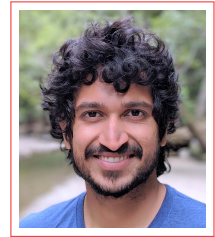


# Aaditya K. Ramdas

## Curriculum Vitae



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📁 [stat.cmu.edu/~aramdas](https://stat.cmu.edu/~aramdas)

### Research summary

My research spans algorithms, theory and applications of statistical inference and machine learning:

- **reproducibility in science and technology**
  - controlling false discoveries in novel static and dynamic settings
  - multiple hypothesis testing, selective and simultaneous inference,
  - quantifying selection bias, causal inference
- **active, sequential decision-making**
  - experimentation for online and streaming settings
  - human-in-the-loop interactive inference
  - large-scale A/B-testing, multi-armed bandits
- **assumption-light uncertainty quantification**
  - always-valid sequential confidence intervals, anytime  $p$ -values
  - conformal prediction sets, distribution-free calibration
  - game theoretic statistical inference via betting and  $e$ -values

### Employment and Background

2022–	Visiting Academic, Amazon Research (AWS),	20%.
2018–	Assistant Professor (tenure-track). Department of Statistics and Data Science (Dietrich College) Machine Learning Department (School of CS) <b>Carnegie Mellon University (CMU)</b> , Pittsburgh (USA)	75%. 25%.
2021–22	Bain Advisor Network, Bain & Company,	Consulting.
2019	Visiting professor, Microsoft Research, <i>Montreal</i> ,	Summer.
2015–18	Postdoctoral Researcher in EECS and Statistics. <b>University of California, Berkeley (UCB)</b> , Berkeley (USA) Mentors: Michael I. Jordan & Martin J. Wainwright	
2010–15	MS+PhD in Statistics and Machine Learning. <b>Carnegie Mellon University (CMU)</b> , Pittsburgh (USA) Advisors: Larry Wasserman & Aarti Singh	GPA 4.2/4
2009-10	Algorithmic financial trading, Tower Research Capital, (India+USA).	
2005–09	Bachelors in Computer Science and Engineering. <b>Indian Institute of Technology (IIT)</b> , Bombay (India)	GPA 9.44/10, Rank 9/600, 3/60

### (Selected) Awards and Honors

Excludes paper awards, which are mentioned along with the papers in the next section.

- 2023 Invited Lecturer, Lunteren Annual Meeting of Dutch Statisticians and Probabilists
- 2022 Invited Lecturer, CUSO Summer School for Swiss students in Statistics and Probability
- 2022 Invited Tutorial, Indian National Conference on Communications
- 2022 Google Research Scholar Award
- 2020-25 NSF CAREER Award
- 2021 COPSS Leadership Academy Award
- 2020 Bernoulli New Researcher Award
- 2019 Adobe Faculty Research Award

- 2015 Umesh K. Gavaskar Memorial PhD Thesis Award, Department of Statistics
- 2015 Alan J. Perlis Graduate Student Teaching Award, School of Computer Science
- 2015 Mihaela Serban Memorial Award, American Statistical Association, Pittsburgh chapter
- 2015 Outstanding Representative Award, Graduate Student Assembly
- 2014 Graduate Student Teaching Award, Machine Learning Department
- 2013 Doug Beeferman PhD Fellowship, Machine Learning Department
  
- 2009 IIT Bombay Cultural Citation, highest honor for cultural accomplishments over 4 years
- 2006-09 Inlaks Full Scholarship, for best all-round student (academic+extra-curricular) in IIT Bombay
- 2005 Prime Minister's invitee to Republic Day Parade, for academic excellence\*

IIT Joint Entrance Exam India Rank 47/400,000, \*Central Board Exams 97.4%, India Rank 10/300,000

## Published or accepted peer-reviewed journal papers

Hyperlinks to all papers (arXiv, proceedings, software) are available from my website publications page. They are omitted here for brevity.

- 42. 2023 On the power of conditional independence testing under model-X.  
E. Katsevich, A. Ramdas Elec J Stat
- 41. 2023 Estimating means of bounded random variables by betting.  
I. Waudby-Smith, A. Ramdas J Royal Stat Soc B  
Discussion paper  
Presentation award, Waterloo student conference
- 40. 2022 Gaussian universal inference.  
R. Dunn, S. Balakrishnan, A. Ramdas, L. Wasserman Biometrika
- 39. 2022 Brainprints: identifying individuals using magnetoencephalograms.  
S. Wu, A. Ramdas, L. Wehbe Nature Comm Bio
- 38. 2022 Distribution-free prediction sets for two-layer hierarchical models.  
R. Dunn, L. Wasserman, A. Ramdas J American Stat Assoc
- 37. 2022 Large-scale simultaneous inference under dependence.  
J. Tian, X. Chen, E. Katsevich, J. Goeman, A. Ramdas Scandinavian J Stat
- 36. 2022 False discovery rate control using e-values.  
R. Wang, A. Ramdas J Royal Stat Soc B
- 35. 2022 Sequential estimation of quantiles with applications to A/B-testing & bandits.  
S. Howard, A. Ramdas Bernoulli
- 34. 2022 Nested conformal prediction and quantile out-of-bag ensemble methods.  
C. Gupta, A. Kuchibhotla, A. Ramdas Pattern Recognition
- 33. 2021 Testing exchangeability: fork-convexity, supermartingales, and e-processes.  
A. Ramdas, J. Ruf, M. Larsson, W. Koolen Intl J Approx Reasoning
- 32. 2021 Fast and powerful conditional randomization testing via distillation.  
M. Liu, E. Katsevich, L. Janson, A. Ramdas Biometrika
- 31. 2021 On the bias, risk and consistency of sample means in multi-armed bandits.  
J. Shin, A. Ramdas, A. Rinaldo SIAM J Math of Data Science
- 30. 2021 Nonparametric iterated-logarithm extensions of the sequential generalized LRT.  
J. Shin, A. Ramdas, A. Rinaldo IEEE J Selected Areas in Info Theory
- 29. 2021 Path length bounds for gradient descent and flow.  
C. Gupta, S. Balakrishnan, A. Ramdas J ML Research
- 28. 2021 Time-uniform, nonparametric, nonasymptotic confidence sequences.  
S. Howard, A. Ramdas, J. Sekhon, J. McAuliffe Annals of Stat
- 27. 2021 Asynchronous online testing of multiple hypotheses.  
T. Zrnic, A. Ramdas, M. Jordan J ML Research
- 26. 2021 Classification accuracy as a proxy for two-sample testing.  
I. Kim\*, A. Ramdas\*, A. Singh, L. Wasserman Annals of Stat  
Winner, Stat Learning & Data Science Student Paper Award
- 25. 2021 Online control of the familywise error rate.  
J. Tian, A. Ramdas Stat Meth in Medical Research

24. 2021 Predictive inference with the jackknife+.  
R. Barber, E. Candes, A. Ramdas, R. Tibshirani Annals of Stat
23. 2020 Interactive martingale tests for the global null.  
B. Duan, A. Ramdas, S. Balakrishnan, L. Wasserman Elec J Stat
22. 2020 A general interactive framework for FDR control under structural constraints.  
L. Lei, A. Ramdas, W. Fithian Biometrika
21. 2020 Simultaneous high-prob. bounds on the FDP in structured, regression & online settings.  
E. Katsevich, A. Ramdas Annals of Stat
20. 2020 The limits of distribution-free conditional predictive inference.  
R. Barber, E. Candes, A. Ramdas, R. Tibshirani Information & Inference
19. 2020 Time-uniform Chernoff bounds via nonnegative supermartingales.  
S. Howard, A. Ramdas, J. Sekhon, J. McAuliffe Prob Surveys
18. 2020 Universal inference.  
L. Wasserman\*, A. Ramdas\*, S. Balakrishnan\* PNAS
17. 2020 Optimal rates and tradeoffs in multiple testing.  
M. Rabinovich, A. Ramdas, M. Wainwright, M. Jordan Stat Sinica
16. 2019 Decoding from pooled data (I): sharp information-theoretic bounds.  
A. El-Alaoui, A. Ramdas, F. Krzakala, L. Zdeborova, M. Jordan SIAM J Math of Data Science
15. 2019 Decoding from pooled data (II): phase transitions of message passing.  
A. El-Alaoui, A. Ramdas, F. Krzakala, L. Zdeborova, M. Jordan IEEE Trans. Info Theory
14. 2019 A unified treatment of multiple testing with prior knowledge using the p-filter.  
A. Ramdas, R. Barber, M. Wainwright, M. Jordan Annals of Stat
13. 2019 Function-specific mixing times and concentration away from equilibrium.  
M. Rabinovich, A. Ramdas, M. Wainwright, M. Jordan Bayesian Analysis
12. 2019 DAGGER: a sequential algorithm for FDR control on DAGs.  
A. Ramdas, J. Chen, M. Wainwright, M. Jordan Biometrika
11. 2018 On kernel methods for covariates that are rankings.  
H. Mania, A. Ramdas, M. Wainwright, M. Jordan, B. Recht Elec J of Statistics
10. 2018 The power of online thinning in reducing discrepancy.  
R. Dwivedi, O. N. Feldheim, O. G. Gurevich, A. Ramdas Prob Theory Related Fields
9. 2017 Iterative methods for solving factorized linear systems.  
A. Ma, D. Needell, A. Ramdas SIAM J Matrix Analysis and App
8. 2017 Rows vs. columns: randomized Kaczmarz or Gauss-Seidel for ridge regression.  
A. Hefny\*, D. Needell\*, A. Ramdas\* SIAM J Scientific Comp.
7. 2016 p-filter: multi-layer FDR control for grouped hypotheses.  
R. Barber\*, A. Ramdas\* J Royal Stat Soc B
6. 2016 Wasserstein two-sample testing and related families of nonparametric tests.  
A. Ramdas, N. Garcia, M. Cuturi Entropy
5. 2016 Fast & flexible ADMM algorithms for trend filtering.  
A. Ramdas, R. Tibshirani J Comp and Graphical Stat
4. 2015 Convergence properties of the rand. extended Gauss-Seidel & Kaczmarz methods.  
A. Ma\*, D. Needell\*, A. Ramdas\* SIAM J Matrix Analysis and App.
3. 2015 Towards a deeper geometric, analytic and algorithmic understanding of margins.  
A. Ramdas, J. Peña Opt Meth and Software
2. 2015 Regularized brain reading with shrinkage and smoothing.  
L. Wehbe, A. Ramdas, R. Steorts, C. Shalizi Annals of Applied Stat
1. 2014 Simultaneously uncovering patterns of brain regions involved in story reading.  
L. Wehbe, B. Murphy, P. Talukdar, A. Fyshe, A. Ramdas, T. Mitchell PLoS ONE

## Published, full-length, peer-reviewed conference papers

Most AI/ML conferences have blind peer-reviewing, low acceptance rates (20-30%), and official proceedings. Oral talks often indicate top few percent of all papers. The following list excludes short workshop papers, which usually have high acceptance rates, and often no proceedings.

41. 2022 Brownian noise reduction: maximizing privacy subject to accuracy constraints.  
J. Whitehouse, A. Ramdas, S. Wu, R. Rogers [NeurIPS](#)
40. 2022 A permutation-free kernel two sample test.  
S. Shekhar, I. Kim, A. Ramdas [long oral](#) [NeurIPS](#)
39. 2022 Faster online calibration without randomization: interval forecasts and power of two choices.  
C. Gupta, A. Ramdas [COLT](#)
38. 2022 Top-label calibration and multiclass-to-binary reductions.  
C. Gupta, A. Ramdas [ICLR](#)
37. 2022 Tracking the risk of a deployed model and detecting harmful distribution shifts.  
A. Podkopaev, A. Ramdas [ICLR](#)
36. 2022 Interactive rank testing by betting.  
B. Duan, L. Wasserman, A. Ramdas [long oral](#) [CLEAR](#)
35. 2021 A unified framework for bandit multiple testing.  
N. Xu, R. Wang, A. Ramdas [NeurIPS](#)
34. 2021 RiLACS: risk limiting audits via confidence sequences.  
I. Waudby-Smith, P. Stark, A. Ramdas [EVoteID](#)  
[Best Paper Award](#)
33. 2021 Distribution-free uncertainty quantification for classification under label shift.  
A. Podkopaev, A. Ramdas [long oral](#) [UAI](#)
32. 2021 Best arm identification in additive transfer bandits.  
O. Neopane, A. Singh, A. Ramdas [Asilomar](#)  
[Best Student Paper Award](#)
31. 2021 Distribution-free calibration guarantees for uniform-mass binning without sample splitting.  
C. Gupta, A. Ramdas [ICML](#)
30. 2021 Off-policy confidence sequences.  
N. Karampatziakis, P. Mineiro, A. Ramdas [ICML](#)
29. 2021 Dynamic algorithms for online multiple testing.  
N. Xu, A. Ramdas [Math and Sci ML](#)
28. 2021 Uncertainty quantification using martingales for misspecified Gaussian processes.  
W. Neiswanger, A. Ramdas [ALT](#)
27. 2020 Confidence sequences for sampling without replacement.  
I. Waudby-Smith, A. Ramdas [spotlight](#) [NeurIPS](#)
26. 2020 Distribution-free binary classification: prediction sets, confidence intervals and calibration.  
C. Gupta, A. Podkopaev, A. Ramdas [spotlight](#) [NeurIPS](#)
25. 2020 Familywise error rate control by interactive unmasking.  
B. Duan, A. Ramdas, L. Wasserman [ICML](#)
24. 2020 Conditional versus marginal bias in multi-armed bandits.  
J. Shin, A. Ramdas, A. Rinaldo [ICML](#)
23. 2020 Online control of the false coverage rate and false sign rate.  
A. Weinstein\*, A. Ramdas\* [ICML](#)
22. 2020 The power of batching in multiple hypothesis testing.  
T. Zrnic, D. Jiang, A. Ramdas, M. Jordan [AISTATS](#)
21. 2020 Analyzing student strategies in blended courses using clickstream data.  
N. Akpinar, A. Ramdas, U. Acar [long oral](#) [Edu. Data Mining](#)
20. 2019 Conformal prediction under covariate shift.  
R. Tibshirani, R. Barber, E. Candes, A. Ramdas [NeurIPS](#)
19. 2019 A higher order Kolmogorov-Smirnov test.  
V. Sadhanala, Y. Wang, A. Ramdas, R. Tibshirani [long oral](#) [AISTATS](#)
18. 2019 Are sample means in multi-armed bandits positively or negatively biased?.  
J. Shin, A. Ramdas, A. Rinaldo [spotlight](#) [NeurIPS](#)
17. 2019 ADDIS: an adaptive discarding alg. for online FDR control with conservative nulls.  
J. Tian, A. Ramdas [NeurIPS](#)
16. 2018 SAFFRON: an adaptive algorithm for online FDR control.  
A. Ramdas, T. Zrnic, M. Wainwright, M. Jordan [long oral](#) [ICML](#)

15. 2017 Online control of the false discovery rate with decaying memory.  
A. Ramdas, F. Yang, M. Wainwright, M. Jordan [long oral](#) NeurIPS
14. 2017 MAB-FDR: Multi (A)rmed/(B)andit testing with online FDR control.  
F. Yang, A. Ramdas, K. Jamieson, M. Wainwright [spotlight](#) NeurIPS
13. 2017 QuTE: decentralized multiple testing on sensor networks with FDR control.  
A. Ramdas, J. Chen, M. Wainwright, M. Jordan IEEE CDC
12. 2017 Generative models and model criticism via optimized Maximum Mean Discrepancy.  
D. Sutherland, H. Tung, H. Strathmann, S. De, A. Ramdas, A. Smola, A. Gretton ICLR
11. 2016 Sequential nonparametric testing using the law of the iterated logarithm.  
A. Balsubramani\*, A. Ramdas\* UAI
10. 2016 Minimax lower bounds for linear independence testing.  
D. Isenberg\*, A. Ramdas\*, A. Singh, L. Wasserman IEEE ISIT
9. 2016 Asymptotic behavior of  $\ell_q$ -based Laplacian regularization in semi-supervised learning.  
A. El-Alaoui, X. Cheng, A. Ramdas, M. Wainwright, M. Jordan COLT
8. 2015 Fast two-sample testing with analytic representations of probability measures.  
K. Chwialkowski, A. Ramdas, D. Sejdinovic, A. Gretton NeurIPS
7. 2015 High-dimensional power of linear-time two-sample tests for mean-shift alternatives.  
S. Reddi\*, A. Ramdas\*, B. Poczos, A. Singh, L. Wasserman AISTATS
6. 2015 On the decreasing power of kernel- & distance-based hyp. tests in high dimensions.  
A. Ramdas\*, S. Reddi\*, B. Poczos, A. Singh, L. Wasserman AAAI
5. 2015 Nonparametric independence testing for small sample sizes.  
A. Ramdas\*, L. Wehbe\* [long oral](#) IJCAI
4. 2014 Margins, kernels and non-linear smoothed perceptrons.  
A. Ramdas, J. Peña [long oral](#) ICML
3. 2014 An analysis of active learning with uniform feature noise.  
A. Ramdas, B. Poczos, A. Singh, L. Wasserman [long oral](#) AISTATS
2. 2013 Optimal rates for stochastic convex optimization under Tsybakov noise condition.  
A. Ramdas, A. Singh [long oral](#) ICML
1. 2013 Algorithmic connections between active learning & stochastic convex optimization.  
A. Ramdas, A. Singh [long oral](#) ALT

## Under Revision

- (arXiv) Comparing sequential forecasters.  
YJ. Choe, A. Ramdas [revision](#), Operations Research  
[Runner-up, Research Competition, Citadel Inaugural PhD Student Summit](#)
- (arXiv) Permutation tests using arbitrary permutation distributions.  
A. Ramdas, R. Barber, E. Candes, R. Tibshirani [revision](#), Sankhya

## Awaiting Review

- (arXiv) Nonparametric two-sample testing by betting.  
S. Shekhar, A. Ramdas [revised](#), IEEE Trans IT
- (arXiv) Dimension-agnostic inference using cross U-statistics.  
I. Kim, A. Ramdas [revised](#), Bernoulli
- (arXiv) Conformal prediction beyond exchangeability.  
R. Barber, E. Candes, A. Ramdas, R. Tibshirani [revised](#), AoS
- (arXiv) Sequential estimation of convex functionals and divergences.  
T. Manole, A. Ramdas [submitted](#), IEEE Trans IT  
[Winner, Statistical Society of Canada, Student Paper Award](#)
- (arXiv) A composite generalization of Ville's martingale theorem.  
J. Ruf, M. Larsson, W. Koolen, A. Ramdas [submitted](#), Elec J Prob
- (arXiv) Catoni-style confidence sequences for heavy-tailed mean estimation.  
H. Wang, A. Ramdas [submitted](#), Stoch Proc App

- (arXiv) Online multiple hypothesis testing for reproducible research.  
D. Robertson, J. Wason, A. Ramdas submitted, Stat Sci
- (arXiv) Game-theoretic statistics and safe anytime-valid inference.  
A. Ramdas, P. Grunwald, V. Vovk, G. Shafer invited paper
- (arXiv) Data fission: splitting a single data point.  
J. Leiner, B. Duan, L. Wasserman, A. Ramdas submitted, JASA  
Runner-up, Poster Competition, Multiple Comparisons Procedures
- (arXiv) Time-uniform central limit theory with applications to sequential causal inference.  
I. Waudby-Smith, D. Arbour, R. Sinha, E. Kennedy, A. Ramdas submitted, AoS
- (pre) Huber-robust confidence sequences.  
H. Wang, A. Ramdas submitted, AISTATS
- (arXiv) Anytime-valid off-policy inference in contextual bandits.  
I. Waudby-Smith, L. Wang, A. Ramdas, N. Karampatziakis, P. Mineiro submitted, ACM/IMS JDS
- (arXiv) E-values as unnormalized weights in multiple testing.  
N. Ignatiadis, R. Wang, A. Ramdas submitted, Biometrika
- (arXiv) Universal inference meets random projections: a scalable test for log-concavity.  
R. Dunn, A. Gangrade, A. Ramdas, L. Wasserman submitted, JASA

## Working papers

- (arXiv) A nonparametric extension of Warner's randomized response for bounded observations.  
I. Waudby-Smith, S. Wu, A. Ramdas
- (arXiv) Fully adaptive composition in differential privacy.  
J. Whitehouse, A. Ramdas, S. Wu, R. Rogers
- (arXiv) Interactive identification of individuals with positive treatment effect while controlling FDR.  
B. Duan, L. Wasserman, A. Ramdas
- (arXiv) Admissible anytime-valid sequential inference must rely on nonnegative martingales.  
A. Ramdas, J. Ruf, M. Larsson, W. Koolen
- (pre) The lady keeps tasting coffee.  
A. Ramdas, L. Wehbe
- (arXiv) E-detectors: a nonparametric framework for online changepoint detection.  
J. Shin, A. Rinaldo, A. Ramdas
- (arXiv) Post-selection inference for e-value based confidence intervals.  
Z. Xu, R. Wang, A. Ramdas tbs, JASA  
Runner-up, Poster Competition, Multiple Comparisons Procedures

## Miscellaneous articles

- 2021 Discussion of "Testing by Betting".  
A. Ramdas J Royal Stat Soc A
- 2019 Discussion of "Covariate-assisted ranking and screening for two-sample inference".  
A. Ramdas J Royal Stat Soc B
- 2015 Adaptivity & comp.-Stat tradeoffs for high-dimensional two-sample testing.  
A. Ramdas, S. Reddi, B. Poczos, A. Singh, L. Wasserman technical report
- 2015 Computational and Statistical Advances in Testing and Learning.  
A. Ramdas CMU PhD Thesis  
Umesh K. Gavaskar Memorial Thesis Award
- 2011 Algorithms for graph similarity and subgraph matching.  
D. Koutra, A. Parikh, A. Ramdas, J. Xiang technical report

## Presentations

Slides and videos to several talks and tutorials are linked from my website.

### University Seminars

- 2022 Conformal prediction beyond exchangeability (ETH Zurich, CS)  
Estimating means of bounded random variables by betting (Rutgers, Stat)

	Game-theoretic statistics	(Geneva, Stat)
	Conformal prediction beyond exchangeability	(Ecole Poly, Stat)
2021	Universal inference, e-values and multiple testing	(Mich State U, Stat)
	Universal inference, e-values and multiple testing	(Duke, BioStat)
	Comparing sequential forecasters	(USC, Marshall)
	Comparing sequential forecasters	(UC Boulder, CS)
	Universal inference, e-values and multiple testing	(UC Riverside, Stat)
	Sequential, interactive, dimension-agnostic inference	(CERN, Stat/Phy)
	Estimating means of bounded random variables by betting	(ETH, Stat)
	Estimating means of bounded random variables by betting	(Iowa, Stat)
	Distribution-free uncertainty quantification: conformal and calibration	(MBZUAI, CS)
	Distribution-free multi-class calibration	(UFSCAR, Stat)
2020	Dimension-agnostic inference	(Ecole Poly., Stat/Prob)
	Distribution-free inference: conformal prediction and calibration	(UToulouse, Stat/ML)
	The lady keeps tasting coffee	(UGA, Stat)
	Betting scores, e-values and martingales	(Rutgers, Prob)
	Online multiple testing	(UNC, Biostat)
	Election auditing via confidence sequences for sampling w/o replacement	(UWaterloo, Stat)
	Election auditing via confidence sequences for sampling w/o replacement	(CMU, Theory)
	Assumption-free prediction intervals for black-box regression algorithms	(Princeton, IAS)
2019	Uniform, nonasymptotic, nonparametric confidence sequences	(Columbia, Prob)
	Bias, risk and consistency of sample means in multi-armed bandits	(Rice, ECE)
	Uniform, nonasymptotic, nonparametric confidence sequences	(McGill, Stat)
	Exponential line-crossing inequalities	(MIT, IDSS)
	Bias, risk and consistency of sample means in multi-armed bandits	(Berkeley, EE)
	Quantiles for bandits and RL	(Mila, CS)
	Doubly-sequential experimentation	(IU, Psych)
2018	Sequential estimation of coin bias and nonparametric generalizations	(Oxford, CSML)
	A new framework for large-scale sequential A/B testing	(IIT Delhi, CS)
	Interactive algorithms for multiple hypothesis testing	(USC, Marshall)
	Exponential line-crossing inequalities	(USC, Math)
	Uniform, nonasymptotic, nonparametric confidence sequences	(Bocconi Milan, DS)
	Interactive algorithms for multiple hypothesis testing	(UCSD, Math)
	Interactive algorithms for multiple hypothesis testing	(UC Davis, Stat)
	Interactive algorithms for multiple hypothesis testing	(UIUC, Stat)
	Interactive algorithms for multiple hypothesis testing	(GaTech, ISyE)
	From stopping times to spotting times in multiple testing	(Stanford, Stat)
	Towards “simultaneous selective inference”	(Berkeley, Stat)
	From stopping times to spotting times in multiple testing	(Princeton, ORFE)
	From stopping times to spotting times in multiple testing	(Cambridge, Stat)
	Towards “simultaneous selective inference”	(UMich., Stat)
	Interactive algorithms for multiple hypothesis testing	(CMU, Stat)
	Towards “simultaneous selective inference”	(Wharton, Stat)
	Towards “simultaneous selective inference”	(EPFL, Math.)
	A new framework for large-scale sequential A/B testing	(EPFL, CS)
	A new framework for large-scale sequential A/B testing	(ETH Zurich, CS)
	Interactive algorithms for multiple hypothesis testing	(Caltech, CMS)
	Interactive algorithms for multiple hypothesis testing	(Duke, Stat)
	A new framework for large-scale sequential A/B testing	(UCL, Gatsby)
	Interactive algorithms for multiple hypothesis testing	(Columbia, Stat)
	Interactive algorithms for multiple hypothesis testing	(UChicago, Stat+Booth)
	Interactive algorithms for multiple hypothesis testing	(UWash., Stat)

	Interactive algorithms for multiple hypothesis testing	(Harvard, Stat)
	Interactive algorithms for multiple hypothesis testing	(Yale, Stat)
	Interactive algorithms for multiple hypothesis testing	(Cornell, Stat)
	A new framework for large-scale sequential A/B testing	(UIUC, CS)
	A new framework for large-scale sequential A/B testing	(Columbia, CS)
2017	DAGGER: A sequential algorithm for FDR control on DAGs	(Stanford, BioStat)
	DAGGER: A sequential algorithm for FDR control on DAGs	(UCB, BioStat seminar)
	STAR: Interactive multiple testing for structured FDR control	(Temple Univ., Stat)
	STAR: Interactive multiple testing for structured FDR control	(UTSW, Biomed.)
	Is reproducibility a problem in the tech industry?	(UCB, BAIR seminar)
	Multi (A)rmcd/(B)andit testing with online FDR control	(UTSW, Biomed.)
	Multi (A)rmcd/(B)andit testing with online FDR control	(CMU, ML/AI)
	Multi (A)rmcd/(B)andit testing with online FDR control	(Stanford, MS&E)
	Multi (A)rmcd/(B)andit testing with online FDR control	(UT Austin, ECE)
	QuTE: Decentralized FDR control on sensor networks	(UCB, BLISS seminar)
2016	False Discovery Rate - a tutorial and new directions	(IIT Bombay, EE)
	p-Filter: FDR control for grouped hypotheses	(Wharton, Stat)
	p-Filter: FDR control for grouped hypotheses	(Stanford, Stat)
	p-Filter: FDR control for grouped hypotheses	(UC Davis, Stat)
	Asymptotics of Laplacian regularization in semi-supervised learning	(CMU, ML)
2015	Adaptivity in high-dimensional two sample testing	(UC Berkeley, CS)
2014	Adaptivity in high-dimensional two sample testing	(Kyoto University, Stat)
	Adaptivity in high-dimensional two sample testing	(ISM Tachikawa, Stat)
	Fast & flexible algorithms for trend filtering	(Gatsby, Neuro.)
2013	Connecting active learning and stochastic optimization	(CMI Chennai, Math.)
	Connecting active learning and stochastic optimization	(IIT Madras, CS)

### Industry Research Labs

2022	Conformal prediction	(Bain, NY)
	Auditing elections: why and how?	(Amazon, Berlin)
	Conditional independence testing	(Amazon, Bay Area)
	Fully adaptive composition in differential privacy	(Google, NY)
	Doubly-sequential experimentation	(Google, Mountain View)
	Asymptotic confidence sequences	(Adobe, Bay Area)
2021	Auditing elections: why and how?	(MSR, NY)
	Doubly sequential experimentation	(Vinted, Lithuania)
	Universal inference, e-values and multiple testing	(Novartis)
2020	Interactive, sequential experimentation	(Berry Consultants, NY)
2019	A framework for asynchronous large-scale sequential testing	(Two Sigma, NY)
	A framework for asynchronous large-scale sequential testing	(MSR, Montreal)
	Sequential estimation of quantiles for A/B testing and bandits	(MSR, Redmond)
	Are bandit sample means positively or negatively biased?	(Google, Pittsburgh)
	A gentle introduction to conformal prediction	(MSR, Montreal)
2018	A new framework for large-scale sequential A/B testing	(MSR, New England)
2017	Is reproducibility a problem in the tech industry?	(Uber Research, SF)
	Is reproducibility a problem in the tech industry?	(AirBnB Research, SF)
2016	Sequential and multiple testing in modern ML	(Groupon Research, Palo Alto)
	p-Filter: FDR control for grouped hypotheses	(Lawrence National Labs, Livermore)
	Multiple testing issues in industry	(AmpLab industry retreat)
2015	Sequential nonparametric testing	(Alibaba Research, Seattle)
	Sequential nonparametric testing	(Google Research, Pittsburgh)
2014	Fast & flexible algorithms for trend filtering	(MSR, Cambridge)



- 2013 Active learning & stochastic optimization (IBM Research, Bangalore)  
 2012 Connecting statistical & logical inference (MSR, Cambridge)

### Conference and Workshop Talks

- 2022 Online nonparametric changepoint detection with e-detectors (CISS)  
 E-values as unnormalized weights in multiple testing (ISSI)  
 Interactive rank testing by betting (CLEAR)  
 Safe anytime-valid inference in bandit data analysis (OneWorld)  
 Universal inference (BFF)
- 2021 Interactive and online multiple testing (JRSS Webinar)  
 A semiparametric approach to variable importance (JSM)  
 Distribution-free uncertainty quantification (IFDS Madison)  
 Martingales, e-values and betting (IMS World Stat Congress [award talk](#))  
 Estimating means of bounded random variables by betting (ICON-STARF)  
 Online multiple testing (MCP)  
 Interactive multiple testing (MRC Cambridge)
- 2020 Universal inference using the split likelihood ratio test (ITA)  
 Confidence sequences and nonparametric supermartingales (Intl. Seminar on Selective Inf.)  
 UQ using martingales for misspecified Gaussian processes (ICML Active Learning Wshop)  
 Universal inference using the split likelihood ratio test (Marseille Luminy)  
 Betting scores, e-values and martingales (JRSS discussion)
- 2019 Interactive FDR control with a human-in-the-loop (ISI-YSM)  
 Theoretical guarantees for doubly sequential experimentation (UCSD Data Science)  
 A unified framework for martingale concentration inequalities (ITA)  
 Online control of the false coverage rate (WHOA-PSI4)  
 The state-of-the-art in online multiple testing (MCP)  
 Simultaneous inference in sequential analysis (ICSA)  
 A tutorial on conformal prediction (IPAM)  
 Are sample means in multi-armed bandits positively or negatively biased? (Asilomar)
- 2018 Towards “simultaneous selective inference” (WHOA-PSI3)  
 Towards “simultaneous selective inference” (CMStat)  
 SAFFRON: an adaptive algorithm for online FDR control (ICML)  
 Towards “simultaneous selective inference” (CiMi)  
 Uniform nonasymptotic confidence sequences for sequential estimation (INI)
- 2017 On kernel methods for covariates that are rankings (CNA)  
 Online FDR control with decaying memory (NeurIPS)  
 QuTE: decentralized multiple testing on sensor networks with FDR control (CDC)  
 A unified treatment of multiple testing with prior knowledge (MCP)  
 Optimal rates and tradeoffs in multiple testing (MCP)  
 Optimal rates and tradeoffs in multiple testing (ICSA)  
 Sequential nonparametric testing using the law of the iterated logarithm (ITA)  
 The power of online thinning in reducing discrepancy (MCM)  
 The power of online thinning in reducing discrepancy (IISA)  
 STAR: Interactive multiple testing for structured FDR control (WHOA-PSI2)
- 2016 A unified framework for multiple testing with prior knowledge (NeurIPS WADAPT)  
 Sequential nonparametric testing using the law of the iterated logarithm (Lorentz)  
 Function-specific mixing times and concentration away from equilibrium (MCQMC)  
 Minimax bounds for linear independence testing (ISIT)  
 Function-specific mixing times and concentration away from equilibrium (ISBA)  
 Beyond worst-case mixing times for markov chains (ITA)
- 2015 Nonparametric independence testing for small sample sizes (IJCAI)  
 Adaptivity in high-dimensional two-sample testing (JSM)

	Sequential nonparametric testing using the law of the iterated logarithm	(IWSM)
2014	Margins, kernels and nonlinear smoothed perceptrons	(ICML)
	Active learning with uniform feature noise	(AISTATS)
2013	Connecting convex optimization and active learning	(NeurIPS OPT)
	Algorithmic connections between convex optimization and active learning	(ALT)
	Optimal convex optimization under Tsybakov noise condition	(ICML)

## Teaching

### Tutorials

2022	Safe, anytime-valid inference and game-theoretic statistics (5hrs)	(CUSO, Switzerland)
2022	Safe, anytime-valid inference and game-theoretic statistics (3hrs)	(SAVI, Eindhoven)
2022	Distribution-free predictive inference (2.5hrs)	(NCC, Bombay)
2022	Conformal prediction (2hrs)	(Amazon, Berlin)
2021	Distribution-free calibration (1.5hrs)	(MLCS, Toulouse)
2020	Conformal prediction (2hrs)	(Learning Theory W'shop, TIFR)
2019	Large-scale sequential experimentation (4hrs)	(KDD, Alaska)

### Courses taught

Designed and offered 7 new semester-long courses. [Syllabi](#), [lecture notes](#), etc, are all linked from my website.

2022 (F)	Voting (UG),	<i>Co-instructor + L. Tetrault (Hist.).</i>
2022 (S)	The ABCDE of Statistical Methods in Machine Learning (PhD),	<i>Instructor.</i>
2021 (F)	Historical advances in machine learning (PhD),	<i>Instructor.</i>
2021 (S)	Game-theoretic statistics (PhD),	<i>Co-instructor + G. Shafer (Rutgers), R. Wang (Waterloo).</i>
2021 (S)	The ABCDE of Statistical Methods in Machine Learning (PhD),	<i>Instructor.</i>
2020 (F)	Voting (UG),	<i>Co-instructor + T. Seidenfeld (Phil.), L. Tetrault (Hist.).</i>
2020 (S)	The ABCDE of Statistical Methods in Machine Learning (PhD),	<i>Instructor.</i>
2019 (F)	Statistical methods for reproducibility (PhD),	<i>Instructor.</i>
2019 (S)	Introduction to Machine Learning (PhD),	<i>Co-instructor + L. Wehbe (ML).</i>
2018 (F)	Martingales and sequential analysis (PhD),	<i>Instructor.</i>

### Teacher Training

- 2013-15 Completed "Future Faculty" training program by CMU's Eberly Center for Teaching Excellence (transcript available).
- 2014-20 Training Seminars: Course & syllabus design, Promoting peer learning, Planning & delivering effective lectures, Leveraging diversity & promoting equity, Conducting productive discussions, Engaging students in active learning, Good assessment practices, Bias-busters

## Grants (or awards/gifts)

Secured over one million dollars for my group's research.

- 2022-27 NSF CSSI 2209819. "Frameworks for Intelligent Adaptive Experimentation: Enhancing and Tailoring Digital Education". Multi-PI (+Joseph Williams, John Stamper, Norman Bier, Jeff Carver, Steve Ritter), \$3,000,000 over 5 years (awarded 08/01/2022).
- 2022 Google [Research Scholar Award](#). "Structured uncertainty quantification for machine learning" Sole PI, \$60,000.
- 2022 Citadel Gift (+ YJ Choe's Citadel PhD summit award). Sole PI, \$10,000.
- 2021 Bloomberg Gift (+ Chirag Gupta's Bloomberg PhD student fellowship). Sole PI, \$15,000.
- 2021-22 PricewaterhouseCoopers Research Grant. "Efficient AI-Enhanced Financial Statement Auditing with Statistical Guarantees". Multi-PI (+Pierre Liang, Zachary Lipton), \$407,500 over 1 year (awarded 10/01/2021).
- 2021-23 Army Research Lab Grant. "Enabling the Safe and Responsible Use of RL". Multi-PI (+Philip Thomas, Emma Brunskill, Nan Jiang), \$760,000 over 18 months (awarded 02/01/2021).

- 2021-24 NSF DMS (CDS&E-MSS) 2053804. "Statistical Procedures and Performance Measures for Simulator-Based Frequentist Inference". Multi-PI (+Ann Lee, Mikael Kuusela), \$425,000 over 3 years (awarded 07/01/2021).
- 2020-25 NSF DMS 1945266 ([CAREER award](#)). "Online multiple hypothesis testing: a comprehensive treatment". Sole PI, \$400,000 over 5 years (awarded 11/15/2019).
- 2020-22 Block Center Grant. "Developing and deploying risk-limiting election audits with continuous monitoring". Sole PI, \$40,000 over two years.
- 2019 Adobe [Faculty Research Award](#). "Quantile-based A/B testing and multi-armed bandits". Sole PI, \$80,000.
- 2019-21 Berkman Faculty Fellowship. Sole PI, \$5,000 over two years.
- 2019-22 NSF DMS 1916320. "Nonparametric confidence sequences and their applications". Sole PI, \$160,000 over 3 years (awarded 7/30/2019).

## Mentorship

2020 Completed active listening training session by CMU's Counseling and Psychological Services.

### Postdoctoral researchers

- 2022-23 Aditya Gangrade (StatDS, joint with A. Rinaldo)
- 2021-23 Shubhanshu Shekhar (StatDS)
- 2019-20 Eugene Katsevich (StatDS, joint with K. Roeder).  
Next position: Assistant Professor, Wharton (UPenn) Statistics
- 2018-19 Asaf Weinstein (StatDS, joint with M. Gavish).  
Next position: Assistant Professor, HUJI Statistics

### Graduated PhD students

- 2020 Jaehyeok Shin (StatDS, joint with A. Rinaldo; externals: G. Lugosi, S. Rakhlin),  
*Thesis: Bias of the sample mean in multi-armed bandits.*  
Next position: Data Scientist, Google
- 2021 Boyan Duan (StatDS, joint with L. Wasserman; externals: P. Grunwald, W. Fithian),  
*Thesis: Advances in interactive testing.*  
Next position: Data Scientist, Google
- 2021 Robin Dunn (StatDS, joint with L. Wasserman; externals: S. Murphy, R. Martin),  
*Thesis: Advances in universal inference* [NSF Fellowship](#).  
Next position: Data Scientist, Novartis

### Soon-to-graduate (post-proposal) PhD student advisees

- 2023 YJ Choe (StatDS+MLD; externals: J. Ziegel, A. d'Amour),  
*Topic: Comparing sequential forecasters and abstaining classifiers.*
- 2023 Chirag Gupta (MLD; externals: D. Foster, V. Perchet),  
*Topic: Post-hoc calibration without distributional assumptions* [Bloomberg Fellowship](#).
- 2023 Aleksandr Podkopaev (StatDS+MLD; externals: R. Barber, S. Kasivishwanathan),  
*Topic: Uncertainty quantification under distribution shifts.*

### Pre-proposal PhD student advisees

- 2024 Ojash Neopane (MLD, joint with Aarti Singh),  
*Topic: Multi-armed bandits* [NSF Fellowship](#).
- 2024 Ian Waudby-Smith (StatDS),  
*Topic: Anytime-valid sequential inference* [Amazon Fellowship](#).
- 2024 Justin Whitehouse (CSD, joint with Steven Wu),  
*Topic: Differential privacy and adaptive data analysis* [NSF Fellowship](#).
- 2025 Akshay Prasad (StatDS),  
*Topic: Universal inference.*
- 2026 Neil Xu (StatDS),  
*Topic: Online multiple testing.*
- 2026 James Leiner (StatDS),  
*Topic: Post-selection inference.*

2027 Ben Chugg (MLD),  
*Topic: Anytime-valid PAC Bayes.*

### Masters student advisees

2024 Hongjian Wang (MLD),  
*Topic: Heavy-tailed sequential inference.*

### PhD Thesis Committees

2022-23 Wanshan Li (StatDS)  
2021-23 David Zhao (StatDS+MLD)  
2021-22 Costin Bădescu (CSD)  
2021-22 Heejong Bong (StatDS+Neuro)  
2021-22 Ben LeRoy (StatDS)  
2021-22 Ron Yurko (StatDS)  
2020-22 Natalia Lombardi De Oliveira (StatDS)  
2020-21 Ciaran Evans (StatDS)  
2020-21 Alan Mishler (StatDS)  
2020-21 Danijel Kivaranovic (Stat, University of Vienna)  
2019-20 Rianne de Heide (CS, CWI Amsterdam)  
2018-20 Ilmun Kim (StatDS)  
2018-20 Kevin Tran (ChemE)

### PhD Advanced Data Analysis Projects

2023 Michael Wieck-Sosa (StatDS, joint with Michel Haddad),  
*Area: Covid forecasting.*  
2022 Neil Xu (StatDS, joint with John Silvestri, Barbara Stern),  
*Area: Real-estate auditing.*  
2022 James Leiner (StatDS, joint with Wesley Tansey),  
*Area: Causal DAGs and multiple testing.*  
2020 Ian Waudby-Smith (StatDS, joint with Philip Stark),  
*Area: Post-election auditing.*  
2019 Nil-jana Akpınar (StatDS, joint with Umut Acar),  
*Area: Educational data mining.*

### Masters Capstone Projects

2020 Radhika Khandelwal, Surya Sindwani, Xiaofan Xu, Muhammad Yafi, Zhe Fei (Heinz)

## Service

### Organization: full- or multi-day workshops and conferences

2022 38th Conference on Uncertainty in Artificial Intelligence (UAI), *Sponsorship Chair.*  
2022 1-day Workshop on Distribution-free Uncertainty Quantification (ICML), *Organizer.*  
+ Anastasios Angelopoulos, Stephen Bates, Sharon Li, Ryan Ribshirani.  
2022 3-day Workshop on probabilistic calibration (CMU), *Lead organizer.*  
+ Dean Foster.  
2022 5-day Workshop on safe anytime-valid inference (EuRandom, Eindhoven), *Organizer.*  
+ Peter Grünwald.  
2021 Lead instructor, 10-day Bocconi-Oxford-Imperial summer school at Lake Como, for advanced PhD students. *Topic: "Inference using betting, e-values and martingales", (Covid).*  
2021 1-day Workshop on Distribution-free Uncertainty Quantification (ICML), *Organizer.*  
+ Anastasios Angelopoulos, Stephen Bates, Sharon Li, Ryan Ribshirani.  
2020 2-day Workshop on statistical learning theory (TIFR, Mumbai), *Organizer.*  
+ Sandeep Juneja, Devavrat Shah.  
2018-22 3-week working group on conformal prediction (AIM Square), *Organizer.*  
+ Ryan Tibshirani, Rina Barber, Emmanuel Candes.

- 2017 20th Conference on AI & Statistics (AISTATS), *Publicity Chair*.  
Program Chairs: Aarti Singh, Jerry Zhu.
- 2016 1-day Workshop on Adaptive Data Analysis (NeurIPS), *Organizer*.  
+ Adam Smith, Aaron Roth, Vitaly Feldman.
- 2016 1-day Workshop on Modern Nonparametrics (NeurIPS), *Organizer*.  
+ Zoltan Szabo, Han Liu, Mladen Kolar, Samory Kpotufe, Bharath Sriperumbudur, John Lafferty.
- 2015 1-day Workshop on Active Learning: Theory & Practice (ICML), *Organizer*.  
+ Akshay Krishnamurthy, Aarti Singh, Nina Balcan.
- 2014 1-day Workshop on Optimization in Machine Learning (NeurIPS), *Organizer*.  
+ Alekh Agarwal, Suvrit Sra, Miro Dudik, Zaid Harchaoui, Martin Jaggi.

### Organization: individual sessions at meetings

- 2022 Invited session: game-theoretic statistics (IMS Annual Meeting, invited session), *Organizer*.
- 2021 Invited session: statistical inference by betting (JSM, IMS invited session), *Organizer*.
- 2020 Invited session: conformal prediction (~~Stat Learning and Data Sci., Covid~~), *Organizer*.
- 2020 Invited session: multiple testing (~~Stat Learning and Data Sci., Covid~~), *Organizer*.
- 2019 Invited session: sequential analysis (Asilomar), *Organizer*.

### Senior Program Committee (or Meta-Reviewer, or Area Chair)

- 2022 9th International Conference on Learning Representations (ICLR).
- 2022 33rd International Conference on Algorithmic Learning Theory (ALT).
- 2021 34th Annual Conference on Learning Theory (COLT).
- 2021 37th Conference on Uncertainty in Artificial Intelligence (UAI).
- 2020 34th Conference on Neural Information Processing Systems (NeurIPS).
- 2020 33rd Annual Conference on Learning Theory (COLT).
- 2020 37th International Conference on Machine Learning (ICML).
- 2020 31st International Conference on Algorithmic Learning Theory (ALT).
- 2020 36th Conference on Uncertainty in Artificial Intelligence (UAI).
- 2019 33rd Conference on Neural Information Processing Systems (NeurIPS).
- 2019 22nd Conference on AI & Statistics (AISTATS).
- 2019 36th International Conference on Machine Learning (ICML).
- 2019 32nd Annual Conference on Learning Theory (COLT).

### Guest Editor

- 2023 [Special Issue on Game-Theoretic Statistics and Safe Anytime-Valid Inference](#).  
+Peter Grunwald, for New England Journal of Statistics in Data Science

### Book Reviewer

- Stat Cambridge University Press
- ML Foundations and Trends in Machine Learning

### Miscellaneous

- 2020 NSF DMS Grant Review Panel
- 2020 arXiv StatML moderator

### Journal Reviewer

- Stat Annals of Statistics, Journal of the Royal Statistical Society Series B (JRSSB), Biometrika, Bernoulli, Statistics and Probability Letters, Annals of Applied Statistics, Journal of the American Statistical Association, Statistica Sinica, Statistical Science, Scandanavian Journal of Statistics, Electronic Journal of Statistics, Annals of the Institute of Statistical Mathematics, The American Statistician.
- ML/AI Journal of Machine Learning Research, Machine Learning Journal, Journal of Artificial Intelligence Research, Data Mining and Knowledge Discovery.

- EE IEEE Transactions on Information Theory, IEEE Signal Processing Letters, IEEE Transactions on Pattern Analysis and Machine Intelligence.
- Opt. BIT Numerical Algorithms, Optimization Methods and Software, Numerical Mathematics, SIAM Journal on Matrix Analysis.
- Other Bioinformatics, Discrete and Computational Geometry, Entropy.

### Conference Reviewer

- ML Conference on Learning Theory (COLT), Conference on AI & Statistics (AISTATS), International Conference on Machine Learning (ICML), Neural Information Processing Systems (NeurIPS), European Conference on Machine Learning (ECML).
- AI Conference on Artificial Intelligence (AAAI), Conference on Uncertainty in Artificial Intelligence (UAI), International Joint Conference on Artificial Intelligence (IJCAI).
- Other Intl. Symp. on Information Theory (ISIT), Math. and Scientific Machine Learning (MSML).

### Department Service

- 2022 MLD extended hiring committee
- 2021- StatDS faculty senator
- 2020- StatML faculty advisor and course review committee
- 2021- StatDS research committee
- 2020- MLD department review committee
- 2020- SCS distinguished speaker seminar committee
- 2018- StatDS department seminar organizer
- 2019- MLD speaking skills committee
- 2019- Trained social host for events with alcohol (StatDS+MLD)
- 2018- Wellness network (StatDS+MLD)
- 2018- Miscellaneous: judge, Meeting of the Minds (2019), first day StatDS retreat organizer (2018), StatDS strategic planning.
- 2015-16 Graduate admissions committee, CS Department (UCB)
- 2014 Lead Organizer, ML Department Student Research Symposium (CMU)
- 2012-15 Organizer, weekly lunch seminar series on ML (CMU)
- 2014-15 Teaching Faculty Hiring Committee, ML Department (CMU)
- 2014-15 Graduate Student Assembly Rep. (CMU), [Outstanding Representative Award](#)
- 2013-14 Graduate Admissions Committee, ML Department (CMU)
- 2013-14 Education Review Committee Founder, ML Department (CMU)

### University Service

- 2022 Panel Discussant on Voting and Elections for Alumni Outreach (CMU)
- 2020 Panel Discussant on Voting and Elections for Alumni Outreach (CMU)
- 2015-17 Steward for Postdoctoral Union (UCB)
- 2014-15 SafeZone Allies for LGBTQ Safety, Trained Member (CMU)
- 2014-15 Campus Smoking Policy Review Committee, Member (CMU)
- 2012-13 Explorer's Club Core Officer (CMU)
- 2011-12 Indian Graduate Students Association Treasurer (CMU)

### Outreach (University)

- 2022- IMS Outreach Committee
- 2022 AISTATS Diversity and Inclusion mentoring (how to read papers) (1 hour, online)
- 2022 Learning Theory Alliance mentoring (how to read papers) (1 hour, online)
- 2021 Ask-me-anything mentoring sessions (1 hour x 3 times, online)
- 2021 Grad-school application mentoring session (1 hour, online)
- 2021 Learning Theory Alliance mentoring (discussion moderator) (1 hour, online)

## Outreach (Schools)

2022	Podcast interview on data science (30 mins, high school, NC School of Science and Math.)
2020	Election polling: bias and variance (40 mins, grade twelve, Winchester Thurston, Pittsburgh)
2019	Introduction to ML (40 mins, grade twelve, Vidya Mandir Mylapore, Chennai)
2017	Introduction to AI (40 mins, grade eleven, Vidya Mandir Mylapore, Chennai)
	Trash-free Living (60 mins, full school, Paathashaala, Chennai)
2016	Robots that run (60 mins, grade three, Stege Elementary, Richmond)
2015	SVD, Random Graphs and Random Walks (90x3 mins, high school, PACT, Princeton)
	Introduction to CS (90x2 mins, middle school girls, Technights, CMU)
	Introduction to ML (30x2 mins, high school, Indian School Al-Ghubra, Muscat)
2014	Mechanism Design: Auctions & Voting (80 mins, high school, Andrew's Leap, CMU)
2013	Multi-armed Bandits (80 mins, high school, Andrew's Leap, CMU)

## Distractions

- **Endurance sports.** Finishing medalist, Ironman triathlon (2.4mi swim, 112mi bike, 26.2mi run) at Louisville, Kentucky (Aug 25, '13). Completed half-ironman in Grafham, olympic triathlons in Marlow ('12), Pittsburgh ('13), Tahoe ('16), and marathons in Columbus ('12) and Pittsburgh ('12, '13, '14), and half-marathons in Wales ('12), Philadelphia ('13), Chicago ('13), Ealing ('14), Berkeley ('15), Napa ('17).
- **Team sports.** Represented the Oman cricket team in the U-13 Gulf Cup (silver medal), and in the U-15 Asia Cup (ranked 5/14). Also played several years for the IIT Bombay Inter-IIT (silver medal) and Carnegie Mellon cricket teams. Awarded several Hostel-3 Sports Colors for winning top-3 spots in table-tennis, badminton, cricket, basketball and water-polo.
- **Adventure sports.** Finished a 26-day Basic Mountaineering Course in the Himalayas (Jul 1-26, '06), a 10-day backpacking school ('13) and 15-day climbing school by the Explorer's Club of Pittsburgh ('15). Also completed a 7-day PADI scuba openwater diving course ('11), and a 2-day Advanced Free Fall Skydiving course ('10), and a 2-day wilderness first aid course ('12).
- **Community service.** Raised funds in '18 for organizations fighting AIDS and empowering women in Zambia (340 mile bike ride from Lusaka to Livingstone). Fundraising in '16 and '17 for the San Francisco AIDS Foundation and the Los Angeles LGBT Center (545 mile bike ride in California from SF to LA, also training ride leader in '17). Also fundraised for the National Multiple Sclerosis Society (150 mile bike ride in Pennsylvania, '13, and in '21) and the Pittsburgh Animal Rescue League and Wildlife Center (Pittsburgh marathon, '12). Regular volunteer for beach cleaning and daily school traffic warden for 3 years (2001-03).