Yun Zhao

yun-zhao.github.io | 217-691-9251 | zhaoyun1230@gmail.com | Green Card Holder

Professional Summary

- Over 10 years of experiences in information/data sciences, data analytics/modeling.
- Extensive experiences in project management and leadership, computer programming, data sciences, machine learning.
- Exceptional communication and writing skills with the ability to work in cross-functional and multidisciplinary environment.

Key skills:

- **(Technical)** – Programming | Data Analytics | Geospatial Information Sciences | Python | Research | Machine Learning | SQL | Remote Sensing | Drone Imagery | Computer Vision | Web Design
- **(Interpersonal)** – Leadership and Management | Scientific and Technical Writing | Workshop Offering | Public Speaking | Effective Communication in Interdisciplinary Team | University Teaching

Employment

2018 – present Assistant Professor of Environmental Studies, University of Illinois Springfield
- Perform university research, teaching and service duties.

2018 – present Director of Geospatial Information Science Lab, University of Illinois Springfield
- Oversee the development, planning, and operation of the GIS Lab;
- Carry out and support research and education activities;
- Build external and internal collaborations.

Projects

As Project Lead/Co-lead:

Invasive Plants Detection Using Machine Learning on Drone Images **2019-Current**

- Lead and supervise project development and progress
- Develop cutting-edge convolutional neural network (CNN) and recurrent neural network (RNN) machine learning models for invasive plants detection
- Collect drone images to train, validate, and calibrate machine learning models to achieve machine learning models with high level of performance and precision
- Apply models to other land conservation applications

High-Speed Rail Feasibility Study **2016-2019**

- Conduct high-speed rail feasibility study with an emphasis on the impact of sprawling urban form for cities in the United States
- Develop multi-mode transportation network and calculate door-to-door travel time
- Investigate and model potential competition high-speed rail will face from other modes of transportation including air and automobile

As Research Associate/Scientist:

National Science Foundation (NSF) EPSCoR Climate Variability Project Jan 2017 –2018

- Collect and build databases for regional natural resources and socioeconomics data at various scale
- Write Python and R codes for data processing and automation
- Build statistical models to measure interactions among water level change, land use/land cover change, local crop insurance policies, and climate variability
- Perform spatial statistics to identify spatial clusters and multi-variate autocorrelation

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NSF Spatial Scaling Project June 2017 – July 2017

- Write R codes to automate the generation of random raster images with specific parameters (e.g., dimensions of image, level of autocorrelation, number of classes, probabilities of classes)

NASA Urban Change Project May 2016 – Aug 2016

- Utilize lidar and Radar data to detect urban change between 2000 and 2009 for 18 major US cities
- Develop a lidar-based estimation method of diurnal and nighttime population dynamics
- Take leading role in a team of four
- Perform lidar conversion and extraction
- Write Python scripting tools for batch processing of large quantities of lidar data

Black Ice Transportation Project Jul 2014 – Aug 2014

- Collect annual average daily traffic (AADT) data for highways
- Contact various government agencies for project input

Landmark Inventory Project Jan 2011 – May 2011

- Publish and manage online map services to Microsoft Server
- Configure online maps and widgets
- Transfer and maintain website to new web servers
- Hold meetings with database designers/programmers

EDGE ZephyrBox Wind Power Project Aug 2009 – Dec 2010

- Create and maintain the main website frame of the project
- Develop and publish a transportation network data model widget to calculate transportation costs

Education

Nanjing University of Information Science and Technology	Nanjing, P. R. China	Remote Sensing	BS, 2009
Oklahoma State University	Stillwater, OK, USA	Geospatial Info. Science	MS, 2011
Oklahoma State University	Stillwater, OK, USA	Geospatial Info. Science	PhD, 2018

Publication (Peer-Reviewed)

[9] Guo, Y., **Zhao, Y.**, Rothfus, T.A., and Avalos, A.S. 2022. A novel invasive plant detection approach using time series images from unmanned aerial systems based on convolutional and recurrent neural networks. *Neural Computing & Applications*, 34. DOI: 10.1007/s00521-022-07560-3.

[8] Tu, Q., **Y. Zhao**, J. Guo, C. Cheng, L. Shi, Y. Yan, and Z. Hao. 2021. Spatial and temporal variations of aerosol optical thickness over the China Seas from Himawari-8. *Remote Sensing*. DOI: 10.3390/rs13245082.

[7] Frazier, A.E., P. Kedron, G. Ovando, and **Y. Zhao**. 2021. Scaling spatial pattern metrics: impacts of composition and configuration on downscaling accuracy. *Landscape Ecology*. DOI: 10.1007/s10980-021-01349-w.

[6] Guo, Y., C. Du, **Y. Zhao**, T. Ting, and T. Rothfus. 2021. Two-level K-nearest neighbors approach for invasive plants detection and classification. *Applied Soft Computing*. DOI: 10.1016/j.asoc.2021.107523.

[5] Kedron, P., **Y. Zhao**, and A.E. Frazier. 2019. Three dimensional (3D) spatial metrics for objects. *Landscape Ecology*. DOI: 10.1007/s10980-019-00861-4.

[4] Mathews, A.J., A.E. Frazier, S. V. Nghiem, G. Neumann, and **Y. Zhao**. 2019. Satellite scatterometer estimation of urban built-up volume: Validation with airborne lidar data.

International Journal of Applied Earth Observation and Geoinformation, 77: 100-107. DOI: 10.1016/j.jag.2019.01.004.

[3] **Zhao, Y.** and H. Yu. 2018. A door-to-door travel time approach for evaluating modal competition of intercity travel: a focus on the proposed Dallas-Houston HSR route. *Journal of Transport Geography*, 72: 13-22. DOI:10.1016/j.jtrangeo.2018.07.008.

[2] Vadjunec, J.M., A.E. Frazier, P. Kedron, T. Fagin, and **Y. Zhao**. 2018. A land systems science framework for bridging land system architecture and landscape ecology: a case study from the southern high plains. *Land*, 7(1). DOI:10.3390/land7010027.

[1] **Zhao, Y.**, G. Ovando, A.E. Frazier, A.J. Mathews, K.C. Flynn, and E. A. Ellis. 2016. Estimation of work and home population from lidar-derived building volumes. *International Journal of Remote Sensing*, 38(4): 1180-1196. DOI:10.1080/01431161.2017.1280634.

Teaching

Instructor of Record at University of Illinois Springfield

2018-Current *ENS 501 Land Use and Environmental Planning*
ENS 404 Fundamentals of Geographic Information Science
ENS 405 Fundamentals of Remote Sensing
ENS 503 Advanced Geographic Information Science Applications

Co-Instructor at Oklahoma State University

2015-2016 *Introduction to GIS Programming*

Presentation And Conference Activity

Peer-reviewed Presentation

[14] **Zhao, Y.***, Y. Guo, and T. Rothfus. 2020. Environmental Monitoring using Unmanned Aerial System (UAS) and Artificial Intelligence (AI) Method. 14th Annual Science Symposium. Virtual Symposium. Apr. 8.

[13] **Zhao, Y.*** and H. Yu. 2019. The impact of urban form on HSR accessibility – a modal competition approach. Presented at the Annual Meeting of the American Association of Geographers (AAG), Washington, D.C. April 3-7.

[12] Mathews, A.J.*, A.E. Frazier, S. V. Nghiem, G. Neumann, and **Y. Zhao**. 2018. "Satellite Scatterometer Estimation of Urban Built-up Volume: Validation with Airborne Lidar Data." Presented at the Fall Meeting of American Geophysical Union (AGU), Washington, DC, Dec. 12.

[11] **Zhao, Y.***, P. Kedron, and A.E. Frazier. 2018. "Identifying Urban Development Patterns by Integrating 2D and 3D Landscape Models." Presented at the Annual Meeting of American Association of Geographers, New Orleans, LA, Apr. 12.

[10] **Zhao, Y.***, P. Kedron, and A.E. Frazier. 2018. "Developing 3D Spatial Pattern Metrics to Describe and Analyze the Urban Environment." Presented at the Annual Meeting of International Association for Landscape Ecology (U.S. Chapter), Chicago, IL, Apr. 9.

[9] **Zhao, Y.***, P. Kedron, and A. Frazier. 2017. Measuring urban patterns and identifying their relationships with changes in land use intensity. Presented at the Southwest Division of American Association of Geographers (SWAAG), Huntsville, TX. October 25-27.

[8] Koch, J*, T. Boyer, H. McCarthy, P. Kedron, Q. Zhou, M. Ghimire, W. Cha, and **Y. Zhao**. 2017 The Oklahoma City ENVISION model: Linking land management, water use, and human well-being. Presented at the Southwest Division of American Association of Geographers (SWAAG), Huntsville, TX. October 25-27.

[7] **Zhao, Y.***, P. Kedron, A. Frazier, T. Fagin, and J. Vadjunec. 2017. Land use patterns in areas of significant water-level decline within the High Plains Aquifer of northwestern Oklahoma. Presented at the Oklahoma NSF EPSCoR conference, Oklahoma City, OK. April 7.

[6] **Zhao, Y.*** and H. Yu. 2016. How urban form rejects high-speed rail. Presented at the Southwest Division of American Association of Geographers (SWAAG), Denton, TX. October 20-22.

[5] Ovando, G.*, **Y. Zhao**, and A. E. Frazier. 2016. Exploring spatial relationships between Lidar-Derived Building Volume and Work-Home Population. Presented at the Southwest Division of American Association of Geographers (SWAAG), Denton, TX. October 20-22.

[4] **Zhao, Y.*** and H. Yu. 2016. Challenge of the last mile—an accessibility study on the proposed Dallas-Houston high-speed rail. Presented at the Annual Meeting of the American Association of Geographers (AAG), San Francisco, CA. April 12-16.

[3] **Zhao, Y.*** and H. Yu. 2015 Assessing the accessibility impact of the proposed high-speed rail between Dallas and Houston at intra-city level. Presented at the Applied Geography Conference (AGC), San Antonio, TX. November 4-7.

[2] **Zhao, Y.*** and H. Yu. 2015. Accessibility impact of high-speed rail development. Presented at the Annual Meeting of the Association of American Geographers (AAG), Chicago, IL. April 21-15.

[1] **Zhao, Y.*** and H. Yu. 2011. Assessing road link importance: a case study of potential bridge collapse in Oklahoma. Presented Annual Meeting of the Association of American Geographers (AAG), Seattle, WA. April 12-16.

* *Indicates presenting author*

Other Presentation

(Invited) **Zhao, Y.** 2018. "The Science of Where: An Overview of Geographic Information System (GIS)." Invited by the AIS Student Chapter at UIS; Presented to MIS Students at UIS. University of Illinois at Springfield, Springfield, IL, Nov. 27.

Zhao, Y. 2018. "Evaluating and Visualizing Door-to-Door Travel Time Advantage of High-Speed Rail." Presented at the Illinois Department of Transportation GIS Day, Springfield, IL, Nov. 14.

Workshop and Conference Attendance

2019 AAG-UCGIS Summer School on Reproducible Problem Solving with CyberGIS and Geospatial Data Science, Champaign, IL, July 8-13.

2018 Big Data Summit. University of Illinois at Urbana-Champaign, Champaign, IL, Nov. 8.

2018 Data Science Day. University of Illinois at Urbana-Champaign, Champaign, IL, Sep. 27.

Workshop Delivery

Mapping COVID-19 For Your Community: Fundamental GIS Applications. 2020/21. Virtual Workshop.

Introduction to GIS and Its Applications in Public Health. 2020. Delivered at Southern Illinois University-School of Medicine. Springfield, IL. Feb. 25.

Using GIS to Explore Your Community: Fundamental GIS Applications. 2019. Delivered at UIS GIS Lab. Springfield, IL. Nov. 16.