

# Agniva Chowdhury

Computer Science and Mathematics Division  
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**Research Interests** Randomized Algorithms, Numerical Linear Algebra, Mathematical Optimization, Machine Learning, Deep Learning, Dimensionality Reduction, High-Dimensional Statistics, Scientific Computing.

<b>Education</b>	<b>Purdue University</b>	West Lafayette, IN, USA
	<b>Ph.D. in Statistics</b>	2015 - 2021
	<b>Indian Institute of Technology Kanpur</b>	Kanpur, UP, India
	<b>M.Sc. in Statistics</b>	2009 - 2011
	<b>University of Calcutta</b>	Kolkata, WB, India
	<b>B.Sc. in Statistics</b>	2006 - 2009

<b>Experience</b>	<b>Oak Ridge National Laboratory</b>	Oak Ridge, TN, USA
	<i>Postdoctoral Research Associate</i>	Jan 2022 - Present
	<b>Purdue University</b>	West Lafayette, IN, USA
	<i>Research Assistant</i>	Jan 2017 - Dec 2021
	<i>Teaching Assistant</i>	Aug 2015 - Dec 2016
	<b>HSBC</b>	Kolkata, WB, India
	<i>Analyst - Decision Sciences</i>	Nov 2012 - Mar 2015
	<b>EXL Service</b>	Gurgaon, Haryana, India
	<i>Senior Programmer Analyst</i>	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. **Selected for oral presentation.**
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 Maehoney'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.

## 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, Pytorch, R, MATLAB, SAS, C++, SQL, LaTeX, Excel VBA

## 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 (IMAI)
- 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**

Professor and Associate Head  
Department of Computer Science  
Purdue University  
West Lafayette, IN, USA  
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### **Haim Avron**

Associate Professor  
School of Mathematical Sciences  
Tel Aviv University  
Tel Aviv, Israel  
haimav@tauex.tau.ac.il