VIJAY KUMAR

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PROFESSIONAL SUMMARY

I'm a doctoral candidate at Clarkson University's mathematics department. My areas of interest in research include time series and spatial data analysis; Applied Mathematics; Statistics; Air Quality Modeling; and Machine Learning. I am conducting research on air quality modeling, forecasting, and analysis of public health variables such as air pollution.

SKILLS

- Statistical analysis
- ArcGIS
- Strong communication
- Strategic planning
- Data filtering
- Spatial Statistics
- Problem-solving
- Written communication
- R Programming
- Data mining
- Team work
- Time Management

ACCOMPLISHMENTS

Journal Articles:

- Source components captured by low-cost sensor network data (joint with S Dinushani Senarathna, Supraja Gurajala, William Olsen, Shantanu Sur, Sumona Mondal, and Suresh Dhaniyala) Status (in preparation)
- Effects of distance and sensor numbers in correction models for accurate PM2.5 estimation from low-cost sensors (joint with S Dinushani Senarathna, Supraja Gurajala, Suresh Dhaniyala,Shantanu Sur, and Sumona Mondal) Status (in preparation)
- COVID-19 in the United States during pre-vaccination period: Shifting impact of so- ciodemographic factors and air pollution (joint with Chaya Chaipitakporn, Prashant Athavale, Thevasha Sathiyakumar, Marko Budisic, Sumona Mondal, and Shantanu Sur) Status (published, October, 2022 in Frontiers in Epidemiology - Infectious Disease Epidemiology)
- Comparative Study of the Fractional-Order Crime System as a Social Epidemic of the USA Scenario (joint with Mohammad Partohaghighi, and Ali Akg¨ul) Status (published, July, 2022 in International Journal of Applied and Computational Mathematics)
- Differential Impact of COVID-19 Risk Factors on Ethnicities in the United States (joint with Prashant Athavale, Jeremy Clark, Sumona Mondal, and Shantanu Sur) Status (published, December, 2021 in Frontiers in Public Health)
- COVID-19 in New York state: Effects of demographics and air quality on infection and fatality (joint with Sumona Mondal, Chaya Chaipitakporn, Bridget Wangler, Supraja Gurajal, Suresh Dhaniyala Shantanu Sur) Status (published, February, 2022 in Science of The Total Environment)
- Fractionalized Magnetohydrodynamics (MHD) Of The Maxwell Fluid Through Porous Cylinders (joint with Muhammad Jamil, Muhammad Zafarullah, and Azam Khan) Status (published, January, 2021 in Special Topics & Reviews in Porous Media: An International Journal)

Invited Speaker:

- Invited as Session Co-Chair during Session 11 of the Instrumentation and Methods (11IM) Raleigh, NC 40th Aerosol Conference by American Aerosol Association (AAAR) October 2022

Conference Talks:

- Understanding the source components captured by the Purple Air Network, Raleigh, NC, 40th Aerosol Conference by the American Aerosol Association (AAAR), October 2022.

- Spectral analysis of low-cost sensor network data UC Davis, Pasadena, California, ASIC, May 2022.
- Deferential Impact of COVID-19 Risk Factors on Ethnicities in the United States Clarkson University, Potsdam, NY, MCCNNY, March 2022.
- Spatiotemporal Analysis of PM2.5 in Chicago using Data from EPA and Low-Cost Sensor Network, Virtual, AAAR Virtual 39th Conference, October 2021.
- Infection vs Fatality of COVID-19 in New York State: Effect of Demographics and Poor Air Quality Virtual, AAAR 38th Virtual Conference, August 2020.
- Evaluating Spatio-temporal accuracy of LUR models using Low-cost Sensor Network Data, Clarkson University, Potsdam, NY, eRAPS, April 2020.
- Air Quality prediction using LUR Model: Parameter Reduction and Optimization UMBC Baltimore, Maryland, 13th Annual Probability and Statistics Day, April 2019.
- Air Quality prediction using LUR Model: Parameter Reduction and Optimization Clarkson University, Potsdam-NY, RAPS spring 2018, April 2019.
- Air Quality prediction using LUR Model: Parameter Reduction and Optimization Clarkson University, Potsdam-NY, RAPS spring 2018, April 2019.
- Fractionalized MHD Maxwell fluid through porous cylinders, Recent Advances in Pure and Applied Mathematics (RAPAM'16), QUEST Nawabshah Pakistan, January 2016.
- Effect of MHD on fractionalized Maxwell fluid between coaxial cylinders, NED UET Karachi Pakistan, First International Conference on Chemical and Material Processing, December 2015.
- Effect of MHD on fractionalized Maxwell fluid between coaxial cylinders, Institute of Space and Planetary Astrophysics Karachi Pakistan, Third National Conference on Space Science and Technology, October 2015.

EXPERIENCE

Instructor — August 2022 - Current
Clarkson University | Potsdam, NY
- Lecturing on course topics and evaluating student assignments and exams to provided constructive feedback.

MBioTS REU program graduate student coordinator (GSC) — May 2022 - July 2022
Clarkson University | Potsdam, NY
- Liaised between administrative offices and logistical personnel for smooth program operations.
- Facilitated communication between students and academic programs.
- Advised students on research projects.

Teaching Assistant — July 2019 - May 2022
Clarkson University | Potsdam, NY
- Assisted instructor with in-class activities, grading assignments, facilitating class discussion, tutoring and proctoring examinations.
- Observed students' performance, recording relevant data to aid primary instructor in assessing progress.
- Helped struggling students with problem areas to build confidence.

Graduate Assistant — August 2018 - June 2019
Clarkson University | Potsdam, NY
- Prepared course paperwork delivered lessons and graded assignments to support teaching.

Mathematics Lecturer August 2016 - July 2018

SMI University | Karachi , Sindh

- Used instructional and tutoring strategies to help students explore foundational concepts in mathematics.
- Assigned projects and homework to reinforce classroom lectures.

Mathematics Lecturer December 2013 - July 2016

NED University of Engineering and Technology | Karachi , Sindh

- Taught undergrad-level courses and administered exams to students.
- Promoted critical thinking, personal development and commitment with custom lectures and assignments.

EDUCATION

Ph.D - Mathematics May 2023

Clarkson University, Potsdam, NY

- Member of American Aerosol Association (AAAR)
- Member of Society of Industrial and Applied Mathematics (SIAM)
- Member of Association of Women in Mathematics (AWM)
- Research in Data Science applications to Air Quality and Public Health
- Nominated for the Graduate Leadership Program by Clarkson University

MS - Applied Data Science May 2023

Clarkson University, Potsdam, NY

- Courses: Database Modeling, Design, and Implementation, Data Warehousing, Probability and Statistics for Analytics, Data Mining, Information Visualization, and Machine Learning.

Master of Science (M.S.) - Mathematics May 2021

Clarkson University, Potsdam, NY

Graduated with 3.72/4 GPA.

Graduated in Top 5% of Class

MS - Applied Mathematics December 2015

NED University of Engineering and Technology, Karachi, Sindh

- Graduated with 3.45/4 GPA.
- Graduated in Top 5% of Class
- Dissertation: Effect of MHD on Fractionalized Maxwell Fluid in Porous Pipes.

Bachelor of Science (B.S.) - Mathematics December 2012

Sindh University, Jamshoro, Sindh

- Graduated with 3.21/4 GPA
- Graduated in the Top 5% Class

AWARDS

- Travel Grant to present research work at the 40th Aerosol Conference by American Aerosol Association (AAAR), Raleigh, NC (October 2022).

- Student Registration Waiver Grant to the 2021 39th Aerosol Conference by the American Aerosol Association (AAAR) (October 2021).
- Student Registration Waiver Grant to the 2020 38th Aerosol Conference by the American Aerosol Association (AAAR) (October 2020).
- PhD Studies Scholarship awarded by US Pakistan Knowledge Corridor, Higher Education Commission (HEC) of Pakistan (August-2018).
- 15 Days Postgraduate Fellowship in Mathematical Analysis, Modelling and Applications awarded by SISSA, Trieste, Italy (August-2016).
- Laptop for MS Studies at NED University, under Prime Minister Laptop Scheme awarded by Higher Education Commission (HEC) of Pakistan (2015).
- District Government Scholarship to support BS Mathematics degree at Sindh University, awarded by the District Government of Ghotki, Pakistan (2009-2012).
- A School Level Scholarship was awarded by the District Education Government, Ghotki, Pakistan (2003).

VOLUNTEER

President August 2021 - Current

Pakistani Student Association at Clarkson University | Potsdam, NY

- Developed leadership abilities by organizing special student activities and service projects.
- Documented council meetings, prepared notes, and distributed information to student body.
- Maintained civility and smooth operations of council meetings by following parliamentary procedures.
- Promote diversity and inclusion.

MENTORING

Mentored undergraduate students to make their research projects successful;

- McKayah Pugh, and Samuel Lowery, Undergraduate in MathBio REU, Clarkson University Summer 2022.
- Isaac Kiiza, Undergraduate in Mathematics, Clarkson University Summer 2021.
- Dawit Gebremichael, Undergraduate in Mathematics, Clarkson University Summer 2021.
- Jeremy Clark, Undergraduate in Computer Science, Clarkson University Spring, Summer 2020.
- Bridget Wangler, Undergraduate in Engineering & Management, Clarkson University Fall 2019, Spring 2020.

SEMINARS AND WORKSHOPS

- Nominated for Clarkson University's Graduate Leadership Development Program, February 28-April 25, 2022 at Clarkson University, Potsdam, NY.
- Participant of 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.
- Participant in a 15-day Faculty Development Program, in August 2016 at SMI University, Karachi, Pakistan.
- Participant in a 01-day workshop on Scientific Writing, February 2016 at the University of Karachi, Karachi, Pakistan.