Agniva Chowdhury

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Research Interests	Randomized Algorithms, Numerical Linear Algebra, Mathematical Optimization, Machine Learning, Deep Learning, Dimensionality Reduction, High-Dimensional Statistics, Scientific Computing.

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	Kolkata, WB, India
Analyst - Decision Sciences	Nov 2012 - Mar 2015
EXL Service	Gurgaon, Haryana, India
Senior Programmer Analyst	Jul 2011 - Nov 2012

Publications/ Preprints

1. **A. Chowdhury** and P. Ramuhalli. *A Provably Accurate Randomized Sampling Algorithm for Logistic Regression*. In Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI), 2024.

2. S. Fadnavis, **A. Chowdhury**, J. Batson, P. Drineas, and E. Garyfallidis. *Patch2Self2: Self-supervised Denoising on Coresets via Matrix Sketching*. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024 (accepted).

3. A. Bose, M. Burch, **A. Chowdhury**, P. Paschou, and P. Drineas, *Structure-informed clustering for population stratification in association studies*, BMC Bioinformatics 24, p. 411 , 2023.

4. F. Liu, **A. Chowdhury**. *Deep Learning with Physics Priors as Generalized Regularizers*. NeurIPS AI for Science Workshop. 2023.

5. **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), 23(336), pp.1-48, 2022.

6. 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. **Selected for long presentation**.

7. **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.

8. **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.

9. **A. Chowdhury**, P. Drineas, D. P. Woodruff, and S. Zhou. *Approximation Algorithms for Sparse Principal Component Analysis*. arXiv:2006.12748, 2020.

10. 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.

11. **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.**

12. **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.

13. **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. *Randomized Linear Algebra for Interior Point Methods.* Mathematics in Computation (MiC) Seminar. Oak Ridge National Laboratory, Oak Ridge, TN, USA, Feb 2024.

2. *A Provably Accurate Randomized Sampling Algorithm for Logistic Regression.* Mathematics and Computer Science (MCS) Seminar. Argonne National Laboratory, Lemont, IL, USA, Jan 2024.

3. *Randomized Linear Algebra for Interior Point Methods.* SIAM Conference on Optimization (OP23). Seattle, WA, USA, May 2023.

4. *Randomized Numerical Linear Algebra and its Applications.* Flash talk in ORNL's AI Initiative mid-year review. Oak Ridge National Laboratory, TN, USA, Mar 2023.

5. *On the Convergence of Inexact Predictor-Corrector Methods for Linear Programming.* Bi-weekly meeting of Data-Driven Decision Control for Complex Systems Project (DnC2S). Oak Ridge National Laboratory, Oak Ridge, TN, USA, Aug 2022 (virtual)

6. *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)

7. *Speeding-up Linear Programming using Randomized Linear Algebra.* Computer Science and Mathematics Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA, Jun 2021 (virtual).

8. *Speeding-up Linear Programming using Randomized Linear Algebra.* Michael Mahoney's Research Group, UC Berkeley, Berkeley, CA, USA, Oct 2020 (virtual).

9. *Randomized Iterative Algorithms for Fisher Discriminant Analysis.* , Graduate Students Seminar, Department of Statistics, Purdue University, West Lafayette, IN, USA, Apr 2020 (virtual).

10. *Randomized Iterative Algorithms for Fisher Discriminant Analysis.* 35th Conference on Uncertainty in Artificial Intelligence (UAI), Tel Aviv, Israel, Jul 2019.

11. *An Iterative, Sketching-based Framework for Ridge Regression.* 35th International Conference on Machine Learning (ICML), Stockholm, Sweden, Jul 2018.

Poster Presentations

1. *A Provably Accurate Randomized Sampling Algorithm for Logistic Regression*
   - 38th Annual AAAI Conference on Artificial Intelligence (AAAI 2024).

2. *Randomized Linear Algebra for Interior Point Methods*
   - AI Expo 2023, Oak Ridge National Laboratory. Oak Ridge, TN, USA.

3. *Faster Randomized Infeasible Interior Point Methods for Tall/Wide Linear Programs*
   - 34th Conference on Neural Information Processing Systems (NeurIPS 2020), virtual.

4. *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.

Technical Skills

Python, Pytorch, TensorFlow, R, MATLAB, C++, SAS, SQL, GitHub, Excel VBA

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*.

Professional Service

Membership:

- Society for Industrial and Applied Mathematics (SIAM)
- Association for the Advancement of Artificial Intelligence (AAAI)

Journal reviewing

- IEEE Transactions on Signal Processing (TSP)
- ACM Journal of Experimental Algorithmics (JEA)
- 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

- AAAI Conference on Artificial Intelligence (AAAI), 2024
- 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.

References

Petros Drineas
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