Vijay Kumar

Clarkson University, Potsdam, NY-USA-13676
Mathematics
SC-4102

vikumar@clarkson.edu
Linkedin

Academic Interests

I am a Ph.D. student at the Department of Mathematics, Clarkson University. My research interest lies in applied mathematics, statistics, and air quality modeling. I am currently working on air quality modeling, predictions and analyzing public health factors including air pollution.

Education

Clarkson University

- Ph.D., Mathematics (2018-2023).
- MS, Applied Data Science (2022-2023).
- MS, Mathematics (2018-2021).
- Advisor:Dr.Sumona Mondal, Dr.Suresh Dhaniyala, Dr.Boris Jukic

NED University of Engineering and Technology

- MS., Applied Mathematics (2013-2015).
- MS thesis: *Effect of MHD on Fractionalized Maxwell Fluid in Porous Pipes.*
- Advisor: Muhammad Jamil

University of Sindh

- B.S., Mathematics (2009-2012).

Publications and Preprints

9. **Spatio-temporal clustering of PM2.5 measurements; GIS application to understanding pattern of pre and post COVID-19 Era air quality in world's metropolitan cities** (joint with S. Dinushani Senarathna, Supraja Gurajala, Shantanu Sur, Sumona Mondal, and Suresh Dhaniyala). Status (in preparation, August, 2022).

8. **Comparison of Consecutive Missing Data Imputation Techniques:An Application to Low Cost Air Quality Sensors Network Missing Data** (joint with S. Dinushani Senarathna, Supraja Gurajala, Shantanu Sur, Sumona Mondal, and Suresh Dhaniyala). Status (in preparation, July, 2022).

7. **Spectral analysis of low-cost sensor network data** (joint with S. Dinushani Senarathna, Supraja Gurajala, William Olsen, Shantanu Sur, Sumona Mondal, and Suresh Dhaniyala). Status (in preparation, May, 2022).

[1]Updated April 20, 2022

6. **Evaluation and modeling of data from low-cost air quality sensors for accurate $PM_{2.5}$ estimation** (joint with S. Dinushani Senarathna, Supraja Gurajala, Suresh Dhaniyala, Shantanu Sur, and Sumona Mondal). Status (in preparation, May, 2022).

5. **Differential impact of air pollution and sociodemographic factors on COVID-19 infection and fatality during pre-vaccination phases of the pandemic in United States** (joint with Chaya Chaipitakporn, Prashant Athavale, Thevasha Sathiyakumar, Marko Budi ˇsic, Sumona Mondal, and Shantanu Sur). Status (in preparation, April, 2022).

4. **Comparative study of the fractional order crime system as a social epidemic** (joint with Mohammad Partohaghighi, and Ali Akgül). Status (submitted, March, 2022). (AIMS Mathematics)

3. **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 (accepted, December, 2021). (https://doi.org/10.3389/fpubh.2021.743003)

2. **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 (accepted, September, 2021). (https://doi.org/10.1016/j.scitotenv.2021.150536)

1. **Fractionalized Magnetohydrodynamics (MHD) Of The Maxwell Fluid Through Porous Cylinders** (joint with Muhammad Jamil, Muhammad Zafarullah, Azam Khan). Status (accepted, January, 2021). (https://doi.org/10.1615/SpecialTopicsRevPorousMedia.2021033214)

Contributed Talks

10. *Spectral analysis of low-cost sensor network data.* UC Davis, Pasadena California, ASIC, May, 2022.

9. *Differential Impact of COVID-19 Risk Factors on Ethnicities in the United States.* Clarkson University, Potsdam-NY, MCCNNY, March, 2022.

8. *Spatiotemporal Analysis of PM2.5 in Chicago using Data from EPA and Low-Cost Sensor Network.* Virtual, AAAR Virtual 39th Conference, October 2021.

7. *Infection vs Fatality of COVID-19 in New York State: Effect of Demographics and Poor Air Quality.* Virtual, AAAR 38th Virtual Conference, August 2020.

6. *Evaluating Spatio-temporal accuracy of LUR models using Low-cost Sensor network data.* Clarkson University, Potsdam-NY, eRAPS, April 2020.

5. *Air Quality prediction using LUR Model: Parameter Reduction and Optimization.* UMBC Baltimore Maryland, 13th Annual Probability and Statistics Day, April 2019.

4. *Air Quality prediction using LUR Model: Parameter Reduction and Optimization.* Clarkson University, Potsdam-NY, RAPS spring 2018, April 2019.

3. *Fractionalized MHD Maxwell fluid through porous cylinders.* QUEST Nawabshah Pakistan, Recent Advances in Pure and Applied Mathematics (RAPAM'16), January 2016.

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

1. *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.

Teaching Experience

Department of Mathematics, Clarkson University

- Teaching Assistant, Probability and Statistics (Spring-2022, Fall-2021).
- Teaching Assistant, Calculus II (Spring-2021).
- Teaching Assistant, Calculus I (Fall-2020).
- Teaching Assistant, Fourier Series and Boundary Value Problems (Spring-2020).
- Teaching Assistant, Advance Engineering Mathematics (Fall-2019).
- Grader, Different Courses (Fall-2018, Spring-2019).

Department of Artificial Intelligence & Mathematical Sciences, SMI University

- Lecturer, Inferential Statistics & Business Mathematics (Spring-2018, Fall-2017, Spring-2017).
- Lecturer, Calculus I & Inferential Statistics (Fall-2016).

Department of Mathematics, NED University of Engineering and Technolgy

- Cooperative Teacher/ Lecturer, Probability and Statistics & Numerical Methods Labs (Spring-2016).
- Cooperative Teacher/ Lecturer, Calculus & Complex Variables and Fourier Analysis (Fall-2015).
- Cooperative Teacher/ Lecturer, Calculus & Mathematics for Architects (Spring-2015).
- Cooperative Teacher/ Lecturer, Calculus & Differential Equations (Fall-2014).
- Cooperative Teacher/ Lecturer, Calculus (Spring-2014).

Mentoring

- Graduate student (Indirect Advisor) to undergraduates from all over US in Math Biology Summer Research Experiences for Undergraduates (REU), May-July, 2022 at Clarkson University, Potsdam-NY (2022).
- Dawit Gebremichael, Undergraduate in Mathematics, Clarkson University Summer 2021.
- Isaac Kiiza, 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.

Organization

Seminars/ 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

Professional Societies

- Society for Industrial and Applied Mathematics (SIAM)
- The American Association for Aerosol Research (AAAR)

Awards

- Graduate Student (Indirect Advisor) at Summer Research Experiences for Undergraduates (REU)-2022 (May-July) in Math Biology, Clarkson University, Potsdam-NY (2022).
- PhD Studies Scholarship awarded by US Pakistan Knowledge Corridor, Higher Education Commission (HEC) of Pakistan (2018).
- 15 Days Postgraduate Fellowship in Mathematical Analysis, Modelling and Applications awarded by SISSA, Trieste, Italy (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 degree at Sindh University, awarded by District Government Ghotki (2009-2012).
- School Level Scholarship awarded by District Education Department Ghotki (2003).

References

- Dr. Sumona Mondal, smondal@clarkson.edu
- Dr. Suresh Dhaniyala, sdhaniya@clarkson.edu
- Dr. Boris Jukic, bjukic@clarkson.edu