

Dr. Amina Shahzadi

Assistant Professor of Statistics

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Academic Profile

Statistician and university educator with more than 20 years of teaching, research, supervision, and academic service. Research expertise includes hidden Markov and semi-Markov models, stochastic processes, incomplete point-process records, distribution theory, Bayesian statistics, and regional frequency analysis using L-moments. Experienced in graduate teaching, research supervision, programme coordination, and scholarly journal editing.

Education

PhD in Statistics | 2019

University of Otago, Dunedin, New Zealand

Thesis: Hidden Markov models for time-inhomogeneous and incompletely observed point processes

MPhil in Statistics | 2008

University of the Punjab, Lahore, Pakistan

Thesis: Regional frequency analysis of annual maximum rainfall in the monsoon region of Pakistan using L-moments

MSc in Statistics | 2004

University of the Punjab, Lahore, Pakistan

Academic Appointments

Assistant Professor

2009-present

Department of Statistics, Government College
University Lahore

- Teach undergraduate and postgraduate statistics; design and assess courses; supervise research; mentor students; and contribute to departmental academic and administrative work.

Tutor and Demonstrator

2016-2019

Department of Mathematics and Statistics, University
of Otago, New Zealand

- Tutored and demonstrated first-year statistics courses STAT 110 and STAT 115 and assessed examinations.

Lecturer

2005-2009

Department of Statistics, Government College
University Lahore

- Taught statistics at undergraduate and postgraduate levels and supervised student research.

Teaching Expertise

Postgraduate: Distribution Theory; Statistical Computing using R and Python. Undergraduate and graduate: Probability and Probability Distributions; Computational Statistics, Order Statistics; Stochastic Processes; Statistical Inference; Applied Statistics; Research Methods; Categorical Data Analysis; and Biostatistics.

Academic Leadership and Service

Role	Period
Editor, Journal of Statistics	2020-present
PhD Programme Coordinator, Department of Statistics	2021-present
Member, Board of Studies, Department of Statistics	2012-2015; 2021-present
Member, Board of Faculty, GCU Lahore	2021-present
Associate Editor, Journal of Statistics	2012-2015
Assistant Editor, Journal of Statistics	2007-2011

Honours and Awards

- Harold Silverstone Memorial Prize in Statistics, University of Otago (2018)
- Conference Grant, University of Otago, Ref. CLPG18/11 (2018)
- University of Otago Doctoral Scholarship (2015-2019)
- Gold Medal for first position in MSc Statistics, University of the Punjab (2004)

Peer Reviewed Publications

- **Shahzadi, A.**, Shakoor, A., Akram, A. & Zaheer, A. (2026) Statistical and Extreme-Value Modeling of Earthquake Magnitudes in Pakistan: A Declustered, Regionally Stratified Analysis. Accepted in *Journal of Himalayan Earth Sciences*.
- **Shahzadi, A.** & Yousaf, K. (2025). L-moment Based Regional Frequency Analysis of Annual Maximum Relative Humidity Across Pakistan. *Pakistan Journal of Statistical and Operation Research*. 21 (4), 2025, 583-599.
- **Shahzadi, A.**, Wang, T., Parry, M., & Bebbington, M. (2026). Modelling time-inhomogeneous incomplete records of point processes using variants of hidden Markov models. *Advances in Data Analysis and Classification*, 20, 663-691.
- **Shahzadi, A.**, Saleem, A., & Hameed, K. ul Rehman, AA (2025). Impact of the use of AI-based tools on university students in Punjab, Pakistan. *Center for Management Science Research*, 3(3), 483-495.
- Sobhi, M. M. A. L., Sajjad, I., **Shahzadi, A.**, Sultan, A., & Malik, M. (2025). Context-aware anomaly detection in smart cities using multi-modal machine learning approaches. *Metallurgical and Materials Engineering*, 141-150.
- Khan, Z., **Shahzadi, A.**, Riaz, N., Cheema, A. N., & Muhammad, Z. (2025). Stratified dual-rank ranked set for estimating population mean. *Metallurgical and Materials Engineering*, 31(1), 805-810.
- **Shahzadi, A.**, Saleem, A., Hameed, K., & ul Rehman, A. A. (2025). Impact of the use of AI-based tools on university students in Punjab, Pakistan. *Center for Management Science Research*, 3(3), 483-495.
- Attiq-ul Rehman, A. A., & **Shahzadi, A.** (2025). Unspoken barriers: A statistical analysis of husbands' justifications for opposing women's post-marital employment. *International Research Journal of Social Sciences and Humanities*, 4(2), 95-121.
- Attiq-ul-Rehman, A., & **Shahzadi, A.** (2025). The effects of students' absenteeism and their exit on educational institutes: A case study. *International Journal of Social Sciences Bulletin*, 3(6), 230-251.
- Attiq-ul-Rehman, A., & **Shahzadi, A.** (2025). Learner support systems in distance learning education systems (Comparative analysis of VU and AIU). *Journal of Digital Learning and Education*, 5(1), 41-52.
- Khan, A. A., Noreen, S., & **Shahzadi, A.** (2024). International trade, economic development, and inflation: Panel data analysis from South Asian economies. *Journal of Development and Social Sciences*, 5(3), 167-175.
- Khan, Z., **Shahzadi, A.**, Cheema, A. N., ul Haq, B., & Malik, M. (2024). An efficient modified ratio estimator under stratified ranked set sampling. *Metallurgical and Materials Engineering*, 30(4), 677-686.

- Attiq-ul-Rehman, A., & **Shahzadi, A.** (2024). Impact of learner support system of English language teaching programs in Pakistan (A case study of GCU). *Journal of Innovations in Education and Social Sciences*, 2(October), 156–168.
- **Shahzadi, A.** (2023). Inhomogeneous hidden semi-Markov models for incompletely observed point processes. *Annals of the Institute of Statistical Mathematics*, 75(2), 253–280.
- **Shahzadi, A.** (2022). *Supplement to 'Inhomogeneous hidden semi-Markov models for incompletely observed point processes'*.
- **Shahzadi, A.** (2019). *Hidden Markov models for time-inhomogeneous and incompletely observed point processes* [Doctoral dissertation, University of Otago].
- **Shahzadi, A.**, Akhter, A. S., & Saf, B. (2013). Regional frequency analysis of annual maximum rainfall in monsoon region of Pakistan using L-moments. *Pakistan Journal of Statistics and Operation Research*, 42, 111–136.
- **Shahzadi, A.** (2013). A review: Regional frequency analysis of annual maximum rainfall in Monsoon region of Pakistan using L-moments. *International Journal of Advanced Statistics and Probability*, 1(3), 97–101.
- Mughal, A. R., **Shahzadi, A.**, Hanif, M., & Ali, U. (2010). Economic reliability group acceptance sampling plan for truncated life test having Weibull distribution. *Journal of Statistics*, 17.

Research in Progress

- HMMscpg: An R package (with T. Wang) Submitted to CRAN of R-project
- Hidden Markov modelling of earthquakes in different regions of Pakistan (with Zunash).
- Bayesian estimation of the truncated inverted exponential distribution using the inverse Ailamujia distribution as a prior (with A. Liaqat; submitted).
- Generalized linear modelling of the number of children ever born to a woman in Punjab, Pakistan (with Rubab Tariq and Jamal Abdul Nasir)

Research Supervision

Supervised 7 MPhil theses, 17 BS theses, and 17 BS internship reports in hidden Markov modelling, Bayesian estimation, rainfall and flood frequency analysis, financial volatility, forecasting, economic modelling, and applied statistics.

Selected MPhil Supervision

- Analysis of Air Quality Index in Pakistan using Hidden Markov Models (Misbah Arshad 3023-2025).
- Bayesian process monitoring of rate parameter of Life Time Exponential Distribution Sadia (2023-2025).
- L-Moment Based Regional Frequency Analysis of Extreme Humidity in Pakistan (Khizra (2022-2024).
- Generalized Linear Modelling Of The Number Of Children Ever Born To A Woman In Punjab, Pakistan (Nuzhat Batool (2020-2022).
- Hidden Markov modelling to detect and forecast rainfall patterns in Pakistan (Saba Taj, 2021-2023).
- Bayesian estimation of the truncated inverted exponential distribution using a truncated inverse Ailamujia prior (Ayesha Liaqat, 2021-2023).
- Volatility analysis of the Karachi Stock Exchange index and conditional dependence with Asian markets: a copula approach (Rabia Manzoor, 2012-2014).
- Peaks-over-threshold analysis of flood data (Sana Ashraf, 2009-2011).
- At-site frequency analysis of annual maximum monthly rainfall across Pakistan (Faiza Zubair, 2008-2010).

Selected Conference Presentations and Seminars

- Statistical Analysis of Earthquake Magnitudes in Pakistan: Identifying Optimal Probability Distributions, 2nd International Conference on Recent Trends in Statistical and Data Analytical Sciences, Air University, Islamabad (2025).
- Time-inhomogeneous hidden Markov models for incompletely observed point processes, University of Otago (2019).

- Estimating record completeness using a two-state hidden Markov model, BigDIA 2018, Houston, USA (2018).
- Estimating record completeness using a two-state hidden Markov model, Joint NZSA/ORSNZ Conference, Massey University, New Zealand (2018).
- Hidden Markov models of incompletely observed point processes, University of Otago (2017).
- Models of incompleteness in volcanic records, NZMASP Conference, Queenstown, New Zealand (2016).
- Economic reliability group acceptance sampling plan for a truncated life test having Weibull distribution, 3rd International Conference on Statistical Sciences, Lahore (2010).

Conference and Event Organization

Contributed to organization and moderation of departmental conferences, workshops, and research poster competitions, including the International Conference on Statistical Sciences (2007), the 2nd International Conference on Statistical Sciences (2022), the 3rd International Conference on Statistical Sciences (2023), and departmental research poster competitions (2014 and 2021).

Professional Development

- One-day workshop on “Artificial Intelligence” organized by Center for Professional Development, Air University Islamabad on May 23, 2025.
- One-day workshop on “Natural Processing Language” organized by Center for Professional Development, Air University Islamabad on May 24, 2025.
- One-day workshop on “Statistical Packages for Social Sciences” organized by Center for Professional Development, Air University Islamabad on May 30, 2025.
- One-day workshop on “Power Business Intelligence” organized by Center for Professional Development, Air University Islamabad on May 31, 2025.
- One-day workshop on “Mapping the Future: Mastering Spatial Data Analysis with QGIS and Google Earth Engine” organized by Pak Institute of Statistical Training and Research held on May 24, 2025, at ISOSS House, Lahore-Pakistan.
- A workshop on “Utilization of Generative AI in Teaching and Research” organized by Pak Institute of Statistical Training and Research held on February 21, 2025, at ISOSS House, Lahore-Pakistan.
- One-day workshop on “Citation and Literature Management using Mendeley Software” organized by Office of Research Innovation & Commercialization (ORIC) in Collaboration with Pakistan Scientific & Technological Information Centre (PASTIC) at GC University Lahore on October 24, 2022.
- Three days Training Workshop on “Sampling Methods, Questionnaire Designing, Setting Up Fieldwork, and the Processing and Displaying of Data” organized by Pakistan Institute of Legislative Development and Transparency (PILDAT) on March 18-20, 2015.
- Two Days Training Course on “PakInfo” at GC University, Lahore from February 03, 2014 to February 04, 2014.
- One Day Symposium on “Mathematical Statistics and Real Data Analysis” organized by Department of Statistics, Lahore College for Women University, Lahore-Pakistan in Collaboration with Higher Education Commission of Pakistan on November 01, 2008.
- Human Resource Development Centre-Training Cycle III organized by Quality Enhancement Cell, GC University, Lahore on July 21-24, 2008.
- A Special Course on “Stochastic Processes” organized by Department of Statistics, GC University, Lahore in collaboration with Higher Education Commission of Pakistan on June 09 to July 10, 2006.
- A Training Course for University Teachers organized by the Department of Learning Innovation, Higher Education Commission of Pakistan held at GC University, Lahore on April 17-22, 2006.
- In-service Teacher’s Training Program organized by Human Resource Development Centre, GC University, Lahore held in September 2005 to May 2006.