Kinjal Basu

CONTACT INFORMATION
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RESEARCH INTERESTS
Fairness, Explainability and Privacy in AI, Large-Scale Optimization, Bayesian Optimization, Causal Inference on Networks, Recommender Systems, Quasi-Monte Carlo Methods

EMPLOYMENT

- **Sr. Staff Software Engineer AI/ML, Data Trust and Foundations, LinkedIn.** *Mountain View, CA.* March 2021 - Feb 2023.

  Overall Tech Lead for Responsible AI, which encompasses Fairness AI, Explainable AI, and Privacy in AI, across all AI-driven products of the company.

  Other focus: Large-Scale optimization, and Causal Inference on Networks.

- **Staff Software Engineer AI/ML, Flagship AI, LinkedIn.** *Mountain View, CA.* October 2018 - Feb 2021

  Lead the efforts on Large-Scale Optimization across all of AI.

  Tech Lead for Fairness in AI efforts across the company.

  Other focus: Driving metric gains through heterogeneous causal effect estimation and causal inference on networks.

- **Senior Software Engineer AI/ML, Growth and Ecosystem AI, LinkedIn.** *Mountain View, CA.* June 2017- September 2018.

  Large-scale optimization problems with focus on global Bayesian optimization and constrained portfolio selection.

- **Software Engineer AI/ML, Growth and Ecosystem AI, LinkedIn.** *Mountain View, CA.* July 2016- June 2017.

  Statistical modeling, recommender systems and large-scale optimization.

EDUCATION

- **Doctor of Philosophy (Ph.D.), Statistics, Stanford University**, September 2012 - June 2016.

  Thesis Title: Quasi-Monte Carlo methods in Non-Cubical Domains. (Link)

  Advisor: Prof. Art Owen.

  Thesis Committee: Prof. Emmanuel Candés, Prof. Sourav Chatterjee, Prof. Persi Diaconis

- **Master of Science (M.S.), Statistics, Stanford University** January 2016

- **Master of Statistics (M. Stat.), Indian Statistical Institute**, May 2012

Specialization: Mathematical Statistics and Probability

Master's Thesis: Spline Smoothing for Estimation of Circular Probability Distributions via Spectral Isomorphism and its Spatial Adaptation

Advisor: Prof. Debapriya Sengupta

- **Bachelor of Statistics (Hons.) (B. Stat.), Indian Statistical Institute**, May 2010

Preprints

1. DiCiccio, C., Hsu, B., Yu, Y., Nandy, P., and **Basu, Kinjal** (2022) "Detection and Mitigation of Algorithmic Bias via Predictive Rate Parity". *In Submission.* Link : (arXiv: 2204.05947)

2. Nandy, P., Yu, X., Liu, W., Tu, Y., **Basu, Kinjal** and Chatterjee, S. (2022) "Generalized Causal Tree for Uplift Modeling." *In Submission.* Link : (arXiv: 2202.02416)

3. Durfee, D., Gupta, A., and **Basu, Kinjal** (2022) "Heterogeneous Calibration: A post-hoc model-agnostic framework for improved generalization." *In Submission.* Link : (arXiv: 2202.04837)

4. **Basu, Kinjal**, DiCiccio, C., Logan, H. and El Karoui, N. (2020) "A Framework for Fairness in Two-Sided Marketplaces." *In Submission.* Link : (arXiv: 2006.12756)

5. **Basu, Kinjal** and Nandy, P. (2019) "Optimal Convergence for Stochastic Optimization with Multiple Expectation Constraints." *In Submission.* Link : (arXiv: 1906.03401)

6. **Basu, Kinjal** and Ghosh, S. (2018) "Analysis of Thompson Sampling for Gaussian Process Optimization in the Bandit Setting". *In Submission.* Link : (arXiv: 1705.06808)

Publications

7. Wang, H., Cheng, M., **Basu, Kinjal**, Gupta, A., Selvaraj, K., and Mazumder, R. (2022) "A Light-speed Linear Program Solver for Personalized Recommendation with Diversity Constraints" *NeurIPS 2022 Workshop on Optimization for Machine Learning* Link : (arXiv: 2211.12409)

8. Hsu, B., Nandy, P., Mazumder, R., and **Basu, Kinjal** (2022) "Pushing the limits of fairness impossibility: Who's the fairest of them all?" *Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS 2022)* Link : (arXiv: 2208.12606)

9. Akpinar, N., DiCiccio, C., Nandy, P., and **Basu, Kinjal** (2022) "Long-term Dynamics of Fairness Intervention in Connection Recommender Systems" *AIES 2022.* (Link)

10. Nandy, P., Diciccio, C., Venugopalan, D., Logan, H., **Basu, Kinjal** and El Karoui, N. (2022) "Achieving Fairness via Post-Processing in Web-Scale Recommender Systems" *FAccT 2022.* (Link)

11. Ramanath, R., Keerthi, S., Pan, Y., Salomatin, K., and **Basu, Kinjal** (2022) "Efficient Vertex-Oriented Polytopic Projection for Web-scale Applications" *In Proceedings of the 36th AAAI Conference on Artificial Intelligence. AAAI 2022* (Link)

12. Tu, Y., **Basu, Kinjal**, DiCiccio, C., Bansal, R., Jaikumar, P., and Chatterjee, S. (2021) "Personalized Treatment Selection using Causal Heterogeneity". *TheWebConf (WWW) 2021* (Link)

13. Nandy, P., **Basu, Kinjal**, Tu, Y., and Chatterjee, S. (2020) "A/B Testing in Dense Large-Scale Networks: Design and Inference." *Thirty-fourth Conference on Neural Information Processing Systems (NeurIPS 2020 Spotlight)* (Link)

14. **Basu, Kinjal**, Ghoting, A., Mazumder, R., and Pan, Y. (2020) "ECLIPSE: An Extreme-Scale Linear Program Solver for Web-Applications ". *In Proceedings of the 37th Annual International Conference on Machine Learning (ICML 2020)* (Link)

15. DiCiccio, C., Vasudevan, S., **Basu, Kinjal**, Kenthapadi, K., and Agarwal, D. (2020) "Evaluating Fairness Using Permutation Tests". *The 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, August 23–27, 2020, Virtual Event. ACM, New York, NY, USA* (Link)

16. Agarwal, D. , **Basu, Kinjal**, Ghosh, S., Xuan, Y., Yang, Y. and Zhang, L. (2018) "Online Parameter Selection for Web-Based Ranking Problems". *The 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, August 19–23, 2018, London, United Kingdom. ACM, New York, NY, USA* (Link)

17. He ,Y., **Basu, Kinjal**, Zhao, Q. and Owen, A. (2018) "Permutation p-value approximation via generalized Stolarsky invariance". *The Annals of Statistics* **47** (1) pp. 583 - 611. (Link)

18. **Basu, Kinjal**, Saha, A. and Chaterjee, S. (2017) "Large-Scale Quadratically Constrained Quadratic Program via Low-Discrepancy Sequences". *Advances in Neural Information Processing Systems (NIPS) 2017.* pp. 2294–2304. (Link)

19. **Basu, Kinjal** and Owen, A. (2018) "Quasi-Monte Carlo for an Integrand with a Singularity along a Diagonal in the Square". *Contemporary Computational Mathematics - A Celebration of the 80th Birthday of Ian Sloan, Springer.* pp. 119 - 130. (Link)

20. **Basu, Kinjal** and Mukherjee, R. (2017) "Asymptotic normality of scrambled geometric net quadrature". *The Annals of Statistics.* **45** (4) pp. 1759 - 1788. (Link)

21. **Basu, Kinjal** and Owen, A. (2017) "Scrambled geometric net integration over general product spaces". *Foundations of Computational Mathematics.* **17** (2) pp. 467 - 496 (Link)

22. **Basu, Kinjal** and Owen, A. (2016) "Transformations and Hardy-Krause Variation". *SIAM Journal of Numerical Analysis.* **54** (3) pp. 1946-1966. (Link)

23. **Basu, Kinjal** (2015) "Quasi-Monte Carlo tractability of high dimensional integration over products of simplices". *Journal of Complexity.* **31** (6) pp. 817 - 834. (Link)

24. **Basu, Kinjal** and Owen, A. (2015) "Low discrepancy constructions in the triangle". *SIAM Journal of Numerical Analysis* **53** (2) pp. 743 - 761. (Link)

25. Basu, D., **Basu, Kinjal**, Bhattacharya, B. and Das, S. (2015) "Almost Empty Monochromatic Triangles in Planar Point Sets." *Discrete Applied Mathematics*. **210** pp. 207-213. (Link)

26. Samanta, D., Joshi, S., **Basu, Kinjal**, et. al (2014) "Receptor-Ligand Interaction at 5-HT_3 Serotonin Receptors: A Cluster Perspective". *Journal of Physical Chemistry A*, **118** (37), pp. 8471-8476. (Link)

27. Anis, M.Z. and **Basu, Kinjal** (2014). "Tests for exponentiality against NBUE alternatives: a Monte Carlo comparison". *Journal of Statistical Computation and Simulation*. **84** (2) pp. 231-247. (Link)

28. **Basu, Kinjal**, Nangia, R and Pal, U, (2012) "Recognition of similar shaped handwritten characters using Logistic Regression.", das, pp. 200-204 *Proceedings of the 2012 10th. IAPR International Workshop on Document Analysis Systems*. (Link)

29. Anis, M.Z. and **Basu, Kinjal**, (2011) "The exact null distribution of the generalized Hollander-Proschan type test for NBUE alternatives, *Statistics & Probability Letters*, **81** (11) pp. 1733-1737. (Link)

Master's Thesis

30. **Basu, Kinjal** and Sengupta, D. (2012) "A spatio-spectral hybridization for edge preservation and noisy image restoration via local parametric mixtures and Lagrangian relaxation". (Link : arXiv:1209.1826)

31. **Basu, Kinjal** and Sengupta, D. (2012) "Spline Smoothing for Estimation of Circular Probability Distributions via Spectral Isomorphism and its Spatial Adaptation" Link: (arXiv:1209.1740)

Patents

1. **Basu, Kinjal**, Xu, Z., Yan, J., Kumar, R., and Dalal, O., (2022) "Automatically Tuning Parameters in a layered model framework". U.S. Patent No. 11514372 B2. Date: Nov. 29, 2022.

2. **Basu, Kinjal**, Shreibati, S., Tiwana, B., et. al. (2022). "Techniques for presenting a Contexual Contact List". U.S. Patent No. 11436566 B2. Date: September 6, 2022.

3. **Basu, Kinjal**, Ouyang, Y., Jiang, C., and Fleming, J., (2022) "Large-Scale Automated Hyperparameter Tuning". U.S. Patent No. 11392859 B2. Date: July 19, 2022.

4. **Basu, Kinjal**, Saha, A., Chatterjee, S. (2022). "Constrained Multi-Slot Optimization for Ranking Recommendations". U.S. Patent No. 11263704 B2. Date: March 1, 2022.

5. **Basu, Kinjal**, Daga, P., Walker, M., et. al. (2021) "Content Generation and Targeting". U.S. Patent No. 10,936,683. Date: Mar. 02, 2021.

6. **Basu, Kinjal**, Saha, A., Chatterjee, S. (2019). "Large-Scale Multi-Objective Optimization". U.S. Patent No. 10,460,402. Date: Oct. 29, 2019.

7. **Basu, Kinjal**, Cheng, M., et. al. (2022) "Linear-Programming-Based Recommender with Personalized Diversity Constraints". U.S. Patent Application. Filed December 2022. *Patent Pending.*

8. **Basu, Kinjal**, Gong, X., and Jimenez, A. (2022) "Secure Machine Learning model training using Encryption". U.S. Patent Application. Filed November 2022. *Patent Pending.*

9. **Basu, Kinjal**, Ouyang, Y. and Gupta, V. (2019) "Tuning model parameters to optimize online content". U.S. Patent Application. Filed September 2019. *Patent Pending.*

10. **Basu, Kinjal**, Jiang, C., et. al. (2019) "Generalized Non-linear mixed effect models via Gaussian Processes". U.S. Patent Application 16/430,243, filed June, 2019. *Patent Pending.*

11. **Basu, Kinjal**, Ouyang, Y., Gupta, V., and Chatterjee, S., (2019) "Identifying the Primary Objective in Online Parameter Selection". U.S. Patent Application 16/370,127, filed April, 2019. *Patent Pending.*

12. **Basu,Kinjal**, Tu, Y., et. al., (2019) "Personalize and Optimize Decision Parameters Using Heterogeneous Effects". U.S. Patent Application 16/370,224, filed April, 2019. *Patent Pending.*

13. **Basu, Kinjal**, Ouyang, Y., Chen, B., and Zhong, Z. (2019) "Modular Autotune For Automated Feed Model Training". U.S. Patent Application, 16/231,199, filed January, 2019. *Patent Pending.*

14. **Basu, Kinjal**, Chatterjee, S., Tu, Y., et. al. (2018) "Low Variance Estimation of Network Effects". U.S. Patent Application 16/145,024, filed October, 2018. *Patent Pending.*

15. **Basu, Kinjal**, Saha, A., Chatterjee, S. (2017). "Populating a user interface using quadratic constraints". U.S. Patent Application 15/794,872, filed October, 2017. *Patent Pending.*

16. **Basu, Kinjal**, Ghosh, S., Xuan, Y., Zhang, L., Agarwal, D., and Yang, Y. (2017). "Calculation of Tuning Parameters for Ranking items in a User Feed." U.S. Patent Application, filed September, 2017. *Patent Pending.*

17. **Basu, Kinjal**, Shreibati, S., Tiwana, B., et. al. (2017). "Contextual Contact Suggestions". U.S. Patent Application 62/368,700, filed July, 2017. *Patent Pending.*

18. **Basu, Kinjal**, Kabdebom, V.L., Rosales, R.E., et. al. (2017). "Mentor and Mentee Matching using Social Networking Data". U.S. Patent Application 15/485,901, filed April, 2017. *Patent Pending.*

Professional Services

Chair

1. Session Chair at INFORMS 2022 Annual Meeting *Indianapolis, USA. October 2022* for "Advances in Responsible AI: From Theory to Practice".

2. Program Committee Member in "User Modeling, Personalization and Experience" for World Wide Web Conference, 2017-2021.

3. Session Chair at 12th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing, *Stanford, USA. August 2016* for "Quadrature at non-QMC points".

Journal Reviewer

1. Computational Statistics and Data Analysis, Elsevier.
2. Journal of Approximation Theory, Elsevier.
3. Econometrics and Statistics, Elsevier.
4. IEEE Transactions on Knowledge and Data Engineering
5. Mathematical Reviews, AMS
6. Mathematics and Computers in Simulation.

Conference Reviewer

1. ACM FAccT Conference 2022
2. International Conference on Machine Learning (ICML 2017 - 2022)
3. Conference on Neural Information Processing Systems (NIPS 2017 - 2022)
4. TheWebConf (WWW 2018 - 2022)
5. Conference celebrating Ian Sloan's 80th Birthday, UNSW, Australia, 2018.

Invited Speaker

1. INFORMS Annual Meeting 2022. *Indianapolis, IN, USA October 2022*
2. Joint Statistical Meeting JSM 2022 *Washington D.C., USA August 2022*
3. Trusted AI Summit 2022 *San Francisco, USA* June 2022.
4. CM Statistics 2022. *Seoul, South Korea (Virtual Event)* June 2022
5. AI Ethics Summit 2022 *San Francisco, USA* February 2022.
6. INFORMS Annual Meeting 2021. *Anaheim, CA, USA October 2021*
7. CM Statistics 2021. *London, UK (Virtual Event)* December 2021
8. INFORMS Annual Meeting 2020. *Washington DC, USA November 2020*
9. INFORMS Annual Meeting 2019. *Seattle, USA October 2019*
10. 2019 ML Platform Meetup: Infra for Contextual Bandits and Reinforcement Learning *Netflix, Los Gatos, CA, USA September 2019*
11. Workshop on Discrepancy Theory, *Varenna, Italy . June 2016.*

12. Statistics Seminar, *Department of Statistics, Stanford University. May 2015.*

13. Industrial Affiliates Conference, *Department of Statistics, Stanford University. Feb 2015.*

14. ICERM workshop on Discrepancy Theory, *ICERM, Brown University. October 2014.*

15. Invited Talk for PCM Memorial Gold Medal Award, *Indian Statistical Institute, Kolkata. June 2012.*

16. Invited Talk for D. Basu Memorial Gold Medal Award, *Indian Statistical Institute, Kolkata. Sept 2011.*

17. United States Conference on Teaching of Statistics (USCOTS), *Ohio State University. June 2009.*

18. Statistics Seminar, *Department of Biostatistics and Epidemiology, University of Cincinnati. June 2009.*

Conference Presentations

1. The 5th AAAI/ACM Conference on Aritificial Intelligence, Ethics and Society (ACM AIES) *Oxford, U.K.* August 2022.

2. ACM Conference on Fairness, Accountability, and Transparency (ACM FAccT 2022) *Seoul, South Korea* June 2022.

3. Spring 2022 Machine Learning, AI and Data Science Conference (MLADS). *Redmond, WA. June 2022.*

4. The 36th AAAI Conference on Aritificial Intelligence (AAAI 2022) *Virtual Event* February 2022.

5. Microsoft Search Summit 2021. *Bangalore, India (Virtual Event)* September 2021.

6. Tutorial on Bayesian Optimization for Balancing Metrics in Recommender Systems, ICJAI 2020 *Virtual Event* January 2021.

7. 2020 Conference on Neural Information Processing Systems (NeurIPS 2020). *Spotlight Presentation, Virtual Event. December 2020*

8. Fall 2020 Machine Learning, AI and Data Science Conference (MLADS). *Virtual Event. November 2020*

9. 2020 Bay Area Machine Learning Symposium. (BayLearn) *Virtual Event, October 2020*

10. The 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD 2020). *Virtual Event. August 2020*

11. 2020 International Conference on Machine Learning (ICML 2020) *Virtual Event. July 2020*

12. 2019 Bay Area Machine Learning Symposium. (BayLearn) *Pinterest, San Francisco, CA, USA. October 2019*

13. 2018 Bay Area Machine Learning Symposium. (BayLearn). *Menlo Park, CA, USA. October 2018.*

14. The 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD 2018). *London, UK. August 2018*

15. 2017 Conference on Neural Information Processing Systems (NIPS 2017). *Los Angeles, USA. December 2017*

16. 2017 Bay Area Machine Learning Symposium. (BayLearn). *Cupertino, CA, USA. October 2017.*

17. Workshop on Quasi-Monte Carlo and High-Dimensional Sampling Methods for Applied Mathematics. *Duke University, Durham, NC, USA. August 2017*

18. 12th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing, *Stanford, USA. August 2016*

19. Conference on Information Based Complexity, *Banach Center at Bedlewo, Poland. April 2015.*

20. 11th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing, *Leuven, Belgium. April 2014.*

21. 10th IAPR International workshop on Document Analysis Systems, *Gold Coast, Australia. April 2012.*

Awards and Honors

1. Ingram Olkin Interdisciplinary Dissertation Award, 2016 awarded for the Best Thesis in the area of inter-discliplinary research to the graduating class of 2016.

2. NSF Travel Award for MCQMC 2014, Leuven, Belgium.

3. Ranked 3rd, at the International Second Biennial Undergraduate Statistics Project Competition (USPROC 2009)

4. Award for Academic Excellence, Indian Statistical Institute, Kolkata.

5. Summer Research Fellowship 2009, funded by the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, India.

6. Summer Research Fellowship 2009, funded by the Indian Academy of Sciences.

7. Summer Research Fellowship 2008, funded by the Indian Academy of Sciences.

8. M.T & T. S. Summer Fellowship 2008, awarded by the National Board of Higher Mathematics.

9. Fellow of the Kishore Vaiganik Protsahan Yojana (KVPY), 2008.

10. Indian National Mathematics Olympiad (INMO) 2006.

11. Governor's Award for "Excellent Academic Performance" in school final examination.

Updated: 02/17/2023