

# Kinjal Basu

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

## EMPLOYMENT

- **Staff Applied Researcher, Flagship Relevance, LinkedIn.** *Mountain View, CA.* October 2018 - present.  
  
Leading the efforts on Large-Scale Optimization across all AI driven products  
Tech Lead for Fairness in AI efforts across the company.  
Driving metric gains through heterogeneous causal effect estimation and focusing on causal inference on networks.
- **Senior Applied Researcher, Growth and Ecosystem Relevance, LinkedIn.** *Mountain View, CA.* June 2017- September 2018.  
  
Working on large-scale optimization problems with focus on global Bayesian optimization and constrained portfolio selection.
- **Applied Researcher, Growth and Ecosystem Relevance, LinkedIn.** *Mountain View, CA.* July 2016- June 2017.  
  
Worked on predictive modeling, statistical learning, recommendation systems and large-scale optimization problems.
- **Research Intern, LinkedIn.** *Mountain View, CA.* Summer 2014, 2015.  
  
Worked on variance reduction techniques for large-scale optimization (2015) and topic models for article recommendations (2014).
- **Financial Research Intern, Deutsche Bank, Global Capital Markets, Mumbai, India.** *Summer 2011*  
  
Worked on dependency structure of six major global markets for optimal price prediction.
- **Research Intern, Johns Hopkins University, Baltimore, MD.** *Summer 2010*  
  
Worked to developed statistical genetic theory for predicting the behavior of DNA array used in detecting deletions in human genome samples.

## 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. **Basu, Kinjal**, DiCiccio, C., Logan, H. and El Karoui, N. (2020) “A Framework for Fairness in Two-Sided Marketplaces.” *In Submission*. [Link : \(arXiv: 2006.12756\)](#)
2. Nandy, P., Sepehri, A., **Basu, Kinjal**, Logan, H., Agarwal, A., and El Karoui, N. (2020) “Scalable Assessment and Mitigation Strategies for Fairness in Rankings.” *In Submission*. [Link : \(arXiv: 2006.11350\)](#)
3. **Basu, Kinjal** and Nandy, P. (2019) “Optimal Convergence for Stochastic Optimization with Multiple Expectation Constraints.” *In Submission*. [Link : \(arXiv: 1906.03401\)](#)
4. Tu, Y., **Basu, Kinjal**, DiCiccio, C., Bansal, R., Jaikumar, P., and Chatterjee, S. (2019) “Personalization and Optimization of Decision Parameters via Heterogenous Causal Effects.” *In Submission*. [Link : \(arXiv: 1901.10550\)](#)
5. Nandy, P., **Basu, Kinjal**, Tu, Y., and Chatterjee, S. (2019) “A/B Testing in Dense Large-Scale Networks: Design and Inference.” *In Submission*. [Link : \(arXiv: 1901.10505\)](#)
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. **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](#))
8. 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](#))

9. 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](#))
10. 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](#))
11. **Basu, Kinjal**, Saha, A. and Chatterjee, S. (2017) “Large-Scale Quadratically Constrained Quadratic Program via Low-Discrepancy Sequences”. *Advances in Neural Information Processing Systems (NIPS) 2017*. pp. 2294–2304. ([Link](#))
12. **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](#))
13. **Basu, Kinjal** and Mukherjee, R. (2017) “Asymptotic normality of scrambled geometric net quadrature”. *The Annals of Statistics*. **45** (4) pp. 1759 - 1788. ([Link](#))
14. **Basu, Kinjal** and Owen, A. (2017) “Scrambled geometric net integration over general product spaces”. *Foundations of Computational Mathematics*. **17** (2) pp. 467 - 496 ([Link](#))
15. **Basu, Kinjal** and Owen, A. (2016) “Transformations and Hardy-Krause Variation”. *SIAM Journal of Numerical Analysis*. **54** (3) pp. 1946-1966. ([Link](#))
16. **Basu, Kinjal** (2015) “Quasi-Monte Carlo tractability of high dimensional integration over products of simplices”. *Journal of Complexity*. **31** (6) pp. 817 - 834. ([Link](#))
17. **Basu, Kinjal** and Owen, A. (2015) “Low discrepancy constructions in the triangle”. *SIAM Journal of Numerical Analysis* **53** (2) pp. 743 - 761. ([Link](#))
18. 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](#))
19. Samanta, D., Joshi, S., **Basu, Kinjal**, et. al (2014) “Receptor-Ligand Interaction at 5-HT<sub>3</sub> Serotonin Receptors: A Cluster Perspective”. *Journal of Physical Chemistry A*, **118** (37), pp. 8471-8476. ([Link](#))
20. 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](#))
21. **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](#))
22. 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

23. **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](#))
24. **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**, Saha, A., Chatterjee, S. (2019). "Large-Scale Multi-Objective Optimization". [U.S. Patent No. 10,460,402](#). Date: Oct. 29, 2019.
2. **Basu, Kinjal**, Ouyang, Y. and Gupta, V. (2019) "Tuning model parameters to optimize online content". U.S. Patent Application. Filed September 2019. *Patent Pending*.
3. **Basu, Kinjal**, Xu, Z., Yan, J., Kumar, R., and Dalal, O., (2019) "Automatically Tuning Parameters in a layered model framework". U.S. Patent Application Docket Number 60352-0406. Filed Aug 2019 *Patent Pending*.
4. **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*.
5. **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*.
6. **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*.
7. **Basu, Kinjal**, Ouyang, Y., Jiang, C., and Fleming, J., (2019) "Large-Scale Automated Hyperparameter Tuning". U.S. Patent Application, 16/246,403, filed February, 2019. *Patent Pending*.
8. **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*.
9. **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*.
10. **Basu, Kinjal**, Daga, P., Walker, M., et. al. (2017) "Content Generation and Targeting". U.S. Patent Application 15/821,663, filed November, 2017. *Patent Pending*.
11. **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*.

12. **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*.
13. **Basu, Kinjal**, Shreibati, S., Tiwana, B., et. al. (2017). “Techniques for presenting a Contextual Contact List”. U.S. Patent Application 15/663,492, filed July, 2017. *Patent Pending*.
14. **Basu, Kinjal**, Shreibati, S., Tiwana, B., et. al. (2017). “Contextual Contact Suggestions”. U.S. Patent Application 62/368,700, filed July, 2017. *Patent Pending*.
15. **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*.
16. **Basu, Kinjal**, Saha, A., Chatterjee, S. (2017). “Constrained Multi-Slot Optimization for Ranking Recommendations”. U.S. Patent Application, filed January, 2017. *Patent Pending*.

PROFESSIONAL  
SERVICES

**Chair**

1. Program Committee Member in “User Modeling, Personalization and Experience” for World Wide Web Conference, 2017-2020.
2. 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. Conference celebrating Ian Sloan’s 80th Birthday, UNSW, Australia, 2018.
2. International Conference on Machine Learning (ICML 2017 - 2020)
3. Conference on Neural Information Processing Systems (NIPS 2017 - 2020)

INVITED  
SPEAKER

1. INFORMS Annual Meeting 2020. *Washington DC, USA November 2020*
2. INFORMS Annual Meeting 2019. *Seattle, USA October 2019*
3. 2019 ML Platform Meetup: Infra for Contextual Bandits and Reinforcement Learning *Netflix, Los Gatos, CA, USA September 2019*
4. Workshop on Discrepancy Theory, *Varenna, Italy . June 2016.*
5. Statistics Seminar, *Department of Statistics, Stanford University. May 2015.*
6. Industrial Affiliates Conference, *Department of Statistics, Stanford University. Feb 2015.*
7. ICERM workshop on Discrepancy Theory, *ICERM, Brown University. October 2014.*
8. Invited Talk for PCM Memorial Gold Medal Award, *Indian Statistical Institute, Kolkata. June 2012.*
9. Invited Talk for D. Basu Memorial Gold Medal Award, *Indian Statistical Institute, Kolkata. Sept 2011.*
10. United States Conference on Teaching of Statistics (USCOTS), *Ohio State University. June 2009.*
11. Statistics Seminar, *Department of Biostatistics and Epidemiology, University of Cincinnati. June 2009.*

CONFERENCE  
PRESENTA-  
TIONS

1. Tutorial on Bayesian Optimization for Balancing Metrics in Recommender Systems, ICJAI 2020 Yokohama, Japan. Rescheduled to January 2021.
2. The 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD 2020). *Virtual Event. August 2020*
3. 2020 International Conference on Machine Learning (ICML 2020) *Virtual Event. July 2020*
4. 2019 Bay Area Machine Learning Symposium. (BayLearn) *Pinterest, San Francisco, CA, USA. October 2019*
5. 2018 Bay Area Machine Learning Symposium. (BayLearn). *Menlo Park, CA, USA. October 2018.*
6. The 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD 2018). *London, UK. August 2018*
7. 2017 Conference on Neural Information Processing Systems (NIPS 2017). *Los Angeles, USA. December 2017*
8. 2017 Bay Area Machine Learning Symposium. (BayLearn). *Cupertino, CA, USA. October 2017.*

9. Workshop on Quasi-Monte Carlo and High-Dimensional Sampling Methods for Applied Mathematics. *Duke University, Durham, NC, USA. August 2017*
10. 12th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing, *Stanford, USA. August 2016*
11. Conference on Information Based Complexity, *Banach Center at Bedlewo, Poland. April 2015.*
12. 11th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing, *Leuven, Belgium. April 2014.*
13. 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-disciplinary 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 Vaigyanik Protsahan Yojana (KVPY), 2008.
10. Indian National Mathematics Olympiad (INMO) 2006.
11. Governor's Award for "Excellent Academic Performance" in school final examination.

Updated: 07/13/2020