

# Agniva Chowdhury

Computer Science and Mathematics Division  
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<b>Research Interests</b>	Randomized Numerical Linear Algebra, Matrix Sketching, Approximation Algorithms, Machine Learning, High-Dimensional Statistics	
<b>Education</b>	<b>Purdue University</b>	West Lafayette, IN, USA
	<b>Ph.D.</b> in <i>Statistics</i>	2015 - 2021
	<b>Indian Institute of Technology Kanpur</b>	Kanpur, UP, India
	<b>M.Sc.</b> in <i>Statistics</i>	2009 - 2011
	<b>University of Calcutta</b>	Kolkata, WB, India
	<b>B.Sc.</b> in <i>Statistics</i>	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
<b>Publications/ Preprints</b>	<ol style="list-style-type: none"><li>1. <b>A. Chowdhury</b>, G. Dexter, P. London, H. Avron, and P. Drineas. <i>Faster Randomized Interior Point Methods for Tall/Wide Linear Programs</i>. Journal of Machine Learning Research (JMLR), 2022 (accepted).</li><li>2. G. Dexter, <b>A. Chowdhury</b>, H. Avron, and P. Drineas. <i>On the Convergence of Inexact Predictor-Corrector Methods for Linear Programming</i>. In Proceedings of the 39th International Conference on Machine Learning (ICML), 2022. <b>Selected for long presentation.</b></li><li>3. <b>A. Chowdhury</b>, A. Bose, S. Zhou, D. P. Woodruff, and P. Drineas. <i>A Fast, Provably Accurate Approximation Algorithm for Sparse Principal Component Analysis Reveals Human Genetic Variation Across the World</i>. In Proceedings of the 26th Annual Conference on Research in Computational Molecular Biology (RECOMB), 2022.</li><li>4. S. Fadnavis, <b>A. Chowdhury</b>, J. Batson, P. Drineas, and E. Garyfallidis. <i>Patch2Self denoising of Diffusion MRI with Self-Supervision and Matrix Sketching</i>. In bioRxiv. Submitted, 2022.</li><li>5. <b>A. Chowdhury</b>, P. London, H. Avron, and P. Drineas. <i>Faster Randomized Infeasible Interior Point Methods for Tall/Wide Linear Programs</i>. In Advances in Neural Information Processing Systems (NeurIPS), 2020.</li><li>6. <b>A. Chowdhury</b>, P. Drineas, D. P. Woodruff, and S. Zhou. <i>Approximation Algorithms for Sparse Principal Component Analysis</i>. arXiv:2006.12748, 2020.</li></ol>	

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 (IMAI)
- 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

### **Petros Drineas**

Professor and Associate Head  
Department of Computer Science  
Purdue University  
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### **Hao Zhang**

Professor  
Department of Statistics  
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### **Haim Avron**

Associate Professor  
School of Mathematical Sciences  
Tel Aviv University  
Tel Aviv, Israel  
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### **Anindya Bhadra**

Associate Professor  
Department of Statistics  
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