Hengrui Luo

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1958 Neil Ave.
Department of Statistics
The Ohio State University
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Education

2019 Ph.D., Statistics, *Expected 2020.*
Advisors Steve N. MacEachern, Mario Peruggia.
Interests Topological data analysis, Bayesian methodology, high dimensional probability.
The Ohio State University, Columbus, OH, USA.

2017 M.Sc., Statistics, May 2017.
The Ohio State University, Columbus, OH, USA.

2015 B.Sc., Mathematics, July 2015.
Sun Yat-Sen University, Guangzhou, China.

Research

Peer-reviewed Articles

2020+ ***Generalized Penalty for Circular Coordinate Representation.*** **Hengrui Luo**, Alice Patania, Jisu Kim, Mikael Vejdemo-Johansson. Submitted.

2019+ ***Asymptotic Detection of Strictly Lower Dimensional Topological Features.*** *The Electronic Journal of Statistics.* **Hengrui Luo**, Steve MacEachern and Mario Peruggia. Submit soon.

2019+ ***Combining Geometric and Topological Information in Image Segmentation Problem.*** *Journal of Machine Learning Research.* **Hengrui Luo** and Justin Strait. arXiv:1910.04778, Submitted.

2019 ***Sparse Additive Gaussian Process Regression.*** *Journal of Machine Learning Research.* **Hengrui Luo**, Giovanni Nattino and Matthew Pratola. arXiv:1908.08864, Submitted.

2018 ***Evaluation of Classical Statistical Methods for Analyzing BS-Seq Data.*** *OBM Genetics: Special Issue in Epigenetic Mechanisms in Health and Disease.* **Hengrui Luo**, Shili Lin. doi: 10.21926/obm.genet.1804053

Ongoing *Asymptotic Analysis of Artificial Autoregressive Errors.* Hengrui Luo, Michael Sonksen and Mario Peruggia. To be submitted.

Ongoing *The Topological Additive Regressive Tree (TART).* Hengrui Luo. To be submitted.

Ongoing *Pattern Extraction Based on Topological Features.* Hengrui Luo, Steve MacEachern and Mario Peruggia.

Notes and Manuscripts

2019	Discussions and corrections of Michel Talagrand's *Upper and Lower Bounds of Stochastic Processes*.
2019	Discussions and corrections of Roman Vershynin's *High Dimensional Probability*.
2018	Discussions and corrections of Thomas Gobet's *Lie Algebra II*.
2017	*A Characterization of Symmetries of Conditional Distributions.*
2017	*An Introduction to High-performance Computation (OSU-HPC) with Unity Cluster.* Manual with Adam Lauretig.
2016	*A Concise Course in Bayesian Nonparametrics.* Discussion with Steve MacEachern.
2016	*Solution Manual for Applied Linear Regression (Graduate Level).*
2015	Discussion and corrections of Phillip Rigollet's *High-dimensional Statistics*.
2015	*Solution Manual for Experimental Design (Graduate Level).*
2014	Notes for lectures on representation theory given by Marc Rosso (Institut de Mathématiques de Jussieuopen).
2014	Discussions and corrections of Yongjin Li's *Introduction to Functional Analysis*.

Awards

2018	STATMOS Student Travel Funding, STATMOS.
2018-19	The G.Koch Travel Award for Graduate Students, OSU.
2015-16	University Fellowship, OSU.
2015	University Outstanding Graduate, SYSU. For top 3-5% students with academic excellence and recognizable career development.
2015	University Outstanding Thesis, SYSU. For top 1-2% students with academic excellence and research writings.
2015	R.E.T. Innovation Award, SYSU. For selected research papers in the fields of theoretical and applied mathematics.
2012-14	Excellent Student Scholarship, SYSU.
2012	National Scholarship, Ministry of Education of the People's Republic of China.
2012	National Prize, National Mathematical Modeling Contest, China Society for Industrial and Applied Mathematics.
2011-15	National Base Program in Natural Sciences for Talented Students, Ministry of Education of the People's Republic of China.

Teaching

2015-20 Graduate Teaching Associate, OSU.

† *For advanced graduate-level courses, I graded and provided some solutions.*

STAT 6801/6802: Theory of Statistics I/II.

STAT 7201: Advanced Probability Theory.

STAT 7301/7302: Advanced Statistical Theory I/II.

STAT 6860: Linear Algebra for Statisticians.

STAT 6910/6950: Applied Statistics I/II (Design of Experiments/Applied Linear Regression).

STAT 7303: Bayesian Analysis.

STAT 7410: Foundation of Linear Models.

STAT 7430: Generalized Linear Models.

STAT 7450: Stochastic Processes.

STAT 7730: Computational Statistics.

† *For undergraduate-level courses, I taught both in-classroom and online and provided tutoring service.*

STAT 1450: Introduction to Applied Statistics.

STAT 4201: Introduction to Mathematical Statistics.

2015+ Online Community. Top 10% established user and reviewer on mathoverflow.net (for professional mathematicians) and crossvalidated.SE (for statisticians and data analysts).

Conference

2020.06.08 *Generalized Penalty for Circular Coordinate Representation*
(Planned) Contributed talk to the ATMCS 2020, TDGA Group, Columbus, OH.

2020.05.05 *Combining Geometric and Topological Information in Image Segmentation Problem*
Poster at MBI Workshop on Mathematical and Computational Methods in Biology, Columbus, OH.

2020.04.18 Stochastic Spatial Processes at OSU 2020, Columbus, OH.

2020.04.10 *Combining Geometric and Topological Information in Image Segmentation Problem*
Poster at TDAI Foundations Community of Practice SP20 Poster Session, Columbus, OH.

2020.04.09 *Combining Geometric and Topological Information in Image Segmentation Problem*
2020 Joint Biostatistics Symposium, Columbus, OH.

2020.02.28 *Lower Dimensional Topological Features: Theory and Applications*
Invited talk at University of New Mexico, Albuquerque, NM. (Supported by Department of Mathematics and Statistics)

2020.01.13 *Lower Dimensional Topological Features: Theory and Applications*
Invited talk at the Stanford University, Palo Alto, CA. (Supported by Department of Statistics)

2019.10.01 Student Seminar on Bayesian Empirical Likelihood, Columbus, OH.

2019.09.19 *Combining Geometric and Topological Information in Image Segmentation Problem.*
Presentation at the poster session of Statistics and Biostatistics Graduate Student Poster Session, Columbus, OH.

2019.08.05 *Circular Coordinate Representation with Generalized Penalty Functions*
Presentation at Applied Mathematical Modeling with Topological Techniques, ICERM, Providence, RI. (Supported by ICERM)

2019.06.10 *Asymptotic Detection of Strictly Lower Dimensional Topological Features.*
Talk at 11th Cornell Probability Summer School (CPSS11), Ithaca, NY.

2019.06.03 MBI Workshop on Bayesian Causal Inference, Columbus, OH.

2019.06.02 *Asymptotic Detection of Strictly Lower Dimensional Topological Features.*
Invited talk at the First Mid-west Student conference: Geometry and Topology meet Data Analysis and Machine Learning, Columbus, OH. (Supported by NSF)

2019.05.28 *Asymptotic Detection of Lower Dimensional Zero Density Regions via Threshold Decay.*
Presentation at the MBI Workshop on TDGA and Biology: Structure in the Micro-world, Columbus, OH.

2019.05.20 *Asymptotic Detection of Strictly Lower Dimensional Topological Features.*
Invited presentation at Conference on Geometric Data Analysis at University of Chicago, Hyde Park, IL.

2019.05.15 *Asymptotic Detection of Strictly Lower Dimensional Topological Features.*
Talk at the NSF-CBMS Conference and Software Day on Topological Methods in Machine Learning and Artificial Intelligence, College of Charleston, SC. (Supported by NSF)

2018.11.07 MBI Workshop on Modeling and Analysis of Dynamic Social Networks, Columbus, OH.

2018.09.28 *Asymptotic Detection of Lower Dimensional Zero Density Regions.*
Presentation at the poster session of STATMOS Workshop on Point Process Models, College Station, TX. (Supported by STATMOS)

2018.09.17 MBI Workshop on Family-Base Genomic Studies, Columbus, OH.

2018.09.20 *Asymptotic Detection of Lower Dimensional Zero Density Regions via Threshold Decay.*
Presentation at the poster session of Statistics and Biostatistics Graduate Student Poster Session, Columbus, OH.

2018.06.05 *Topological Features in Submanifolds: Dimension Reduction.*
Presentation at the poster session of Ninth International Purdue Symposium on Statistics and Workshop, West Lafayette, IN.

2018.05.14 *Topological Features in Submanifolds.*
Presentation at the poster session of OSU TRIPODS Center Summer School and Workshop: Theory and Foundations of TDGA, Columbus, OH.

2016.03.31 ENVR/EnviBayes Workshop on Bayesian Environmetrics, Columbus, OH.

2015-2017 Student Seminar on Statistical Genetics and Bioinformatics, Columbus, OH.

2015	Student Seminar on Data Mining and Statistical Learning, Columbus, OH.
2015	Student Seminar on Spatial Statistics and Environmental Statistics, Columbus, OH.
2015	Student Seminar on Observational Data and Network Analysis, Columbus, OH.

Membership

2019+	Student Member of Institute of Mathematical Statistics (IMS)
2017+	Student Member of American Statistical Association (ASA)
2017+	Member of Society for Industrial and Applied Mathematics (SIAM)

Service

2020	Session Chair of "Statistical Methods for Topological Data Analysis" at Joint Statistical Meeting 2020, Philadelphia, PA.
2018-19	Graduate Research Associate, Ohio State University. with Steve MacEachern and Mario Peruggia.
2018	Graduate Volunteer, Ohio State University. Florence Nightingale Day sponsored by the American Statistical Association and CWS.
2018	Graduate Mentor, Ohio State University. Data Science Fair sponsored by the American Statistical Association and the Department of Statistics and OSU.
2016	Graduate Volunteer and Participant, Ohio State University ENVR/EnviBayes Conference on Bayesian Environmetrics in OSU.
2016	Graduate Judge, Ohio State University. For Statistical Analysis Award in the Ohio Science Fair.

Skills

Language Chinese (Native), Cantonese (Native), English (Advanced), German (Intermediate)

Computational Skills

R. (Proficient in package building, Java-R interface and parallel computation)
Java. (Proficient in multi-threaded programming and framework deployment)
TEX, SAS, Mathematica, Python3, MATLab, Linux shell.

Computational Specialization

Parallel and distributed computation (Java/Hadoop/TensorFlow) and high-performance clusters (bash),

Computer simulation (LAMMPS/BUGS/JAGS), GPU computation (OpenACC), Computational geometry (CGAL/GUDHI).

Last Update: March 4, 2020