Agniva Chowdhury

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Research Interests Randomized Numerical Linear Algebra, Matrix Sketching, Approximation Algorithms, Machine Learning, High-Dimensional Statistics

Education

Purdue University — West Lafayette, IN, USA
Ph.D. in *Statistics* — 2015 - 2021

Indian Institute of Technology Kanpur — Kanpur, UP, India
M.Sc. in *Statistics* — 2009 - 2011

University of Calcutta — Kolkata, WB, India
B.Sc. in *Statistics* — 2006 - 2009

Experience

Oak Ridge National Laboratory — Oak Ridge, TN, USA
Postdoctoral Research Associate — Jan 2022 - Present

Purdue University — West Lafayette, IN, USA
Research Assistant — Jan 2017 - Dec 2021
Teaching Assistant — Aug 2015 - Dec 2016

HSBC — West Lafayette, IN, USA
Analyst - Decision Sciences — Nov 2012 - Mar 2015

EXL Service — West Lafayette, IN, USA
Senior Programmer Analyst — Jul 2011 - Nov 2012

Publications/ Preprints

1. **A. Chowdhury**, G. Dexter, P. London, H. Avron, and P. Drineas. *Faster Randomized Interior Point Methods for Tall/Wide Linear Programs*. Journal of Machine Learning Research (JMLR), 2022 (accepted).
2. G. Dexter, **A. Chowdhury**, H. Avron, and P. Drineas. *On the Convergence of Inexact Predictor-Corrector Methods for Linear Programming*. In Proceedings of the 39th International Conference on Machine Learning (ICML), 2022 (To appear). **Selected for long presentation**.
3. **A. Chowdhury**, A. Bose, S. Zhou, D. P. Woodruff, and P. Drineas. *A Fast, Provably Accurate Approximation Algorithm for Sparse Principal Component Analysis Reveals Human Genetic Variation Across the World*. In Proceedings of the 26th Annual Conference on Research in Computational Molecular Biology (RECOMB), 2022.
4. S. Fadnavis, **A. Chowdhury**, J. Batson, P. Drineas, and E. Garyfallidis. *Patch2Self denoising of Diffusion MRI with Self-Supervision and Matrix Sketching*. In bioRxiv. Submitted, 2022.
5. **A. Chowdhury**, P. London, H. Avron, and P. Drineas. *Faster Randomized Infeasible Interior Point Methods for Tall/Wide Linear Programs*. In Advances in Neural Information Processing Systems (NeurIPS), 2020.
6. **A. Chowdhury**, P. Drineas, D. P. Woodruff, and S. Zhou. *Approximation Algorithms for Sparse Principal Component Analysis*. arXiv:2006.12748, 2020.

7. A. Bose, M. C. Burch, **A. Chowdhury**, P. Paschou, and P. Drineas. *CluStrat: A Structure Informed Clustering Strategy for Population Stratification*. In Proceedings of the 24th Annual Conference on Research in Computational Molecular Biology (RECOMB), 2020.
8. **A. Chowdhury**, J. Yang, and P. Drineas. *Randomized Iterative Algorithms for Fisher Discriminant Analysis*. In Proceedings of the 35th Conference on Uncertainty in Artificial Intelligence (UAI), 2019. **Selected for oral presentation.**
9. **A. Chowdhury**, J. Yang, and P. Drineas. *Structural Conditions for Projection-Cost Preservation via Randomized Matrix Multiplication*. Linear Algebra and its Applications, vol 573, pp. 144-165, 2019.
10. **A. Chowdhury**, J. Yang, and P. Drineas. *An Iterative, Sketching-based Framework for Ridge Regression*. In Proceedings of the 35th International Conference on Machine Learning (ICML), 2018.

Oral Presentations

1. *Faster Matrix Algorithms via Randomized Sketching & Preconditioning.* Bi-weekly meeting of Data-Driven Decision Control for Complex Systems Project (DnC2S). Oak Ridge National Laboratory, Oak Ridge, TN, USA, Mar 2022 (virtual)
2. *Speeding-up Linear Programming using Randomized Linear Algebra*. Computer Science and Mathematics Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA, Jun 2021 (virtual).
3. *Speeding-up Linear Programming using Randomized Linear Algebra*. Michael Mahoney's Research Group, UC Berkeley, Berkeley, CA, USA, Oct 2020 (virtual).
4. *Randomized Iterative Algorithms for Fisher Discriminant Analysis*. , Graduate Students Seminar, Department of Statistics, Purdue University, West Lafayette, IN, USA, Apr 2020 (virtual).
5. *Randomized Iterative Algorithms for Fisher Discriminant Analysis*. 35th Conference on Uncertainty in Artificial Intelligence (UAI), Tel Aviv, Israel, Jul 2019.
6. *An Iterative, Sketching-based Framework for Ridge Regression*. 35th International Conference on Machine Learning (ICML), Stockholm, Sweden, Jul 2018.

Poster Presentations

1. *Faster Randomized Infeasible Interior Point Methods for Tall/Wide Linear Programs*
   - 34th Conference on Neural Information Processing Systems (NeurIPS 2020), virtual.
2. *An Iterative, Sketching-based Framework for Ridge Regression*
   - TRIPODS Madison Summer School 2018, Madison, USA.
   - 35th International Conference on Machine Learning (ICML 2018), Stockholm, Sweden.
   - 9th International Purdue Symposium on Statistics, 2018 West Lafayette, USA.
   - Conference on Scientific Computing and Approximation 2018 (in honor of Walter Gautschi), West Lafayette, USA.

Teaching Experience

Lab Instructor

- STAT 350: Introduction to Statistics (Fall 2016)
- STAT 301: Elementary Statistical Methods (Fall 2015)

TA and Grader

- CS 590RA: Randomized Algorithms (Fall 2019)
- STAT 519: Introduction to Probability (Spring 2016, Fall 2016)

- STAT 512: Applied Regression Analysis (Fall 2015, Spring 2016)
- STAT 501: Experimental Statistics I (Summer 2016)

Honors and Awards

- Travel Award: NeurIPS 2020 (as complimentary registration)
- Invited to the workshop on "Randomized Numerical Linear Algebra, Statistics, and Optimization" organized by *Center for Discrete Mathematics and Theoretical Computer Science (DIMACS)* at Rutgers University, New Jersey.
- Travel Award: UAI 2019, Tel Aviv, Israel.
- Invited to the workshop on "Randomized Numerical Linear Algebra and Applications" organized by *Simons Institute for the Theory of Computing* at the *University of California, Berkeley*.
- Travel Award: ICML 2018, Stockholm, Sweden.
- Invited to the TRIPODS Madison summer school 2018 on "Fundamentals of Data Analysis" organized by *Institute for Foundations of Data Science (IFDS)* at the *University of Wisconsin–Madison*.

Technical Skills

Python, R, MATLAB, SAS, C++, SQL, LaTeX, Excel VBA

Professional Service

Journal reviewing

- Journal of Machine Learning Research (JMLR)
- ACM Transactions on Algorithms (TALG)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- Journal of Computational and Graphical Statistics (JCGS)
- SIAM Journal on Scientific Computing (SISC)
- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- SIAM Journal on Matrix Analysis and Applications (SIMAX)
- Information and Inference: A Journal of the IMA (IMAIAI)
- Linear Algebra and its Applications (LAA)
- Applied and Computational Harmonic Analysis (ACHA)

Conference reviewing

- International Conference on Artificial Intelligence and Statistics (AISTATS), 2022
- International Conference on Machine Learning (ICML) 2020, 2021
- Neural Information Processing System (NeurIPS) 2020

Committee service

- Graduate student member of the Diversity and Inclusion Committee 2019-21, Department of Statistics, Purdue University

Graduate Coursework

Big Data Theory and Methods, Randomized Algorithms for Big Data Matrices, Computational Statistics, Probability and Stochastic Processes, Linear Models, Regression Techniques, Statistical Inference, Bayesian Statistics, Statistical Methods for D & R Algorithm.

References

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