

Berk Ustun

CURRICULUM VITAE – JULY 2018

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ACADEMIC POSITIONS	Harvard University Postdoctoral Fellow Center for Research in Computation and Society Mentors: David Parkes, Flavio 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: Healthcare, Criminal Justice, Credit Scoring, 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 Travel Awards for KDD, SAMSI, NSF Workshops	2017 – 2018 2017 2016 2017 2018 2012 – 2013 2014 2012 2006 – 2009 2015 – 2017
PUBLICATIONS	Machine Learning Methods Actionable Recourse in Linear Classification Alexander Spangher and Berk Ustun. <i>Workshop on Fairness, Accountability and Transparency in Machine Learning (FAT/ML)</i> , 2018. 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.

Machine Learning, 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

[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 on Large Scale Datasets](#)

Berk Ustun and Cynthia Rudin.

In Submission, 2018.

[Optimized Scoring Systems: Towards Trust in ML for Healthcare and Criminal Justice](#)

Berk Ustun and Cynthia Rudin.

In Submission, 2017.

IN PROGRESS

Auditing Discrimination with Influence Functions

with Hao Wang and Flavio du Pin Calmon.

Learning Certifiably Optimal Linear Models for Categorical Data

with Cynthia Rudin and Margo Seltzer.

Envy-freeness in Classification

with Yang Liu and David Parkes.

Fairness in Experimental Design

with Yang Liu, Debmalya Mandal and David Parkes.

Decoupling with Distributional Guarantees


with Lily Hu, Flavio du Pin Calmon.

Learning by Agreeing to Disagree

with Rachel Cao.

PTSD Screening in Military Service Members

with Ronald Kessler, Terry Keane and Frank Weathers.

INVITED TALKS	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 WORKSHOPS & PANELS	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, statistics and probability. Participated in a 6-month training program to develop tutoring skills and learn how to approach challenging problems in multiple ways.	
SOFTWARE	actionable-recourse	
	 github Recourse-related auditing tools for linear classifiers.	
	risk-slim / slim-python / slim-matlab	
	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	Organizer	
	FAT/ML - Fairness, Accountability and Transparency in Machine Learning	2017 – 2018
	MIT Machine Learning Tea Talks	2016 – 2017
	Program Committee	
	FAT* - Conference on Fairness, Accountability and Transparency	2017
	FAT/ML - Fairness, Accountability, and Transparency in ML	2017
	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
Journal of Quantitative Criminology
Artificial Intelligence and Law
Epidemiology

Conference Reviewing

NIPS - Neural Information Processing Systems 2018
UAI - Conference on Uncertainty in Artificial Intelligence 2018
ISIT - IEEE International Symposium on Signal Theory 2018
INFORMS Computing Society 2013

Session Organizer

INFORMS Session on Machine Learning in Society 2018
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
Research Scientist Intern, IPC Buying Strategy Team

Highbridge Capital Management. New York, NY SUMMER 2008
Summer Analyst, Corporate Strategy

E.I.M. Lyon, Switzerland SUMMER 2007
Summer Analyst, Portfolio Management

SELECTED CONSULTING EXPERIENCE

Massachusetts General Hospital. Boston, MA 2014 – PRESENT
Department of Neurology / Sleep Laboratory / Lab of Computer Science
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
Student Analyst, Supply Chain Division
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 the NY Metropolitan Transit Authority (2013), Kiva Microfinance (2009), Beats Headphones (2008), SF Chronicle (2008), and Monster Cable (2007).

SELECTED PRESS & EDITORIALS

[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.