Curriculum Vitae

Manan Mukherjee

Contact Information

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Professional Summary

My research focuses on developing statistical inference–based frameworks and interpretable machine learning (ML) models through a problem-driven approach to address challenges in biostatistics and biomedical engineering. Current projects involve applying advanced statistical, machine learning, and artificial intelligence methods to investigate how the exposome influences child health using data from large, longitudinal, population-based cohorts. Recognized for contributing to public health research through strong analytical skills, cross-disciplinary collaboration, and innovative problem-solving.

Education and Research Appointments

- **2025 − 2026:**
  Postdoctoral Fellow, Department of Public Health Sciences
  Queen's University, ON, Canada

- **2021 − 2025:**
  Ph.D. in Statistics
  McMaster University, Hamilton, ON, Canada
  Dissertation Topic: *Computationally Efficient Statistical Methods in IoT and Human Gait Analysis.*

- **2017 − 2019:**
  M.Sc. in Statistics
  University of Calcutta, Kolkata, India
  Thesis Title: *Outlier detection in Astronomical Data..*

  First Class (Grade A+)

- **2014 − 2017:**
  B.Sc. in Statistics
  University of Calcutta, Kolkata, India
  First Class with Honours (Grade A)

Publications:

Published

1. **Mukherjee, M**., Balakrishnan, N., Kumar, S., Deen, M.J., *Satterthwaite Approximation of the Distribution of SPE Scores: An R-Simulation-Based Improvement of the R-PCA-Based Outlier Detection Method.* IEEE Internet of Things Journal, 2024. **DOI:** 10.1109/JIOT.2024.3409583, **Impact factor: 10.6, Q1** (SJR score: 2.48)

2. **Mukherjee, M**., Faisal, A.I., Balakrishnan, N., Kumar, S., Deen, M.J., *An Inferential Model for Understanding the Effects of Demographic and Gait Factors and Their Interactions on the Human Gait Index: A Beta Regression Approach*. IEEE Journal of Biomedical and Health Informatics, 2025. **DOI:** 10.1109/JBHI.2025.3570664 **Impact factor: 6.7, Q1** (SJR score: 1.96)

3. Son, K., Jamil, R., *Chowdhury, A.**, **Mukherjee, M***., et al., *Circulating anti-nuclear autoantibodies in COVID-19 survivors predict long COVID symptoms*. European Respiratory Journal, 2023. **DOI:** https://doi.org/10.1183/13993003.00970-2022, **Impact factor: 16.6, Q1** (SJR score: 3.81 and Altmetric Attention Score: 1452)

4. Chiu, M. N., Chowdhury, A., Zhang, K., Somalwar, S., Jamil, R., Thakar, A., Sidhom, K., Sedhom, N., Thanavala, N., **Mukherjee, M**., Kjarsgaard, M., Garrido Venegas, C., Radadia, N., Tan, N. S., Patel, Z., Ahammed, N., Isshiki, T., Chagla, Z., Kolb, M., Duong, M., Gershon, A. S., Nair, P., Satia, I., Tselios, K., Ho, T., Balakrishnan, N., Svenningsen, S., Mukherjee, M., *Respiratory burden in Post-acute COVID-19 Sequelae associates with systemic inflammation*. ERJ Open Research, 2025. **DOI:** https://doi.org/10.1183/23120541.01331-2024 **Impact factor: 4.2, Q1** (SJR score: 1.24)

5. Purohit et al., *Men in menopause? Experimental verification of mate choice theory with Drosophila melanogaster shows both sexes can undergo menopause*. PLOS One, 2025. **Impact factor: 2.9, Q1** (SJR score: 0.84)

Finished Projects and Ongoing Collaborations

- **Mukherjee, M**., Faisal, A.I., Balakrishnan, N., Kumar, S., Deen, M.J., *Understanding Wearable Sensor-based Patient-Level Gait Predictions Using an Interpretable Bayesian Regression Tree Framework.*(To be submitted to **The Lancet Digital Health**)

- *Tan, N.S.**, *Zhang, K**., **Mukherjee, M***., et al., *Persistent inflammation, autoantibodies and aberrant B cells predict the development of autoimmune disease in patients with post-acute COVID-19 sequelae.*(To be submitted to **Nature Communications**)(1st co-authored)

- Study on Charcot-Leyden Crystals (CLCs). (Current collaboration with the Firestone Institute for Respiratory Health, The Research Institute of St. Joe's Hamilton)

- Early-life exposome profiles and their association with atopic diseases in Canadian children. (Current collaboration with Queen's University, Department of Public Health Sciences. This study is supported by the Canadian Institutes of Health Research (CIHR))

- Longitudinal spirometry change in adults: an evaluation of statistical modeling strategies to improve risk factor epidemiology and clinical trial efficiency. (Current Collaboration with Queen's University, Department of Public Health Sciences and McGill University, Division of Clinical and Translational Research)

Consultation Work

Long-Term Clinical and Sustained REMIssion in Severe Eosinophilic Asthma treated with Mepolizumab (REMI-M study)
Provided consultation on statistical analysis, model selection, sample size calculation, and goodness of fit. Contributed to answering reviewers' comments.
Output: Study was accepted and published. Acknowledgement can be found in the published paper.
DOI: https://doi.org/https://doi.org/10.1016/j.jaip.2024.08.033 (**Impact factor: 8.2, Q1**)

Presentations

- **Poster Presentation:** Presented at the Statistical Society of Canada (SSC) Data Analysis Competition, Ottawa, Canada. Presentation title: *Exploring the Impact of Climate Change on the Canadian Economy: A Bayesian Hierarchical CAR-based Model.*

  - Led a team of 3 data scientists in a project modeling historical climate patterns to study the impact on the productivity of sixteen Canadian industrial sectors.
  - Transformed 200GB of raw CSV data into geospatial polygon format and cleaning it through GAM interpolation to ensure accurate analysis.
  - Employed STAN to fit Bayesian spatio-temporal generalized linear mixed models (GLMMs), significantly enhancing computational efficiency by implementing high-performance computing techniques, including code parallelization.

- **Talk Invitation:** Received an invitation to present a talk at the *IEEE 10th World Forum on Internet of Things* on the published article: **Satterthwaite Approximation of the Distribution of SPE Scores: An R-Simulation-Based Improvement of the R-PCA-Based Outlier Detection Method** in Ottawa, Canada.

Work Experience

- **Sessional Faculty, McMaster University, Summer Term, 2025**: Responsible for teaching duties in STATS 2B03 (Introductory Biostatistics), including lecture preparation and delivery, student assessment (quizzes, tests, and exams), and providing academic support through office hours and individual consultations. (Enrollment: 211)

- **2021 − Current:** Graduate Teaching Assistant, Department of Mathematics and Statistics, McMaster University, Hamilton, ON, Canada

  - TA-ed Undergraduate-level courses:
    * **Survey Sampling (STATS 3S03)**
    * **Statistical Methods and Applications (STATS 2MB3)**
    * **Mathematical Statistics (STATS 2D03)**
    * **Probability and Statistics for Civil Engineering (STATS 3J04)**
    * **Calculus for Life Sciences-I (MATH 1LS3)**
  - TA-ed Graduate-level courses:
    * **STATS 780: Data Science**
    * **STATS 710: Statistical Inference**
  - **Math Help Centre:** Solved final year undergraduate problems in calculus, linear algebra, and probability.

- **2019 − 2020:** Associate Statistical Programmer, Novartis, Hyderabad, India. (**Global Drug Development Operations Unit.**)

Courses Taken (Doctoral Studies)

- **STATS 756: Biostatistics Topics** (A+)

- **STATS 790: Statistical Learning** (A+)

- **STATS 780: Data Science** (A+)

Skills

- **Programming Languages:** R, SAS, Python (currently learning).

- **Computing Environments:** High-Performance Computing (SHARCNET).

- **Data Handling:** Geospatial Data, Wearable Sensor (IMU) Data Extraction, Pre-processing for Model Development.

- **Academic Writing:** Proficient in LaTeX.

Awards

- **INSPIRE Scholarship for Higher Education (SHE)**
  Issued by the Department of Science and Technology, Government of India, June 2014.

- **Department and Research Scholarships**
  Received a department scholarship in the amount of $8,500.00 (CAD) along with research scholarship of $9,000.00 (CAD) per year for four years at McMaster University (2021-2025).

References

- **Prof. N. Balakrishnan (Supervisor)**
  Department of Mathematics and Statistics, McMaster University, Hamilton, ON, Canada
  Email: bala@mcmaster.ca

- **Prof. Ben Bolker**
  Department of Mathematics and Statistics, McMaster University, Hamilton, ON, Canada
  Email: bolker@mcmaster.ca

- **Dr. Katherine Davies**
  Department of Mathematics and Statistics, McMaster University, Hamilton, ON, Canada
  Email: daviek5@mcmaster.ca