Suhail Mahmud

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SUMMARY OF SKILLS

Atmospheric data Scientist with the expertise of working in different weather prediction models like WRF, CESM, and air quality model like CMAQ, CAMx with the Concentration on Machine Learning and Statistical climatology.

Data Scientist with 7+ years of experience using Numerical modeling, Predictive modeling, Data processing and Machine learning, Deep learning methods using MATLAB,Python, R and NCL.

Big Data analytic using Hadoop, Spark and MySQL.

Analyzing remote sensing data, e.g - Satellites, Wind profiler, Lidar.

Expertise on using different GIS software like ArcGIS, QGIS, GeoDa, and Benmap.

Experience working with different Global climate models, Regional climate models (i.e. CMIP5/CMIP6), ensemble analysis, uncertainty quantification, Spatial Statistics.

Proficient in different Programming languages like Python, FORTRAN, R and MATLAB.

Extensive Knowledge of High Performance Computing and Parallel programming technique (e.g. MPI, OPENMP, Pthreads, CUDA).

EDUCATION

Ph.D at Computational Science, University of Texas at El Paso
August 2016 - December 2020

Masters at Computational Science, University of Texas at El Paso
August 2014 - August 2016

WORK EXPERIENCE

Postdoctoral Scholar March 2021- Present
Earth and Environmental Systems Institute
The Pennsylvania State University

- Developing a Stochastic Weather Generator for Mid-Atlantic region focusing extreme climate events.
- Implementing Machine Learning algorithms to create high-resolution gridded climate products.
- MARISA project team member which helps Mid-Atlantic communities become more resilient to a changing climate through improved data, place-based decision support, and public engagement.
- HPC specialist at the ROAR supercomputer located at PSU.

- Working at the INTEGRATED COASTAL MODELING (ICoM) which tackles key uncertainties associated with the evolution of coastal systems by developing and applying computational models that can simulate the complex multi-scale processes and interactions.

Postdoctoral Scholar January - March 2021
Atmospheric Physics Lab
Physical Science Dept.
University of Texas at El Paso

- Analysis of Mesoscale and Synoptic Scale Meteorological Influences on Ozone.
- Inter-comparison of PBL using instrumental and simulation values and Interpretation of the results.
- System Administrator of Lab's Server and HPC Cluster.
- Mentoring Undergraduate Students and Summer Research student at UTEP.

Research Assistant August 2014 - December 2020
Atmospheric Physics Lab
University of Texas at El Paso

- Developed an ensemble method for determining the Planetary boundary layer
- Down-scaling regional weather model for Paso del Norte region to achieve more efficient and accurate forecast and prediction using data mining and machine learning algorithms.
- Worked in a project with NOAA retrieving atmospheric parameters from different Satellites by developing scripts and Algorithms.
- Developed atmospheric models to investigate impact of different parameters like Ozone concentration, Photolysis coefficient etc.
- Analyzed and upgraded automated interface for Numerical weather prediction models like WRF,HYSPLIT.
- Github: `https://github.com/suhail017`

Research Assistant January 2019 - May 2019
University of Maryland, Baltimore County

- A NSF-funded initiative in big data applied to atmospheric sciences Using high-performance computing as a vital tool.
- Publication of the Project : Disentangling Atmospheric Teleconnection Patterns at Global Scale (AMS,2020)
- Github: `https://github.com/big-data-lab-umbc/cybertraining/tree/master/year-2-projects/team-2`

Group Leader Summer 2017,2019 & 2020
Tropospheric Ozone Pollution Project

- Conducted the synoptic study of meteorology at Paso del norte region while focusing on the vertical profiles of different meteorological parameters .
- Researched the planetary boundary layer profile and ozone concentration through out the summer,2017.
- Website: `http://ir.stedwards.edu/natural-sciences/ozone`

Instructor January 2018-May 2018
Dona Anna Community College
New Mexico State University

- Conducting theory and practical classes related to Introductory Computer Science courses.

Lab Instructor August 2014 - August 2016
Physics Dept, ECE dept.
University of Texas at El Paso

- Designed and Conducted Labroatry courses like Electrical Circuits, Physical Science and Senior Project of ECE undergrads.

VOLUNTARY EXPERIENCE

- CPS Student Association, *Vice President* August 2018 - December 2020
- SIAM,*Program Organizer*,UTEP August 2016 - May 2018
- Penn State Postdoc Society, *Member* March 2021 - Present
- Postdocs of Earth and Mineral Science Engineering
  Active Member August 2021 - Present

JOURNAL PUBLICATIONS

- Suhail Mahmud, M. bhuiyan et al."Machine learning applied to study ground level $PM_{(2.5)}$ across Paso del Norte region.". Air Quality, Atmosphere Health.(Submitted)
- Bhuiyan, Md Al Masum, Ramanjit K. Sahi, Md Romyull Islam, and Suhail Mahmud. "Machine Learning Techniques Applied to Predict Tropospheric Ozone in a Semi-Arid Climate Region." Mathematics 9, no. 22 (2021): 2901.
- Bhuiyan, Md Al Masum, Suhail Mahmud, Md Romyull Islam, and Nishat Tasnim. "Volatility estimation for COVID-19 daily rates using Kalman filtering technique." Results in Physics 26 (2021): 104291.
- Suhail Mahmud, Nakul N. Karle, Rosa M. Fitzgerald, Duanjun Lu, Nicholas R. Nalli, and William R. Stockwell. "Intercomparison of Sonde, WRF/CAMx and Satellite Sounder Profile Data for the Paso Del Norte Region." Aerosol Science and Engineering 4, no. 4 (2020): 277-292.
- Nakul N. Karle, Suhail Mahmud, Ricardo K. Sakai, Rosa M. Fitzgerald, Vernon R. Morris, and William R. Stockwell. "Investigation of the Successive Ozone Episodes in the El PasoJuarez Region in the Summer of 2017." Atmosphere 11, no. 5 (2020): 532.
- Bhuiyan, Md Al Masum, Suhail Mahmud, Nusrat Sarmin, and Sanjida Elahee. "A Study on Statistical Data Mining Algorithms for the Prediction of Ground-Level Ozone Concentration in the El PasoJuarez Area." Aerosol Science and Engineering (2020): 1-13.
- Suhail Mahmud, M. bhuiyan et al. "Study of Wind Speed and Relative Humidity using Stochastic Technique in a Semi-arid Climate Region", AIMS Environmental Science, 2020, 7(2): 156-173. doi:10.3934/environsci.2020010
- Hussung, Steve, Suhail Mahmud, Akila Sampath, Mengxi Wu, Pei Guo, and Jianwu Wang. "Evaluation of data-driven causality discovery approaches among dominant climate modes." UMBC Faculty Collection (2019).
- Suhail Mahmud, Pema Wangchuk, Rosa Fitzgerald, William Stockwell, Duanjun Lu, "Study of the Photolysis Rate Coefficients to improve Air Quality Models for PdN region. American Physical Society, Volume 61

CONFERENCE PROCEEDING

- Suhail Mahmud, Nakul Karle,Rosa Fitzgerald,William R. Stockwell,"Extensive Study of Planetary Boundary Layer Height in Paso Del Norte Region Using CALIPSO Satellite, Ground Based Ceilometer, Radiosonde Measurement and Numerical Weather Prediction Models", American Meteorological Society 100th Annual Meeting, 2020
- Suhail Mahmud, Nakul Karle,Rosa Fitzgerald,William R. Stockwell, "Regional Weather Modeling for the Paso del Norte Region: A Sensitivity Study for Determining PBL", American Meteorological Society 99th Annual Meeting, 2019
- Suhail Mahmud, Nakul Karle, Rosa Fitzgerald,"Inter-Comparison of WRF Simulations, Radiosonde Meteorological Observations and Satellite Data for the Paso del Norte Region", American Meteorological Society 98th Annual Meeting, 2018
- Nakul Karle, Suhail Mahmud, Rosa M. Fitzgerald, Ricardo K. Sakai, William R. Stockwell, Belay B. Demoz, and Vernon R. Morris. "Analysis of Regional Meteorology During the Ozone Episodes in the El PasoJuarez Airshed in the Summer of 2017." In 99th American Meteorological Society Annual Meeting. AMS, 2019.
- Steve R Hussung, Suhail Mahmud, Akila Sampath, Mengxi Wu, Pei Guo, Jianwu Wang. "Evaluation of Data-Driven Causality Discovery Methods among Dominant Climate Modes". American Meteorological Society 100th Annual Meeting, 2020.
- Nakul Karle, Suhail Mahmud, Rosa Fitzgerald, Study of the Urban Heat Island and its Effect on the Planetary Boundary Layer for the El Paso-Juarez Air shed, American Geophysical Union, fall,2017
- DuBois, David W., Gary A. Morris, Mark Spychala, Paul J. Walter, Alexander D. Garcia, Suhail Mahmud, Ana Quevedo et al. "The 2017 El Paso Ozone Transport Field Study." In 98th American Meteorological Society Annual Meeting. AMS, 2018.
- Suhail Mahmud,Pema Wangchuk, Rosa Fitzgerald, William Stockwell,Duanjun Lu, "Study of the Photolysis Rate Coefficients to improve Air Quality Models",NOAA 8th Biannual Education and Science Forum, August 2016,CUNY.
- Suhail Mahmud, Noe Lebrado, Rosa Fitzgerald, Scott Williams, "Correlation Between NDVI and LST using real time imagery for the Paso Del Norte Region", NOAA 8th Biannual Education and Science Forum, August 2016,CUNY.
- Suhail Mahmud, Pema Wangchuk, Rosa Fitzgerald, William Stockwell, Duanjun Lu, " Study of the Photolysis rate coefficients to improve air quality models of El-Paso Juarez Airshed" Southwest emerging technology symposium,April,2016,UTEP.
- Suhail Mahmud, Pema Wangchuk, Rosa Fitzgerald, William Stockwell, Duanjun Lu, "Study of the Photolysis Rate Coefficients for the Paso del Norte (PdN) Region" Graduate Expo, November 2015,UTEP.
- Suhail Mahmud, Asad Galib, Rosa Fitzgerald, Scott Williams, "Use of Satellite Data to Perform Atmospheric Studies in the Paso del Norte Region" Graduate Expo, November 2015,UTEP.
- Suhail Mahmud, Rosa Fitzgerald, Scott Williams, "Real time retrieval of Satellite Data for the Paso Del Norte Region", Graduate Expo, November 2016,UTEP.

CERTIFICATION AND WORKSHOP

- PSU Machine Learning Workshop December 14-16, 2020
  Implementation of machine learning to existing problems in numerical analysis, such as Bayesian inference, operator estimation, solving PDEs, density estimation, sampling methodology, and uncertainty quantification.
- Planetary Boundary Layer Workshop July 13 - 24, 2020
  A National Science Foundation funded workshop in planetary boundary layer theory, measurements and modeling, constructed by Howard University, Penn State and UMBC.
- Weather Research and Forecast model Tutorial August 2016-Sep 2016
  Consisting of lectures and hand on practice session on various components of WRF and WRF data assimilation system which includes software framework, post processing and preprocessing system as well.
- Model For Prediction Across Scales tutorial Sep 2019
  Hands on Experience and in-depth theoretical explanation of how MPAS-A works and basics of how to set-up, run, and post-process stand-alone MPAS-A simulations.
- HPC Workshop Series: Summer Boot Camp June 8-11, 2021
  This 4 day event covers several topics such as MPI, OpenMP, GPU programming using OpenACC and accelerators.
- XSEDE HPC Workshop: BIG DATA and Machine Learning October 5-6, 2021
  This workshop focus on topics such as Hadoop and Spark and Deep Learning with Tensorflow with hands on practical session.

MEMBERSHIP

- American Meteorological Society 2016-2020
- Society of Industrial and Applied Mathematics 2016-2020
- American Geophysical Union 2016-2017

TECHNOLOGY SKILLS

Programming Languages: MATLAB, Python, FORTRAN, C, Shell Script, Julia,R
Big Data & Machine Learning Analysis/Viz Software: Hadoop, SPARK, Python(scikit-learn,Keras,Pytorch)
Visualization & Database Software: Tableau, Plotly, MySQL
Operating System: Unix, Linux, Macos, CentOS, Redhat.
Geographic information software: ArcGIS, QGIS, ENVI, GeoDA
Version Control: Github, SVN, BitBucket