LIZHEN LIN

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EMPLOYMENT

Professor, Statistics Director, Department of Mathematics, The University of Maryland (July 1, 2023-current)

Associate Professor, Robert and Sara Lumpkins Associate Professor in Applied and Computational Mathematics and Statistics (July 2019- June 2023), The University of Notre Dame.

Assistant Professor, Huisking Foundation Inc. Assistant Professor (08/ 2016-06/ 2019): Department of Applied and Computational Mathematics and Statistics, The University of Notre Dame.

Assistant Professor (08/2014-07/2016): Department of Statistics and Data Sciences, The University of Texas-Austin.

Postdoctoral Associate (06/ 2012-08/ 2014): Department of Statistical Science, Duke University. Mentor: Prof. David Dunson, Arts and Sciences Distinguished Professor.

Member of Laboratory of Psychiatric Neuroengineering (2012-2014), Duke University Medical Center. Mentor: Prof. Kafui Dzirasa, MD Ph.D.

EDUCATION

Doctor of Philosophy (Ph.D.) in Mathematics. Department of Mathematics, The University of Arizona (May 2012). Thesis advisor: Prof. Rabi Bhattacharya.

HONORS/AWARDS

- 1. 2017 NSF Career award.
- 2. 2017 DARPA YFA (Young Faculty Award).

RESEARCH INTERESTS

Bayesian nonparametrics; Bayesian Asymptotics; Statistics on manifolds; Geometry & Statistics; Network analysis; Statistical properties of deep neural network models; Shape constrained inference; Robust statistical inference; Machine learning in neuroscience; Persistent DNA analysis.

PUBLICATIONS

Books

1. Bhattacharya, R., Lin, L., and Patrangenaru, V (2016). A Course in Mathematical Statistics and Large Sample Theory. Springer Series in Statistics.

Research Articles

- Ohn, I.⁺, Lin, L. and Kim, Y. (2023). A Bayesian factor model with adaptive posterior contraction. Bayesian Statistics, accepted.
- Lee, K., You, K, and Lin, L. (2023). Bayesian optimal two-sample tests in high-dimension. arXiv:2112.02580 Bayesian Analysis. accepted.
- 4. Amini, A., Paez., M., and Lin, L. (2023). Hierarchical stochastic block model for community detection in multiplex networks. *Bayesian Analysis.* accepted.
- 5. Chae, M.⁺, Kim, D., Kim, Y. and **Lin, L.** (2023). A likelihood approach to nonparametric estimation of a singular distribution using deep generative models. *Journal of the Machine Learning Research*, vol 24, 1-42.
- Lee, K.⁺ and Lin, L. (2023). Scalable Bayesian high-dimensional local department and dependence learning. *Bayesian analysis.* 18(1): 25-47.
- Ohn, I.⁺ and Lin, L. (2023). Optimal Bayesian estimation of Gaussian mixtures with growing number of components. *Bernoulli*. Vol. 29 (2), pp. 1195-1218
- Chen, L.*, Zhou, J. and Lin, L. (2023). Hypothesis testing for population of networks. Communication in Statistics-Theory and Methods. vol 52 (11), 3661-3684. arXiv:1911.03783
- Y Fang *, M Niu, P Cheung, L Lin (2023). Extrinsic Bayesian Optimization on Manifolds. Algorithms vol. 16 (2), 117
- 10. Lin, L., Lazar, D., Saparbayeva, B., and Dunson, D. B. (2022). Robust optimization and inference on manifolds. *Statistics Sinica*, accepted.
- Josephs, N.*, Lin, L., Rosenberg, S. and Kolaczyk, E. (2023). Bayesian classification, anomaly detection, and survival analysis using network inputs with application to the microbiome. Arxiv:2004.04765. Annals of Applied Statistics. vol 17 (1), 199-224.
- 12. Chen, L.*, Josephs, N., Lin, L., Zhou, J. and Kolaczyk, E. (2022). A spectral-based framework for hypothesis testing in populations of networks arXiv:2011.12416. *Statistics Sinica, accepted.*
- Jin, I., Jeon, M., Schweinberger, M. and Lin, L. (2022). Hierarchical network item response modeling for discovering differences between innovation and regular school systems in Korea. Arxiv:1810.07876. *Journal of the Statistical Royal Society, ser. C.* vol 71 (5), 1225–1244.
- Lee, K.⁺, Lin, L., and Dunson, D. (2021). Maximum pairwise Bayes factors for covariance structure testing. *Electronic Journal of Statistics*. 15(2): 4384–4419.
- Thomas, B., You, K., Lin, L.#, Lim, L., and Mukherjee, S (2021). Learning subspaces of different dimensions. Journal of the Computational and Graphical Statistics. DOI: 10.1080/10618600.2021.2000420. Arxiv:1404.6841. #-corresponding.
- Hong, M, Lin, L. and Chen, Y. (2021). Asymptotically corrected person fit statistics for multidimensional constructs with simple structure and mixed item types. PsyArXiv, 30 Apr.2020. Psychometrika. Vol 86, 464-488.
- 17. Lee, K.⁺, Chae, M.⁺, and Lin, L. (2021). Bayesian high-dimensional semi-parametric inference beyond sub-Gaussian errors. *Journal of the Korea Statistical Society*, Vol 50, pp 511–527.
- 18. Kolaczyk, E., Lin, L., Rosenberg, S., Xu., J and Jackson, W. (2020). Averages of unlabeled networks: geometric characterization and asymptotic behavior. *Annals of Statistics*, Vol. 48, No. 1, 514–538.
- 19. Lee, K.⁺, and Lin, L. (2020). Bayesian bandwidth test and selection for high-dimensional banded precision matrices. *Bayesian Analysis*, Vol 15, No. 3 737–758.
- Lee, K⁺., Lee, J. and Lin, L. (2019). Minimax posterior convergence rates and model selection consistency in high-dimensional DAG models based on sparse Cholesky factors. Annals of Statistics 2019, Vol. 47, No. 6, 3413–3437.

- Niu, M., Cheung, P., Lin, L.[#], Dai, Z., Lawrence, N. and Dunson, D. B. (2019). Intrinsic Gaussian processes on complex constrained domains. *Journal of the Royal Statistical Society, Ser. B.* 81: 603–627. [#]-corresponding.
- 22. Bhattacharya, R. and Lin, L. (2019). Differential geometry for model independent analysis of images and other non-Euclidean data: recent developments. In: Sidoravicius V. (eds) Sojourns in Probability Theory and Statistical Physics - II. Springer Proceedings in Mathematics & Statistics, vol 299. Springer.
- Chae, M.⁺, Lin, L and Dunson, D.B. (2019) Bayesian sparse linear models with unknown symmetric errors. *Information and Inference*. vol 8 (3), 621–653.
- 24. Lin, L., Niu, M., Pokman, C. and Dunson. D.B. (2019). Extrinsic Gaussian process models for regression and classification on manifolds. *Bayesian Analysis*. vol.14, 907–926. Arxiv:1706.08757
- Li, C., Lin, L. and Dunson, D. B. (2019). On posterior consistency of tail index for Bayesian kernel mixture models. *Bernoulli*, Vol. 25, No. 3, 1999–2028.
- 26. Sarpavayeva, B.⁺, Zhang, M.* and Lin, L. (2018). Communication efficient parallel algorithms for optimization on manifolds. *Neural Information Processing Systems 2018*.
- Zhang, M.*, Lam, H. and Lin, L. (2018). Robust and scalable Bayesian model selection. Computational Statistics & Data Analysis, Vol. 127, 229–247.
- Lin, L., Thomas, B.*, Zhu, H. and Dunson, D.B (2017). Extrinsic local regression on manifold-valued data. Journal of the American Statistical Association-Theory and Methods. 112(519), 1261-1273.
- Bhattacharya, R. and Lin, L. (2017). Omnibus CLTs for Fréchet means and nonparametric inference on non-Euclidean spaces. *Proceedings of American Mathematical Society*. Vol. 145, 413-428.
- Minsker, S., Srivastava, S., Lin, L. and Dunson, D.B. (2017). Robust and scalable Bayes via a median of subset posterior measure. *Journal of Machine Learning Research*, 18(124):1–40.
- Mukherjee, S. S., Sarkar, P., and Lin, L. (2017). On clustering network-valued data. Neural Information Processing Systems 2017.
- Lin, L., Rao, V., and Dunson, D.B (2017). Bayesian nonparametric inference on Stiefel manifold. Statistics Sinica 27, 535–553.
- Lazar, D. and Lin, L. (2017). Scale and curvature effects in principal geodesic analysis. Journal of the Multivariate Analysis 153, 64–82.
- Borg, J.S., Lin, L. et al. (2017) Rat intersubjective decisions are encoded by frequency-specific oscillatory contexts. Brain and Behavior 7: e00710. DOI: 10.1002/brb3.710.
- Hultman, R., Mague, S.D., Li, Q., Katz, B.M., Michel, N., Lin, L., et.al (2016). Dysregulation of cortical-mediated slow evolving limbic dynamics drives stress-induced emotional pathology. *Neuron* 91(2),439–452.
- Rao, V., Lin, L., and Dunson, D.B (2016). Data augmentation for models based on rejection sampling. Biometrika 103 (2): 319–335.
- Li, D., Wang X., Lin, L and Dey, D.(2016). Flexible link functions in nonparametric binary regression with Gaussian process priors. *Biometrics* 72, 707–719.
- Lin, L, Piegorsch, W., and Bhattacharya, R. (2015). Nonparametric benchmark dose estimation with continuous dose-response data. *Scandinavian Journal of Statistics* 42, 713–731.
- Lin, L. and Dunson, D. B. (2014). Bayesian monotone regression using Gaussian process projection. Biometrika, 101 (2): 303–317.
- Piegorsch, W., Xiong, H. Bhattacharya, R., and Lin, L. (2014). Benchmark dose analysis via nonparametric regression modeling. *Risk Analysis* 34(1), 135–151.
- 41. Minsker, S., Srivastava, S., Lin, L., and Dunson, D.B. (2014) Scalable and robust Bayesian inference via the median posterior. *ICML 2014.*

- Bhattacharya, R. and Lin, L. (2013). Recent progress in the nonparametric estimation of monotone curves -with applications to bioassay and environmental risk assessment. *Computational Statistics & Data Analysis*, 63, 63–80.
- 43. Bhattacharya, R., Majumdar, M., and Lin, L. (2013). Problem of ruin and survival in economics: application of limit theorems in probability. Sankhyā, Ser.B 75(2), 145–180
- 44. Piegorsch, W., Xiong, H., Bhattacharya, R., and Lin, L. (2012). Nonparametric estimation of benchmark doses in environmental risk assessment. *Environmetrics* 23 (8), 717–728.
- 45. Bhattacharya, R. and Lin, L. (2011). Nonparametric benchmark analysis in risk assessment: a comparative study by simulation and data analysis. *Sankhyā*, *Ser.B* **73**(1), 144-163.
- Bhattacharya, R. and Lin, L. (2010). An adaptive nonparametric method in benchmark analysis for bioassay and environmental Studies. Stat & Probab. Lett 80, 1947-1953.

Topological data analysis, Graph neural networks

- Bao, D.⁺, You, K.* and Lin, L. (2022). Network distance based Laplacian flow on graphs. Arxiv:1810.02906. *IEEE BigData 2022*, 715-720.
- 48. Hu, Y., Zhao, T., Xu, S., Lin, L. and Xu, Z. (2022). Neural-PDE: a RNN based neural network for solving time dependent PDEs. *Communications in Information and Systems*. Volume 22 (2), 223–245.
- Nguyen, D., Lin, X., Le, P. and Lin, L. (2022). A graph-theoretical approach to DNA similarity analysis. BioArxiv. Communications in Information and Systems (CIS), Volume 22 (3), 383–400.
- 50. Nguyen, D., Le, P., Lin, X. and Lin, L. (2022). A topological characterization of DNA sequences based on chaos geometry and persistent homology. BioArxiv. *IEEE CSCI 2022.*.
- 51. Nguyen, D., Le, P., Hu, Z. and Lin, L. (2021). A topological approach to DNA similarity analysis from 5-dimensional representation. BioArxiv. Submitted.
- 52. Hu, Z., Fang, Y., and Lin, L. (2021). Training graph neural networks via graphon estimation (2021). Arxiv2109.01918. *IEEE BigData 2021*.
- Nguyen, D., Lin, X. and Lin, L. (2020). Community detection, pattern recognition, and hypergraphbased learning: approaches using metric geometry and persistent homology. *Fuzzy Systems and Data Mining VI 457.*
- 54. Izadi, M.*, Fang, Y., Stevenson, R. and Lin, L. (2020). Optimization of Graph Neural Networks with Natural Gradient Descent. arXiv:2009.09624. *IEEE BigData 2020*.

Research Articles under review

- 55. S Winter, T Campbell, L Lin, S Srivastava, DB Dunson (2023). Machine Learning and the Future of Bayesian Computation. arXiv:2304.11251. Under review.
- Fazeli-Asl, F., Zhang, M. and Lin, L. (2023). A Semi-Bayesian Nonparametric Hypothesis Test Using Maximum Mean Discrepancy with Applications in Generative Adversarial Networks. arXiv:2303.02637. Submitted to *JMLR*.
- 57. Fang, Y., Ohn, I., Gupta, V. and Lin, L. (2023). Intrinsic and extrinsic deep learning on manifold. arXiv: 2302.08606. Submitted to *EJS*.
- 58. Ohn, I.⁺ and Lin, L. (2021). Adaptive variational Bayes: optimality, computation and applications. arXiv:2109.03204. Revision submitted to Annals of Statistics.
- 59. Shen, L^{*}., Amini, A., Josephs, N. and Lin, L. (2022). Bayesian community detection for networks with covariates arXiv:2203.02090. *Bayesian Analysis*. Under revision.
- 60. Lin, L., Sarpabayeva, B., Zhang, M. and Dunson, D. (2020). Accelerated algorithms for convex and

non-convex optimizations on manifolds. Machine Learning Under revision. arXiv:2010.08908

GRANTS

- 1. Current: PI for DMS: Deep Learning on Manifolds: New Architectures and Theoretical Foundations (Co-PI: Nguyen). \$180, 000. 07/2021 -06/2024.
- Current: PI for DMS: Geometric and Statistical Foundations for Modeling Cell Shapes (Co-PI: Xu). \$288,000. 07/2019 -06/2022.
- 3. Current: PI for DMS CAREER: Utilizing Geometry for Statistical Learning and Inference. \$400,000. 07/01/2017-06/30/2022.
- Completed: PI for DARPA: Topological, Geometric and Statistical Foundations for Dynamic Networks (Co-PI: Nguyen). \$458,744. 07/2017-12/2019.
- Completed: Lead PI for NSF BigData 154633: BIGDATA:Collaborative Research:F:Big Data, it's not so big: exploiting low-dimensional geometry for learning and inference (PIs: Lim and Mukherjee). \$1,000,000. 12/01/ 2015-11/30/ 2018.
- Completed: Co-PI for ARO 201403161 (PI for Notre Dame subcontract): Mathematical Foundations for Analyzing Large Collections of Combinatorial-Data; \$330,000. 07/01/2015-07/30/ 2018;
- 7. **Completed**: PI and organizer for NSF CBMS mathematical regional conference: Topological Data Analysis: Topology, Geometry and Statistics. \$ 37,500. Summer 2016 at UT-Austin.

TEACHING EXPERIENCE

Courses Taught at Notre Dame

- 1. Instructor: ACMS 60885, Applied Bayesian Statistics, Fall 2022.
- 2. Instructor: ACMS 80870, Topics in Statistics: Bayesian Nonparametric Modeling and Theory, Fall 2021.
- 3. Instructor: ACMS 80870, Topics in Statistics: Geometry & Statistics, Spring 2021.
- 4. Instructor: ACMS 60850, Applied Probability, Fall 2020.
- 5. Instructor: ACMS 80870, Topics in Statistics: High-dimensional Statistics, Fall 2019.
- Instructor: ACMS 60801-01, Statistical Inference, Spring 2018, Spring 2019, Spring 2020, Spring 2023.
- 7. Instructor: ACMS 80870, Topics in Statistics: Network Analysis, Fall 2018.
- 8. Instructor: ACMS 30540-01, Mathematical Statistics, Spring 2018, Spring 2019.
- 9. Instructor: ACMS 30540-1, Mathematical Statistics, Spring 2017.
- 10. Instructor: ACMS 80870, Topics in Statistics: Network Analysis, Fall 2016.

Courses Taught at UT-Austin

- 11. Instructor: SDS 383D, Statistical Modeling II (Bayesian Nonparametrics), Spring 2016.
- 12. Instructor: SDS 302, Data Analysis for the Health Sciences, Fall 2015
- 13. Instructor: SSI 2015, Introduction to Mixed Models with Applications, May 26–29, 2015; May 23-26, 2016
- 14. Instructor: SDS 302, Data Analysis for the Health Sciences, Fall 2014

Courses Taught at UA

- 15. Instructor: Math 263, Intro: Stat+Biostatistics, Spring 2010
- 16. Instructor: Math 120R, Calculus Preparation, Fall 2009
- 17. Instructor: Math 160, Basic Statistics, Spring 2009
- 18. Instructor: Math 110, College Algebra, Fall 2007, Spring 2008, Summer 2008.

STUDENTS AND POSTDOC SUPERVISED

1. Postdocs:

Francesco Gaffi (02/2023-). Lumpkins postdoc in statistics.
Abdul-Nasah Soale (08/2021-). Moreau Academic Diversity postdoc. Co-supervised with Marie Lynn Miranda. Now tenure track at Case Western Reserve University.
Minho Cho (08/2020-02/2022). Now tenure track at Inha University
Ilsang Onh (03/2020-01/2022). Now tenure track at Inha University
Bayan Saparbayeva (08/2017-07/2019, Co-supervise with with Dong Quan Nguyen). Now at University of Rochester.
Kyoungjae Lee (01/2017-01/2019). Now tenure track at Sungkyunkwan University (SKKU).
Dianbin Bao (08/2017-,07/2018, Co-supervise with with Dong Quan Nguyen)
Minwoo Chae (08/2015-2017, Co-supervise with Stephen Walker). Now tenure track at Postech University.
Dridherich Bhammile (2014-2016). Nom et Ouentified

Prithwish Bhaumik (2014-2016). Now at Quantifind.

2. Ph.D students:

Yihao Fang (4th year, Co-supervise with Zhiliang Xu); Shivam Kumar (2nd year, co-supervise with Daren Wang); Shitao Fan (1st year)

Graduated:

Kisung You (2021, Co-supervise with Ick Hoon Jin): Now postdoc at Yale. Yutzu Kuo (2021): Now Principal Biostatistician at INCYTE. Luyi Shen (2021): Now Data Scientist at Comerica bank. Kevin Manley (2022): Now Data Scientist at Army.

3. Master's students:

Notre Dame: Meng Qiu (May, 2022); Mohammad Rasool Izadi (May, 2020). Max Hong (May, 2019). Philip Pickering (June, 2019). Zhou Kastner (graduated in August, 2017, now Data Scientist at Epic System). <u>UT-Austin</u>:

Na Li (August, 2016.) Wanyi Wang (August 2016). Lingjia Zhang (May, 2016). Jiajun Chen (May, 2015). Shuling Malloy (May, 2015).

RECENT TALKS/PRESENTATIONS

- 1. Seminar talk. Fudan Mathematics Center. May 16. 2023.
- 2. Seminar talk. Zhejiang University. May 12. 2023.
- 3. Seminar talk. Washington State University. April 19. 2023.

- 4. Invited talk. Geometry & Statistics conference, Harvard university. Feb 28-Mar. 2, 2023.
- 5. Invited talk. Probability & Statistics seminar. University of Nottingham. November 3, 2022.
- 6. Colloquium talk. University of Science, Vietnam. July 28, 2022.
- 7. Invited talk. New England Statistics Symposium (NESS), May 22 25, 2022.
- 8. Invited talk. Department of Statistics and Data Science, Cornell University. April 20, 2022.
- 9. Invited talk. Tongji University research seminar. December 14, 2021.
- Invited talk. Department seminar. Department of Statistics and Data Science. National University of Singapore. November 2, 2021.
- 11. Invited talk. Iowa State University Statistics Colloquium. October 4, 2021.
- 12. Invited talk. Applied Math Seminar. University of Kentucky. September 30, 2021;
- 13. Invited talk. 2021 ICSA Applied Statistics Symposium. September 13, 2021.
- 14. Invited talk. JSM 2021. August 12, 2021.
- 15. Invited talk. Tongji University research seminar. July 15, 2021.
- 16. Invited talk. 2021 ISBA World Meeting. July 1, 2021.
- 17. Invited talk. Data Science Institute (DSI) Seminar Series. Lawrence Livermore National Laboratory, June 1, 2021.
- 18. Colloquium talk. Hongkong University. May 12, 2021.
- 19. Invited Talk, CMStatistics conference, December 19, 2020.
- Invited talk, Statistics Seminar, Department of Mathematics and Statistics, The University of Massachusetts, November 6, 2020.
- 21. Invited talk, Colloquium Seminar, Department of Statistics, Penn State University, October 17, 2020.
- Invited talk for the Introductory Lecture Series on Scalable Bayes, Joint Statistical Meetings, August 6, 2020.
- Seminar talk. School of Mathematical and Statistical Sciences, Arizona State University October 22, 2019.
- 24. Seminar talk. School of Mathematics and Computer Science, Wuhan University, China. July 26, 2019.
- Colloquium talk. Department of Mathematics and Computer Science, University of Science, Ho Chi Minh City, Vietnam. July 8, 2019.
- 26. Invited keynote talk. 2nd Midwest Statistical Machine Learning Colloquium. May 13, 2019.
- 27. Colloquium talk. Department of Statistics and Actuarial Science, The University of Iowa. May. 9, 2019.
- 28. Invited talk. Biostatistics seminar. Indiana University. Jan 11, 2019.
- Invited talk. Applied and Computational Mathematics Seminar. Department of Mathematics, Georgia Institute of Technology. November 5, 2018.
- 30. Invited talk. Biostatistics seminar. Northwestern University. October 29, 2018.
- 31. Invited talk. Machine Learning Seminar series. Michigan State University. October 1, 2018.
- 32. Invited talk. Eastern Asia Chapter of ISBA, July 12-13, 2018.
- Lecturer for Summer school on 'Bayesian methods for Machine Learning'. Department of Mathematics and Computer Science, University of Science, Ho Chi Minh City, Vietnam. July 5-6, 2018.
- 34. Invited talk. IMS Asia Pacific Rim Meeting (IMS-APRM), June 26-29, 2018.
- 35. Invited talk. TGDA@OSU (Topology, Geometry, and Data Analysis @ OSU) TRIPODS workshop on Theory and Foundations of TGDA. May 21-25, 2018.

- Invited talk. AMS Special Session on Geometric Methods in Shape Analysis at The Ohio State University. Mar. 17-18, 2018.
- 37. Invited talk. Special invited session. EcoSta 2017, Hong Kong, June 15-17, 2017.
- Colloquium talk. Department of Mathematics and Computer Science, University of Science, Ho Chi Minh City, Vietnam. May 31, 2017.
- Invited talk. 'Geometry, Statistics and Data Analysis'. RTG Statistical Sciences Symposium 2017. May 19-20, 2017.
- 40. Invited talk. Quantitive psychology seminar, The University of Notre Dame. November 17, 2016.
- 41. Invited talk. The 2016 IISA International Conference on Statistics. August 18-21, 2016.
- 42. Invited talk. IMS-APRM conference, Section on Geometry and Statistics, Hong Kong, June 27-30, 2016.
- 43. Colloquium talk. Department of Mathematics, Zhejiang University. Mar. 18. 2016.
- 44. Colloquium talk. Department of Statistics and Biostatistics, Rutgers University. Feb 24. 2016.
- 45. Stochastic seminar. Department of Mathematics, The University of Utah. Feb. 9, 2016.
- 46. Colloquium talk. Department of Mathematics, The University of Utah. Feb. 8, 2016.
- 47. Colloquium talk. Department of Statistics, Yale University. Feb. 5, 2016.
- 48. Colloquium talk. Department of Statistics, Columbia University. Jan. 21, 2016.
- 49. Colloquium talk. Department of Statistics, The University of California at Los Angeles. Jan. 5, 2016.
- 50. Colloquium talk. Department of Mathematical Sciences, NJIT. Dec. 2, 2015.
- Colloquium talk. Department of Applied and Computational Mathematics and Statistics. The University of Notre Dame. November 19, 2015.
- Invited talk. 15th Annual Red Raider Mini-Symposium on Spatial Inference on Manifolds. Nov. 6-7, 2015.
- 53. Colloquium talk. Department of Statistics, Purdue University, Oct. 16. 2015.
- 54. Colloquium talk. College of Mathematics, Sichuan University, June 2nd. 2015.
- Colloquium talk. Department of Statistics and Actuarial Science, The University of Iowa. Apr. 30, 2015.
- Invited lectures on Parametric Bayesian models (with Mingyuan Zhou). Machine Learning Summer School. The University of Texas at Austin, Jan. 07-08, 2015.
- 57. Colloquium talk. Department of Mathematics and Statistics, Boston University. Nov. 14, 2014.
- 58. Short presentation. ICML, Beijing, Jun. 22-26, 2014.
- Invited talk. "Computational Methods for Massive/Complex Data" workshop, Imperial College London, UK, Jun. 19-20, 2014
- 60. Colloquium talk. Department of Statistics, University of Toronto. Feb. 25, 2014.
- Colloquium talk. The Fariborz Maseeh Department of Mathematics and Statistics, Portland State University. Feb. 21, 2014.
- 62. Colloquium talk. Department of Statistics, Rice University. Feb. 17, 2014.
- 63. Colloquium talk. Department of Statistics, University of Pittsburgh. Feb. 7, 2014.
- Colloquium talk. Department of Mathematical and Statistical Sciences, University of Colorado-Denver. Feb. 3, 2014.
- 65. Colloquium talk. Department of Statistics, Indiana University. Jan. 31, 2014.
- 66. Colloquium talk. Department of Mathematics and Statistics, Boston University. Jan.27, 2014.
- 67. Colloquium talk. Department of Statistics and Data Sciences, University of Texas-Austin. Jan. 24,

2014.

- 68. Colloquium talk. Department of Statistics, University of South Carolina. Jan. 21, 2014.
- 69. Colloquium talk. Department of Mathematics, New Mexico State University. Dec. 3, 2013.
- 70. Colloquium talk. Statistics Graduate Interdisciplinary Program. University of Arizona. Mar. 7th, 2013.
- 71. Colloquium talk. Trinity University, Texas, Feb. 15th, 2011.

OUTREACH/CONFERENCES ORGANIZED

- 1. **PI and organizer for NSF CBMS regional conference:** Organized the 2016 NSF-CBMS regional conference on Topological Data Analysis: Topology, Geometry and Statistics, which attracted almost 100 participants including graduate students, junior researchers and others.
- 2. Co-organizer for Sonia Kovalevsky High School Mathematics Day: Organized Sonia Kovalevsky High School Mathematics Day with two other female graduate students which is aimed at promoting women in science and mathematics, March 2010, University of Arizona.

RESEARCH REFERENCES

- Professor David Dunson. Arts and Science Distinguished Professor Department of Statistical Science, Duke University, Durham, NC 27708, U.S.A. Email: dunson@duke.edu
- Professor Eric Kolaczyk.
 Director of Hariri Institute of Computing Department of Mathematics and Statistics, Boston University, Boston, MA 02215, U.S.A Email: kolaczyk@bu.edu
- Professor Rabi Bhattacharya. Department of Mathematics, The University of Arizona, Tucson, AZ 85721, U.S.A. Email: rabi@math.arizona.edu