. Kessler  
*JAMA Psychiatry*, 2017
  12. [Association of an EEG-Based Risk Score With Seizure Probability in Hospitalized Patients](#)  
Aaron Struck, Berk Ustun, Andres Rodriguez Ruiz, Jong Woo Lee, Suzette LaRoche, Lawrence J. Hirsch, Emily J. Gilmore, Jan Vlachy, Hiba Arif Haider, Cynthia Rudin, Brandon Westover  
*JAMA Neurology*, 2017
  13. [Interpretable Classification Models for Recidivism Prediction](#)  
Jiaming Zeng, Berk Ustun, Cynthia Rudin  
*Journal of the Royal Statistical Society: Series A*, 2016
  14. [Clinical Prediction Models for Sleep Apnea: Superiority of Medical History over Symptoms](#)  
Berk Ustun, Brandon Westover, Cynthia Rudin, Matt Bianchi  
*Journal of Clinical Sleep Medicine*, 2016
- REFEREED WORKSHOP PAPERS
15. [On the Multiplicity of Predictions in Classification](#)  
Charles Marx, Flavio du Pin Calmon, Berk Ustun  
*NeurIPS Workshop on Human Centered Machine Learning*, Forthcoming
  16. [Actionable Recourse in Linear Classification](#)  
Berk Ustun, Alexander Spangher, Yang Liu  
*NeurIPS Workshop on Ethical, Social and Governance Issues in AI*, 2018
  17. [Auditing Discrimination with Counterfactual Distributions](#)  
Hao Wang, Berk Ustun, Flavio du Pin Calmon  
*NeurIPS Workshop on Ethical, Social and Governance Issues in AI*, 2018
  18. [Supersparse Linear Integer Models for Predictive Scoring Systems](#)  
Berk Ustun, Stefano Tracà, Cynthia Rudin  
*AAAI Late Breaking Track*, 2013

PREPRINTS	19. <a href="#">Predictive Multiplicity in Classification</a> Charles Marx, Flavio du Pin Calmon, Berk Ustun <i>In Submission, 2019</i>	
IN PROGRESS	Learning Certifiably Optimal Linear Models for Categorical Data with Cynthia Rudin, Tynan Seltzer, and Margo Seltzer  Calibrating Trust in Model Selection with Elena Glassman  Feedback Loops in Credit Scoring with Eric Mibuari and David Parkes  Decoupling with Distributional Guarantees with Lily Hu and Flavio du Pin Calmon  Fair Classification with Noisy Labels with Yang Liu  Actionable Recourse in Classification with Theja Thulabundula	
INVITED TALKS	INFORMS Annual Meeting Data & Society Meeting on Fair ML in Health Analysis Consulting Group – Data Science Seminar Series 10th Workshop on Decisions, Games, and Logic MIT Lincoln Labs AI Seminar Series CCC Workshop on Economics and Fairness Harvard Economics & Computation Seminar Series ACM Conference on Fairness, Accountability, and Transparency Harvard Data Science Conference Cornell University ORIE Department Harvard CRCS Colloquium INFORMS Annual Meeting Data & Society Research Institute INFORMS Annual Meeting UPENN Criminology Colloquium American Society of Criminology Annual Meeting ASA Conference on Statistical Learning and Data Mining MIT Big Data Initiative INFORMS Annual Meeting AAAI Conference on Artificial Intelligence 8th Conference on Computational Management Science	2019 2019 2019 2019 2019 2019 2019 2019 2018 2018 2018 2017 2017 2016 2016 2015 2014 2014 2014 2013 2010
INVITED PANELS & WORKSHOPS	Cornell Young Researchers in Data-Driven Decision-Making NSF Workshop on Trustworthy Decision-Making Broadening Participation in Data Mining Workshop. Panel on Ethics and Fairness in ML SAMSI Workshop on the Interface of Statistics and Optimization NSF Data Science Workshop	2018 2017 2017 2017 2015
TEACHING EXPERIENCE	<b>MIT Teaching and Learning Laboratory</b> <a href="#">Kaufman Teaching Certification Program</a> Completed a semester-long course on modern pedagogical techniques in syllabus design, lecturing, and assessment. Course provided training and feedback on topics like active learning and instructional scaffolding.	SPRING 2014

## MIT Engineering Systems Division

[ESD 862: Modeling Risk Dynamics and Decisions](#)

Guest Lecturer & Teaching Assistant

Designed and delivered lectures on how to model and solve sequential decision-making problems via stochastic programming. Led weekly recitations and office hours. Developed and graded assignments for 20+ MS and PhD students at MIT and Harvard.

FALL 2011

RATING: 6.4/7.0

## UC Berkeley Student Learning Center

Mathematics and Statistics Tutor

Tutored undergraduates in calculus, linear algebra and statistics. Participated in a 6-month training program to develop tutoring skills and learn how to approach difficult problems in different ways.

2007–2009

## ADVISING & MENTORING

Madeleine Barowsky, PhD Student, Harvard SEAS

2019–PRESENT

Eric Mibuari, PhD Student, Harvard SEAS

2018–PRESENT

Hao Wang, PhD Student, Harvard SEAS

2017–PRESENT

Tynan Seltzer, Undergraduate Researcher, Harvard SEAS

2018–PRESENT

Charles Marx, Undergraduate Researcher, Haverford College

SUMMER 2019

Alexander Spangher, MS Student, Columbia University

2017–2019

Jiaming Zeng, Undergraduate Researcher, MIT

2014–2016

## SOFTWARE

[actionable-recourse](#) – check recourse in linear classification models



[risk-slim](#) – build customized risk scores

[slim-python](#) – build customized decision aids

[ctfdist](#) – repair classifiers with performance disparities

[dcpmtree](#) – fit decoupled classifiers for intersectional subgroups

[group-em](#) – interactive tool to build student groups for class projects

## ACADEMIC SERVICE

### GRANT REVIEWING

National Science Foundation Panelist

2019

### CONFERENCE & WORKSHOP ORGANIZATION

FAT\* – Co-Chair for the Computer Science Track

2020

FAT/ML – Workshop Organizer and Webmaster

2017, 2018

MIT Machine Learning Tea Seminar Series – Organizer

2016–2017

INFORMS Annual Meeting – Session Organizer

2013–2019

### JOURNAL REVIEWING

Management Science, IEEE Transactions on Signal Processing, Statistical Analysis & Data Mining, Artificial Intelligence, Information Sciences, Minds & Machines, Big Data, Epidemiology, Nature Digital Medicine, Artificial Intelligence & Law, Journal of Quantitative Criminology, IBM Journal of Research & Development.

### CONFERENCE PROGRAM COMMITTEE

NeurIPS – Neural Information Processing Systems

2018, 2019

ICML – International Conference on Machine Learning

2019, 2020

FAT\* – ACM Conference on Fairness, Accountability and Transparency

2018, 2019

AISTATS – Artificial Intelligence and Statistics

2019

AAAI – Association for the Advancement of Artificial Intelligence

2019

HCOMP – AAAI Conference on Human Computation and Crowdsourcing

2019

UAI – Conference on Uncertainty in Artificial Intelligence

2018

ISIT – IEEE International Symposium on Information Theory

2018

ICS – INFORMS Computing Society

2013

#### WORKSHOP PROGRAM COMMITTEE

NeurIPS Workshop on Fair ML for Healthcare	2019
NeurIPS Workshop on Human Centered Machine Learning	2019
CRAFT – Critiquing and Rethinking Accountability, Fairness, and Transparency	2019
SafeML – ICML Workshop on Safe Machine Learning	2019
DebugML – ICLR Workshop on Debugging Machine Learning Models	2019
AIMLAI – Advances in Interpretable ML and AI	2019
FAT/ML – Fairness, Accountability, and Transparency in ML	2017, 2018
NeurIPS Machine Learning for Healthcare Workshop	2017, 2018
ICML Workshop for Human Interpretability in ML	2017

#### SELECTED PROFESSIONAL EXPERIENCE

**Massachusetts General Hospital.** Boston, MA 2014 – PRESENT  
*Departments of Neurology, MGH Lab of Computer Science, MGH Sleep Laboratory*  
Built customized machine learning models to (i) predict seizure risk for patients in the ICU, (ii) predict the risk of hospital readmissions, and (iii) screen obstructive sleep apnea using electronic medical records.

**Amazon.** Seattle, WA SUMMER 2013  
*Research Scientist Intern, IPC Buying Strategy Team*  
Developed algorithms to identify complementary products sold on Amazon.com. Proposed new inventory and transportation policies for complementary products that achieved major cost savings.

**Pacific Gas and Electric.** San Francisco, CA FALL 2009  
*Student Analyst, Supply Chain Division*  
Designed a stocking and ordering policy for replacement parts projected to save \$30M+ in inventory costs. Created an inventory management tool to help planners implement the policy across California.

**Highbridge Capital Managment.** New York, NY SUMMER 2008  
*Summer Analyst, Corporate Strategy*  
Researched trading initiatives to diversify a \$30B hedge fund and PE firm. Interviewed 20+ executives on team strategy. Compiled and reporting findings to the JP Morgan Board of Directors.

#### SELECTED PRESS & EDITORIALS

[What does a fair algorithm actually look like?](#)

*Wired*, October 2018.

[Just Data. How algorithms go bad – and how they can be saved.](#)

*Colloquy*, August 2018.

[Do You Zone Out? Procrastinate? Might Be Adult ADHD](#)

*National Public Radio*, April 2017.

[Good News for Screening for Adult ADHD](#)

*Invited Commentary in JAMA Psychiatry*, April 2017.

[A Novel Clinical Score to Assess Seizure Risk](#)

*Invited Commentary in JAMA Neurology*, October 2017.

[Big-Data or Slim-Data: Predictive Analytics Will Rule with World](#)

*Editorial in Journal of Clinical Sleep Medicine*, February 2016.

#### PERSONAL

**Citizenship:** Switzerland and Turkey

**Languages:** Fluent in English, French and Turkish

**Software:** Proficient in Python, R, CPLEX. Familiar with Java, SQL, Javascript, HTML.

**Interests:** Basketball, Hiking, Cooking, Photography, Settlers of Catan, Hard Science Fiction