Pulong Ma

Address

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Education & Training

Postdoctoral Fellow — Aug 2018 - July 2021

- Department of Statistical Science, Duke University, Durham, NC
- Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC
- Program: Model Uncertainty: Mathematical and Statistical (MUMS)
- Mentors: Prof. Jim Berger and Prof. Li Ma.

Ph.D., Statistics, University of Cincinnati, Cincinnati, OH — 2018

- Dissertation title: Hierarchical Additive Spatial and Spatio-Temporal Process Models for Massive Datasets.
- Advisor: Emily L. Kang, Ph.D. and Co-advisor: Bledar A. Konomi, Ph.D.

B.S., Computational Mathematics, Northeast Forestry University, China — 2013

Professional Experience

Assistant Professor — June 2023 - Present
Department of Statistics, *Iowa State University*, Ames, IA

Assistant Professor — Aug 2021 - June 2023
School of Mathematical and Statistical Sciences, *Clemson University*, Clemson, SC

Graduate Research Fellow — Aug - Dec 2017
Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC

SIParCS Graduate Student Intern — May - July 2016
National Center for Atmospheric Research (NCAR), Boulder, CO

Research Interests

Uncertainty Quantification; Spatial and Spatio-Temporal Statistics; Objective Bayes; Nonparametric Bayes; Machine Learning; Big Data Analytics; Interdisciplinary Research in Natural Hazards, Remote Sensing Science, Engineering, Climate Science, Medical Science, Public Health.

Grants

Current

1. **NSF DMS-2310419**. Role: Sole PI.
   Start/End: 10/2023-9/2026. Total Amount: $195,956.
   Title: Modeling Multivariate and Space-Time Processes: Foundations and Innovations.
2. **NSF DMS-2152998**. Role: PI.
   Start/End: 8/2022-7/2025. Total Amount: $180,000.
   Title: Collaborative Research: Bayesian Residual Learning and Random Recursive Partitioning Methods for Gaussian Process Modeling.

Completed

3. **USCRP**. Role: Co-Investigator. (PI: R. Luettich at UNC at Chapel Hill).
   Start/End: 12/2019–7/2021. Total Amount: $172,506 (my share: $67,676).
   Title: Quantifying and Communicating Numerical Model Uncertainty.

Publications

Peer-reviewed and published papers

1. **Ma, P.** and Bhadra, A. (2022) "Beyond Matérn: On A Class of Interpretable Confluent Hypergeometric Covariance Functions." *Journal of the American Statistical Association, T&M*. Accepted. DOI:10.1080/01621459.2022.2027775.
2. **Ma, P.**, Karagiannis, G., Konomi, B. A., Asher, T. G., Toro, G. R., and Cox, A. T. (2022) "Multifidelity Computer Model Emulation with High-Dimensional Output: An Application to Storm Surge." *Journal of the Royal Statistical Society: Series C*. **71**(4), 861-883. DOI:10.1111/rssc.12558.
3. Baker, E., Barbillon, P., Fadikar, A., Gramacy, R. B., Herbei, R., Higdon, D., Huang, J., Johnson, L. R., **Ma, P.**, Mondal, A., Pires, B., Sacks, J., and Sokolov, V. (2022) "Analyzing Stochastic Computer Models: A Review with Opportunities." *Statistical Science*. **37**(1), 64-89. DOI:10.1214/21-STS822.
4. **Ma, P.**, Mondal, A., Konomi, B. A., Hobbs, J., Song, J. J., and Kang, E. L. (2022) "Computer Model Emulation with High-Dimensional Functional Output in Large-Scale Observing System Uncertainty Experiments." *Technometrics*. **64**(1), 65-79. DOI:10.1080/00401706.2021.1895890.
5. **Ma, P.** (2020) "Objective Bayesian Analysis of a Cokriging Model for Hierarchical Multifidelity Codes." *SIAM/ASA Journal on Uncertainty Quantification*, **8**(4), 1358-1382. DOI:10.1137/19M1289893.
6. **Ma, P.** and Kang, E. L. (2020) "A Fused Gaussian Process Model for Very Large Spatial Data." *Journal of Computational and Graphical Statistics*, **29**(3), 479-489. DOI:10.1080/10618600.2019.1704293.
7. **Ma, P.** and Kang, E. L. (2019) "Spatio-Temporal Data Fusion for Massive Sea Surface Temperature Data from MODIS and AMSR-E Instruments." *Environmetrics*, **31**(2), e2594. DOI:10.1002/env.2594.
8. Konomi, B. A., Hanandeh, A. A., **Ma, P.**, and Kang, E. L. (2019) "Computationally Efficient Nonstationary Nearest Neighbor Gaussian Process Models Using Data-Driven Techniques." *Environmetrics*, **30**(8), e2571. DOI:10.1002/env.2571.
9. **Ma, P.**, Konomi, B. A., and Kang, E. L. (2019) "An Additive Approximate Gaussian Process Model for Large Spatio-Temporal Data." *Environmetrics*, **30**(8), e2569. DOI:10.1002/env.2569.
10. **Ma, P.**, Kang, E. L., Braverman, A., and Nguyen, H. (2019) "Spatial Statistical Downscaling for Constructing High-Resolution Nature Runs in Global Observing System Simulation Experiments." *Technometrics*, **61**(3), 322-340. DOI:10.1080/00401706.2018.1524791.

11. Cawse-Nicholson, K., Fisher, J. B., Famiglietti, C. A., Braverman, A., Schwandner, F. M., Lewicki, J. L., Townsend, P. A., Schimel, D. S., Pavlick, R., Bormann, K. J., Ferraz, A., Kang, E. L., **Ma, P.**, Bogue, R. R., Youmans, T., and Pieri, D. C. (2018) "Ecosystem Responses to Elevated CO2 Using Airborne Remote Sensing at Mammoth Mountain, California." *Biogeosciences*, **15**(24), 7403-7418. DOI:10.5194/bg-15-7403-2018.

Technical report

1. Kaufman, W., **Ma, P.**, Hammerling, D., and Lombardozzi, D. (2016) "Ozone and Foliar Damage Analysis: NCAR and St. Louis." *NCAR Technical Note*, NO. NCAR/TN-530+STR. DOI:10.5065/D6WH2NCQ.

Statistical Software

1. **Ma, P.** (2021) R package "GPBayes: Tools for Gaussian Process Modeling in Uncertainty Quantification." `https://CRAN.R-project.org/package=GPBayes`. R package version 0.1.0-5.
2. **Ma, P.** (2020) R package "ARCokrig: Autoregressive Cokriging Models for Multifidelity Codes." `https://CRAN.R-project.org/package=ARCokrig`. R package version 0.1.2.

Honors and Awards

O'Bayes 2022 Travel Award, Santa Cruz, CA 2022

Winner of Student Paper Competition, the Section on Statistics and the Environment of American Statistical Association 2018

SIAM Student Travel Award, the 2018 SIAM Conference on Uncertainty Quantification, Garden Grove, CA 2018

Visiting Graduate Research Fellowship, SAMSI, Research Triangle Park, NC 2017

Winner of Student Paper Competition, the 2017 ICSA Applied Statistics Symposium, Chicago, IL 2017

Charles Phelps Taft Dissertation Fellowship, University of Cincinnati 2016-17

Honorable Mention in Student Paper Competition, the Section on Statistics and the Environment of American Statistical Association 2016

Outstanding Academic Performance for First Year PhD Student Award, Department of Mathematical Sciences, University of Cincinnati 2014

Departmental Seminars

1. Department of Public Health Sciences, Medical University of South Carolina, Charleston, SC, Sep 2022.
2. Department of Mathematics and Statistics, Auburn University, Auburn, AL, Online, March 2022.
3. Department of Mathematical Sciences, Durham University, Durham, UK, Online, Jan 2021.
4. School of Engineering, The University of Melbourne, Online, Dec 2020.
5. Jet Propulsion Laboratory, Online, Aug 2020.
6. IMAGe Brown Bag Seminar, National Center for Atmospheric Research, Boulder, CO, June 2016.

Invited Conference/Workshop Presentations

1. Joint Statistical Meetings, Toronto, Canada, Aug 2023.
2. EcoSta 2023: The 6th International Conference on Econometrics and Statistics, Online, Aug 2023.
3. Spatial Statistics 2023: Climate and the Environment, Boulder, CO, July 2023. (Session in Honor of Noel Cressie)
4. The 64th ISI World Statistics Congress, Ottawa, Canada, July 2023.
5. The ICSA 2023 Applied Statistics Symposium, University of Michigan, Ann Arbor, MI, June 2023.
6. AIRES 4: Machine Learning for Robust Digital Twins, Oak Ridge National Laboratory, Oak Ridge, TN, April 2023.
7. The 2022 Rising Star Symposium, Clemson University, Clemson, SC, Sep 2022.
8. The 2022 SIAM Conference on Uncertainty Quantification, Atlanta, GA, April 2022.
9. The 5th EAC-ISBA Conference: A Satellite Meeting of the 2020 ISBA World Meeting in Celebrating James O Berger's 70th Birthday, Online, Nov 2021.
10. The 34th New England Statistics Symposium, Online, Oct 2021.
11. Joint Statistical Meetings, Online, Aug 2021.
12. Virtual Breakout Meeting on Uncertainty Quantification for Remote Sensing Inverse Problems, Jet Propulsion Laboratory, Online, Oct 2020.
13. Data Science, Statistics & Visualization 2020, Online, July 2020.
14. US CLIVAR Working Group on Emerging Data Science Tools for Climate Variability and Predictability, Online, June 2020.
15. The 2019 ICSA Applied Statistics Symposium, Raleigh, NC, June 2019.
16. The SAMSI MUMS Transition Workshop and SPUQ, University of North Carolina at Chapel Hill, NC, May 2019.
17. The SAMSI MUMS Program on Data Fusion, SAMSI, NC, Oct 2018.
18. The International Conference on Advances in Interdisciplinary Statistics and Combinatorics, University of North Carolina at Greensboro, Greensboro, NC, Oct 2018.
19. Winner of Student Paper Competition, Joint Statistical Meetings, Canada, Aug 2018.
20. The 2018 SIAM Conference on Uncertainty Quantification, Garden Grove, CA, April 2018.
21. The Remote Sensing, Uncertainty Quantification and a Theory of Data Systems Workshop, California Institute of Technology, Pasadena, CA, Feb 2018.
22. Winner of Student Paper Competition, The 2017 ICSA Applied Statistics Symposium, Chicago, IL, July 2017.

Student Advising

MS Committee Member

1. Katherine Kreuser, M.S., School of Mathematical and Statistical Sciences, Clemson University, Graduation date: May 2022.
2. Yangyi Li, M.S., School of Mathematical and Statistical Sciences, Clemson University, Graduation date: May 2022.

Teaching and Mentoring Experience

Iowa State University, Ames, IA

- *Instructor*, STAT 475/575 - Introduction to Multivariate Data Analysis Fall 2023

Clemson University, Clemson, SC

- *Instructor*, MATH 8050 - Data Analysis (two sections) Fall 2022
- *Instructor*, STAT 3090 - Introductory Business Statistics Fall 2021, Spring 2022

North Carolina State University, Raleigh, NC

- *Co-mentor* a Ph.D. student in Statistics with Prof. Brian Reich with dissertation topic on spatial extremes. Aug 2019 - Aug 2020

SAMSI Education and Outreach Programs and Workshops, Durham, NC

- Undergraduate Modeling Workshop May 16-May 18, 2021
  Project leader, Designed and led a three-day project for undergraduates on "Statistical Learning for Tropical Cyclones with Historical Storm Data."
- The 25th Industrial Mathematical and Statistical Modeling Workshop July 14 - 25, 2019
  Faculty mentor, Served as faculty mentor to help graduate students work on the project titled "Analysis and Visualization of Continuous Glucose Monitoring Data."
- Undergraduate Modeling Workshop May 28-June 2, 2019
  Project leader, Designed and led a week-long project for undergraduates on "Predictive Modeling for Tropical Cyclones with Historical Storm Data."
- The Story of Data Science and Machine Learning Workshop Mar 2019
  Mentor, Hands-on session on R.
- Undergraduate Workshop on Uncertainty Quantification Feb 2019
  Lecturer, R tutorials.

Department of Mathematical Sciences, University of Cincinnati

- *Instructor*, MATH 1014 - The Mathematics of Social Choice Spring 2018
- *Teaching Assistant*, MATH 1062 - Calculus II section 010 and 011 Spring 2014
- *Teaching Assistant*, MATH 1061 - Calculus I section 012 and 021 Fall 2013

The Institute for Mathematics Applied to Geosciences (IMAGe) at NCAR

- *Lecturer*, "Introduction to Bayesian Analysis" in Data Analytics Boot Camp for High School Students 2016
- *Coach*, Workshop on Beyond P-values: Introduction to Bayesian Statistics 2016

Professional Service

Editorial

- Associate Editor, *Journal of Agricultural, Biological, and Environmental Statistics (JABES)* 1/2022 - Present

Grant Review: NSF DMS Panelist (2023)

Journal Referee: *Annals of Applied Statistics*; *Bayesian Analysis*; *Computational Statistics*; *Econometrics and Statistics*; *Electronic Journal of Statistics*; *Environmetrics*; *IISE Transactions*; *Journal of Agricultural, Biological, and Environmental Statistics*; *Journal of Computational and Graphical Statistics*; *Journal of Machine*

Learning Research; *Journal of the American Statistical Association, Theory and Methods*; *Journal of the American Statistical Association, Applications and Case Studies*; *Journal of the Royal Statistical Society: Series A*; *Journal of the Royal Statistical Society: Series B*; *PLoS ONE*; *SIAM/ASA Journal on Uncertainty Quantification*; *Statistical Analysis and Data Mining*; *Statistics and Public Policy*; *Spatial Statistics*; *Stat*; *Statistica Sinica*; *Statistics Surveys*; *Technometrics*.

Administrative Service

- Statistics Seminar Committee Member, Clemson University, Clemson, SC, Aug 2021 - Present
- SAMSI MUMS program working group administrator, Durham, NC, Aug 2018-May, 2019
- Mathematical Graduate Student Association (MGSA) Treasurer, University of Cincinnati, May 2015 - Dec 2017

Session Organizer and Chair

- Session organizer, *Gaussian Processes for Modeling High-Dimensional and Complex Data*, Joint Statistical Meetings, Toronto, Canada, August 2023
- Session co-organizer, *Random Partitioning Methods for Modeling Complex Data*, The 2023 ICSA Applied Statistics Symposium, Ann Arbor, Michigan, June 2023.
- Session co-organizer, *Advances in Multivariate Spatial Process Modeling for Environmental Data*, Joint Statistical Meetings, Washington, DC, August 2022
- Minisymposium organizer, *Bayesian calibration and machine learning methods for Uncertainty Quantification*, SIAM Conference on Uncertainty Quantification, Atlanta, GA, March 2022
- Session organizer, *Uncertainty Quantification Across the Boundaries*, Joint Statistical Meetings, Seattle, Washington, August 2021
- Session organizer and chair, *Emerging Issues in Uncertainty Quantification for Computer Experiments*, Joint Statistical Meetings, Philadelphia, PA, August 2020
- Session organizer and chair, *Bayesian Modeling for Complex Spatial and Spatio-Temporal Data*, ISBA 2020 World Meeting, Kunming, China, June 2020
- Minisymposium organizer, *Learning Parameters in Complex Physical Systems with Simulation Experiments*, SIAM Conference on Uncertainty Quantification, Munich, Germany, March 2020
- Session chair, *Bayesian Nonparametrics*, Section on Bayesian Statistical Sciences, Joint Statistical Meetings, Denver, CO, July 2019
- Session chair, *Inverse Problems and Data Assimilation II*, SIAM Conference on Uncertainty Quantification, Garden Grove, CA, April 2018
- Session chair, *Bayesian Models for Gaussian and Point Processes*, Section on Bayesian Statistical Sciences, Joint Statistical Meetings, Baltimore, MD, August 2017

Last updated: July 10, 2023