

# QIANG PU

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## RESEARCH INTERESTS

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Ambient air pollution exposure modeling (primarily PM<sub>2.5</sub>), Satellite air quality remote sensing, Spatial temporal data analytics, Environmental health, GIScience.

## EDUCATION

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**08/2017 - Present**

*Ph.D.*, in Geography

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

*Dissertation:* Spatial-temporal modeling of ambient PM<sub>2.5</sub> concentrations at high resolutions using remote sensing, GIS, and advanced statistical approaches.

*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

*Advisor:* Dr. Bin Zou

**09/2010 - 06/2014**

*B.S.*, in Geomatics Engineering

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

## RESEARCH EXPERIENCE

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**Graduate Student**, Department of Geography, University at Buffalo

08/2017 - Present

- Developed a spatio-temporal PM<sub>2.5</sub> 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 PM<sub>2.5</sub> estimates with quantified uncertainty. Full coverage PM<sub>2.5</sub> concentrations were predicted over Beijing metropolitan area (Publication in the *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 PM<sub>2.5</sub> predictions either propagated from imputed AOD or due to the choice of PM<sub>2.5</sub> prediction models (Publication in the *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 PM<sub>2.5</sub> concentrations were predicted over Eastern China provinces and South Korea (Manuscript in revision).

**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 the *Applied Geography*).

## PUBLICATIONS

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### *Peer-reviewed journal Articles*

#### Submitted and in preparation

- Pu, Q.** & Yoo, E. H. A hybrid approach to estimate spatially and temporally resolved PM<sub>2.5</sub> distributions from multi-sourced AOD data. (under review)
- Yoo, E. H, **Pu, Q.** & Palermo, Tia. A two-stage geostatistical linkage of national demographic and health survey data. (in preparation)

#### Published or in press

- 2021 **Pu, Q.** & Yoo, E. H. (2021). Ground PM<sub>2.5</sub> 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 PM<sub>2.5</sub>: assessing effect modification by travel patterns and spatial variability of PM<sub>2.5</sub>. *International Journal of Environmental Research and Public Health*, 18(4), 2194. DOI: 10.3390/ijerph18042194
- 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
- 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 PM<sub>2.5</sub> 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
- 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

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### Oral Presentations

- 2022 Yoo, E. H., Roberts, J., **Pu, Q.** & Palermo, T. Geospatial modeling of national health survey delivery data: A case study of Tanzania. *International Conference on Geostatistics for Environmental Applications*, Parma, Italy, June 22-24, 2022.
- 2022 **Pu, Q.** & Yoo, E. H., A hybrid Approach to estimate spatially and temporally resolved PM2.5 distributions from multi-satellite AOD data. *AAG Annual Conference, John Odland student paper competition through the Spatial Analysis and Modeling specialty group*, New York City, U.S., Feb 25 - Mar 1, 2022. (**Finalist, top 10 out of 25**)
- 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., Mar 5-6, 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., Apr 3-7, 2019.
- 2019 Niu, Z., Mu, L., Wen, X., & **Pu, Q.** 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., Perdiction of Urban PM<sub>2.5</sub> Concentrations Using a Bayesian Spatio-temporal Modelling Approach. *The 13<sup>th</sup> International Symposium of Spatial Accuracy: Spatial Accuracy Assessment in Natural Resources and Environmental Sciences*, Beijing, China, May 21-24, 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.

### Poster Presentations

- 2022 Eum, Y., **Pu, Q.** & Yoo, E. H. Spatio-temporal exposure assessment of urban cyclists: Using bike-sharing data and highly-resolved PM2.5 estimates. *UCGIS Symposium 2022 GIScience Forward: Meeting the Challenge*, Syracuse, U.S., June 7-9, 2022.

## TEACHING EXPERIENCE

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### Department of Geography, University at Buffalo, SUNY

<b>Lab Instructor</b>	GEO 481/506: Geographical Information System (3 times)	<b>Fall 2017</b> To <b>Spring 2022</b>
(Cross-level listed	GEO 479/559: GIS for Environmental Modeling (4 times)	
Evaluation: 4.2/5.0)	GEO 483/553: Remote Sensing (2 times)	
<b>Grader</b>	GEO 102 Human Geography; GEO 106 Global Climate Change	
(Undergraduate)	GEO 120: Maps: Earth from Above; GEO 106: Global Climate Change	

<b>Guest Lecturer</b>	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.	<b>Spring 2020</b>
	GEO 482/507, Locational Analysis. Invited to teach one 50-minute lecture about the network analysis using GIS.	<b>Fall 2019</b>

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## AWARDS AND HONORS

2021	<b>Travel Award</b> , Department of Geography, University at Buffalo, SUNY
2019	<b>Professional Development Award</b> , Graduate Student Employees Union <b>Travel Award</b> , National Center for Geographic Information and Analysis at Buffalo
2018	<b>First Place Student Paper Presentation Award</b> , the 13 <sup>th</sup> International Symposium of Spatial Accuracy <b>Travel Award</b> , Department of Geography, University at Buffalo, SUNY
2015	<b>National Scholarship for Graduates</b> , Ministry of Education of China
2014	<b>National Scholarship for Graduates</b> , Ministry of Education of China <b>The Baogang Excellence Scholarship</b> , Baosteel Group Corporation <b>First-Class Outstanding Student Scholarship</b> , Central South University
2013	<b>National Encouragement Scholarship</b> , Ministry of Education of China <b>Second-Class Outstanding Student Scholarship</b> , Central South University

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## AD-HOC JOURNAL REVIEWER

*African Geographical Review*  
*Geocarto International*  
*Journal of Environmental Management*  
*Scientific Reports*

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## SKILLS

Statistical Programming Languages: R, Python  
Machine Learning: H2O, Scikit-learn, TensorFlow  
Software Packages: ArcGIS suite, ENVI, Google Earth Engine, LaTeX, QGIS, SAS, SPSS

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## MEDIA

<b>Global Health Equity Research in Translation Series</b> (policy brief)	Issue 12: <a href="#">Towards a Cartography of Equity: Leveraging Geographic Information Systems and Data Science to Improve Access to Healthcare in North Kivu, DRC, and other LMICs.</a>
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