Shariq Mohammed

Department of Biostatistics
Department of Computational Medicine & Bioinformatics
University of Michigan
100 Washtenaw Ave, Ann Arbor, Michigan 48109-2218

shariqm@umich.edu
shariq-mohammed.github.io

PRESENT POSITION

Precision Health Scholar *September 2019+*
Postdoctoral Research Fellow *September 2018+*
University of Michigan (U-M), Ann Arbor, MI
Mentors: Dr. *Veerabhadran Baladandayuthapani* & Dr. *Arvind Rao*

EDUCATION

University of Connecticut (UConn), Storrs, CT

Ph.D. in Statistics *August 2018*
Dissertation: Bayesian variable selection with applications to neuroimaging data
Advisors: Dr. *Dipak Dey* & Dr. *Yuping Zhang*

M.S. in Statistics *September 2017*

Chennai Mathematical Institute (CMI), Chennai, India

M.Sc. Applications of Mathematics *May 2014*

Indian Statistical Institute (ISI), Bangalore, India

B.Math.(Hons.) *June 2012*

RESEARCH INTERESTS

Methodology:
Bayesian modeling, variable selection, geometric/functional data analysis and spatial statistics

Applications:
medical imaging analysis, neuro- and cancer-imaging, imaging-genomics and precision health

RESEARCH POSITIONS

Research Assistant, *The Travelers Companies*, Hartford, Connecticut *2016 - 2018*

Graduate/Research Assistant, *UConn* *2016 - 2017*

Summer Student Worker, *Pfizer Inc.*, Boston, Massachusetts *Summer 2016*

Research Intern, *Tata Consultancy Services Innovation Labs*, Hyderabad, India *Summer 2013*

GRANTS & AWARDS

Grants

- Integrative decision models combining radiological-imaging and genotypic data in gliomas: *Precision Health Scholars Award* ($80K) by Precision Health at U-M *September 2019+*

Awards

- *Doctoral Dissertation Fellowship* awarded by Graduate School at UConn *Spring 2018*
- *Doctoral Student Travel Award* awarded by Graduate School at UConn *2017*
- Multiple conference travel grants from Department of Statistics at UConn *2017*
- *Pre-doctoral Dissertation Fellowship* *Summer 2016*
- *Matthew M. Goldstein Graduate Fellowship* *Summer 2015*

- *CMI Medal of Excellence* for outstanding performance in National Graduate Program in Applications of Mathematics *2014*
- *Post-graduate Fellowship* awarded by CMI *2012 - 2014*
- *INSPIRE Scholarship for Higher Education* awarded by Ministry of Science & Technology, Government of India *2009 - 2014*
- *Undergraduate Fellowship* awarded by ISI *2009 - 2012*

PUBLICATIONS

Mohammed, S. and Dey D.K. (2020+): Scalable spatio-temporal Bayesian analysis of high-dimensional electroencephalography data. To appear in *The Canadian Journal of Statistics*.

Lee, J., Wang, N., Turk, S., **Mohammed, S.** et al., (2020+): Discriminating Pseudoprogression and True Progression in Diffuse Infiltrating Glioma using Multi-parametric MRI data through Deep Learning. To appear in *Scientific Reports*.

Mohammed, S., Li, T., Chen, X.D., Warner, E. et al., (2020). Density-based classification in diabetic retinopathy through thickness of retinal layers from optical coherence tomography. *Scientific Reports*, 10(1), pp.1–13. 10.1038/s41598-020-72813-x

Chekouo, T.*, **Mohammed, S***, Rao, A*. (2020): A Bayesian 2D functional linear model for gray-level co-occurrence matrices in texture analysis of lower grade gliomas. *NeuroImage: Clinical*, 28, p.102437. 10.1016/j.nicl.2020.102437 (*co-corresponding author)

Mohammed, S., Dey D.K. and Zhang, Y. (2020): Classification of high-dimensional electroencephalography data with location selection using structured spike-and-slab prior. *Statistical Analysis and Data Mining: The ASA Data Science Journal*, 13(5), pp.465–481. 10.1002/sam.11477

Ray, D., Salvatore, M., Bhattacharyya, R., Wang, L., Du, J., **Mohammed, S.** et al., (2020). Predictions, role of interventions and effects of a historic national lockdown in India's response to the COVID-19 pandemic: data science call to arms. *Harvard Data Science Review*(Suppl 1). 10.1162/99608f92.60e08ed5

Mohammed, S., Dey D.K. and Zhang, Y. (2019): Bayesian variable selection using spike-and-slab priors with application to high dimensional electroencephalography data by local modelling. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 68(5), pp.1305–1326. 10.1111/rssc.12369

Mohammed, S. and Dey D.K. (2019): Assessing malaria using neutral-zone classifiers with mixture discriminant analysis on 2D images of red blood cells. *Journal of Biostatistics and Epidemiology*, 5(1), pp.1–11. 10.18502/jbe.v5i1.1901

Bhat, S.P., Murali, U.K. and **Mohammed, S.** (2016): A dynamical systems approach to systemic risk in a financial network. In *2016 Indian Control Conference (ICC)*, pp.377–384. IEEE. 10.1109/INDIANCC.2016.7441162

Book Chapter:

Matuk, J., **Mohammed, S.**, Kurtek, S. and Bharath, K. (2020): Biomedical applications of geometric functional data analysis. In *Handbook of Variational Methods for Nonlinear Geometric Data*, pp.675–701. Springer, Cham. 10.1007/978-3-030-31351-7_24

Preprints:

Mohammed, S., Bharath, K., Kurtek, S., Rao, A., Baladandayuthapani, V.: RADIOHEAD: Radiogenomic analysis incorporating tumor heterogeneity in imaging through densities. *Tentatively accepted (minor revision requested) in Annals of Applied Statistics.*

Mohammed, S., Kurtek, S., Bharath, K., Rao, A., Baladandayuthapani, V.: Tumor radiogenomics with Bayesian layered variable selection. *Submitted*.

Chekouo, T., Stingo, F.C., **Mohammed, S**, Rao, A., Baladandayuthapani, V.: A Bayesian group selection approach for the analysis of volumetric images of brain cancers and their genomic determinants. *Submitted*.

Halder, A., **Mohammed, S.**, Chen, K. and Dey D.K.: Spatial risk estimation in Tweedie compound Poisson double generalized linear models. *Submitted*. arXiv:1912.12356

Halder, A., **Mohammed, S.**, Chen, K. and Dey D.K.: Spatial Tweedie exponential dispersion models. *Submitted*. arXiv:2003.06299

Panigrahi, S., **Mohammed, S.**, Rao, A. and Baladandayuthapani, V.: Integrative Bayesian models using post-selective inference: a case study in radiogenomics. arXiv:2004.12012

SOFTWARE

R Packages (on GitHub)

- RADIOHEAD - github.com/shariq-mohammed/RADIOHEAD
- ScalableBayesEEG - github.com/shariq-mohammed/ScalableBayesEEG
- stSpikeSlabEEG - github.com/shariq-mohammed/stSpikeSlabEEG
- SpikeSlabEEG - github.com/shariq-mohammed/SpikeSlabEEG

TEACHING

Instructor

- Computational Biostatistics and Survival Analysis - a workshop at *Tata Memorial Center*, Navi Mumbai, India (taught jointly with Dr. *Bhramar Mukherjee*) *December 2019*
  - ⋆ Prepared course materials and gave lectures on `R` computations for survival analysis and variable selection approaches: shariq-mohammed.github.io/teaching/cbsa2019/
- Statistical Methods (Calculus level I) - UConn *Summer & Fall 2017*
  - ⋆ Prepared course materials (including homework and exams), gave lectures, and graded and provided evaluation to students

Teaching Assistant

- Introduction to Statistics I & II, and Introduction to Mathematical Statistics I & II - Department of Statistics, UConn *Fall 2014 - Spring 2016*
- Numerical Linear Algebra and Probability Theory - CMI *Spring 2013 - Fall 2013*

TALKS

Invited

- Joint Statistical Meetings, Seattle, Washington (*Upcoming*) *August 2021*
- ENAR Spring Meeting, Baltimore, Maryland (*Upcoming*) *March 2021*
- Precision Health Seminar (Pharmacy 217), U-M (*Upcoming*) *Spring 2021*
- 2020 U-M Precision Health Symposium - Virtual (*Poster*) *September 2020*
- StatChat 2020 - Panel discussions at NMIMS Sunandan Divatia School of Science, Mumbai, India - Virtual *August & September 2020*
- Joint Statistical Meetings - Virtual (*Topic-contributed*) *August 2020*
- MIDAS COVID-19 Special Seminar Series, U-M (*Group presentation*) *June 2020*
- ENAR Spring Meeting, Nashville, Tennessee *March 2020*

- Precision Health Seminar (Pharmacy 217), U-M *March 2020*
- Tools and Technology Seminar, U-M *March 2020*
- IISA Annual Conference, Mumbai, India *December 2019*

Contributed

- ENAR Spring Meeting, Philadelphia, Pennsylvania *March 2019*
- Joint Statistical Meetings, Vancouver, Canada *July 2018*
- Symposium on Data Science and Statistics, Reston, Virginia *May 2018*
- BayesComp 2018. Barcelona, Spain (*Poster*) *March 2018*
- IISA Annual Conference, Hyderabad, India *December 2017*
- 34th Quality and Productivity Research Conference, UConn (*Poster*) *June 2017*
- 31st New England Statistics Symposium, UConn *April 2017*

SERVICE & LEADERSHIP

Academic

- *Reviewer*: Biometrics, Biostatistics, Clinical Cancer Informatics, Harvard Data Science Review, Journal of the American Medical Informatics Association *2019 - 20*
- *Member*: Membership & Outreach Committee, IISA *2020+*
- *Organizer (Invited Sessions)*: JSM 2020, ENAR Spring Meeting 2021, JSM 2021 *2020+*

Departmental

- *Vice-President*, Statistics Graduate Student Committee, UConn *2016 - 2017*
- *Vice-Chair* of Student Committee, 31st New England Statistics Symposium *April 2017*
- *Co-President*, Statistics Graduate Student Committee, UConn *2015 - 2016*
- *Senator*, UConn Graduate Student Senate *2015 - 2016*

External

- *Advisor*, Tarang (South Asian cultural organisation), UConn *2017 - 2018*
- *President*, Tarang, UConn *2016 - 2017*
- *Student Representative*, Senate Faculty Standards Committee, UConn *2015 - 2016*
- *Treasurer*, Tarang, UConn *2015 - 2016*

REFERENCES

Postdoc Mentors

- *Dr. Veerabhadran Baladandayuthapani*, Professor of Biostatistics, University of Michigan, Ann Arbor, Michigan. *Contact*: veerab@umich.edu or (734) 764-5702
- *Dr. Arvind Rao*, Associate Professor of Computational Medicine & Bioinformatics, University of Michigan, Ann Arbor, Michigan. *Contact*: ukarvind@umich.edu or (734) 647-1289

PhD Advisor

- *Dr. Dipak K. Dey*, Board of Trustees Distinguished Professor, University of Connecticut, Storrs, Connecticut. *Contact*: dipak.dey@uconn.edu or (860) 486-4755

Collaborators & Mentors

- *Dr. Sebastian Kurtek*, Associate Professor of Statistics, The Ohio State University, Columbus, Ohio. *Contact*: kurtek.1@stat.osu.edu or (614) 292-0463
- *Dr. Bhramar Mukherjee*, Professor and Chair of Biostatistics, University of Michigan, Ann Arbor, Michigan. *Contact*: bhramar@umich.edu or (734) 764-6544