# FEDERICO ANTOLINI

Hazard Geography - Informatics - Hydrology

Institute for a Disaster Resilient Texas, Houston, TX Texas A&M University, College Station, TX antolinif@tamu.edu | +1 319 512 1006

### **EDUCATION**

Ph.D., Geoinformatics, University of Iowa, 2022

Dissertation: "Geospatial Methods for Distributed Flood Attenuation on Riverine Catchments"

M.A., Geography, University of Iowa, 2015

Thesis: "Geospatial modeling to assess location suitability in a detention system of small reservoirs"

**B.S. & M.Eng., Environmental Engineering,** Università degli Studi di Udine, Udine, Italy, 2011 Concentration track: <u>Fluvial processes and land planning</u>

#### RESEARCH AND TEACHING INTERESTS

**Disaster and resilience**; hazard data collection, management and analysis; support for policymaking in disaster mitigation and recovery

Water and flooding: surface hydrology; distributed runoff attenuation; nature-based approaches to flood risk reduction; flood risk estimate; machine learning for real-time flood modeling

GIScience; spatial optimization; heuristic search; topology of drainage and other natural networks

Environmental modelling; spatial-temporal processes; raster-vector integration; sensitivity analysis; high-performance computing

Social vulnerability: quantitative and spatial metrics

### PROFESSIONAL EXPERIENCE

**Assistant Research Scientist,** Institute for a Disaster Resilient Texas, Texas A&M University at Galveston, 2022-present

Lead instructor, Foundations of GIS, University of Iowa, Spring 2020

Teaching Assistant, Foundations of GIS, University of Iowa, 2018-2020

Research Assistant, Department of Geography, University of Iowa, 2016-2017

- Developed a Python program for of census data extraction, social vulnerability indicators construction and sensitivity analysis (ongoing project)
- o Constructed and mapped social vulnerability for Houston, Baltimore and Chicago metro areas. 2019 National Academics of Sciences, Engineering, and Medicine report "Framing the challenge of urban flooding in the US"
- o Processed flood data, built and mapped social vulnerability indicators in Rufat et al. 2019

Research consultant, Iowa Social Science Research Center, University of Iowa, 2015-2018

- o Advised faculty, staff, graduate and undergraduate students on GIS, statistics, data analysis
- o Designed and taught workshops on data visualization, map making in ArcMap and R

Research Assistant, IIHR - Hydroscience & Engineering, University of Iowa, 2014-2015

Teaching Assistant, Contemporary Environmental Issues, University of Iowa, 2013-2014

### RECENT PUBLICATIONS

- Lee, C. C., Huang, L., **Antolini, F.**, Garcia, M., Juan, A., Brody, S. D., & Mostafavi, A. (2024). Predicting peak inundation depths with a physics informed machine learning model. Scientific Reports, 14(1), 14826.
- Antolini, F., & Tate, E. (2021). Location Matters: A Framework to Investigate the Spatial Characteristics of Distributed Flood Attenuation. Water, 13(19), 2706
- Antolini, F., Tate, E., Dalzell, B., Young, N., Johnson, K., & Hawthorne, P. L. (2020). Flood risk reduction from agricultural best management practices. JAWRA Journal of the American Water Resources Association, 56(1), 161-179
- Antolini, F., Baron, S., Barreto, B. L., Dollan, I. J. (2019). A Study on Parsimonious Models in Catchments Generating Saturation Excess Runoff. In National Water Center Innovators Program - Summer Institute, CUAHSI Technical Report (pp. 45-56)
- Rufat, S., Tate, E., Emrich, C. T., & **Antolini, F.** (2019). How valid are social vulnerability models?. Annals of the American Association of Geographers, 109(4), 1131-1153

#### PROGRAMMING AND COMPUTING SKILLS

- Geospatial: ArcGIS Pro, QGIS, ERDAS Imagine, ENVI, Google Earth Engine
- Hydrology: wflow, HEC-RAS 6.3.1, CUENCAS
- **Programming** languages: Python, Java, R
  - o Python geospatial: GDAL, arcpy
  - o Python data analysis: pandas, SciKit-Learn, TensorFlow
- Databases: PostgreSQL, PostGIS
- High-performance computing and MPI parallel programming
- Spatiotemporal data format: NetCDF, HDF, PCRaster
- Flood risk assessment: HAZUS-MH

#### AWARDS AND FELLOWSHIPS

Outstanding Teaching Assistant Award 2020-2021, Council of Teaching, University of Iowa, Spring 2021

Summer Fellowship, Graduate College, University of Iowa, Summer 2020

Post-comprehensive Fellowship, Graduate College, University of Iowa, Fall 2019

### OTHER RESEARCH AND EDUCATION

National Water Center Innovators Program: Summer Institute 2019, Tuscaloosa, AL, June-July 2019 (https://www.cuahsi.org/education/summerinstitute/)

- o Designed and developed a spatially explicit hydrologic model from scratch in Python
- o Validated model with measured data and compared to an existing generic model

Summer School on Sensitivity Analysis of Model Output, Joint Research Center, Ranco, Italy, June 2018

### PROFESSIONAL SOCIETY MEMBERSHIP

American Water Resources Association (AWRA)

## **CONFERENCE ABSTRACTS**

- "MaxFloodCast: a Surrogate Model for Real-Time Flood Forecast Applications." Water Science Conference, Saint Paul, MN. June 26, 2024
- "Geospatial methods for distributed flood attenuation." International SSPEED Conference, Houston, TX. October 13, 2023
- "Location matters: a framework to guide the siting of distributed reservoirs for flood mitigation." Virginia Water Conference, Richmond, VA. March 7, 2020
- "Flood loss reduction from agricultural best management practices." Annual Meeting of the American Association of Geographers, New Orleans, LA. April 12, 2018
- "Spatial criteria for optimal siting of distributed systems of reservoirs." Annual Meeting of the American Association of Geographers, Boston, MA. April 5, 2017
- "Distributed systems of reservoirs: a spatial approach to flood management." Annual Meeting of the American Association of Geographers, Chicago, IL. April 21, 2015