




Berk Ustun

CURRICULUM VITAE – OCTOBER 2018

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ACADEMIC POSITIONS	Harvard University Postdoctoral Research Fellow Center for Research in Computation and Society Mentors: David Parkes, Flavio du Pin Calmon, Margo Seltzer	2017 – PRESENT
RESEARCH INTERESTS	Topics: Fairness and Interpretability in Machine Learning and Causal Inference Methods: Discrete Optimization, Stochastic Optimization, Monte Carlo Methods Applications: Medicine, Credit Scoring, Criminal Justice, Revenue Management	
EDUCATION	Massachusetts Institute of Technology Ph.D. Electrical Engineering and Computer Science Thesis: Simple Linear Classifiers via Discrete Optimization Advisor: Cynthia Rudin Thesis Committee: Leslie Kaelbling, Stefanie Jegelka	2012 – 2017
	Massachusetts Institute of Technology S.M. Computation for Design and Optimization Thesis: MCMC for Importance Sampling in Stochastic Programming Advisor: Mort Webster	2010 – 2012
	University of California, Berkeley B.S. Industrial Engineering and Operations Research B.A. Economics	2005 – 2009
AWARDS & HONORS	Harvard Berkman Klein Center Affiliate INFORMS Computing Society Best Student Paper Award INFORMS Innovative Applications in Analytics Award INFORMS Wagner Award for Excellence in O.R. Practice, Finalist Invenia Labs Social Environmental & Economic Challenges Award, Finalist MIT Presidential Fellowship MIT Kaufman Teaching Certificate MIT Externship Award Alpha Pi Mu IEOR Honors Society	2017 – 2018 2017 2016 2017 2018 2012 – 2013 2014 2012 2006 – 2009
PUBLICATIONS	Machine Learning Methods Actionable Recourse in Linear Classification Berk Ustun, Alexander Spangher, and Yang Liu. <i>Forthcoming in ACM Conference on Fairness, Accountability, and Transparency (FAT*)</i> , 2019. On the Direction of Discrimination: an Information-Theoretic Analysis of Disparate Impact in ML Hao Wang, Berk Ustun and Flavio du Pin Calmon. <i>IEEE International Symposium on Information Theory (ISIT)</i> , 2018. Optimized Risk Scores Berk Ustun and Cynthia Rudin. <i>Proceedings of Knowledge Discovery and Data Mining (KDD)</i> , 2017. Supersparse Linear Integer Models for Optimized Medical Scoring Systems Berk Ustun and Cynthia Rudin. <i>Machine Learning</i> , 2015.	

Supersparse Linear Integer Models for Predictive Scoring Systems

Berk Ustun, Stefano Tracà and Cynthia Rudin.

Proceedings of AAAI Late Breaking Track, 2013.

Machine Learning Applications

Optimized Scoring Systems: Towards Trust in ML for Healthcare and Criminal Justice

Berk Ustun and Cynthia Rudin.

Interfaces, 2018.

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, and Ronald Kessler.

JAMA Psychiatry, 2017.

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, and Brandon Westover.

JAMA Neurology, 2017.

Interpretable Classification Models for Recidivism Prediction

Jiaming Zeng, Berk Ustun and Cynthia Rudin.

Journal of the Royal Statistical Society: Series A, 2016.

Clinical Prediction Models for Sleep Apnea: Superiority of Medical History over Symptoms

Berk Ustun, Brandon Westover, Cynthia Rudin, and Matt Bianchi.

Journal of Clinical Sleep Medicine, 2016.

Stochastic Optimization

Importance Sampling in Stochastic Programming: A Markov Chain Monte Carlo Approach

Panos Parpas, Berk Ustun, Mort Webster and Quan Kha Tran.

INFORMS Journal of Computing, 2015.

PREPRINTS

Learning Optimized Risk Scores

Berk Ustun and Cynthia Rudin.

In Submission, 2018.

Auditing Discrimination with Counterfactual Distributions

Hao Wang and Flavio du Pin Calmon.

In Submission, 2018.

IN PROGRESS

Fairness in Experimental Design

with Yang Liu, Debmalya Mandal and David Parkes.

Decoupling with Fairness Guarantees

with Yang Liu and David Parkes.

Decoupling with Distributional Guarantees

with Lily Hu, Flavio du Pin Calmon.

Long-Term Fairness in Credit Scoring

with Eric Mibuari and David Parkes.

Learning Certifiably Optimal Linear Models for Categorical Data

with Cynthia Rudin and Margo Seltzer.

PTSD Screening at the US Veterans' Administration

with Ronald Kessler, Terry Keane and Frank Weathers.

Automated Seizure Prediction in ICU with an Interpretable Front-End

with Brandon Westover, and Haoqi Sun.

INVITED TALKS	Harvard Data Science Conference, Boston, USA	2018
	Cornell University ORIE Department, Ithaca, USA	2018
	Harvard CRCS Colloquium, Cambridge, USA	2018
	INFORMS Annual Meeting, Houston, USA	2017
	Data & Society Research Institute, New York, USA	2017
	INFORMS Annual Meeting, Nashville, USA	2016
	UPENN Criminology Colloquium, Philadelphia, USA	2016
	American Society of Criminology Annual Meeting, Washington D.C., USA	2015
	ASA Conference on Statistical Learning and Data Mining, Durham, USA	2014
	MIT Big Data Initiative, Cambridge, USA	2014
	INFORMS Annual Meeting, San Francisco, USA	2014
	AAAI Conference on Artificial Intelligence, Bellevue, USA	2013
8th Conference on Computational Management Science, Neuchatel, Switzerland	2010	
INVITED PANELS & WORKSHOPS	Cornell Young Researchers in Data-Driven Decision-Making, Ithaca, USA	2018
	NSF Workshop on Trustworthy Decision-Making, Washington DC, USA	2017
	BPDM Panel on Ethics and Fairness in ML, Halifax, Canada	2017
	SAMSI Workshop on the Interface of Statistics and Optimization, Durham, USA	2017
	NSF Data Science Workshop, Seattle, USA	2015
TEACHING EXPERIENCE	MIT Engineering Systems Division	FALL 2011
	<i>ESD 862: Modeling Risk Dynamics and Decisions</i> [®] <i>Guest Lecturer & Teaching Assistant</i> Presented lectures on how to model and solve sequential decision-making problems using stochastic programming. Led recitation sessions, held office hours, designed and graded homework assignments for over 20 Masters and PhD students at Harvard and MIT.	RATING: 6.4/7.0
	UC Berkeley Student Learning Center	2007 – 2009
	<i>Mathematics and Statistics Tutor</i> Tutored undergraduates in calculus, linear algebra and statistics. Participated in a 6-month program to develop tutoring skills and learn how to frame challenging problems in different ways.	
SOFTWARE  github	actionable-recourse	
	Tools to audit linear classifiers for actionable recourse.	
	risk-slim / slim-python / slim-matlab	
	Tools to create simple data-driven scoring systems for decision-making and risk assessment.	
	group-em	
	Interactive online tool for teachers to easily create student groups.	
ACADEMIC SERVICE	Organization	
	FAT/ML - Fairness, Accountability and Transparency in Machine Learning MIT Machine Learning Tea Talks	2017 – 2018 2016 – 2017

Program Committee

AISTATS - Artificial Intelligence and Statistics	2019
AAAI - Association for the Advancement of Artificial Intelligence	2019
NIPS - Neural Information Processing Systems	2018
UAI - Conference on Uncertainty in Artificial Intelligence	2018
FAT* - Conference on Fairness, Accountability and Transparency	2018, 2019
FAT/ML - Fairness, Accountability, and Transparency in ML	2017, 2018
NIPS Machine Learning for Healthcare Workshop	2017
ICML Workshop for Human Interpretability in ML	2017

Journal Reviewing

Machine Learning Journal
IEEE Transactions on Signal Processing
Statistical Analysis and Data Mining
Big Data
Artificial Intelligence
Information Sciences
Epidemiology
Nature Digital Medicine
IBM Journal of Research and Development
Artificial Intelligence and Law
Journal of Quantitative Criminology

Session Organizer

INFORMS Session on Interpretable Machine Learning	2017
INFORMS Session on Discrete Optimization and Machine Learning	2016
INFORMS Session on Interpretable Machine Learning	2013

SELECTED PROFESSIONAL EXPERIENCE	Amazon. Seattle, WA	SUMMER 2013
	<i>Research Scientist Intern, IPC Buying Strategy Team</i> Developed scalable algorithms to identify sets of complimentary products. Proposed new inventory and transportation policies for complimentary products to achieve major savings without changing Amazon's current inventory management platform.	
	Highbridge Capital Management. New York, NY	SUMMER 2008
	<i>Summer Analyst, Corporate Strategy</i> Researched new trading initiatives to diversify a \$30B hedge fund and private equity firm. Interviewed over 20 executives to identify the strengths and weaknesses of each department. Wrote a 160-page report on short-term firm strategy for the JP Morgan Board of Directors.	
	E.I.M. Lyon, Switzerland	SUMMER 2007
	<i>Summer Analyst, Portfolio Management</i> Investigated data-driven approaches to classify and characterize hedge funds. Created databases to track daily risk statistics for over 500 hedge funds. Audited closed client accounts to identify areas of sub-par performance relative to major global hedge fund indices	
SELECTED CONSULTING EXPERIENCE	Massachusetts General Hospital. Boston, MA	2014 – PRESENT
	<i>Department of Neurology / Sleep Laboratory / Lab of Computer Science</i> Building simple tools for data-driven decision-making. Ongoing projects include: (i) predicting seizure risk for patients in intensive care; (ii) screening for sleep apnea using electronic medical records; (iii) predicting 30-day readmission risk.	
	Pacific Gas and Electric. San Francisco, CA	FALL 2009
	<i>Student Analyst, Supply Chain Division</i> Designed a stocking and ordering policy for electric grid replacement parts that saved over \$30M	

in inventory costs at PG&E's Fremont warehouse. Created an inventory management tool to help planners implement the stocking and ordering policy across warehouses in CA.

Other consulting work includes projects with: NY Metropolitan Transit Authority (2013), Kiva Microfinance (2009), Beats Headphones (2008), SF Chronicle (2008), and Monster Cable (2007).

SELECTED
PRESS &
EDITORIALS

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

WIRED, October, 10, 2018.

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


Colloquy, August 13, 2018.

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

National Public Radio, April 5, 2017.

[Good News for Screening for Adult Attention-Deficit/Hyperactivity Disorder](#) 

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, 2016.

SOFTWARE
SKILLS

Advanced: Python, R, MATLAB, CPLEX

Intermediate: Java, Javascript, SQL

Beginner: HTML, CSS, C, Bash

PERSONAL

Languages: Fluent in English, French, Turkish

Interests: L.A. Lakers, Basketball, Photography, Cooking, Travel

REFERENCES

Available upon request.