VIJAY KUMAR

POSTDOCTORAL RESEARCH SCIENTIST · COLUMBIA UNIVERSITY MAILMAN SCHOOL OF PUBLIC HEALTH

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Education

Clarkson University   *Potsdam, NY - USA*
PHD, MS MATHEMATICS   *2018 - 2023*
- Advisor: Dr. Sumona Mondal & Dr. Suresh Dhaniyala
  Thesis: Statistical Learning and Modeling of Low-Cost Air Quality Sensor Data and Epidemiological Analysis

Clarkson University   *Potsdam, NY - USA*
MS APPLIED DATA SCIENCE   *2022 - 2023*
- Advisor: Dr. Boris Jukic

NED University   *Karachi, Pakistan*
MS APPLIED MATHEMATICS   *2013- 2015*
- Advisor: Dr. Muhammad Jamil

University of Sindh   *Jamshoro, Pakistan*
BS MATHEMATICS   *2009 - 2012*

Professional Experience

2023-   **Postdoctoral Research Scientist**, Causal Inference, Machine Learning, Columbia University, New York, NY, USA
2022-2023   **Graduate Student Coordinator, NSF MBioTS Summer REU**, Mathematics, Clarkson University, Potsdam, NY, USA
2022-2023   **Adjunct Instructor**, Mathematics, Clarkson University, Potsdam, NY, USA
2018-2022   **Graduate Teaching Assistant**, Mathematics, Clarkson University, Potsdam, NY, USA
2016-2018   **Lecturer**, Artificial Intelligence & Mathematical Sciences, SMI University, Karachi, Pakistan
2013-2016   **Lecturer**, Mathematics, NED University of Engineering and Technology, Karachi, Pakistan

Publications

[†] *equally contributing first author,* [*] *corresponding author*

PEER REVIEWED PUBLICATIONS

Jaime Benavides, Sabah Usmani, **Vijay Kumar**, and Marianthi-Anna Kioumourtzoglou. "Development of a Community Severance Index for urban areas in the United States: A case study in New York City." Environment International, February, 2024.

Vijay Kumar, Dinushani Senarathna, Supraja Gurajala, William Olsen, Shantanu Sur, Sumona Mondal, and Suresh Dhaniyala. "Spectral Analysis Approach for Assessing Accuracy of a Low-Cost Air Quality Sensor Network Data." Atmospheric Measurement Techniques, 21 (2023): 5415427.

Mohammad Meysami [†], **Vijay Kumar** [†], Mckayah Pugh, Samuel Thomas Lowery, Shantanu Sur, Sumona Mondal, and James Martin Greene. "Utilizing logistic regression to compare risk factors in disease modeling with imbalanced data: a case study in vitamin D and cancer incidence." Frontiers in Oncology, 13 (2023): 1227842.

Chaipitakporn Chaya [†], Prashant Athavale [†], **Vijay Kumar**, Thevasha Sathiyakumar, Marko Budišić, Shantanu Sur, and Sumona Mondal. "COVID-19 in the US during pre-vaccination period: Shifting impact of sociodemographic factors and air pollution." Frontiers in Epidemiology 2 (2022): 927189.

Partohaghighi Mohammad, **Vijay Kumar**, and Ali Akgül. "Comparative study of the fractional-order crime system as a social epidemic of the USA scenario." International Journal of Applied and Computational Mathematics 8, no. 4 (2022): 190.

Mondal Sumona [†], Chaya Chaipitakporn [†], **Vijay Kumar**, Bridget Wangler, Supraja Gurajala, Suresh Dhaniyala, and Shantanu Sur. "COVID-19 in New York state: Effects of demographics and air quality on infection and fatality." Science of The Total

Environment 807 (2022): 150536.

Athavale, Prashant[†], **Vijay Kumar**[†], Jeremy Clark, Sumona Mondal, and Shantanu Sur. "Differential impact of COVID-19 risk factors on ethnicities in the United States." Frontiers in public health 9 (2021): 743003.

Jamil, Muhammad [†], **Vijay Kumar**[†], Muhammad Zafarullah, and Azam Khan. "Fractionalized magnetohydrodynamics (MHD) of the Maxwell fluid through porous cylinders." Special Topics & Reviews in Porous Media: An International Journal 12, no. 6 (2021).

In Review

Vijay Kumar[*], Shantanu Sur, Dinushani Senarathna, Supraja Gurajala, Suresh Dhaniyala, and Sumona Mondal[*]. "Quantifying impact of correlated predictors on low-cost air quality sensor data using KZ-filter." Frontiers in Applied Mathematics and Statistics: Mathematics of Computation and Data Science, January, 2024.

Dinushani Senarathna[†], **Vijay Kumar**[†], Supraja Gurajala, Suresh Dhaniyala, Shantanu Sur, and Sumona Mondal. "Correction models for estimation of $PM_{2.5}$ from low-cost sensor data: Effects of distance and sensor numbers." Environmental Science: Advances, January. 2024.

In Preparation

Vijay Kumar, Dinushani Senarathna, Thevasha Sathiyakumar, Shantanu Sur, and Sumona Mondal. "Effect of COVID-19 Lockdown on Traffic-related Air Pollution."

Pre-prints

Vijay Kumar, Dinushani Senarathna, Supraja Gurajala, William Olsen, Shantanu Sur, Sumona Mondal, and Suresh Dhaniyala. "Understanding the source components captured by the Purple Air Network." ChemRxiv: Earth, Space, and Environmental Chemistry, January, 2023.

Awards, Fellowships, & Grants

RESEARCH GRANTS

2023	**Echo360 e3 Tech Grant**, Echo360

TRAVEL GRANTS

2024	**Travel Grant**, Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University
2023	**Early Career Travel Grant**, Colorado State University, Fort Collins
2023	**Student Travel Grant**, American Statistical Association
2023	**Graduate Student Travel Grant**, Clarkson University
2022	**Student Travel Grant**, American Aerosol Association for Aerosol Research
2021	**Student Grant**, American Aerosol Association for Aerosol Research
2020	**Student Grant**, American Aerosol Association for Aerosol Research

AWARDS

2023	**Phalanx Leadership Award**, Phalanx, Highest Honorary Society, Clarkson University

FELLOWSHIPS/SCHOLARSHIPS

2016	**15 Days Postgraduate Fellowship**, SISSA, Trieste, Italy
2009-2012	**District Government Scholarship**, District Government Ghotki, Pakistan

Presentations

*presenting author; [+] mentored undergraduate

Invited Talks

March, 2024, *Data Science Approach to Monitoring and Exposure Analysis of Air Pollution*, David A Walsh Arts and Science Seminar, Clarkson University, Potsdam, NY, USA.

February, 2024, *Panelist for Balancing Act; Climate Mitigation and Adaption*, Conference on Climate Crisis in Pakistan, PSA Columbia University, New York, NY, USA.

October 2022, *Session Co-Chair during Session 11 of the Instrumentation and Methods (11IM)*, 40th Annual Conference by American Aerosol Association for Aerosol Research, Raleigh, NC, USA.

CONTRIBUTED PRESENTATIONS

May 2024. A simulation study analyzing the impact of differential exposure measurement error of air pollution on preterm birth . 2024 Columbia University Postdoctoral Research Symposium, New York, NY, USA.

April 2024. Bayesian Nonparametric Ensemble (BNE) algorithm for predictions of high spatiotemporal PM2.5 concentrations. Data Science Day 2024, Columbia University, New York, NY, USA.

July 2023, Undergrad, Olivia Varricchione*[+], Alexander Heywood *[+], **Vijay Kumar**, Adverse Effects as a Predictor of Tumor Response in Maintenance Therapy of Advanced Lung Cancer by Pemetrexed and Bevacizumab, Clarkson University, Research, and Projects Showcase, Potsdam-NY, USA.

April 2023. Spectral analysis approach for assessing the accuracy of low-cost air quality sensor network data. Probability and Statistics Day, University of Maryland, Baltimore County, MD, USA.

October 2022. Understanding the source components captured by the Purple Air Network. 40th Annual Conference by American Aerosol Association for Aerosol Research, Raleigh, NC, USA.

July 2022, Undergrad, Samuel Lowery *[+] McKayah Pugh[+], **Vijay Kumar**, A statistical analysis of the effect of vitamin D on cancer incidence and mortality, Clarkson University, Research, and Projects Showcase, Potsdam-NY, USA.

March 2022. Differential Impact of COVID-19 Risk Factors on Ethnicities in the United States. Mathematics Conference and Competition of Northern New York (MCCNNY), Clarkson University, Potsdam-NY, USA.

October 2021. Spatiotemporal Analysis of $PM_{2.5}$ in Chicago using Data from EPA and Low-Cost Sensor Network, 39th Annual Virtual Conference by American Aerosol Association for Aerosol Research, USA.

October 2020. Infection vs Fatality of COVID-19 in New York State: Effect of Demographics and Poor Air Quality, 38th Annual Virtual Conference by American Aerosol Association for Aerosol Research, USA.

April 2018, Air Quality prediction using LUR Model: Parameter Reduction and Optimization, Clarkson University, Research, and Projects Showcase, Potsdam-NY, USA.

December 2015. Effect of MHD on fractionalized Maxwell fluid between coaxial cylinders, NED University of Engineering and Technology, First International Conference on Chemical and Material Processing, Karachi Pakistan.

Mentoring

Summer-2023	**Olivia Varricchione, and Alexander Heywood**, Undergraduate in Mathematics and Biology, NSF MBioTS Summer REU	*Clarkson University*
Summer-2022	**McKayah Pugh, and Samuel Lowery**, Undergraduate in Mathematics, NSF MBioTS Summer REU	*Clarkson University*
2021-2022	**Dawit Gebremichael**, Undergraduate in Mathematics	*Clarkson University*
2021-2022	**Isaac Kiiza**, Undergraduate in Mathematics	*Clarkson University*
2020-2021	**Jeremy Clark**, Undergraduate in Computer Science	*Clarkson University*
2019-2020	**Bridget Wangler**, Undergraduate in Engineering & Management	*Clarkson University*

Outreach & Professional Development

SERVICE AND OUTREACH

2024-	**Journal of Atmospheric Environment**, Reviewer
2022-2023	**Pakistani Student Association**, Founding Member & President
2018	**Science Fair at SUNY Potsdam**, Volunteer Judge

Development

- Participant at *Workshop on The Industrialization of SciML,* March 23-24, 2024 at Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI, USA.

- Presenter and participant at *EnviBayes Workshop on Complex Environmental Data,* September 18-20, 2023 at Colorado State University, Fort Colins, CO, USA.

- Participant at *Intermediate Webinar: Satellite Data for Air Quality Environmental Justice and Equity Applications,* August 23, 2023 by NASA Applied Remote Sensing Training (ARSET) program, and Health and Air Quality Science Team (HAQAST) Tiger Team, USA.

- Participant st *Ensemble Learning with Bayesian Additive Regression Trees,* June 7-8, 2023 at Medical College of Wisconsin (MCW), Milwaukee, WI, USA.

- Participant st *Using UST Finder in Identifying UST Locations, Impacts on Drinking Water Supplies, and Climate Change Impacts,* April 6, 2023, U.S. EPA's Tools & Resources Webinar Series, USA.

- Participant at *Clarkson University's Graduate Leadership Development Program,* February 28-April 25, 2022 at Clarkson University, Potsdam, NY, USA.

- Participant at *Clarkson – SRIHR-ICMR Indo-US Training Workshop on Low-Cost Air Quality Sensors and Related Data Analytics,* August 5-9, 2019 at Clarkson University, Potsdam, NY, USA.

- Participant at *01-day workshop on Scientific Writing,* February 2016 at University of Karachi, Karachi, Pakistan.

Professional Memberships

- Inducted Member-2023, Phalanx, Highest Honorary Society, Clarkson University

- American Statistical Association (ASA)

- Society for Industrial and Applied Mathematics (SIAM)

- The American Association for Aerosol Research (AAAR)

- International Society for Environmental Epidemiology (ISEE)