Dr. Guowen Huang

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Research Interest

My main research interest focuses on the development of statistical methodologies tailored for modelling diverse air pollution datasets, and the application and enhancement of statistical techniques that enable the quantitative assessment of health consequences linked to air pollution exposure.

Education

University of Glasgow, Scotland, UK — Sep 2013 – Dec 2016
PhD in Environmental Statistics in School of Mathematics and Statistics
Supervisors: Professors Duncan Lee, and Marian Scott.
Thesis: *Quantification of Air Quality in Space and Time and its Effects on Health.*

Tianjin University, Tianjin, China — Sep 2010 – Mar 2013
Master in Industrial Engineering in College of Management and Economics
Graduated with College Honors.

Nankai University, Tianjin, China — Sep 2006 – Jul 2010
Bachelor in Physics in School of Physics
Graduated with College Honors.

Work Experience

Associate Professor, Shantou University, China — Jan 2021 – present
[1]Bayesian hierarchical modelling, air pollution health effects.

Postdoc, St. Michael's Hospital, & University of Toronto, Canada — Aug 2018 – Dec 2020
[1] Extended study on air pollution risk model for multiple pollutants.
Collaborating with Professor Patrick Brown

Visiting Researcher, Imperial College London, UK — Aug 2019 – Dec 2019
[1] Case-crossover model for snakebite in India.
Collaborating with Professor Marta Blangiardo

Postdoc, National Tsing Hua University, Taiwan — Dec 2016 – Jul 2018
[1] Spatio-temporal modelling of $PM_{2.5}$ in Taiwan.
[2] Spatial signal detection based on small area aggregated data.
Collaborating with Professors Noel Cressie, Hsin-Cheng Huang, and Andrew Zammit-Mangion

Papers

[1] Guowen Huang*, Lee D. and Scott M. An integrated Bayesian model for estimating the long-term health effects of air pollution by fusing modelled and measured pollution data: A case study of nitrogen dioxide concentrations in Scotland. ***Spatial and Spatio-temporal Epidemiology***. 2015;14-15: 63-74.

[2] Guowen Huang*, Lee D. and Scott M. Multivariate space-time modelling of multiple air pollutants and their health effects accounting for exposure uncertainty. ***Statistics in Medicine***. 2017; 37: 1134-1148.

[3] Guowen Huang; Ling-Jyh Chen; Wen-Han Hwang; ShengLi Tzeng; Hsin-Cheng Huang. Real-time PM2.5 mapping and anomaly detection from AirBoxes in Taiwan. ***Environmetrics***. 2018;1-15.

[4] Hsin-Cheng Huang and Noel Cressie and Andrew Zammit-Mangion and **Guowen Huang**. False Discovery Rates to Detect Signals from Incomplete Spatially Aggregated Data. ***Journal of Computational and Graphical Statistics***. 2021, 30(4):1081-1094.

[5] **Guowen Huang***, Patrick Brown. Population-weighted exposure to air pollution and COVID- 19 incidence in Germany ***Spatial Statistics***. 2021, 41(100480): 1-12.

[6] **Guowen Huang**; Patrick E. Brown; Sze Hang Fu; Hwashin Hyun Shin. Daily mortality/morbidity and air quality: Using multivariate time series with seasonally varying covariances. ***Journal of the Royal Statistical Society Series C: Applied Statistics***. 2022, 71(1): 148-174.

[7] **Guowen Huang***, Marta Blangiardo, Patrick E. Brown and Monica Pirani. Long-term exposure to air pollution and COVID-19 incidence: A multi-country study. ***Spatial and Spatio-temporal Epidemiology***. 2021, 39(100443):1-11.

[8] Xuyang Tang, ..., **Guowen Huang** and et al. Assessment of SARS-CoV-2 Seropositivity During the First and Second Viral Waves in 2020 and 2021 Among Canadian Adults. ***JAMA Netw Open***. 2022;5(2):e2146798.

[9] Xuyang Tang, ..., **Guowen Huang** and et al. COVID Symptoms, Seroprevalence, and Mortality During the First Wave of SARS-CoV-2 in Canada. ***Social Science Research Network***. 2021.

[10] Patrick E. Brown, Yurie Izawa, Kalpana Balakrishnan, Sze Hang Fu, Joy Chakma, Geetha Menon, Rajesh Dikshit, R.S. Dhaliwal, Peter S. Rodriguez, **Guowen Huang**, Rehana Begum, Howard Hu, George D'Souza, Randeep Guleria, and Prabhat Jha. Mortality from Particulate Matter $2 \cdot 5$ in India: National Prospective Proportional Mortality Study. ***Environmental Health Perspectives***. 2022; 130:9 CID: 097004

[11] **Guowen Huang***; Feng Liu. Urban/rural differences in air pollution impacts on deaths in Scotland: A comparison study on different pollution data sources. ***Spatial Statistics***. 2022; 52: 100712

[12] **Guowen Huang**; Patrick Brown; Hwashin Hyun Shin. Multi-pollutant case-crossover models of all-cause and cause-specific mortality and hospital admissions by age group in 47 Canadian cities. ***Environmental research***. 2023; 225: 115598.

[13] **Guowen Huang***; Feng Liu. A comparison of exposure uncertainty propagation models used in epidemiological studies. ***Journal of the Royal Statistical Society Series A: Statistics in Society***. 2023; 00: 1-16.

[14] **Guowen Huang**. Missing data imputation strategies: A comparative analysis of hourly and daily pollution models. ***Atmospheric Environment***. 2023; 314: 120121.

Grants

- National Natural Science Foundation General Project (Participant), $84K 2023 – 2026
- Shantou University Research Startup Fund, $47K 2021 – 2024
- Mitacs: Globalink Research Award Abroad for research abroad, $6K 2019 – 2019
- China Scholarship Council funding for PhD degree 2013 – 2016
- National Scholarship for Master degree 2010 – 2013
- Nankai University Excellence Scholarship for each year 2006 – 2010

Invited Conferences

- 2015 Annual University of Glasgow Learning and Teaching conference in Glasgow, UK.
- Research Students' Conference in Leeds, UK
- GEOMED 2015 in Florence, Italy.
- Conference on Experimental Design and Analysis 2016 in Taiwan.
- The International Environmetrics Society (TIES 2016) in Edinburgh, UK.
- The International Environmetrics Society (TIES 2017) in Bergamo, Italy.
- The 26th South Taiwan Statistics Conference 2017 in Taiwan.
- The 2018 IISA International Conference on Statistics in Florida, USA.
- JSM 2018: Joint Statistical Meetings - American Statistical Association in Vancouver, Canada.
- 2019 Annual Meeting for Statistical Society of Canada. in Calgary, Canada.
- GEOMED 2019 in Glasgow, UK.
- The 9th General Assembly of Members of the Guangdong Mathematical Society and the 2021 Academic Annual Conference in Meizhou, China.
- Chinese Mathematical Society 2021 Academic Annual Conference in Yunnan, China.
- GEOMED 2022 at the University of California, Irvine, US.
- ICSA 2023 China Conference in Chengdu, China.
- Joint Conference on Statistics and Data Science in China (JCSDS 2023) in Peking, China.
- The 9th International Forum on Statistics (RUC IFS 2023) in Peking, China.
- 23rd Meeting of New Researchers in Statistics and Probability in Toronto, Canada.
- JSM 2023: Joint Statistical Meetings - American Statistical Association in Toronto, Canada.

Invited Talks

Title: Multivariate Space-Time Modelling of Multiple Air Pollutants and their Health Effects Accounting for Exposure Uncertainty.

- Academia Sinica, 2017.
- The 26th South Taiwan Statistics Conference, 2017.
- Graduate Institute of Statistics and Information Science National Changhua University of Education, 2017.

Title: Daily mortality/morbidity and air quality: using multivariate time series with seasonally-varying covariances.

- University of Southampton, 2019.
- GEOMED, University of Glasgow, 2019.
- Shantou University, 2021.

Title: Urban/rural differences in air pollution impacts on deaths in Scotland: a comparison study on different pollution data sources.

- GEOMED, University of California, Irvine, 2022.

Teaching Experience

Shantou University
Jan 2021-present
Course Instructor

- Bayesian Statistics: Designed the curriculum, developed course materials, delivered lectures, facilitated discussions, and offered guidance on Bayesian statistical methods.
- Sampling Techniques: Designed the curriculum, developed course materials, delivered lectures, and assessed students' understanding through assignments and examinations.
- Multivariate Analysis: Delivered lectures, and evaluated students' performance in multivariate statistical analysis.
- Mathematical Statistics: Delivered lectures on various mathematical aspects of statistics, including probability theory and statistical inference.
- Linear Regression: Delivered lectures, facilitated class discussions, and assessed students' progress in linear regression analysis.
- Spatial Statistics: Designed the curriculum, delivered lectures, and taught spatial statistical techniques.
- Epidemiological Models: Taught students the fundamentals of epidemiological modelling principles and facilitated their exploration of relevant research papers.

University of Toronto
May-Jul 2019
Course Instructor

- Methods of Data Analysis I: Designed the curriculum, developed course materials, delivered lectures, facilitated discussions, and administered both mid-term and final exams.

Student Learning Service, University of Glasgow
May 2014-Jul 2016
Graduate Teaching Assistant

- Centered on assisting students from diverse departments with their statistical challenges, I have deepened my comprehension of handling varied data types across a wide array of subjects, encompassing medicine, health, disease, sports, engineering, and economics. My experience spans over 300 individual appointments (each lasting an hour), over 10 workshops attended by 10 to 20 students, and the delivery of three lectures to audiences exceeding 200 students in each instance.

University of Glasgow
Aug 2013-Jul 2016
Teaching Assistant

- Introduction to R Programming: Supported students with coding exercises, assignments, and troubleshooting. Collaborated with the course instructor to facilitate discussions and workshops.
- Introduction to Statistics-Learning from Data: Assisted with grading assignments, and examinations. Offered additional support to students seeking clarification on course materials.
- Data Modelling in Action: Assisted with grading assignments, and provided guidance and feedback to students to improve their data modelling skills.

Instructor's Teaching Performance

- **University of Toronto**, undergraduate
  Methods of Data Analysis I (evaluation: 4.3/5), Summer 2019
- **Shantou University**, graduate
  Spatial Statistics (evaluation: 98.5/100), Fall 2022
  Epidemiological Models (evaluation: 98/100), Spring 2023
- **Shantou University**, undergraduate
  Bayesian Statistics (ongoing), Fall 2023
  Linear Regression (ongoing), Fall 2023
  Multivariate Analysis (evaluation: 96.92/100), Spring 2023
  Sampling Technique (evaluation: 98.38/100), Spring 2023
  Bayesian Statistics (evaluation: 96.12/100), Fall 2022
  Multivariate Analysis (evaluation: 96.91/100), Spring 2022
  Sampling Technique (evaluation: 96.13/100), Spring 2022
  Bayesian Statistics (evaluation: 99.68/100), Fall 2021
  Mathematical Statistics (evaluation: 99.40/100), Fall 2021
  Sampling Technique (evaluation: 98.52/100), Spring 2021

Supervision

2021 - present:

- Master student: Feng Liu.
- Supervise 7-8 undergraduate theses annually.
- Examiner of BSc and MSci programmes at Shantou University annually.
- Provide academic guidance for 14 undergraduate students through their four-year university journey.
- Annual mentor for National College Student Mathematical Modelling Competition. **Guided multiple teams to win First, Second, and Third Prizes.**
- Guided the 2021 Greater Bay Area Cup Guangdong-Hong Kong-Macao Financial Mathematical Modelling Competition. **Won the Innovation Copper Award; the First Prize.**

Administrative Experience

Shantou University
Sep 2022-present
Leader of the Statistics Teaching and Research Group

- Organize teachers' participation in the school's teaching competitions;
- Develop new courses, including guiding the development of curriculum and teaching materials, ensuring the quality of statistical education;
- Organize interactive meetings between students and faculty, promoting the advancement of statistical knowledge among both educators and students;
- Coordinate meetings to ensure smooth examinations;
- Organize statistics seminars.

Honors & Awards

- Certificate of Qualification for University Teachers 2022
- Advanced Big Data Technology Applications Professional Technical Certificate 2021
- Excellent Mentor Award 2021

Journal Reviewer	Atmospheric Environment; Biostatistics; Biometrical Journal; Environmetrics; Environmental pollution; Epidemiologic Methods; International journal of epidemiology; Journal of Environmental Informatics; Journal of the Royal Statistical Society: Series A (Statistics in Society); Journal of the Royal Statistical Society: Series C (Applied Statistics); Spatial Science; Spatial and Spatio-temporal Epidemiology; The Lancet Planetary Health.
Languages	**English, Mandarin and Cantonese**
Skills	Proficient with: **R** (daily used); Familiar with: **C++, SPSS, AWS, Python**.
Hobbies	Badminton, Skiing, Billiards, Table tennis, Swimming, Hiking, Driving.