Aukosh S. Jagannath

Curriculum Vitae

Department of Statistics and Actuarial Science
Department of Applied Mathematics
University of Waterloo
Mathematics 3 (M3) Rm 2114
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Education

Ph. D. in Mathematics, New York University, May 2016
Title: Variational and structural methods in mean field spin glasses
Advisor: Gérard Ben Arous

B.A. in Mathematics and Physics, New York University, May 2011
Summa Cum Laude with highest honors in Mathematics and highest honors in Physics

Employment

University of Waterloo

Assistant Professor, Department of Statistics and Actuarial Science Jul 2019 –
Department of Applied Mathematics (cross-appointed) Jul 2019 –

Harvard University

Benjamin Pierce Fellow, Harvard University, Sep 2016–Jun 2019 (on leave AY 2016-2017)
NSF MSPRF Postdoctoral Fellow, Sep 2017– Jun 2019

University of Toronto

NSF MSPRF Postdoctoral Fellow, Sep 2016-Sep 2017

Research Interests

Probability, mathematical physics of disordered media, specifically spin glasses, applications to optimization, mathematics of data science, and high dimensional statistics

Awards, Grants, and Honors

NSERC Discovery Grant RGPIN-2020-04597, DGECR-2020-00199 (PI), $177,500, 2020-2025

NSF DMS 1854406 (PI), $150,000, *highly recommended for funding* (declined for move to U. Waterloo)

NSF Mathematical Sciences Postdoctoral Research Fellowship, NSF OISE-1604232 (PI), $150,000, 2016- 2019

Dean's Dissertation Fellowship, NYU GSAS, 2015-2016

Wilhelm Magnus memorial prize, NYU Courant, 2015

NSF Graduate Research Fellowship, NSF, 2011-2016

College of Arts and Sciences Dean's Award for Scholarship, NYU CAS, 2011

Perley Lenwood Thorne Medal in Mathematics, NYU Courant, 2011

George Granger Brown Scholarship for Physics, NYU CAS, 2010-2011

Phi Beta Kappa (National Honours Society)

Sigma Pi Sigma (National Physics Honours Society)

Research

Preprints and Publications

(Preprints Available at `http://math.uwaterloo.ca/~a3jagann/research.html`)

23. A classification for the performance of online SGD for high-dimensional inference (with Gérard Ben Arous and Reza Gheissari), *submitted*, arXiv:2003.10409 (2020)
22. The overlap gap property in principal submatrix recovery (with David Gamarnik and Subhabrata Sen), *submitted*, arXiv:1908.09959 (2019)
21. Low-degree hardness of random optimization problems (with David Gamarnik and Alexander S. Wein), Foundations of Theoretical Computer Science (FOCS 2020), *to appear*, arXiv:2004.12063 (2020)
20. The overlap gap property and approximate message passing algorithms for p-spin models (with David Gamarnik), Ann. Probab, *to appear*, arXiv:1911.06943 (2019)
19. On the unbalanced cut problem and the generalized Sherrington-Kirkpatrick model (with Subhabrata Sen), Ann. Inst. H. Poincaré D, *to appear* arXiv:1707.09042
18. Statistical Thresholds for Tensor PCA (with Patrick Lopatto and Léo Miolane), Ann. Appl. Probab. (2020), Vol. 30, No. 4, 1910-1933
17. Algorithmic Thresholds for Tensor PCA (with Gérard Ben Arous and Reza Gheissari), Ann. Probab., Volume 48, Number 4 (2020), 2052-2087
16. Bounding flows for spherical spin glass dynamics (with Gérard Ben Arous and Reza Gheissari), Commun. Math. Phys., 373, 1011-1048 (2020)
15. Dynamics of mean field spin glasses on short and long timescales, J. Math. Phys. 60, 083305 (2019)
14. Thouless–Anderson–Palmer equations for generic p-spin glasses (with Antonio Auffinger), Ann. Probab. 47 (2019), No. 4, 2230–2256
13. On the Spectral Gap of Spherical Spin Glass Dynamics (with Reza Gheissari), Ann. Inst. H. Poincaré Probab. Statist., Vol. 55, No. 2 (2019), 756-776.
12. On spin distributions for generic p-spin models (with Antonio Auffinger), Jour. Stat. Phys. (2019) 174: 316

11. Spectral gap estimates for mean field spin glasses (with Gérard Ben Arous), Commun. Math. Phys. (2018), Volume 361, Issue 1, pp 1-52
10. MAX κ-CUT and the inhomogeneous Potts spin glass (with Justin Ko and Subhabrata Sen), Ann. Appl. Probab. (2018), Vol. 28, No. 3, 1536-1572
9. Bounding the Complexity of Replica Symmetry Breaking for Spherical Spin Glasses (with Ian Tobasco), Proc. Amer. Math. Soc., Volume 146, Number 7, July 2018, Pages 3127-3142
8. Random matrices and the New York City subway system (with Tom Trogdon), Phys. Rev. E 96, 030101(R), (2017)
7. Low Temperature Asymptotics in Spherical Mean Field Spin Glasses (with Ian Tobasco), Commun. Math. Phys. (2017), Volume 352, Issue 3, pp 979-1017
6. Some Properties of the Phase Diagram of Mixed p-Spin Glasses (with Ian Tobasco), Probab. Theory Relat. Fields (2017) 167: 615-672.
5. Approximate Ultrametricity for Random Measures with Applications to Spin Glasses, Comm. on Pure and Appl. Math 70 (2017), 611-664.
4. On the Overlap Distribution of Branching Random Walks, Electron. J. Probab. Volume 21 (2016), paper no. 50, 16 pp.
3. A Dynamic Programming Approach to the Parisi Functional (with Ian Tobasco), Proc. Amer. Math. Soc. Volume 144, Number 7, July 2016, Pages 3135-3150
2. Solution of the propeller conjecture in $\mathbb{R}^3$ (with Steven Heilman and Assaf Naor). Discrete and Computational Geometry: Volume 50, Issue 2 (2013), Pages 263-305. an extended abstract appeared at STOC 2012.
1. Charged particle motion in electromagnetic fields varying moderately slowly in space (with Harold Weitzner) Physics of Plasmas 18, 104510 (2011).

Invited Talks and Minicourses

30. 61st annual IEEE Symposium on Foundations of Theoretical Computer Science (FOCS 2020), November 2020 (Expected)
29. Algorithms and Complexity seminar, University of Waterloo, September 2020
28. Youth in High Dimensions, International Centre for Theoretical Physics, July 2020
27. Online Open Probability School (prev. Séminaire de Mathématiques Supérieures, Centre de Recherche Mathematiques) June 2020
26. Mathematical Methods and Models in Machine Learning, University of Bologna, April 2020
25. The rough high-dimensional landscape problem, Kavli Institute for Theoretical Physics, Feb. 2019
24. Probability seminar, MIT, November 2018
23. Math, Information, and Computation seminar, NYU Center for Data Science, November 2018
22. Math and Data working group, NYU Center for Data Science, November 2018
21. Stochastics and Statistics seminar, Institute for Data, Systems, and Society, MIT, October 2018
20. Spin glasses and related topics, Banff International Research Station, October 2018
19. Probability seminar, Cornell University, September 2018
18. Scaling Limits in Models of Statistical Mechanics, Oberwolfach, September 2018

17. Statistical physics and machine learning back together, Institut d'Etudes Scientifique de Cargese, August 2018
16. Equilibrium Statistical Mechanics Session, International Congress of Mathematical Physics, Montreal, July 2018
15. Simons Meeting on High-dimensional dynamics, Simons Collaboration on "Cracking the Glass Problem", CUNY, April 2018 (Keynote speaker)
14. Dynamical systems seminar, Lefschetz Center, Brown University, April 2018
13. Probability seminar, University of Toronto, January 2018
12. First joint meeting of CRM-IMPA, Centre de Recherche Mathematiques, July 2017
11. Phase transitions in random computational problems, American Institute of Mathematics, June 2017
10. Analysis seminar, University of Toronto, March 2017
9. Probability seminar, Stanford University, February 2017
8. Analysis and probability seminar, University of Michigan, February 2017
7. Random matrix theory and probability seminar, Harvard University, February 2016
6. Probability seminar, Northwestern University, February 2016
5. Probability and statistical physics Seminar, University of Chicago, January 2016
4. Probability seminar, Cornell University, September 2015
3. Analysis Seminar, Northwestern University, June 2015
2. Doctoral student working group seminar of LPMA (Paris VI and VII), April 2015
1. Spin glasses and related topics, Banff International Research Station, July 2014

Academic Experiences and Synergistic Activities

Teaching

University of Waterloo

Instructor: Probability Theory (advanced) Stat 240 Fall 2019, Applied Probability Stat 333, Winter 2020

Ph D proposal committee: Takaai Koike (Chair, 2019), Weinan Qi (Chair, 2020)

Current students: Aseem Baranwal (PhD, CS, joint with Kimon Fountoulakis)

Harvard University

Instructor: Math 21a (Undergraduate), Fall 2017; Topics In Mean Field Spin Glasses (Graduate), Spring 2018, Probability Theory, Spring 2019

Ph D defence committee member (reader): Benjamin Landon (2018), Zilian Che (2018)

New York University

Recitation Leader: Theory of Probability (Undergraduate), Spring 2014; Honors Analysis 1 (Undergraduate), Fall 2014, Fall 2015

Grader: Adv. Topics in Probab.: Random Graphs (Graduate), Spring 2016

Committees

University of Waterloo

communication committee 2019-, probability seminar committee 2020-

Harvard University

colloquium committee AY 17-18, qualification exam committee AY 18-19

Seminar and Conference Organization

Organizer, Waterloo Probability Seminar, Winter 2020–

Organizer, Harvard CMSA Random Matrix and Probability Theory Seminar, Fall 2017– Spring 2019

Organizer, Brandeis-Harvard-MIT-Northeastern Colloquium, Fall 2017– Spring 2018

Organizer, Toronto Probability Seminar, Fall 2016– Spring 2017

Organizer, Special Session on Spin Glasses and Disordered Media, JMM (AMS), Jan. 2017

Organizer, Courant Graduate Student Post-Doc Seminar (NYU) Spring 2014–Fall 2015

Organizer, Student Probability Seminar (NYU) Fall 2013–Spring 2016

Last updated: October 7, 2020