

QIANG PU

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RESEARCH INTERESTS

Ambient air pollution exposure modeling (primarily PM2.5), Satellite aerosol remote sensing, Spatial temporal data analytics, Human mobility and environmental health, GIScience.

EDUCATION

08/2017 - Present

Ph.D., in Geography

Department of Geography, University at Buffalo, SUNY, U.S.

Specialization: Ambient PM2.5 exposure modeling using machine learning and geospatial techniques of remote sensing and GIS.

Advisor: Dr. Eun-Hye Enki Yoo

09/2014 - 06/2017

M.S., in Cartography and Geographical Information Engineering

School of Geosciences and Info-Physics, Central South University, China

09/2010 - 06/2014

B.S., in Geomatics Engineering

School of Geosciences and Info-Physics, Central South University, China

RESEARCH EXPERIENCE

Graduate Student, Department of Geography, University at Buffalo

08/2017 - Present

- Developed a spatio-temporal PM2.5 prediction model which accounts for the presence of missing data in satellite AOD. An additional Bayesian statistical model was used to fill the gaps of AOD-based PM2.5 estimates with quantified uncertainty. Full coverage PM2.5 concentrations were predicted over Beijing metropolitan area. This work was published in *International Journal of Geographical Information Science*.
- Built a missing data imputation model for satellite AOD using multi-source AOD data for the New York State (e.g. satellites, CMAQ, MERRA-2). Examined the uncertainties in downstream PM2.5 predictions either propagated from imputed AOD or due to the choice of PM2.5 prediction models (four machine learning based models). This study was published in *Environmental Pollution*.
- Proposed a spatio-temporal data fusion approach to synergize the multi-source AOD data from ground monitoring network, polar-orbiting and geostationary satellites, and global reanalysis. Derived AOD at both high spatial and temporal resolutions (1km/hourly) using machine learning and geostatistical methods. AOD-based ground PM2.5 concentrations were predicted over Eastern China provinces and South Korea. Manuscript of this study is in preparation.

Graduate Research Assistant, University at Buffalo

06/2018 - 08/2018

Funded through *Community for Global Health Equity Seed Funding* - "Pediatric Surgery Infrastructure Development in Eastern Democratic Republic of Congo".

- Developed a systematic approach to evaluate the spatial accessibility and to conduct healthcare planning in resource-poor regions using open-source spatial datasets (Publication in *Applied Geography*).

PUBLICATIONS

Peer-reviewed journal Articles

- 2021 **Pu, Q.** & Yoo, E. H. (2021). Ground PM2.5 prediction using imputed MAIAC AOD with uncertainty quantification. *Environmental Pollution*. 274, 116574.
DOI: 10.1016/j.envpol.2021.116574
- 2021 Yoo, E. H., **Pu, Q.**, Eum, Y., & Jiang, X. (2021). The impact of individual mobility on long-term exposure to ambient PM2.5: assessing effect modification by travel patterns and spatial variability of PM2.5. *International Journal of Environmental Research and Public Health*, 18(4), 2194. DOI: 10.3390/ijerph18042194
- 2020 **Pu, Q.**, Yoo, E. H., Rothstein, D. H., Cairo, S. B., & Malemo, L. (2020). Improving the spatial accessibility of healthcare in North Kivu, Democratic Republic of Congo. *Applied Geography*, 121, 102262. DOI: 10.1016/j.apgeog.2020.102262
- 2020 **Pu, Q.** & Yoo, E. H. (2020). Spatio-temporal modeling of PM2.5 concentrations with missing data problem: a case study in Beijing, China. *International Journal of Geographical Information Science*, 34(3), 423-447.
DOI: 10.1080/13658816.2019.1664742
- 2020 Cairo, S. B., **Pu, Q.**, Kalisya, L. M., Bake, J. F., Zaidi, R., Poenaru, D., & Rothstein, D. H. (2020). Geospatial mapping of pediatric surgical capacity in North Kivu, Democratic Republic of Congo. *World Journal of Surgery*, 44(11), 3620-3628.
DOI: 10.1007/s00268-020-05680-2
- 2016 Zou, B., **Pu, Q.**, Bilal, M., Weng, Q., Zhai, L., & Nichol, J. E. (2016). Nichol. High-resolution satellite mapping of fine particulates based on geographically weighted regression. *IEEE Geoscience and Remote Sensing Letters*, 4(13): 495-499.
DOI: 10.1109/LGRS.2016.2520480
- 2014 Dong, M., Zou, B., **Pu, Q.**, Wan, N., Yang, L., & Luo, Y. (2014). Spatial pattern evolution and casual analysis of county level economy in Changsha-Zhuzhou-Xiangtan urban agglomeration, China. *Chinese Geographical Science*, 24(5): 620-630.
DOI: 10.1007/s11769-014-0685-2

CONFERENCE PRESENTATIONS

Oral Presentations

- 2022 **Pu, Q.** & Yoo, E. H. 2022 AAG Annual Conference, John Odland student paper competition through the Spatial Analysis and Modeling specialty group, New York City, U.S., 2022. **(Finalist)**
- 2020 **Pu, Q.** & Yoo, E. H., Modeling spatial variation of hourly PM2.5 concentrations using both CMAQ model and satellite aerosol optical depth. *Exposome Symposium: Measuring the Exposome Using Novel Methods and Big Data to Improve Human Health*, New York City, U.S., 2020

- 2019 **Pu, Q.** & Yoo, E. H., Spatio-temporal modeling of PM2.5 concentrations with missing data problem. *2019 AAG Annual Conference, Symposium on Frontiers in Geospatial Data Science*, Washington DC, U.S., 2019.
- 2019 Niu, Z., Mu, L., Wen, X., & **Pu, Q.** (2019). Leukocyte telomere length and cardiovascular disease mortality among US adults: effect modification by race. *Annals of Epidemiology*, 40, 38.
- 2018 **Pu, Q.** & Yoo, E. H., Perdition of Urban PM_{2.5} Concentrations Using a Bayesian Spatio-temporal Modelling Approach. *The 13th International Symposium of Spatial Accuracy: Spatial Accuracy Assessment in Natural Resources and Environmental Sciences*, Beijing, China, 2018.
- 2015 **Pu, Q.**, & Zou, B., High-resolution satellite mapping of fine particulates based on geographically weighted regression. *International Workshop on Mobility and Land Cover Change Mapping*, Changsha, China, 2015.

TEACHING EXPERIENCE

University at Buffalo, SUNY

- Lab Instructor**, GEO 481/506: Geographical Information System **Fall 2021**
- Lab Instructor**, GEO 479/559: GIS for Environmental Modeling **Spring 2021**
- Lab Instructor**, GEO 483/553: Remote Sensing **Fall 2020**
- Grader**, GEO 102 Human Geography, GEO 106 Global Climate Change
- Lab Instructor**, GEO 479/559: GIS for Environmental Modeling **Spring 2020**
- Guest lecturer**, GEO 481/506, Geographic Information Systems
Invited to teach one 50-minute lecture on introduction to satellite remote sensing and its application for air pollution monitoring.
- Lab Instructor**, GEO 481/506: Geographical Information System **Fall 2019**
- Guest lecturer**, GEO 482/507, Locational Analysis
Invited to teach one 50-minute lecture about the network analysis using GIS.
- Lab Instructor**, GEO 479/559: GIS for Environmental Modeling **Spring 2019**
- Lab Instructor**, GEO 483/553: Remote Sensing **Fall 2018**
- Grader**, GEO 120: Maps: Earth From Above; GEO 106: Global Climate Change **Spring 2018**
- Grader**, GEO 102: Human Geography; GEO 112: International Health **Fall 2017**

AWARDS AND HONORS

- 2021 **Travel Award**, Department of Geography, University at Buffalo, SUNY
- 2019 **Professional Development Award**, Graduate Student Employees Union
Travel Award, National Center for Geographic Information and Analysis at Buffalo
- 2018 **First Place Student Paper Presentation Award**, the 13th International Symposium of Spatial Accuracy
Travel Award, Department of Geography, University at Buffalo, SUNY

- 2015 **National Scholarship for Graduates**, Ministry of Education of China
- 2014 **National Scholarship for Graduates**, Ministry of Education of China
The Baogang Excellence Scholarship, Baosteel Group Corporation
First-Class Outstanding Student Scholarship, Central South University
- 2013 **National Encouragement Scholarship**, Ministry of Education of China
Second-Class Outstanding Student Scholarship, Central South University

SKILLS

Statistical Programming Languages: R, Python
Machine learning: H2O, XGBoost, Scikit-learn, TensorFlow
Software: ArcGIS, ENVI, QGIS, SPSS, SAS

REFERENCES

Dr. Eun-Hye Enki Yoo

Associate Professor	Phone: (716) 645-0476
Department of Geography	Email: eunhye@buffalo.edu
University at Buffalo, SUNY	Address: 121 Wilkeson Quad, Buffalo NY, 14261

Dr. Ling Bian

Associate Professor	Phone: (716) 645-0484
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University at Buffalo, SUNY	Address: 301 Wilkeson Quad, Buffalo NY, 14261

Dr. Kang Sun

Assistant Professor	Phone: (716) 645-6167
Department of Civil, Structural and Environmental Engineering	Email: kangsun@buffalo.edu
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