Vita
Carolynne Hultquist

Research Experience Narrative

I'm a spatial data scientist who develops computational approaches to integrate and validate data on physical and human systems for decision making during disasters. As a Lecturer at the University of Canterbury I'm forming a research agenda on environmental monitoring of hazards and teaching geoinformatics. My postdoctotal research at Columbia University focused on developing integrable products for the NASA Socioeconomic Data and Applications (SEDAC) and operational anticipatory action protocol for the Red Cross that captures flood risk, exposure, and vulnerability at a high resolution. A core aspect of my research is the evaluation of citizen science data to improve monitoring of environmental hazards at local scales. My graduate studies at Penn State started with a master's thesis on the validation of citizen science radiation measurements around Fukushima by developing a methodology to compare the Volunteered Geographic Information (VGI) to government data and dispersion models over space and time. My Ph.D. research continued on this theme by assessing the validity, resolution, and usefulness of citizen-contributed environmental hazard data. I serve as co-chair of the Committee on Data (CODATA) Participatory Mapping task group of the International Science Council.

Research Positions

Lecturer University of Canterbury, Christchurch, NZ   2022 - present
School of Earth & Environment

Postdoctoral Research Scientist Columbia University, NY, USA   2020 - 2022
Center for International Earth Science Information Network (CIESIN)

Ph.D. Student Penn State Geography Department   2014 - 2019
Adviser: Dr. Guido Cervone, Geoinformatics and Earth Observation Lab
Validation and use of novel data streams to improve situational awareness during disasters.

Research Assistant University of North Carolina at Charlotte, NC, USA   2013 - 2014
Dr. Gang Chen, Laboratory for Remote Sensing and Environmental Change (LRSEC)
Machine learning post-fire burn severity assessment using hyperspectral imagery.

Education

The Pennsylvania State University University Park, PA, USA   2014–2019
  Ph.D. Geography, Minor: Social Data Analytics - 2019
  M.S. Geography - 2016

University of North Carolina at Charlotte Charlotte, NC, USA   2010-2014
  B.S. Geography, Geographical Information Systems *magna cum laude, honors*
  B.A. International Studies, Comparative Studies *magna cum laude*

Selected Publications

10. 2022 - Hultquist, C., Tubbeh, R. Sociotechnical systems of solidarity: how citizen initiatives tackled the COVID-19 pandemic in New York City. Citizen Science: Theory and Practice, 7(1), p.20. DOI: http://doi.org/10.5334/cstp.454

9. 2022 - Velez, R., Calderon, D., Carey, L., Aime, C., Hultquist, C., Yetman, G., Kruczkiewcz, A., Gorokhovich, Y., Chen, R.S. Extraction and Validation of Crowdsourced Street-Level Flood Vulnerability from Google Street View in Quito, Ecuador. IEEE Open Journal of the Computer Society, Vol. 3, pp. 51-61. doi: 10.1109/OJCS.2022.3166887.

8. 2022 - Bucherie, A. Hultquist, C., Adamo, S., Neely, C., Ayala, F., Bazo, J., Kruczkiewicz, A. Socioeconomic vulnerability Ecuador. A comparison of social vulnerability indices specific to flooding in Ecuador: Principal Component Analysis (PCA) and expert knowledge. International Journal of Disaster Risk Reduction, 73. doi: 10.1016/j.ijdrr.2022.102897

7. 2021 - Hultquist, C., Oravecz, Z., Cervone, G. A Bayesian approach to estimate the spatial distribution of crowdsourced radiation measurements around Fukushima. ISPRS International Journal of Geo-Information, 10(12), 822. https://doi.org/10.3390/ijgi10120822

6. 2021 - Kruczkiewicz, A., Bucherie, A., Ayala, F., Hultquist, C., Vergara, H., Mason, S., Bazo, J., de Sherbinin, A. Development of a flash flood confidence index from disaster reports and geophysical susceptibility. Remote Sensing, 13(14), 2764. doi: 10.3390/rs13142764

5. 2020 - Archer, C.L., Cervone, G., Golbazi, M., Fahel, N. Hultquist, C. Changes in air quality and human mobility in the USA during the COVID-19 pandemic. Bulletin of Atmospheric Science and Technology. doi: 10.1007/s42865-020-00019-0

4. 2020 - Hultquist, C., Cervone, G. Integration of Crowdsourced Images, USGS Networks, Remote Sensing, and a Model to Assess Flood Depth during Hurricane Florence. Remote Sensing. Vol. 12, No. 5, pp. 834-851. doi:10.3390/rs12050834

3. 2018 - Hultquist, C., Cervone, G. Comparison of Fukushima Radiation Dispersion Simulation to Contributed Environmental Observations. Atmospheric Environment. Vol. 198, pp. 478-488. doi: 10.1016/j.atmosenv.2018.10.018

2. 2017 - Hultquist, C., Cervone, G. Citizen Monitoring during Hazards: Validation of Fukushima Radiation Measurements. GeoJournal. Vol. 83, No. 2, pp. 189-206. doi: 10.1007/s10708-017-9767-x.

1. 2014 - Hultquist, C., Chen, G., and Zhao, K. A Comparison of Gaussian Process Regression, Random Forests and Support Vector Regression for Burn Severity Assessment in Diseased Forests. Remote Sensing Letters. Vol. 5, No. 8, pp. 723-732. doi: 10.1080/2150704X.2014.963733

Teaching Experience

Lectured Columbia University   2020-2022
EESC5407 Applications in Climate and Society, BUS 8209 Climate justice, real estate and vulnerability,
SDEV W3390 GIS for Sustainable Development, SDEV W3450 Spatial Analysis for Sustainable Development,
SUSC5210 Environmental Sustainability Indicators, SUMA Quantifying the Financial Impact of Climate Change

2021	Instructor	GIS for Sustainability Management (ArcGIS)
2021	Instructor	Analytics for Environmental Science Policy (ArcGIS) (taught twice)
2020	Instructor	Data Analysis & Visualization in Sustainability (Python & R) (taught twice)

Lectured The Pennsylvania State University   2015-2019
GEOG 497 Advanced Observation of the Earth and its Environment,
IST 557 Data Mining, GEOG 485 GIS Programming and Customization,
IST/SRA 497 Crisis Informatics, GEOG 160 Mapping Our Changing World

2019	Instructor	Introduction to GIScience (ArcGIS)
2018	Instructor	Mapping Our Changing World (ArcGIS)
2017	TA	Image Analysis (R)

Awards and Honors

2018	USGIF Doctoral Scholarship
2018	George Schenck Teaching Assistant of the Year Award
2017	NASA Pennsylvania Space Grant Graduate Fellowship
2017	PSU Geography Award for best Master's Paper
2017	AGU Fall Meeting Travel Award
2017	American Meteorological Society (AMS) Travel Award
2015	NSF funded Big Data Social Science IGERT Traineeship
2015	ACM SIGSPATIAL Travel award

Professional Society Membership

American Geophysical Union (AGU)
American Association of Geographers (AAG)
Citizen Science Association (CSA)