

Barnabás Póczos

Barnabás Póczos, Ph.D.

Associate Professor
Machine Learning Department
Carnegie Mellon University

CONTACT INFORMATION

Carnegie Mellon University
School of Computer Science
Machine Learning Department
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5000 Forbes Ave
Pittsburgh, PA, USA, 15213

phone: +1-412-251-9209
e-mail: bapoczos@cs.cmu.edu
web: <http://www.cs.cmu.edu/~bapoczos/>

RESEARCH INTERESTS

Theory:

machine learning, artificial intelligence, nonparametric statistics, information theory, data mining, signal processing, Bayesian methods, scalability, complex datasets, nonconvex optimization

Applications:

astrophysics, cosmology, high-energy physics, chemistry, material science, bioinformatics, neurobiological modeling, additive manufacturing, finance, image processing, computer vision, natural language processing, robotics, and art

EMPLOYMENT

Associate Professor	2018 –
Machine Learning Department School of Computer Science Carnegie Mellon University Pittsburgh, PA, USA	
Senior Vice President	2020 – 2021
Head of Statistical Machine Learning D. E. Shaw & Co New York, NY, USA	
Assistant Professor	2012 – 2018
Machine Learning Department School of Computer Science Carnegie Mellon University Pittsburgh, PA, USA	
Postdoctoral Fellow	2010 – 2012
Auton Lab, Robotics Institute School of Computer Science Carnegie Mellon University Pittsburgh, PA, USA Supervisor: Prof. Jeff Schneider	

Postdoctoral Fellow	2007 – 2010
Alberta Ingenuity Center for Machine Learning (AICML) Reinforcement Learning and Artificial Intelligence research group (RLAI) Department of Computing Science University of Alberta Edmonton, AB, Canada Supervisor: Prof. Csaba Szepesvári	
Assistant Professor	2005 – 2007
Department of Information Systems Eötvös Loránd University, Budapest, Hungary	
Lecturer	2004 – 2005
Department of Information Systems Eötvös Loránd University Budapest, Hungary	

EDUCATION

Eötvös Loránd University, Budapest, Hungary	
Ph.D., Computer Science (<i>summa cum laude</i>)	2001 – 2007
specialization in Artificial Intelligence, Machine Learning, and Neurobiological modeling Thesis title: Independent Subspace Analysis Supervisor: Prof. András Lőrincz	
M.Sc., Applied Mathematics (<i>summa cum laude</i>)	1996 – 2001
Specialization in Statistics, Probability Theory, Operation Research, Artificial Intelligence, Machine Learning, Financial and Actuarial Mathematics Thesis title: The problems of representation and interpretation in neural systems Supervisor: Prof. András Lőrincz	

AWARDS

NeurIPS-2019 Outstanding paper Award, Honorable Mentions.	2019
Ananya Uppal, Shashank Singh and Barnabás Póczos: Nonparametric Density Estimation & Convergence Rates for GANs under Besov IPM Losses. Neural Information Processing Systems, 2019, Vancouver, BC, Canada	
Selected to be among the ‘Top Phys.org articles of 2019’.	2019
S. He and Y. Li and Y. Feng and S. Ho and S. Ravanbakhsh and W. Chen and B. Póczos: Learning to predict the cosmological structure formation, Proceedings of the National Academy of Sciences, 2019	
IJCAI-2017 Best student paper runner-up.	2017
Wei-Chen Chang, Chun-Liang Li, Yiming Yang and Barnabás Póczos: Data-driven Random Fourier Feature using Stein Effect. 26 th International Joint Conference on Artificial Intelligence, 2017, Melbourne, Au.	
IJCAI-2015 Distinguished Paper Award.	2015
Kirthevasan Kandasamy, Jeff Schneider, and Barnabás Póczos: Bayesian Active Learning for Posterior Estimation. 24 th International Joint Conference on Artificial Intelligence, 2015, Buenos Aires, Argentina. (Out of 1,996 paper submissions with 575 accepted papers, this was one of two papers to receive the award).	

Yahoo! Academic Career Enhancement Award	2012
1st prize, 25th Hungarian National Scientific Student Competition and Conference. Computer Science Session, Eger, Hungary	2001
1st prize, Scientific Student Competition and Conference of Eötvös Loránd University. Computer Science Session, Budapest, Hungary	2001

SCHOLARSHIPS

Scholarship of the John von Neumann Computer Society	2002 – 2007
Scholarship of the Bliss Foundation	2004
Scholarship of the Eötvös Loránd University, predoctorial appointment	2004
Scholarship of the Pázmány–Eötvös Foundation	2000

CONTRIBUTIONS TO EDUCATION

Lecturing

Carnegie Mellon University, Pittsburgh, PA	
<i>Scalability in Machine Learning, (Computer Science 10-745),</i> ca. 20 students	2019 Fall
<i>Machine Learning with Large Datasets, (Computer Science 10-405 and 10-605),</i> ca. 50 students	2019 Spring
<i>Machine Learning with Large Datasets, (Computer Science 10-605 and 10-805),</i> ca. 150 students	2018 Fall
<i>Art and Machine Learning (Computer Science 10-615),</i> ca. 30 students (joint lecturing with Prof. Eunsu Kang)	2018 Spring
<i>Introduction to Machine Learning (Computer Science 10-701),</i> ca. 150 graduate students	2017 Fall
<i>Introduction to Machine Learning (Computer Science 10-401),</i> ca. 50 undergraduate students	2017 Spring
<i>Advanced Introduction to Machine Learning (Computer Science 10-715),</i> ca. 40 graduate students	2016 Fall
<i>Introduction to Machine Learning (Computer Science 10-401),</i> ca. 50 undergraduate students (joint lecturing with Prof. Aarti Singh)	2016 Spring
<i>Advanced Introduction to Machine Learning (Computer Science 10-715),</i> ca. 35 graduate students (joint lecturing with Prof. Alex Smola)	2015 Fall
<i>Advanced Introduction to Machine Learning (Computer Science 10-715),</i> ca. 35 graduate students (joint lecturing with Prof. Eric Xing)	2014 Fall
<i>Introduction to Machine Learning (Computer Science 10-701),</i> ca. 140 graduate students (joint lecturing with Prof. Aarti Singh)	2014 Spring
<i>Convex Optimization (Computer Science 10-725),</i> ca. 90 graduate students (joint lecturing with Prof. Ryan Tibshirani)	2013 Fall
<i>Introduction to Machine Learning (Computer Science 10-701),</i> ca. 120 graduate students (joint lecturing with Prof. Alex Smola)	2013 Spring
University of Alberta, Edmonton, Canada	2009 Fall
<i>Introduction to Machine Learning (CMPUT 466/551)</i> 26 graduate and 7 undergraduate students (joint lecturing with Prof. Russell Greiner)	
Eötvös Loránd University, Budapest, Hungary	(2005 – 2007, Fall and Spring)

Artificial Neural Networks, (ca. 45 students in each semester)
Artificial Intelligence and its applications, (ca. 25 students in each semester)
Image Processing, (ca. 25 students in each semester)
Speech Processing, (ca. 25 students in each semester)

Curriculum development:

Scalability in Machine Learning (Computer Science 10-745), (2018 Fall)
new course for PhD students

Machine Learning with Large Datasets (Computer Science 10-605, 10-805), (2018 Fall)
updated content

Machine Learning for Art (Computer Science 10-615, Art 60-411), (2018 Spring)
new MS level course, co-developed with Eunsu Kang

Introduction to Machine Learning (Computer Science 10-401), (2014 Fall)
new course for undergraduate students, co-developed with Aarti Singh

Advanced Introduction for Machine Learning (Computer Science 10-715), (2016 Spring)
new course for ML PhD students, co-developed with Eric Xing

Teaching materials: exam questions, homework assignments, program codes (matlab, python, and ipython notebooks), lecture slides, lecture notes, and video lectures are available on the class websites.

STUDENT SUPERVISION

Postdoctoral Fellow Supervision (Alumni)

Kirthevasan Kandasamy 2018 -
joint supervision with Jeff Schneider
Robotics Institute, Carnegie Mellon University, Pittsburgh, PA,
Research topics: i) Bayesian Optimization, ii) Bandits, iii) Design of Experiments

Siamak Ravanbakhsh 2015 - 2017
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
Research topics: i) Machine Learning Algorithms for Matching Theories, Simulations,
and Observations in Cosmology, ii) Machine Learning on Structured Domains
Occupation: Assistant Professor, University of British Columbia, Vancouver, BC, Canada

Ph.D. Supervision (Current)

Chenghui Zhou 2018 -
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
PhD program entrance year: 2016
Research topics: Reinforcement Learning
Expected graduation: 2023

Hai Pham 2018 -
Language Technologies Institute, CMU, Pittsburgh, PA,
PhD program entrance year: 2018
Research topic: Semisupervised Word and Character Recognition
Expected graduation: 2022

Biswajit Paria 2017 -
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. Jeff Schneider)
PhD program entrance year: 2017
Research topics: Automated Scientific Discovery
Expected graduation: 2022

Ph.D. Supervision (Alumni)

- Han Nguyen 2018 - 2021
Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA,
Thesis title: Adaptive Optimization Methods for Machine Learning
Occupation: Machine Learning Engineer at Comcast
- Ananya Uppal 2017 - 2021
Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA,
Thesis title: Nonparametric Density Estimation under Dual Besov Norms
Occupation: Postdoctoral Fellow at University of Texas at Austin
- Otilia Stretcu 2015 - 2021
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. Tom Mitchell)
CMLH Fellowship winner in Digital Health (2018-2019)
Thesis title: Curriculum Learning
Occupation: Research Scientist at Google AI
- Ilqar Ramazanli 2017 - 2020
Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA,
Thesis Title: Optimal Adaptive Matrix Completion
Occupation: Research Scientist at Facebook
- Chun-Liang Li 2015 - 2019
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
IBM Fellowship Winner (2018-2019)
IJCAI 2017, Best student paper runner-up
Thesis title: Learning Generative Models using Transformations
Occupation: Research Scientist at Google Cloud AI
- Shashank S. Singh 2014 - 2019
Department of Statistics, Carnegie Mellon University, Pittsburgh, PA,
Joint PhD Program in Statistics and Machine Learning
PhD program entrance year: 2014
National Science Fellowship Winner (2015 - 2018)
(2017-2018) Richard K. Mellon Foundation Presidential Fellowships in the Life Sciences
Thesis title: Estimating Probability Distributions and their Properties.
Occupation: Postdoctoral Fellow at Max Planck Institute for Intelligent Systems,
Tuebingen, Germany
- Simon Du 2015 - 2019
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. Aarti Singh)
PhD program entrance year: 2015
Thesis title: Gradient Descent for Non-convex Problems
Occupation: Assistant professor
Paul G. Allen School of Computer Science & Engineering at Univ. of Washington
- Kirthivasan Kandasamy 2013 - 2018
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. Jeff Schneider)
Facebook Fellowship Winner (2017-2019)
Siebel Fellowship Winner (2017-2018)
CMU Presidential Fellowship Winner (2015)
PhD program entrance year: 2013

Thesis title: Tuning Hyperparameters without Grad Students:
Scaling up Bandit Optimisation
Occupation: Postdoctoral Fellow, UC Berkeley

Manzil Zaheer 2016 - 2018

Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. Ruslan Salakhutdinov)
Best TA Award, Machine Learning Department 2016
TA of the Year Award, Machine Learning Department 2017
PhD program entrance year: 2013
Thesis title: Representation Learning @ Scale
Occupation: Research Scientist at Google, Mountain View, CA

Junier Oliva 2012 - 2018

Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. Jeff Schneider)
PhD program entrance year: 2012
Thesis title: Distribution and Histogram (DisH) Learning
Occupation: Assistant Professor,
University of North Carolina at Chapel Hill, Chapel Hill, NC

Sashank Jakkam Reddi 2012 - 2017

Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. Alex Smola)
PhD program entrance year: 2011
Thesis title: New Optimization Methods for Modern Machine Learning
Occupation: Research Scientist at Google, NYC, NY

M.Sc. Supervision (Current)

Naji Shajari 2017 -

ML Secondary Masters
Philosophy department, CMU, Pittsburgh, PA
co-advised by Kun Zhang and Peter Spirtes
MSc program entrance year: 2017
Research topic: Exploiting Functional Structures For Learning From Positive
and Unlabeled Data

M.Sc. Supervision (Alumni)

Saket Dingliwal 2019 - 2020

Language Technologies Institute
Research topic: Hand written text recognition and detection

Amrith Setlur 2020 - 2021

Language Technologies Institute
Research topic: Hand written text recognition and detection

Tzu Hsiang (Anthony) Lin 2018 - 2019

Language Technologies Institute
MSc program entrance year: 2018
Research topic: Hand written text recognition and detection

Emre Yolcu 2017 - 2019

Machine Learning Department, CMU, Pittsburgh, PA,
MSc program entrance year: 2017
Research topic: Automatic Theorem Proving, Question Answering

Sanket Mehta 2017 - 2019

- Language Technologies Institute, CMU, Pittsburgh, PA,
(joint supervision with Prof. Jaime Carbonell)
MSc program entrance year: 2017
Research topic: Demand Forecast Prediction
- Zirui Wang 2017 - 2019
Language Technologies Institute, CMU, Pittsburgh, PA,
(joint supervision with Prof. Jaime Carbonell)
MSc program entrance year: 2017
Research topic: Demand Forecast Prediction
- Zheng Jiang 2018 - 2019
Master Program of Music and Technology, CMU, Pittsburgh, PA,
(joint supervision with Prof. Roger Dannenberg)
MSc program entrance year: 2017
Research topic: Computer Based Music Structure Analysis for Symbolic Music Representation
- Daniel Martin 2017 - 2018
Machine Learning Department, CMU, Pittsburgh, PA,
(joint supervision with Prof. Burton Hollifield)
MSc program entrance year: 2017
Research topic: Machine Learning in Financial Applications
- YuSha Liu 2017 -2018
Machine Learning Department, CMU, Pittsburgh, PA
MSc program entrance year: 2017
Research topic: Anomaly Detection in Video Streams
- Yang Zhang 2017 -2018
Machine Learning Department, CMU, Pittsburgh, PA
MSc program entrance year: 2017
Research topic: Point Cloud Generative Adversarial Networks
- Rulin Chen 2017 - 2018
Department of Physics and Machine Learning Department, CMU, Pittsburgh, PA
MSc program entrance year: 2017
Research topic: Optimization in tomography reconstruction
- Deepak Dilipkumar 2016 - 2017
Machine Learning Department, CMU, Pittsburgh, PA
MSc program entrance year: 2016
Research topic: Handwritten Word Recognition with Deep Learning
- Eric Ma 2016 - 2017
Machine Learning Department, CMU, Pittsburgh, PA
MSc program entrance year: 2016
Research topic: Machine learning approaches for understanding the ‘Mapping Nearby Galaxies at Apache Point Observatory’ dataset.
- Hai Pham 2016 - 2018
Language Technologies Institute, CMU, Pittsburgh, PA,
(joint supervision with Prof. Ravi Starzl)
MSc program entrance year: 2016
Research topic: Semisupervised Word and Character Recognition

Michael Muehl 2015 - 2017
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA,
(joint supervision with Prof. David Bourne)
MSc program entrance year: 2015
Research topic: Anomaly Detection in Crowd Behavior Using Point-cloud Data

Jingkun Gao 2015 - 2016
Department of Civil and Environmental Engineering, Carnegie Mellon U., Pittsburgh, PA,
(joint supervision with Prof. Mario Berges)
Secondary MSc Program entrance year: 2015
Thesis title: Point Type Inference in Heating, Ventilation and Air Conditioning Systems

Shashank S. Singh 2013 - 2014
Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA
MSc program entrance year: 2013
MSc Honors Thesis title: Concentration Inequalities for Density Functionals

Mohsen Ravanbaksh 2009 - 2010
Department of Computing Science, University of Alberta, Edmonton, Canada,
(joint supervision with Prof. Russell Greiner)
Thesis title: A Stochastic Optimization Method for Partially Decomposable Problems,
with Application to NMR Spectra, (nominated for the 'Best M.Sc. Thesis' award)

Undergraduate Supervision (Alumni)

Shalom Yiblet 2018 - 2019
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
SCS Senior Thesis title: Multi Scale Residual Image Compression via Deep Neural Networks
a Wide Variety of Images

Ziheng (George) Cai 2018 - 2019
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
Co-advised by Chun-Liang Li
SCS Senior Thesis title: Understanding Lipschitzity in Generative Adversarial Networks

George Stoica 2018 - 2019
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
BSc program entrance year: 2015
SCS Senior Thesis title: Contextual Parameter Generation for Knowledge Graph
Link Prediction

Shashank Singh 2013 - 2014
Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA
BSc program entrance year: 2012
BSc Honors Thesis title: Generalized Exponential Concentration Inequality for
Renyi Divergence Estimation

Jit Nandi 2013 - 2015
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
BSc program entrance year: 2013
BSc Honors Thesis title: Distinguishing between different mechanisms of network
evolution using network motifs and machine learning

Research Assistant (Alumni)

George Stoica 2020
Machine Learning Department, CMU, Pittsburgh, PA
Research topic: Explainable Anomaly Detection

YuSha Liu 2019 -
Machine Learning Department, CMU, Pittsburgh, PA
Research topic: Anomaly Detection

Thesis Committees

Naji Shajari (Ph.D.)
Department of Philosophy, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2019
Thesis title: Incorporating Human Decision Making Process to Leverage Learning From Data

Eric Lei (Ph.D.)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2019
Thesis title: TBA

Wei-Cheng Chang (Ph.D.)
Language Technologies Institute, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2019
Thesis title: TBA

Petar Stojanov (Ph.D.)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2019
Thesis title: TBA

Siqi Liu (Ph.D.)
Department of Computer Science, University of Pittsburgh, Pittsburgh, PA
(Committee member for Thesis proposal) 2019
Thesis title: Methods For event time series prediction and anomaly detection

Kwangho Kim (Ph.D.)
Statistics Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2019
Thesis title: Causal Inference with Complex Data Structures and Non-Standard Effects

Hieu Pham (Ph.D.)
Language Technologies Institute, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2018
Thesis title: Efficient Machine Learning

Zheng Jiang (MS)
Master Program of Music Technology, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2018
Thesis title: Computer Based Music Structure Analysis for Symbolic Music Representation

Han Zhao (Ph.D.)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2018
Thesis title: Learning Tractable Probabilistic Graphical Models

Keerthiram Murugesan (Ph.D.)
Language Technologies Institute, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis defense) 2018
(Committee member for Thesis proposal) 2017
Thesis title: Online and Adaptive Methods for Multitask Learning

Shashank S. Singh (M.Sc.)

Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee head for PhD Thesis proposal) 2018
Thesis proposal title: Estimating Probability Distributions and Their Properties

Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA 2014
(Committee head for MSc Thesis defense)
Thesis proposal title: Concentration Inequalities for Density Functionals

Christoph Dann (Ph.D)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2018
Thesis title: TBA

Brandon Amos (Ph.D)
Computer Science Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis defense) 2019
(Committee member for Thesis proposal) 2018
Thesis title: Differential Optimization-Based Inference for Machine Learning

George Philipp (Ph.D)
Computer Science Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2018
Thesis title: Predicting the performance of neural networks with neural nonlinearity analysis

Jesse Dodge (Ph.D)
Language Technologies Institute, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal) 2018
Thesis title: Modeling Diversity in the Machine Learning Pipeline

Manzil Zaheer (Ph.D)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee co-head for Thesis defense) 2018
(Committee co-head for Thesis proposal) 2018
Thesis title: Representation Learning @ Scale

Simon Du (Ph.D)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee co-head for Thesis proposal) 2018
Thesis title: Understanding Gradient Descent for Non-convex Problems

Junier Oliva (Ph.D)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee co-head for Thesis defense) 2018
(Committee co-head for Thesis proposal) 2017
Thesis title: Distribution and Histogram (DisH) Learning

Ian E.H. Yen (Ph.D)
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis defense) 2018
(Committee member for Thesis proposal) 2017
Thesis title: Sublinear-Time Optimization for High-Dimensional Learning

Avinava Dubey (Ph.D) 2017
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA
(Committee member for Thesis proposal)
Thesis title: Scalable Bayesian Nonparametrics

Michelle Ntampaka (Ph.D) 2017
Department of Physics, Carnegie Mellon University, Pittsburgh, PA

(Committee member for Thesis defense)	2017
(Committee member for Annual review)	2014
Thesis title: Cosmology with Galaxy Cluster Dynamics Using Machine Learning and Forward Modeling	
Jingkun Gao (Ph.D)	2017
Department of Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, PA,	
(Committee member for Thesis defense)	2017
Thesis title: A Metadata Inference Framework to Provide Operational Information Support for Fault Detection and Diagnosis Applications in Secondary HVAC Systems	
(Committee member for Thesis proposal)	2016
Thesis proposal title: A Point Identification Framework to Provide Operational Information Support for Fault Detection and Diagnosis Applications in Secondary HVAC Systems	
Kirstin Early (Ph.D)	2017
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA	
(Committee member for Thesis defense)	
Thesis title: Dynamic Question Ordering: Obtaining Useful Information While Reducing User Burden	
Sashank Jakkam Reddi (Ph.D)	2017
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA	
(Committee co-head for Thesis defense)	2017
(Committee co-head for Thesis proposal)	2016
Thesis title: New Optimization Methods for Modern Machine Learning	
Michael Spece (Ph.D)	2017
Machine Learning Department, Carnegie Mellon University, Pittsburgh, PA Stat/ML Joint PhD program	
(Committee member for Thesis proposal)	
Thesis proposal title: Structural Learning of Data Regularity and Ensemble Size	
Mu Li (Ph.D)	2017
Computer Science Department, Carnegie Mellon University, Pittsburgh, PA	
(Committee member for Thesis defense)	2017
(Committee member for Thesis proposal)	2016
Thesis proposal title: Scaling Distributed Machine Learning with System and Algorithm Co-design	
Irem Velibeyoglu (Ph.D)	2016
Department of Civil and Environmental Engineering, Carnegie Mellon U., Pittsburgh, PA, (Committee member for Qualifying exam)	
Dougal Sutherland (Ph.D)	
Computer Science Department, Carnegie Mellon University, Pittsburgh, PA	
(Committee member for Thesis defense)	2016
(Committee member for Thesis proposal)	2015
Thesis proposal title: Scalable, Flexible, and Active Learning on Distributions	
In-Soo Jung (Ph.D.) Carnegie Mellon University, Pittsburgh, PA	
Department of Civil and Environmental Engineering, Carnegie Mellon U., Pittsburgh, PA, (Committee member for Thesis defense)	2015
(Committee member for Thesis proposal)	2013
Thesis proposal title: Anomaly Detection of Piezometer Data Collected from Embankment Dams	

Mohsen Ravanbaksh (M.Sc.), Department of Computing Science, University of Alberta, Edmonton, Canada, (joint supervision with Prof. Russell Greiner) Thesis title: A Stochastic Optimization Method for Partially Decomposable Problems, with Application to NMR Spectra	2009
Levente Török (Ph.D.) Eötvös Loránd University, Budapest, Hungary. (Thesis reviewer)	2007

Data Analysis Project (DAP) Committees

Rulin Chen, Department of Physics and MLD, Carnegie Mellon University, Pittsburgh, PA	2018
Hongyu Zhu, Department of Physics, Carnegie Mellon University, Pittsburgh, PA	2018
Simon Du, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Otilia Stretcu, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Igor Gitman, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Rui Peng, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Eric Ma, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Deepak Dilipkumar, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Chun-Liang Li, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Vivek Nangia, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Mu-Chu Lee, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Eric Lei, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Michael Muehl, MLD, Carnegie Mellon University, Pittsburgh, PA	2017
Manzil Zaheer, MLD, Carnegie Mellon University, Pittsburgh, PA	2016
Kirthevasan Kandasamy, MLD, Carnegie Mellon University, Pittsburgh, PA	2016
Tianshu Ren, MLD, Carnegie Mellon University, Pittsburgh, PA	2016
Junier Oliva, MLD, Carnegie Mellon University, Pittsburgh, PA	2016
Jingkun Gao, MLD, Carnegie Mellon University, Pittsburgh, PA	2016
Sashank Jakkam Reddi, MLD, Carnegie Mellon University, Pittsburgh, PA	2015

Advanced Data Analysis (ADA) Committees

Shashank S. Singh, Dept. of Statistics, Carnegie Mellon University, Pittsburgh, PA	2015
Yotam Hechtlinger, Dept. of Statistics, Carnegie Mellon University, Pittsburgh, PA	2015

Mentoring

Liang Xiong, Ph.D., Machine Learning Department, Carnegie Mellon University	2010 - 2012
Liuyang Li, M.Sc., Dept. of Computing Science, University of Alberta	2010
Zoltán Szabó, M.Sc., Ph.D., Faculty of Informatics, Eötvös Loránd University	2005 - 2007
Nikolett Bakos, M.Sc., Faculty of Informatics, Eötvös Loránd University	2006

PROFESSIONAL ACTIVITIES

Auton Lab

I'm co-directing the Auton Lab with Artur Dubrawski and Jeff Schneider.
The Auton Lab currently has 60+ members
(students, postdocs, research programmers, faculty, staff).
Our computer cluster has 100+ active users.
Auton Lab website: <https://www.autonlab.org/>

Reviewing for Scientific Journals

Journal of Machine Learning Research (JMLR)
Machine Learning Journal (MLJ)

Foundations and Trends in Machine Learning
IEEE's Transactions on Information Theory (IEEE IT)
IEEE's Transactions on Pattern Analysis and Machine Intelligence (IEEE TPAMI)
IEEE's Transactions on Knowledge and Data Engineering (IEEE TKDE)
IEEE's Transactions on Signal Processing (IEEE TSP)
IEEE's Transactions on Neural Networks (IEEE TNN)
Scandinavian Journal of Statistics
ESAIM Probability and Statistics (P&S)
Artificial Intelligence (AI)
Annals of Mathematics and Artificial Intelligence (AMAI)
Neurocomputing (NEUCOM)
Digital Signal Processing (DSP)
Neural Computing and Applications (NCA)
Progress in Artificial Intelligence (PRAI)
The European Physical Journal B (EPJ B)
Journal of Chemometrics (J CHEMOMETR)

Reviewing for Conferences

International Conference on Machine Learning (ICML)
Advances in Neural Information Processing Systems (NIPS)
Conference on Learning Theory (COLT)
AI & Statistics (AISTATS)
Association for the Advancement of Artificial Intelligence (AAAI)
European Conference on Machine Learning (ECML)
International Conference on Learning Representations (ICLR)
AI & Math Symposium (ISAIM)
European Signal Processing Conference (EUSIPCO)
International Joint Conference on Artificial Intelligence (IJCAI)
International Joint Conference on Neural Networks (IJCNN)
European Conference on Complex Systems (ECCS)
International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)
NIPS2011, Workshop on Bayesian Optimization, Experimental Design and Bandits
Hungarian National Scientific Student Competition and Conference

Reviewing for Scientific Publishing Houses

Cambridge University Press

Senior Program Committee Member

International Conference on Machine Learning (senior area chair) (ICML-2019)
International Conference on Machine Learning (area chair) (ICML-2018)
AI & Statistics (publications chair) (AISTATS-2017)
AI & Statistics (area chair) (AISTATS-2018, 2019)
Neural Information Processing Systems (area chair) (NIPS-2015, 2017)
International Joint Conference on Artificial Intelligence (2011, 2015, 2016)

Reviewing Grant Applications

National Science Foundation (NSF)
Natural Sciences and Engineering Research Council of Canada (NSERC)
European Research Council (ERC)
Department of Energy (DOE)

Conference Organization

Machine Learning in Science and Engineering (MLSE), 2018, Organizer
CMU Symposium on Machine Learning in Science and Engineering, 2017, Organizer
International Conference on Machine Learning (ICML) 2016, Session chair

AI and Statistics (AISTATS) 2011, 2017-2019, Session chair
European Signal Processing Conference (EUSIPCO) 2011, Session chair
Hungarian National Scientific Student Competition and Conference 2005, Organizer

University Service

Help developing the "Executive Program in Data Science and Machine Learning" in the
CMU-Portugal program, 2019
Co-Director of the PhD Program, Machine Learning Dept., Carnegie Mellon U., 2018 – 2019
Head of PhD Students Admission Committee, 2017, 2018
Machine Learning Dept., Carnegie Mellon U.,
Education Review Committee member, Machine Learning Dept., Carnegie Mellon U., 2018 – 2019
Speaking Skills Committee, Machine Learning Dept., Carnegie Mellon U., 2017 – 2019
Head of MSc Students Admission Committee, Machine Learning Dept., Carnegie Mellon U., 2016
Organizing the ML Seminar series, Machine Learning Dept., Carnegie Mellon U., 2016 – 2019
Faculty Search Committee member, Physics Department, Carnegie Mellon U., 2015
Dowd Fellowship Proposal Reviewer, College of Engineering, Carnegie Mellon U., 2016
Faculty Search Committee member, Machine Learning Department, Carnegie Mellon U., 2014
Judge for the regional Siemens High School Science Talent competition, Pittsburgh, PA 2013
Organizing and chairing the Reinforcement Learning and Artificial Intelligence (RLAI) 2010
weekly group meetings at the University of Alberta, Department of Computing Science
Secretary for the Hungarian National Scientific Student Competition and Conference at 2005 – 2007
the Eötvös Loránd University, Department of Information Systems

SKILLS

Languages: English (fluent), German (basic), Hungarian (native)
Computer languages: Python, C++, C#, Javascript, Matlab, Html, L^AT_EX
Other skills: Certified soccer referee

GUEST LECTURES

1. **10-335, 10-615: Art and Machine Learning** 2019
Topic: Manifold Learning applications for Art
Lecturer: Eunsu Kang
2. **10-703: Deep Reinforcement Learning and Control** 2018
Topic: Planning in Scientific Experiments
Lecturers: Katerina Fragkiadaki and Tom Mitchell
3. **10-601: Introduction to Machine Learning** 2017
Topic: Reinforcement Learning
Lecturer: Matt Gromley

INVITED TALKS

1. **Distribution regression and nonparametric density estimation under adversarial losses** (45 minutes)
Workshop on "Estimation of Entropies and Other Functionals: Statistics Meets Information Theory"
Cambridge, UK, 2019.
<http://www.statslab.cam.ac.uk/~tbb26/WorkshopIndex.html>

2. **Bayesian Active Learning for Posterior Estimation and Experiment Design** (45 minutes)
AICosmo2019: Artificial Intelligence Methods in Cosmology
Ascona, Switzerland, 2019.
<https://sites.google.com/site/aicosmo2019/>
3. **Bayesian Optimization** (45 minutes)
Machine Learning and Revealing the Internal Structure of Nucleon and Nuclei
Center for Nuclear Femtography, Washington, DC, 2019
<https://www.jlab.org/conference/2019/CNF>
4. **ML for Science: Some Open Questions** (30 minutes)
Gotham City ML X Physics Workshop
Flatiron Institute Center for Computational Astrophysics ,
NYC, NY, 2019.
5. **Multi-Objective Multi-Fidelity Experiment Design** (10 minutes)
The Mark Foundation Workshop: Accelerating Innovation at the Intersection of AI and Cancer Research
Carnegie Mellon University,
Pittsburgh, PA, 2019.
6. **Machine Learning for Experiment Design**
Deep Learning for Multi-messenger Astrophysics: Real-Time Discovery at Scale
Short talk + 90 minutes panel discussion
University of Illinois at Urbana–Champaign
Champaign, IL, 2018.
7. **Trends in Machine Learning**
US ATLAS (A Toroidal Large Hadron Collider ApparatuS) Summer workshop, (30 minutes)
Pittsburgh, PA, 2018.
8. **Machine Learning methods for Cosmology**
Time Domain Cosmology Workshop, Pittsburgh, (50 minutes)
Pittsburgh, PA, 2018.
9. **Machine Learning for Experiment Design**
Machine Learning in Science and Engineering, Pittsburgh, (30 minutes)
Pittsburgh, PA, 2018.
10. **Distribution Regression and its Applications**
Google, Pittsburgh, (50 minutes)
Pittsburgh, PA, 2018.
11. **Density Functional Estimation and Distribution Regression**
Wilks Statistics Seminar, Princeton University, (60 minutes)
Princeton, NJ, 2018.
12. **Distribution Regression**
NIPS workshop on Learning on Distributions, Functions, Graphs and Groups
Long Beach, CA, 2017.
13. **Automated Scientific Discovery**
Lawrence Berkeley National Laboratory, (60 minutes)
Berkeley, CA, 2017.
14. **Density Functional Estimation**
55th Annual Allerton Conference on Communication, Control, and Computing
Density Estimation and Property Testing, Invited session
Urbana, IL, 2017.
15. **Density Functional Estimation and its Applications**
Mind Research Network, (60 minutes)
Albuquerque, NM, 2017.

16. **Density Functional Estimation**
École polytechnique, Université Paris-Saclay (60 minutes)
Palaiseau, France, 2017.
17. **Stochastic Variance Reduction for Nonconvex Optimization**
École polytechnique, Université Paris-Saclay, (60 minutes)
Palaiseau, France, 2017.
18. **Artificial Intelligence: A New Hope?**
Földes Ferenc High School, (50 minutes)
Miskolc, Hungary, 2016.
19. **Applied Machine Learning for Design Optimization in Cosmology, Neuroscience, and Drug Discovery**
Machine Learning Technologies and Their Applications to Scientific and Engineering Domains Workshop.
NASA Langley Research Center, (30 minutes)
Hampton, VA, 2016.
20. **Machine Learning for Cosmology 101**
Innovative Cosmological Simulations with Machine Learning and Statistics in the era of LSST Workshop.
Carnegie Mellon University, (45 minutes)
Pittsburgh, PA, 2015.
21. **Machine Learning on Functional Data**
Gatsby Unit, University College London, (1 hour)
London, UK, 2015.
22. **Machine Learning on Distributions**
NIPS 2012 Workshop on Modern Nonparametric Methods in Machine Learning, (1 hour)
Lake Tahoe, Nevada, 2012.
23. **Support Distribution Machines and Copula-based Kernel Dependency Measures**
University of Alberta, Department of Computing Science, AI Seminar, (1 hour)
Edmonton, Canada, 2012.
24. **Dependence estimation in high-dimensional Euclidean spaces**
Carnegie Mellon University, Department of Statistics, Statistics Seminar, (1 hour)
Pittsburgh, PA, USA, 2012.
25. **Learning with nonparametric dependence and divergence estimation**
University of Cambridge, Department of Engineering, (1 hour)
Cambridge, UK, 2012.
26. **Learning with nonparametric dependence and divergence estimation**
Carnegie Mellon University, School of Computer Science, (1 hour)
Pittsburgh, PA, USA, 2012.
27. **Machine learning to recognize phenomena in large scale simulations**
SIAM Conference on Uncertainty Quantification, (25 minutes)
Raleigh, North Carolina, 2012.
28. **Support distribution machines**
Carnegie Mellon University, School of Computer Science, (1 hour)
Machine Learning Lunch Seminar,
Pittsburgh, PA, USA, 2012.

29. **Information and divergence estimation in machine learning**
University of Sheffield, Sheffield Institute for Translational Neuroscience, (1 hour)
Sheffield, UK, 2011.
30. **Nonparametric estimation in machine learning**
Johns Hopkins University, Department of Physics and Astronomy, (20 mins)
Baltimore, MD, 2011.
31. **Nonparametric estimation in machine learning**
University of Sheffield, Department of Computer Science, (25 mins)
Sheffield, UK, 2011.
32. **Nonparametric estimation of probabilistic divergences**
Purdue University, Department of Statistics, Machine Learning colloquium, (1 hour)
West Lafayette, IN, USA, 2011.
33. **Nonparametric estimation of divergences and its applications in machine learning**
University of Alberta, Department of Computing Science, AI Seminar, (1 hour)
Edmonton, Canada, 2010.
34. **Rank based Euclidean graph optimization methods for information estimation**
University of Alberta, Department of Mathematical and Statistical Sciences,
Statistics Seminar, (1 hour)
Edmonton, Canada, 2010.
35. **Nonparametric information estimation using rank based Euclidean graph optimization methods**
Carnegie Mellon University, School of Computer Science,
Machine Learning Lunch Seminar, (45 minutes)
Pittsburgh, PA, USA, 2010.
36. **Rank based Euclidean graph optimization methods for information estimation**
University of Alberta, Department of Computing Science, AI Seminar, (1 hour)
Edmonton, Canada, 2010.
37. **Dependence and mutual information estimation**
Eötvös Loránd University, (4 hours)
Budapest, Hungary, 2009.
38. **Nonparametric copula methods for mutual information estimation and independent component analysis**
University of Alberta, Department of Computing Science, AI Seminar, (1 hour)
Edmonton, Canada, 2008.
39. **Independent subspace analysis**
Max Planck Institute for Biological Cybernetics, (45 minutes)
Tübingen, Germany, 2007.
40. **Independent subspace analysis**
University of Alberta, Department of Computing Science, AI Seminar, (1 hour)
Edmonton, Canada, 2007.
41. **Independent subspace analysis**
Radboud University Nijmegen, (1 hour)
Nijmegen, Netherlands, 2007.
42. **Independent subspace analysis**
IDSIA, Dalle Molle Institute for Artificial Intelligence, (45 minutes)
Lugano, Switzerland, 2007.
43. **New possibilities in the human–computer communications**
Budapest University of Technology and Economics, Applied mathematics seminar, (1 hour)
Budapest, Hungary, 2003.
44. **New ways in the human–computer interactions**
Eötvös Loránd University, The day of Applied mathematics, (30 minutes)
Budapest, Hungary, 2003.

OTHER TALKS, POSTER PRESENTATIONS

1. Z. Szabó, B. Póczos, and A. Lőrincz,;
Collaborative Filtering via Group-Structured Dictionary Learning,
Eötvös Loránd University, Faculty of Informatics, Innomation Day, Budapest, Hungary, 2012.
2. Z. Szabó, B. Póczos, and A. Lőrincz,;
Online group-structured dictionary learning,
Eötvös Loránd University, Faculty of Informatics, von Neumann's Day, Budapest, Hungary, 2011.
3. Z. Szabó, B. Póczos, and A. Lőrincz,
Online group-structured dictionary learning,
Eötvös Loránd University, TÁMOP Research Seminar, Budapest, Hungary, 2011.
4. Z. Szabó, B. Póczos, and A. Lőrincz,
Online group-structured dictionary learning,
Machine Learning at Budapest, Budapest, Hungary, 2011.
5. Z. Szabó, B. Póczos, and A. Lőrincz,
Online structured dictionary learning and its applications,
Eötvös Loránd University, Problem Solving Seminar for Applied Mathematicians,
Budapest, Hungary, 2011.
6. Z. Szabó, B. Póczos, and A. Lőrincz,
Exploration of behavioral patterns and its applications in Human-Computer interaction,
Info Savaria, Szombathely, Hungary, 2005.
7. Z. Szabó, B. Póczos, and A. Lőrincz,
Recognition of behavioral patterns and its potentials of human-computer interaction,
Info ÉRA, Békéscsaba, Hungary, 2005.
8. Gy. Hévízi, M. Biczó, B. Póczos, Z. Szabó, B. Takács, and A. Lőrincz,
Adaptive human-computer interaction via face and gaze tracking,
Eötvös Loránd University, Faculty of Informatics, von Neumann's Day,
Budapest, Hungary, 2003.

PUBLICATIONS

H-index: 54

I-10 index: 137

Citations are available at:

<https://scholar.google.com/citations?user=sUriZlUAAAAJ&hl=en>

REFEREED JOURNAL PAPERS—PUBLISHED

- [1] F. Lanusse, R. Mandelbaum, S. Ravanbakhsh, C-L. Li, P. Freeman, and B. Póczos.
Deep generative models for galaxy image simulations.
Monthly Notices of the Royal Astronomical Society, 504(4):5543–5555, 2021.
- [2] M. Andrews, M. Paulini, S. Gleyzer, and B. Póczos.
End-to-end physics event classification with CMS open data: Applying image-based deep learning to detector data for the direct classification of collision events at the LHC.
Computing and Software for Big Science, 4(1):1–14, 2020.
- [3] M. Andrews, J. Alison, S. An, B. Burkle, S. Gleyzer, M. Narain, M. Paulini, B. Póczos, and E. Usai.
End-to-end jet classification of quarks and gluons with the CMS Open Data.
Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, 977:164304, 2020.

- [4] K. Kandasamy, R. Vysyaraju, W. Neiswanger, B. Paria, C. Collins, J. Schneider, B. Póczos, and E. Xing.
Tuning Hyperparameters without Grad Students: Scalable and Robust Bayesian Optimisation with Dragonfly.
Journal of Machine Learning Research, 21(81):1–27, 2020.
- [5] H. Liao, W. Zhang, X. Dong, B. Póczos, K. Shimada, and Burak L.
A deep reinforcement learning approach for global routing.
Journal of Mechanical Design, 142(6):061701, 2020.
- [6] A. Dave, J. Mitchell, K. Kandasamy, H. Wang, S. Burke, B. Paria, B. Póczos, J. Whitacre, and V. Viswanathan.
Autonomous discovery of battery electrolytes with robotic experimentation and machine learning.
Cell Reports Physical Science, 1(12):100264, 2020.
- [7] C. Childs, O. Canbek, T. Kirby, C. Zhang, J. Zheng, C. Szeto, B. Póczos, K. Kurtis, and N. Washburn.
Cheminformatics for accelerated design of chemical admixtures.
Cement and Concrete Research, 136:106173, 2020.
- [8] J. Bone, C. Childs, A. Menon, B. Póczos, A. Feinberg, P. LeDuc, and N. Washburn.
Hierarchical Machine Learning for High-Fidelity 3D Printed Biopolymers.
ACS Biomaterials Science & Engineering, 6(12):7021–7031, 2020.
- [9] K. Kandasamy, G. Dasarathy, J. Oliva, J. Schneider, and B. Póczos.
Multi-fidelity Gaussian Process Bandit Optimisation.
Journal of Artificial Intelligence Research (JAIR) 66, 151-196, 2019.
- [10] A. Menon, B. Póczos, A. Feinberg, and N. Washburn.
Optimization of Silicone 3D Printing with Hierarchical Machine Learning.
3D Printing and Additive Manufacturing, 2019.
- [11] S. He, Y. Li, Y. Feng, S. Ho, S. Ravanbakhsh, W. Chen, and B. Póczos.
Learning to predict the cosmological structure formation.
Proceedings of the National Academy of Sciences, 2019.
- [12] H. Liao, W. Zhang, X. Dong, B. Póczos, K. Shimada, and L. B. Kara.
A Deep Reinforcement Learning Approach for Global Routing.
Journal of Mechanical Design (JMD), 2019.
- [13] A. Menon, C. Childs, B. Póczos, N. Washburn, and K. Kurtis.
Molecular Engineering of Superplasticizers for Metakaolin-Portland Cement Blends with Hierarchical Machine Learning.
Advanced Theory and Simulations, 2018.
- [14] S. Singh, Y. Yang, B. Póczos, and J. Ma.
Predicting Enhancer-Promoter Interaction from Genomic Sequence with Deep Learning.
Quantitative Biology, 2018.
- [15] F. Lanusse, Q. Ma, N. Li, T. Collett, C. Li, S. Ravanbakhsh, R. Mandelbaum, and B. Póczos.
CMU DeepLens: Deep Learning For Automatic Image-based Galaxy-Galaxy Strong Lens Finding.
Monthly Notices of the Royal Astronomical Society Main Journal (MNRAS), 2017.

- [16] A. Menon, C. Gupta, K. Perkins, B. DeCost, N. Budwal, R. Rios, K. Zhang, B. Póczos, and N. Washburn.
Elucidating Multi-Physics Interactions in Suspensions for the Design of Polymeric Dispersants: A Hierarchical Machine Learning Approach.
Molecular Systems Design & Engineering. Published by the Royal Society of Chemistry, 2017.
- [17] K. Kandasamy, J. Schneider, and B. Póczos.
Query Efficient Posterior Estimation in Scientific Experiments via Bayesian Active Learning.
Artificial Intelligence Journal, 2016.
- [18] F. Yeh, J. Vettel, A. Singh, B. Póczos, S. Grafton, K. Erickson, W. Tseng, and T. Verstynen.
Quantifying Differences and Similarities in Whole-Brain White Matter Architecture Using Local Connectome Fingerprints.
PLOS Computational Biology, 2016.
- [19] Z. Szabó, B. Sriperumbudur, B. Póczos, and A. Gretton.
Learning Theory for Distribution Regression.
Journal of Machine Learning Research (JMLR), 2016.
- [20] M. Ntampaka, H. Trac, D. Sutherland, S. Fromenteau, B. Póczos, and J. Schneider.
Dynamical Mass Measurements of Contaminated Galaxy Clusters Using Machine Learning.
The Astrophysical Journal, 2016.
- [21] I. Jung, M. Berges, J. Garrett, and B. Póczos.
Exploration and Evaluation of AR, MPCA and KL Anomaly Detection Techniques to Embankment Dam Piezometer Data.
Advanced Engineering Informatics, 2015.
- [22] M. Ntampaka, H. Trac, D. Sutherland, N. Battaglia, B. Póczos, and J. Schneider.
A Machine Learning Approach for Dynamical Mass Measurements of Galaxy Clusters.
The Astrophysical Journal, 2015.
- [23] X. Xu, S. Ho, H. Trac, J. Schneider, B. Póczos, and M. Ntampaka.
A First Look at Creating Mock Catalogs with Machine Learning Techniques.
The Astrophysical Journal, 2013.
- [24] Z. Szabó, B. Póczos, and A. Lórinicz.
Separation Theorem for Independent Subspace Analysis and its Consequences.
Pattern Recognition (PR), 45(4):1782–1791, 2012. doi:10.1016/j.patcog.2011.09.007
 (Impact factor: 2.607).
- [25] Z. Szabó, B. Póczos, and A. Lórinicz.
Auto-regressive Independent Process Analysis without Combinatorial Efforts .
Pattern Analysis and Applications (PAA) , 13:1–13, 2010.
 (Impact factor: 1.367) .
- [26] B. Póczos and A. Lorincz.
Identification of Recurrent Neural Networks by Bayesian Interrogation Techniques.
Journal of Machine Learning Research (JMLR), 10:515–554, 2009.
 (Impact factor: 3.116).
- [27] Z. Szabó, B. Póczos, and A. Lórinicz.
Undercomplete Blind Subspace Deconvolution.

Journal of Machine Learning Research (JMLR), 8:1063–1095, 2007.
(Impact factor: 3.116).

- [28] B. Póczos and A. Lőrincz.
Noncombinatorial Estimation of Independent Auto-regressive Sources.
Neurocomputing (NEUCOM), 69:2416–2419, 2006.
(Impact factor: 1.440).
- [29] G. Szirtes, B. Póczos, and A. Lőrincz.
Neural Kalman-filter.
Neurocomputing (NEUCOM), 65:349–355, 2005. ISSN: 0925-2312
(Impact factor: 1.440).
- [30] B. Szatmáry, B. Póczos, and A. Lőrincz.
Competitive Spiking, Rate Code and Indirect Entropy Minimization in Structure Finding.
Journal of Physiology, 98:407–416, 2004.
(Impact factor: 4.649).
- [31] A. Lőrincz and B. Póczos.
Cost Component Analysis.
International Journal of Neural Systems (IJNS), 13:183–192, 2003.
(Impact factor: 0.901).
- [32] A. Lőrincz, B. Póczos, G. Szirtes, and B. Tákacs.
Ockham’s Razor at Work: Modeling of the Homunculus.
Brain and Mind, 3:187–220, 2002.

REFEREED CONFERENCE/WORKSHOP PAPERS

- [1] G. Stoica, A. Platanios, and B. Póczos.
Re-tacred: Addressing shortcomings of the tacred dataset.
Proceedings of the AAAI Conference on Artificial Intelligence, 35(15):13843–13850, 2021.
- [2] K. Korovina, S. Xu, K. Kandasamy, W. Neiswanger, B. Poczcos, J. Schneider, and E. Xing.
Chembo: Bayesian optimization of small organic molecules with synthesizable recommendations.
International Conference on Artificial Intelligence and Statistics, pages 3393–3403, 2020.
- [3] G. Stoica, O. Stretcu, A. Platanios, T. Mitchell, and B Póczos.
Contextual parameter generation for knowledge graph link prediction.
Proceedings of the AAAI Conference on Artificial Intelligence, 34(03):3000–3008, 2020.
- [4] H. Pham, A. Setlur, S. Dingliwal, T. Lin, B. Póczos, K. Huang, Z. Li, J. Lim, C. McCormack, and T. Vu.
Robust Handwriting Recognition with Limited and Noisy Data.
2020 17th International Conference on Frontiers in Handwriting Recognition (ICFHR), pages 301–306, 2020.
- [5] M. Toneva, O. Stretcu, B. Póczos, L. Wehbe, and T. Mitchell.
Modeling Task Effects on Meaning Representation in the Brain via Zero-Shot MEG Prediction.
Advances in Neural Information Processing Systems, 33, 2020.
- [6] Z. Milacski, B. Poczcos, and A. Lorincz.
VideoOneNet: Bidirectional Convolutional Recurrent OneNet with Trainable

Data Steps for Video Processing.

International Conference on Machine Learning, pages 6893–6904, 2020.

- [7] O. Stretcu, E. Platanios, T. Mitchell, and B. Póczos.
Coarse-to-Fine Curriculum Learning for Classification.
International Conference on Learning Representations (ICLR) Workshop on Bridging AI and Cognitive Science (BAICS), 2020.
- [8] S. Du, K. Hou, R. Salakhutdinov, B. Póczos, R. Wang, and K. Xu.
Graph Neural Tangent Kernel: Fusing Graph Neural Networks with Graph Kernels.
Neural Information Processing Systems (NeurIPS), 2019.
- [9] E. Yolcu and B. Póczos.
Learning Local Search Heuristics for Boolean Satisfiability.
Neural Information Processing Systems (NeurIPS), 2019.
- [10] A. Uppal, S. Singh, and B. Póczos.
Nonparametric Density Estimation & Convergence Rates for GANs under Besov IPM Losses.
Neural Information Processing Systems (NeurIPS), 2019.
(Outstanding paper Award, Honorable Mentions).
- [11] Z. Milacski, B. Póczos, and A. Lőrincz.
Differentiable Unrolled Alternating Direction Method of Multipliers for OneNet.
British Machine Vision Conference (BMVC), 2019.
- [12] J. Alison, S. An, M. Andrews, P. Bryant, B. Burkle, S. Gleyzer, U. Heintz, M. Narain, M. Paulini, B. Póczos, and E. Usai.
End-to-end particle and event identification at the Large Hadron Collider with CMS Open Data. *3rd CMS Machine Learning Workshop* CERN, Geneva, Switzerland, 2019.
- [13] M. Andrews, M. Paulini, S. Gleyzer, and B. Póczos.
Exploring End-to-end Deep Learning Applications for Event Classification at CMS.
European Physical Journal (EPJ) Web of Conferences, 2019.
- [14] K. Kandasamy B. Paria and B. Póczos.
A Flexible Framework for Multi-Objective Bayesian Optimization using Random Scalarizations. *Uncertainty in Artificial Intelligence (UAI)*. Tel Aviv, Israel, 2019.
- [15] S. Ge, A. Dill, E. Kang, C. Li, M. Zaheer, and B. Póczos.
Developing Creative AI to Generate Sculptural Objects.
International Symposium on Electronic Art, (ISEA). Gwangju, South-Korea, 2019.
- [16] L. Huang, Z. Jiang, S. Sun, T. Bai, E. Kang, and B. Póczos.
Legend of Wrong Mountain: AI Generated Opera.
International Symposium on Electronic Art, (ISEA). Gwangju, South-Korea, 2019.
- [17] O. Stretcu, M. Toneva, B. Póczos, and T. Mitchell.
Investigating Task Effects on Brain Activity During Stimulus Presentation in MEG.
Human Brain Mapping Conference, (HMB). Minneapolis, MN, 2019.
- [18] E. Platanios, O. Stretcu, G. Neubig, and B. Póczos and T. Mitchell.
Competence-based Curriculum Learning for Neural Machine Translation.

Annual Conference of the North American Chapter of the Association for Computational Linguistics, (NAACL). Minneapolis, MN, 2019.

- [19] Z. Milacski, B. Póczos, and A. Lőrincz.
Group k-Sparse Temporal Convolutional Neural Networks: Unsupervised Pretraining for Video Classification.
International Joint Conference on Neural Networks, (IJCNN). Budapest, Hungary, 2019.
- [20] Z. Wang, Z. Dai, B. Póczos, and J. Carbonell.
Characterizing and Avoiding Negative Transfer.
Computer Vision and Pattern Recognition, (CVPR). Long Beach, CA, 2019.
- [21] C. Li, T. Simon, J. Saragih, B. Póczos, and Y. Sheikh.
LBS Autoencoder: Self-supervised Fitting of Articulated Meshes to Point Clouds.
Computer Vision and Pattern Recognition, (CVPR). Long Beach, CA, 2019.
- [22] W. Chang, C. Li, Y. Yang, and B. Póczos.
Kernel Change-point Detection with Auxiliary Deep Generative Models.
International Conference on Learning Representations, (ICLR). New Orleans, USA, 2019.
- [23] S. Du, X. Zhai, B. Póczos, and A. Singh.
Gradient Descent Provably Optimizes Over-parameterized Neural Networks.
International Conference on Learning Representations, (ICLR). New Orleans, USA, 2019.
- [24] K. Kandasamy, W. Neiswanger, R. Zhang, A. Krishnamurthy, J. Schneider, and B. Póczos.
Myopic Posterior Sampling for Adaptive Goal Oriented Design of Experiments.
International Conference on Machine Learning, (ICML). Long Beach, CA, 2019.
- [25] Y. Wu, B. Póczos, and A. Singh.
Towards Understanding the Generalization Bias of Two Layer Convolutional Linear Classifiers with Gradient Descent.
AI and Statistics, (AISTATS). Naha, Okaniwa, Japan, 2019.
- [26] C. Li, W. Chang, Y. Mroueh, Y. Yang, and B. Póczos.
Implicit Kernel Learning.
AI and Statistics, (AISTATS). Naha, Okaniwa, Japan, 2019.
- [27] H. Pham, P. Liang, T. Manzini, L.-P. Morency, and B. Póczos.
Found in Translation: Learning Robust Joint Representations by Cyclic Translations Between Modalities.
AAAI Conference on Artificial Intelligence (AAAI). Honolulu, Hawaii, 2019.
- [28] D. Martin, B. Póczos, and B. Hollifield.
Machine learning-aided modeling of fixed income instruments.
NeurIPS Workshop on Challenges and Opportunities for AI in Financial Services: the Impact of Fairness, Explainability, Accuracy, and Privacy. Montreal, Canada, 2018.
- [29] C. Li, E. Kang S. Ge, L. Zhang, A. Dill, M. Zaheer, and B. Póczos.
Hallucinating Point Cloud into 3D Sculptural Object.
NeurIPS Workshop on Machine Learning for Creativity and Design. Montreal, Canada, 2018.
- [30] L. Huang, Z. Jiang, S. Sun, T. Bai, E. Kang, and B. Póczos.
Legend of Wrong Mountain: Full Generation of Traditional Chinese Opera Using Multiple Machine Learning Algorithms.
NeurIPS Workshop on Machine Learning for Creativity and Design. Montreal, Canada, 2018.

- [31] K. Kandasamy, W. Neiswanger, J. Schneider, B. Póczos, and E. Xing.
Neural Architecture Search with Bayesian Optimisation and Optimal Transport.
Neural Information Processing Systems, (NeurIPS). Long Beach, CA, 2018.
- [32] S. Singh, A. Uppal, B. Li, C. Li, M. Zaheer, and B. Póczos.
Nonparametric Density Estimation under Adversarial Losses.
Neural Information Processing Systems, (NeurIPS). Long Beach, CA, 2018.
- [33] C. Li Y. Liu and B. Póczos.
Classifier Two-Sample Test for Video Anomaly Detections.
British Machine Vision Conference (BMVC). Newcastle, UK, 2018.
(29.9% acceptance rate).
- [34] P. Sodhi, H. Sun, B. Póczos, and D. Wettergreen.
Robust Plant Phenotyping via Model-based Optimization.
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Madrid, Spain, 2018.
- [35] S. Du, J. Lee, Y. Tian, A. Singhand, and B. Póczos.
Gradient Descent Learns One-hidden-layer CNN: Don't be Afraid of Spurious Local Minima.
International Conference on Machine Learning (ICML). Stockholm, Sweden, 2018.
(25% acceptance rate).
- [36] J. Oliva, K. Dubey, M. Zaheer, R. Salakhutdinov, E. Xing, J. Schneider, and B. Póczos.
Transformation Autoregressive Networks.
International Conference on Machine Learning (ICML). Stockholm, Sweden, 2018.
(25% acceptance rate).
- [37] S. Singla, K. Batmanghelich, and B. Póczos.
Subject2Vec: Generative-Discriminative Approach from a Bag of Image Patches to a Vector.
International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI). Granada, Spain, 2018.
- [38] S. Singh, B. Póczos, and J. Ma.
Reconstruction Risk of Convolutional Sparse Dictionary Learning.
International Conference on Artificial Intelligence and Statistics (AISTATS). Playa Blanca, Lanzarote, Canary Islands, Spain, 2018.
(33% acceptance rate).
- [39] S. Reddi, M. Zaheer, S. Sra, B. Póczos, F. Bach, R. Salakhutdinov, and A. Smola.
A Generic Approach for Escaping Saddle points.
International Conference on Artificial Intelligence and Statistics (AISTATS). Playa Blanca, Lanzarote, Canary Islands, Spain, 2018.
(33% acceptance rate).
- [40] K. Kandasamy, A. Krishnamurthy, J. Schneider, and B. Póczos.
Parallelised Bayesian Optimisation via Thompson Sampling.
International Conference on Artificial Intelligence and Statistics (AISTATS). Playa Blanca, Lanzarote, Canary Islands, Spain, 2018.
(33% acceptance rate).
- [41] B. Póczos M. Zaheer, C. Li and R. Salakhutdinov.
GAN Connoisseur: Can GANs Learn Simple 1D Parametric Distributions?
NIPS Workshop on Deep Learning: Bridging Theory and Practice, Long Beach , CA, 2017.

- [42] M. Ravanbakhsh, J. Schneider, and B. Póczos.
Deep Learning with Sets and Point Clouds.
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TECHNICAL REPORTS

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Thorough Testing of Hierarchical Connectionist Architecture Before its Utilization for Classification Problems. Technical report, Eötvös Loránd University, Budapest, Hungary, 2001. (Technical report for Honda Future Technology Research Group).

THESES

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PATENTS AND INVENTION DISCLOSURES

- [1] N. Washburn, A. Menon, B. Poczso, and K. Zhang.
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US Patent App. 16/488,047.
- [2] N. Washburn, A. Menon, K. Zhang, and B. Póczos.
Machine learning optimization of complex formulations and processes.
Disclosure of Intellectual Property, CMU, Carnegie Mellon File 2017-230, 2017.
- [3] J. Chang, C. Li, B. Póczos, V. Bhagavatula, and A. Sankaranarayanan.
Solving Linear Inverse Problems using Deep Projection Network.
Disclosure of Intellectual Property, CMU, 2017.
- [4] R. Starzl and B. Póczos.
Handwriting Recognition with Deep Neural Network.
Disclosure of Intellectual Property, CMU, 2017.

- [5] N. Washburn, A. Menon, K. Zhang, and B. Póczos.
Hierarchical Machine Learning.
Disclosure of Intellectual Property, CMU, Carnegie Mellon File 2017-142, 2017.
- [6] M. Ravanbaksh, B. Póczos, and R. Greiner.
A New Stochastic Optimization Method Applicable to Analysis of Nuclear Magnetic Resonance Spectra. (UA ref No. 2009054).
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System and Method for Solving Nonlinear Optimization Problem Using Cross Entropy Exploiting Partial Decomposability. (US provisional patent application, serial number: 61/363,042).

ART EXHIBITIONS

- [1] E. Kang, C. Li, S. Ge, L. Zhang, A. Dill, M. Zaheer, and B. Póczos.
Aural Fauna: Illuminato, 2019.
Lux Aeterna Exhibition of ISEA, *Gwangju, Korea*.
- [2] L. Huang, Z. Jiang, S. Sun, T. Bai, E. Kang, and B. Póczos.
Legend of Wrong Mountain, 2018.
2018 NeurIPS Workshop on Machine Learning for Creativity and Design, *Montreal, Canada*
Online gallery: aiartonline.com.
- [3] E. Kang, C. Li, S. Ge, L. Zhang, A. Dill, M. Zaheer, and B. Póczos.
The Hallucinated Body of GANymedes, 2018.
2018 NeurIPS Workshop on Machine Learning for Creativity and Design, *Montreal, Canada*
Online gallery: aiartonline.com.
- [4] E. Kang and B. Póczos.
GANymedes Vox, Feb 16th - March 3rd, 2018.
Future Perfect, Ammerman Center for Arts and Technology 16th Biennial Symposium, Hygienic Art Gallery, *New London, CT*.

SOFTWARE ARTIFACTS

Software implementations are available at:

<http://www.cs.cmu.edu/~bapoczos/code.html>
and <https://github.com/bapoczos>

GRANTS

1. **Data-Driven Discovery of Optimized Multifunctional Material Systems Center of Excellence (D3OM2S CoE)**, 2019-2024
Source of Support: Air Force Research Laboratory
Principal Investigator: Elizabeth Holm
Amount: \$5,000,000
2. **Integrated Design of Chemical Admixture Systems for Ultradurable, Low CO2 Alternative Binder Chemistries via Machine Learning**, 2020-2021
Source of Support: ARPA-E
Principal Investigator: Newell Washburn
Amount: \$566,370
3. **Sensemaking with Large, Heterogeneous Small Satellite Constellations**, 2018-2020
Source of Support: Lockheed Martin Corporation
Principal Investigator: Barnabás Póczos

- Amount: \$450,000
4. **Monte Carlo Search for Answers**, 2018-2019
Source of Support: JPMorgan Chase Bank
Principal Investigator: Barnabás Póczos
Amount: \$120,000
 5. **Accelerating MAM Commercialization and Military Readiness: Expert-guided Machine Learning to Identify Candidate Parts and Subassemblies for Additive Manufacturing**, 2018-2019
Source of Support: Manufacturing Futures Initiative (MFI)
Principal Investigator: Alex Davis
Amount: \$177,779
 6. **Development of High-throughput Photoreactors and Computational Tools for the Discovery and Manufacturing of Solar Fuels and Functional Materials**, 2018-2019
Source of Support: Manufacturing Futures Initiative (MFI)
Principal Investigator: Stefan Bernhard
Amount: \$177,288
 7. **Machine Learning Approach to Develop High Entropy Alloy Coatings for Additive Manufacturing**, 2018-2019
Source of Support: Manufacturing Futures Initiative (MFI)
Principal Investigator: Maarten De Boer
Amount: \$175,349
 8. **Machine-Learning for Automatic Generation of Electronic Systems through Intelligent Collaboration (MAGESTIC) in support of Intelligent Design of Electronic Assets (IDEA)** 2018-2022
Source of Support: Cadence Design Systems / DARPA
Principal Investigator: Levent Burak Kara
Amount: \$1,128,513
 9. **Many-Body Perturbation Theory Meets Machine Learning to Discover Singlet Fission Materials** Source of Support: ALCF's Aurora Early Science Program for Data and Learning 2018-2021
Principal Investigator: Noa Marom
Co-Principal Investigators: Jack Deslippe, Luca Ghiringhelli, and Barnabás Póczos
Amount: 50 million ExaFLOPS-hours, 100 TB Disk Storage, and salary support for one postdoc
 10. **Deep Learning Based Question Answering and Dialogue Systems** , 2017-2018
Source of Support: JPMorgan Chase Bank
Principal Investigator: Barnabás Póczos
Amount: \$180,000
 11. **Computer-Controlled Molecular Machinery: Using Data-Driven Chemistry to Unlock Photocatalytic Pathways to Renewable Energy**, 2018-2019
Source of Support: Kavcic-Moura Endowment Fund
Principal Investigator: Stefan Bernhard
Co-Principal Investigators: David Yaron, Kevin Noonan, Nikolaos Sahinidis, Katerina Fragkiadaki, Barnabás Póczos, and Tomasz Kowalewski
Amount: \$75,000
 12. **Interactive Learning from Sparse and Diverse Feedback**, 2017-2018
Source of Support: Air Force Research Laboratory
Principal Investigator: Aarti Singh
Co-Principal Investigators: Barnabás Póczos, and Artur Dubrawski
Amount: \$440,344
 13. **Machine Learning Unified Synchronous Experimentation (MUSE): Rapid Autonomous Discovery/Optimization of Electrode and Electrolyte Materials**, 2017-2021
Source of Support: Toyota Research Institute
Principal Investigator: Jay Whitacre

- Co-Principal Investigators: Venkat Viswanathan, Barnabás Póczos, and Aditya Parameswaran
Amount: \$1,132,914
14. **Machine Learning in Support of Additive Manufacturing**, 2017-2018
Source of Support: Manufacturing Futures Initiative (MFI)
Principal Investigators: Elizabeth A. Holm and Jack Beuth
Co-Principal Investigators: Burak Kara, Barnabás Póczos, Anthony D. Rollett, and Mahadev Satyanarayanan
Amount: \$333,901
 15. **Accessible Machine Learning**, 2017-2021
Source of Support: DARPA D3M program
Principal Investigator: Artur Dubrawski. Co-Principal Investigators: Eric Nyberg and Barnabás Póczos
Amount: \$2,099,981
 16. **Scalable Machine Learning for Automating Scientific Discovery in Astrophysics**, 2016-2020
Source of Support: NSF-III-RI Medium
Principal Investigator: Barnabás Póczos. Co-Principal Investigators: Eric Xing, Andrew Wilson, Rachel Mandelbaum. Senior Personnel: Hy Trac, Shirley Ho
Amount: \$1,099,889
 17. **Amazon Web Services (AWS) award**, 2016-2017
Principal Investigator: Barnabás Póczos.
Amount: \$4,500
 18. **Airplane Parts Demand Forecasting and Inventory Optimization**, 2015-2019
Source of Support: Boeing Aerospace Data Analytics Lab
Principal Investigator: Jaime Carbonell, Alex Smola (2015-2020), and Barnabás Póczos.
Amount: \$2,083,942
 19. **Airplane Maintenance and Handwriting Recognition**, 2015-2020
Source of Support: Boeing Aerospace Data Analytics Lab
Principal Investigator: Ravi Starzl (2015-2017) and Barnabás Póczos.
Amount: \$1,189,496
 20. **Automated Terra Phenotyping System for Genetic Improvement of Energy Crops**
ARPA-E grant, 2015-2017.
Principal Investigator: William L. Rooney, Texas A&M AgriLife Research, College Station, Texas
Co-Principal Investigators: David Wettergreen, Dimitrios Apostolopoulos, Herman Herman, Barnabás Póczos (Carnegie Mellon University, Pittsburgh, Pennsylvania)
John Mullet, Alex Thomasson (Texas A&M AgriLife Research, College Station, Texas)
Amount: \$2,440,000
 21. **Anomaly Detection On Piezometer Data Collected From Embankment Dams**
Pennsylvania Infrastructure Technology Alliance, 2015.
Principal Investigator: Mario Berges, Co-Principal Investigator: Barnabás Póczos.
Amount: \$40,000
 22. **ConnPort: A standardized interface accessing human connectome data.**
ProSEED/BrainHub seed grant, 2015.
Principal Investigators: Timothy Verstynen, Aarti Singh, Barnabás Póczos.
Amount: \$45,000
 23. **Intelligent Data Ecosystem For Automation (IDEA)** (2014-2017).
Source of Support: Foxconn Technology Group
Principal Investigator: Howie Choset.
Amount: Barnabas Poczcos (co-PI) portion is \approx \$476,000.
 24. **Nonparametric machine learning on sets, functions, and distributions.**
NSF-EAGER, 2012-2014. Award Number:1250350
Principal Investigator: Barnabás Póczos; Co-Principal Investigator: Artur Dubrawski.
Amount: \$200,000
 25. **Distribution-based machine learning for high dimensional datasets.**

NSF-BIGDATA, 2012-2016. Award Number: 1247658

Principal Investigator: Aarti Singh. Co-Principal Investigators: Barnabás Póczos, Timothy Verstynen.

Amount: \$1,000,000

26. **Machine Learning Algorithms for Matching Theories, Simulations, and Observations in Cosmology.**

DOE Program: Mathematical and Statistical Methodologies for DOE Data-Centric Science at Scale. 2014-2017

Principal Investigators: Barnabás Póczos (2015-2017), Jeff Schneider (2014-2015). Co-Principal Investigators: Chris Genovese, Shirley Ho. Senior Personnel: Peter Freeman, Rachel Mandelbaum, Chad Schafer, Hy Trac

Amount: \$1,650,000