Kiarash Farzad, Ph.D. Candidate

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PROFESSIONAL SUMMARY

Doctoral researcher and data scientist, specialized in numerical meteorological and air quality modeling, health impact assessment, and application and development of statistical and machine learning-based models. Proven leadership and project management skills, having led multiple PhD-level projects in collaboration with national institutes. Passionate about applying data-driven solutions to environmental and energy challenges, particularly those impacting public health and sustainability.

EDUCATION

Ph.D. in Interdisciplinary Engineering Expected December 2025
Northeastern University, Boston, MA

M.S. in Civil & Environmental Engineering February 2020
Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

B.S. in Civil Engineering June 2017
Islamic Azad University, Central Tehran Branch (IAUCTB), Tehran, Iran

RESEARCH EXPERIENCES

Doctoral Researcher September 2021 - Present
Northeastern University, Boston, MA

- Managed and carried out the installation of the NOAA National Air Quality Forecast Capability (NAQFC) system and two Air Quality/Chemical Transport Models (AQM/CTM) on Northeastern University's high-performance computing (HPC) infrastructure, optimizing system performance and stability
- Processed and prepared large-scale, high-resolution satellite datasets for integration into a machine learning–based AQM
- Developed a multithreaded computation method to perform millions of regressions for projecting future Aerosol Optical Depth (AOD) data, significantly improving processing speed and scalability
- Developed a machine learning-enhanced AQM to generate high-resolution (1-km) air quality data products across the U.S., reducing error by 20%
- Developed a custom health impact assessment tool replicating BenMAP functionality for high-resolution (i.e., 1-km), nationwide application across the U.S. (+20M grid cells)
- Simulated air quality using three numerical models (AQMs) and evaluated results through statistical, spatial, and time-series analyses of surface, airborne, and satellite observations for more than 100 simulations
- Enhanced the NAQFC by upgrading the chemical mechanism to the latest CMAQ in the forecasting model, increasing accuracy by 2%
- Integrated the dust module from the NOAA NAQFC package into the latest CMAQ model
- Performed source apportionment of air pollution and its analysis in the Greater Boston area and determined the top ten contributing emission sources and regions
- Designed and implemented a post-processing framework for CAMx and source apportionment on the Discovery HPC cluster, reducing manual user interaction with model outputs by 50%

Graduate Researcher January 2018 - February 2020
Amirkabir University of Technology, Tehran, Iran

- Analyzed the relationship between air pollution and mortality in Tehran, identifying a 1.4-2-day lag between high pollution events and increased death rates
- Applied health impact assessment tools (i.e., BenMAP) to quantify air pollution effects, estimating ~11,000 annual premature deaths in Tehran attributable to black carbon

PROFESSIONAL EXPERIENCES

Quality Assurance Coordinator October 2016 - July 2021

Pion Parto Biomedical Engineering Ltd., Tehran, Iran

- Contributed to the initial design and implementation of Quality Management System (QMS) in alignment with ISO 9001 and ISO 13485, collaborating cross-functionally to ensure ongoing compliance
- Contributed to the design of an internal communication framework by mapping the flow of information between departmental staff, mid-level management, and executive leadership
- Led audit preparation and oversight, ensuring compliance with ISO 9001 and ISO 13485 standards
- Served as the firm's representative during external audits, acting as the primary point of contact for auditors, coordinating documentation, and ensuring smooth communication between auditors and internal departments

SKILLS

Programming: R, Python (NumPy, pandas, scikit-learn, TensorFlow), MATLAB, Fortran, Bash, C Shell

Modeling & Analysis: CMAQ, CAMx, WRF, BenMAP, AERMOD, GCAM/GLIMPS, Timeseries (ARIMA, GARCH)

Data Science: Machine Learning (Linear Regression, GAM, RNN/LSTM), Statistical Analysis, High Performance Computing (HPC)

Visualization: Matplotlib, Seaborn, ArcGIS, QGIS

Productivity: Git, LaTeX, AutoCAD, FreeCAD, Photoshop, Microsoft Office

Core Competencies: Analytical Problem Solving, Data-Driven Decision Making, Independent & Team-Based Research, Adaptability in Dynamic Environments, Clear Technical Communication, Project Management & Leadership, Self-Motivation & Continuous Learning, Resilience Under Pressure

RELEVANT COURSES

Leadership: Leading Self and Others

Climate and Sustainability: Climate and Atmospheric Change**,** Sustainable Development and Environmental Engineering Management**,** Environmental Assessment of Civil Engineering Projects

Data Science: Time Series and Geospatial Data Sciences**,** Remote Sensing (RS) and GIS Applications in Civil Engineering

Health: Tools and Techniques of Environmental Health

SELECTED PUBLICATIONS

Journal Papers (1/7)

- Farzad, K., Zhang, Y., Wang, K., Chen, X., Goldberg, D. L., & Bell, M. L. (2025). Statistical downscaling of coarse-resolution fine particulate matter predictions over the contiguous United States: model development, evaluation, and implication in health impact assessment. *Science of The Total Environment.* (under review)