

Aaditya K. Ramdas

Curriculum Vitae

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Research Interests

My research spans theory and algorithms in machine learning and statistics, with applications to science and technology. Recent work focuses on the theme of **scientific reproducibility** (multiple hypothesis testing, adaptive data analysis, selective inference), specifically designing new algorithms for controlling the false discovery rate (FDR) in novel static & dynamic settings:

- Interactive human-in-the-loop FDR control
- Decentralized FDR control on networks
- Group FDR control with arbitrary partitions
- Online FDR with multi-armed bandits
- Sequential FDR on directed acyclic graphs
- Batch FDR control with prior knowledge

Current Position

2015–now Postdoctoral Researcher in Statistics and EECS.
University of California, Berkeley (UCB), Berkeley (USA)
Advisors: Michael I. Jordan & Martin J. Wainwright

Academic Background

2010–15 PhD in Statistics and Machine Learning, Masters in Machine Learning.
Carnegie Mellon University (CMU), Pittsburgh (USA)
Advisors: Larry Wasserman & Aarti Singh
[Umesh K. Gavaskar Memorial Best PhD Thesis* Award](#), Department of Statistics (2016)
[Alan J. Perlis Graduate Student Teaching Award](#), School of Computer Science (2015)
[Mihaela Serban Memorial Research Award](#), ASA Pittsburgh chapter (2015)
[Outstanding Representative Award](#), Graduate Student Assembly (2015)
[Best Teaching Assistant Award](#), Machine Learning Department (2014)
[Doug Beeferman PhD Fellowship Award](#), Machine Learning Department (2013)

PhD Thesis*: Computational and Statistical Advances in Testing and Learning
MS Data Analysis: Statistical Modeling of Burglaries in Pittsburgh, GPA – 4.2 / 4

2005–09 Bachelors in Computer Science and Engineering.
Indian Institute of Technology (IIT), Bombay (India)
[Inlaks Full Scholarship Award \(3 years\)](#), for best all-round student in IIT Bombay
[IIT Bombay Cultural Citation](#), highest honor for cultural accomplishments over 4 years
[Prime Minister's invitee to Republic Day Parade](#), for academic excellence*

GPA – 9.44 / 10, Institute Rank 9 / 600, Department Rank 3 / 60
IIT Joint Entrance Exam National Rank 47 / 400,000
*CBSE Central Board Exams 97.4%, National Rank 10 / 300,000.

Work Experience

2009–10 Algorithmic Trader, **Tower Research Capital**, *Gurgaon (India) & New York (USA)*.
Sum'14 Research Intern, **Gatsby Neuroscience Unit (UCL)**, *London (UK)*.
Sum'12 Research Intern, **Microsoft Research (MSR)**, *Cambridge (UK)*.
Sum'09 Quantitative Analyst, **Deutsche Bank**, *Mumbai (India)*.
Sum'08 Research Intern, **INRIA**, *Sophia-Antipolis (France)*.
Sum'07 Research Intern, **LaBRI**, *Bordeaux (France)*.

Pre-prints and submissions

- (sub.) A unified treatment of multiple testing with prior knowledge using the p-filter.
A. Ramdas, R. Barber, M. Wainwright, M. Jordan
(Arxiv preprint, in revision at the Annals of Statistics)
- (sub.) STAR: Interactive multiple testing for structured FDR control.
L. Lei, A. Ramdas, W. Fithian
(Arxiv preprint, in review at the Journal of the Royal Statistical Society, Series B)
- (sub.) Optimal rates and tradeoffs in multiple testing.
M. Rabinovich, A. Ramdas, M. Wainwright, M. Jordan
(Arxiv preprint, in review at Statistica Sinica)
- (sub.) DAGGER: a sequential algorithm for FDR control on DAGs.
A. Ramdas, J. Chen, M. Wainwright, M. Jordan
(Arxiv preprint, in review at Biometrika)
- (sub.) The power of online thinning in reducing discrepancy.
R. Dwivedi, O. N. Feldheim, O. G. Gurevich, A. Ramdas
(Arxiv preprint, in review at Probability Theory and Related Fields)
- (pre.) Uniform martingale concentration and nonasymptotic confidence sequences.
S. Howard, A. Ramdas, J. Sekhon, J. McAuliffe
(in preparation).
- (sub.) Decoding from pooled data (I): sharp information-theoretic bounds.
A. El-Alaoui, A. Ramdas, F. Krzakala, L. Zdeborova, M. Jordan
(Arxiv preprint, in review at Mathematical Statistics and Learning)
- (sub.) Decoding from pooled data (II): phase transitions of message passing.
A. El-Alaoui, A. Ramdas, F. Krzakala, L. Zdeborova, M. Jordan
(Arxiv preprint, in review at IEEE Transactions on Information Theory)
- (sub.) On kernel methods for covariates that are rankings.
H. Mania, A. Ramdas, M. Wainwright, M. Jordan, B. Recht
(Arxiv preprint, in review at Electronic Journal of Statistics)
- (sub.) Function-specific mixing times and concentration away from equilibrium.
M. Rabinovich, A. Ramdas, M. Wainwright, M. Jordan
(Arxiv preprint, in revision at Bayesian Analysis)
- (pre.) Classification accuracy as a proxy for two-sample testing.
A. Ramdas, A. Singh, L. Wasserman
(Arxiv preprint, in revision)
- (pre.) Adaptivity & comp.-stat. tradeoffs for high-dimensional two-sample testing.
A. Ramdas, S. Reddi, B. Poczos, A. Singh, L. Wasserman
(Arxiv preprint, in revision)

Published journal articles

- 2017 Iterative methods for solving factorized linear systems.
A. Ma, D. Needell, A. Ramdas
SIAM Journal on Matrix Analysis and Applications (SIMAX).

- 2017 Rows vs. columns: randomized Kaczmarz or Gauss-Seidel for ridge regression.
A. Hefny*, D. Needell*, A. Ramdas*
SIAM Journal on Scientific Computing (SISC).
- 2016 p-filter: multi-layer FDR control for grouped hypotheses.
R. Barber*, A. Ramdas*
Journal of the Royal Statistical Society, Series B (JRSSB).
- 2016 Wasserstein two-sample testing and related families of nonparametric tests.
A. Ramdas, N. Garcia, M. Cuturi
Entropy (Special Issue on Statistical Significance and the Logic of Hypothesis Testing).
- 2015 Fast & flexible ADMM algorithms for trend filtering.
A. Ramdas, R. Tibshirani
Journal of Computational and Graphical Statistics (JCGS).
- 2015 Regularized brain reading with shrinkage and smoothing.
L. Wehbe, A. Ramdas, R. Steorts, C. Shalizi
Annals of Applied Statistics (AoAS).
- 2015 Convergence properties of the rand. extended Gauss-Seidel & Kaczmarz methods.
A. Ma*, D. Needell*, A. Ramdas*
SIAM Journal of Matrix Analysis and Applications (SIMAX).
- 2015 Towards a deeper geometric, analytic and algorithmic understanding of margins.
A. Ramdas, J. Peña
Optimization Methods and Software (OMS).
- 2014 Simultaneously uncovering patterns of brain regions involved in story reading.
L. Wehbe, B. Murphy, P. Talukdar, A. Fyshe, A. Ramdas, T. Mitchell
Public Library of Science ONE (PLoS ONE).

Full-length conference publications

Most AI and ML conferences have stringent blind peer-review processes, and have acceptance rates in the range of 20-30%.

- 2017 Online control of the false discovery rate with decaying memory.
A. Ramdas, F. Yang, M. Wainwright, M. Jordan
31st Conference on Advances in Neural Information Processing Systems (NIPS).
- 2017 MAB-FDR: Multi (A)rmed/(B)andit testing with online FDR control.
F. Yang, A. Ramdas, K. Jamieson, M. Wainwright
31st Conference on Advances in Neural Information Processing Systems (NIPS).
- 2017 QuTE: decentralized multiple testing on sensor networks with FDR control.
A. Ramdas, J. Chen, M. Wainwright, M. Jordan
IEEE Conference on Decision and Control (CDC).
- 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
5th International Conference on Learning Representations (ICLR).
- 2017 Decoding from pooled data (II): phase transitions of message passing.
A. El-Alaoui, A. Ramdas, F. Krzakala, L. Zdeborova, M. Jordan
IEEE Intl. Symposium on Information Theory (ISIT)
- 2016 Sequential nonparametric testing using the law of the iterated logarithm.
A. Balsubramani*, A. Ramdas*
32nd Conference on Uncertainty in Artificial Intelligence (UAI).

- 2016 Minimax lower Bounds for linear independence testing.
D. Isenberg*, A. Ramdas*, A. Singh, L. Wasserman
IEEE Intl. Symposium on Information Theory (ISIT).
- 2016 Asymptotic behavior of ℓ_q -based Laplacian regularization in semi-supervised learning.
A. El-Alaoui, X. Cheng, A. Ramdas, M. Wainwright, M. Jordan
29th Intl. Conference on Learning Theory (COLT).
- 2015 Fast two-sample testing with analytic representations of probability measures.
K. Chwialkowski, A. Ramdas, D. Sejdinovic, A. Gretton
29th Conference on Neural Information Processing Systems (NIPS).
- 2015 High-dimensional power of linear-time two-sample tests for mean-shift alternatives.
S. Reddi*, A. Ramdas*, B. Poczos, A. Singh, L. Wasserman
18th Intl. Conference on Artificial Intelligence & Statistics (AISTATS).
- 2015 On the decreasing power of kernel- & distance-based hyp. tests in high dimensions.
A. Ramdas*, S. Reddi*, B. Poczos, A. Singh, L. Wasserman
29th AAAI Conference on Artificial Intelligence (AAAI).
- 2015 Nonparametric independence testing for small sample sizes.
A. Ramdas*, L. Wehbe*
24th Intl. Joint Conference on Artificial Intelligence (IJCAI).
- 2014 Margins, kernels and non-linear smoothed perceptrons.
A. Ramdas, J. Peña
31st International Conference on Machine Learning (ICML).
- 2014 An analysis of active learning with uniform feature noise.
A. Ramdas, B. Poczos, A. Singh, L. Wasserman
17th Intl. Conference on Artificial Intelligence & Statistics (AISTATS).
- 2013 Optimal rates for stochastic convex optimization under Tsybakov noise condition.
A. Ramdas, A. Singh
30th International Conference on Machine Learning (ICML).
- 2013 Algorithmic connections between active learning & stochastic convex optimization.
A. Ramdas, A. Singh
24th International Conference on Algorithmic Learning Theory (ALT).

Presentations

Invited University Seminars

- 2017 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)
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.)
Multi (A)rmed/(B)andit testing with online FDR control (UTSW, Biomed.)
Multi (A)rmed/(B)andit testing with online FDR control (CMU, ML/AI)
Multi (A)rmed/(B)andit testing with online FDR control (Stanford, MS&E)
Multi (A)rmed/(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)

Internal Talks

- 2017 Is reproducibility a problem in the tech industry? (UCB, RISE seminar)
 - Is reproducibility a problem in the tech industry? (UCB, BAIR seminar)
- 2016 p-Filter: FDR control for grouped hypotheses (UCB, AmpLab retreat)
- 2015 Margins - algorithms, geometry and convex analysis (CMU, CS Theory Lunch)
 - Adaptivity in high-dimensional two sample testing (CMU, ML Lunch)
- 2014 Fast & flexible algorithms for trend filtering (CMU, ML Lunch)
- 2013 Connecting active learning and stochastic optimization (CMU, ML Lunch)

Invited Industry Talks

- 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)
- 2015 Sequential nonparametric testing (Alibaba Research, Seattle)
 - Sequential nonparametric testing (Google Research, Pittsburgh)
- 2014 Fast & flexible algorithms for trend filtering (Microsoft Research, Cambridge)
- 2013 Active learning & stochastic optimization (IBM Research, Bangalore)
- 2012 Connecting statistical & logical inference (Microsoft Research, Cambridge)

Conference Talks

- 2017 On kernel methods for covariates that are rankings (CNA)
 - Online FDR control with decaying memory (NIPS)
 - 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 (NIPS 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 (NIPS OPT)
- Algorithmic connections between convex optimization and active learning (ALT)
- Optimal convex optimization under Tsybakov noise condition (ICML)

Teaching

- 2015 [Alan J. Perlis Graduate Student Teaching Award](#), awarded to one student per year in the School of Computer Science, CMU.
- 2014 [Graduate Student Teaching Award](#), awarded to one student per year in the Machine Learning Department, CMU.
- 2014 Machine Learning (MS), *Review Videos*, for introductory ML courses.
Created 12 YouTube videos, 10-15 minutes each, on multivariate calculus, probability & statistics, real & functional analysis, linear algebra; over 5000 views in total.
- 2013 Convex Optimization (PhD), *Teaching Assistant*, R. Tibshirani & B. Póczós.
Helped redesign syllabus (content+schedule), restructured homeworks to increase flexibility — mastery questions, peer-grading, optional questions and project.
- 2012 Convex Optimization (PhD), *Teaching Assistant*, G. Gordon & R. Tibshirani.

Guest Lectures (University)

- 2017 Structured multiple testing (50 mins, Biomedical Big Data, M. Van der Laan)
- Big bias in big data (80 mins, Data Science, D. Nolan, J. Gonzalez)
- Modern aspects of optimization (80 mins, Optimization, M. Wainwright)
- 2016 Multivariate exponential Families (80 mins, Prob. Graph. Models, M. Wainwright)
- Sparse linear models (80 mins, Statistical Theory, M. Wainwright)
- 2015 Active learning (80 mins, Statistical ML, L. Wasserman & R. Tibshirani)
- Stochastic optimization for ML (80 mins, Optimization, R. Tibshirani)
- 2014 Lower bounds in optimization (80 mins, Adv. Optimization, A. Smola & S. Sra)
- 2013 ADMM and mirror descent (80 mins, Optimization, G. Gordon & R. Tibshirani)

Outreach (Schools)

- 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)

Future Faculty Program

Completed program by CMU's Eberly Center for Teaching Excellence (transcript available).

- 2014-15 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
- 2014 Observations & projects: Classroom teaching, Microteaching workshop, Designed syllabus of UG course Math. Foundations of ML, Pedagogical aspects of learning through videos

Service

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

Journal Reviewing

- Stat Annals of Statistics (AoS), Journal of the Royal Statistical Society Series B (JRSSB), Biometrika, Bernoulli, Statistics and Probability Letters, Annals of Applied Statistics (AoAS), Journal of the American Statistical Association (JASA), Statistica Sinica
- ML/AI Foundations and Trends in Machine Learning (FTML), Journal of Machine Learning Research (JMLR), Machine Learning Journal (MLJ), Journal of Artificial Intelligence Research (JAIR), Data Mining and Knowledge Discovery (DAMI)
- EE Transactions on Information Theory (IEEE-TIT), Signal Processing Letters (IEEE-SPL), Transactions on Pattern Analysis and Machine Intelligence (IEEE-TPAMI)
- Opt. Numerical Algorithms (BIT-NA), Optimization Methods and Software (OMS), Numerical Mathematics
- Other Bioinformatics, Entropy

Conference Reviewing

- ML Conference on Learning Theory (COLT), Conference on AI & Statistics (AISTATS), International Conference on Machine Learning (ICML), Neural Information Processing Systems (NIPS), European Conference on Machine Learning (ECML)
- EE International Symposium on Information Theory (ISIT).
- AI Conference on Artificial Intelligence (AAAI), Conference on Uncertainty in Artificial Intelligence (UAI), International Joint Conference on Artificial Intelligence (IJCAI).

Department Service

- 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)
- 2008-09 Industry Job Placement Coordinator, CS Department (IITB)

2007-08 Sports Coordinator, CS Department (IITB)

University Service

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)
2008-09 Campus Radio Cofounder (IITB)
2008-09 Job Fair Placement Representative, CS Department (IITB)
2007-08 Google Campus Ambassador (IITB)
2007-08 Institute Secretary for Academic Affairs (IITB)
2007-08 Sports Secretary, CS Department (IITB)
2006-07 Sports Secretary, Hostel 3 (IITB)

Courses taken (for credit or audit)

Berkeley: Stochastic Processes (J. Pitman), Graphical Models (M. Wainwright), Theoretical Statistics (M. Wainwright), Learning Theory (P. Bartlett), Dynamical Systems (F. Rezakhanlou), Causal Inference (J. Sekhon), Deep Learning (J. Bruna), Measure Theory (D. Aldous), Applied Statistics (J. McAuliffe).

CMU: Adv. Prob. (J. Lei), Adv. Stat. (C. Genovese), Stat. ML (L. Wasserman, A. Singh), Rand. Alg. (A. Blum, A. Gupta), App. Stat. (R. Kass), Databases and Data Mining (C. Faloutsos), Intro to ML (A. Singh), Intermediate Stat. (L. Wasserman), Comp. Bio. (D. Durand), Mechanism Design (T. Sandholm), Learning Theory (A. Blum), Optimization (R. Tibshirani, G. Gordon, B. Póczos), Adv. Optimization (S. Sra, A. Smola).

IIT Bombay: Logic (S. Chakraborty), Theory of comp. (S. Krishna), Alg. (A. Ranade), Data structures (G. Sivakumar), Verification (S. Chakraborty), Discrete math. (S. Biswas), Func. prog. (A. Sanyal), Compilers (U. Khedkar), OS (D. Dhamdhere), DB (S. Sudarshan), Graphics (S. Chandran), Networks (U. Bellur).

Distractions

2012-now **Endurance Sports.**

Finishing medalist of the Ironman triathlon (2.4mi swim, 112mi bike, 26.2mi run) at Louisville, Kentucky (Aug 25, '13). Also completed a half-ironman in Grafham, and olympic triathlons in Marlow ('12), Pittsburgh ('13), Tahoe ('16). Finished marathons in Columbus ('12) and Pittsburgh ('12, '13, '14), and half-marathons in Wales ('12), Philadelphia ('13), Chicago ('13), Ealing ('14), Berkeley ('15).

2001-12 **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, and for representing in hockey, football, cross-country, kho-kho.

2006-now **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).

2001-now **Community Service.**

Fundraised ~ 8000\$ in '16 and '17 for the SF AIDS Foundation and the LA LGBT Center (545 mile bike ride in California from SF to LA, also training ride leader in '17). Also fundraised ~ 1000\$ for the National Multiple Sclerosis Society (150 mile bike ride in Pennsylvania, '13) 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).

2001-03 **Duke of Edinburgh Award.**

Awarded the International Award for Young People (bronze and silver) under the Duke of Edinburgh Award Scheme, for social service, skill development, physical training and adventurous expeditions.

2005-09 **Cultural Activities.**

Was awarded IIT-B institute cultural citation (5 out of 1000 graduating students) for winning over 20 intercollegiate competitions in speaking, quizzing, literature and debate, and awarded several Hostel-3 Cultural Colors for excellence in similar interhostel events.

References

Michael I. Jordan
Professor of Statistics and EECS
University of California, Berkeley
jordan@berkeley.edu

Martin J. Wainwright
Professor of Statistics and EECS
University of California, Berkeley
wainwrig@berkeley.edu

Larry Wasserman
Professor of Statistics and Machine Learning
Carnegie Mellon University
larry@stat.cmu.edu

Aarti Singh
Associate Professor of Machine Learning
Carnegie Mellon University
aarti@cs.cmu.edu