Guiming Zhang   curriculum vitae   v.2021.03.04

Assistant Professor, Ph.D.
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RESEARCH INTERESTS

Geographic information science, volunteered geographic information, geospatial big data analytics, species habitat mapping, digital soil mapping, geospatial computing

EDUCATION

Ph.D. GIScience, University of Wisconsin-Madison, USA, May 2018

M.S. Computer Sciences, University of Wisconsin-Madison, USA, 2016

M.S. Cartography and GIS, Beijing Normal University, China, 2013

B.S. Geography, Beijing Normal University, China, 2010

HONORS AND AWARDS

- Best Paper Competition Award (Runner Up) at the 2nd International Symposium on Spatiotemporal Computing, Cambridge, MA, 2017. $500.

- Whitbeck Graduate Dissertator Award, Department of Geography, UW-Madison, 2017. $6,000.

- Trewartha Conference Travel Award, Department of Geography, UW-Madison, 2017. $500.

- Campus-Wide Capstone Ph.D. Teaching Award, UW-Madison, 2016. $500. (Featured in the Department news).

- Third Place, ESRI Chinese College Students GIS Software Development Contest, 2009/2010

- Excellent Olympics Volunteer Award, Beijing Summer Olympics, 2008

- First-Class Undergraduates Scholarship, Beijing Normal University, 2007/2008

TEACHING

University of Denver (since September 2018)

Academic Year 20-21:

GEOG3140: GIS Database Design. **2020 Fall**. [Synchronous online due to COVID-19]. 14 students. *Topics*: relational model, relational database, spatial database, geodatabase, SQL, PostgreSQL/PostGIS.

AY19-20:

GEOG2100: Introduction to Geographic Information Systems (GIS). **2020 Spring**. [Synchronous/asynchronous online due to COVID-19]. 20 students. Topics: georeferencing, map projections, raster data model, vector data model, spatial data collection, attribute/spatial queries, overlay, map algebra, etc.

GEOG3120: Environmental/GIS Modeling. **2020 Winter**. [New course]. 10 students. *Topics*: kernel density estimation, kriging, digital soil mapping, species distribution modeling, geographically weighted regression.

GEOG2000: Geographic Statistics. **2020 Winter**. 18 students. *Topics*: descriptive statistics, probability, sampling, inferential statistics, correlation and regression, categorical data analysis.

GEOG3140: GIS Database Design. **2019 Fall**. 8 students. *Topics*: topics as above.

AY18-19:

GEOG2000: Geographic Statistics. **2019 Winter**. 17 students. *Topics*: topics as above.

GEOG3140: GIS Database Design. **2018 Fall**. 16 students. *Topics*: topics as above.

University of Wisconsin-Madison (September 2013 - May 2018)

1. **Lecturer**, Geography 579: GIS and Spatial Analysis [Online]. **2017 Summer, Fall** Semester. *Topics*: digital terrain analysis, spatial autocorrelation, spatial interpolation, point pattern analysis.

2. **Lecturer**, Geography 576: Geospatial Web and Mobile Programming [Online]. **2017 Spring** Semester. *Topics*: Java programming language, web and mobile application development for GIS.

3. **Lecturer**, Geography 579: GIS and Spatial Analysis [Online]. **2016 Fall** Semester. *Topics*: topics as above.

4. **Teaching Assistant**, Geography 170: Our Digital Globe - An Overview of GIScience and its Technology [Online]. **2016 Summer** Semester. *Topics*: GIS, GPS, remote sensing.

5. **Lecturer**, Geography 377: An Introduction to Geographic Information System. **2016 Spring** Semester. Topics: spatial data representation, spatial database, spatial analysis, geovisualization, uncertainty. This is an in-classroom course with 78 students enrolled.

6. **Teaching Assistant**, Geography 578: GIS Applications. **2015 Spring** and **Fall** Semester. *Topics*: GIS application to solve real-world geographic problems, problem conceptualization, technical implementation.

7. **Teaching Assistant**, Geography 377: An Introduction to Geographic Information System, **2014 Fall** Semester. *Topics*: geo-referencing, digitalizing, geodatabase, spatial analysis.

8. **Teaching Assistant**, Geography 676: Web Spatial Database Development and Programming, **2014 Spring** Semester. *Topics*: relational data model, spatial database, PostgreSQL/PostGIS, Java programming language, Java Server Page, JavaScript, HTML.

9. **Teaching Assistant**, Geography 578: GIS Applications. **2013 Fall** Semester. *Topics*: topics as above.

PUBLICATIONS

Refereed Journal Articles (Google Scholar)

Published/Accepted:

1. **Zhang, G**, Zhu, A-X, Liu, J, Guo, S, Zhu, Y. **2021**. PyCLiPSM: Harnessing heterogeneous computing resources on CPUs and GPUs for accelerated digital soil mapping. *Transactions in GIS* 00: 1– 23. doi: https://doi.org/10.1111/tgis.12730.

2. **Zhang, G., 2021**. DC-29 - Volunteered Geographic Information. *The Geographic Information Science & Technology Body of Knowledge* (1st Quarter 2021 Edition), John P. Wilson (Ed.). doi: 10.22224/gistbok/2021.1.1.

3. **Zhang, G., 2020**. Spatial and temporal patterns in volunteer data contribution activities: A case study of eBird. *ISPRS International Journal of Geo-Information*, 9(10): 597. doi: 10.3390/ijgi9100597.

4. **Zhang, G.**, and Zhu, A.X., **2020**. Sample size and spatial configuration of volunteered geographic information affect effectiveness of spatial bias mitigation. *Transactions in GIS*, 00: 1–26. doi: 10.1111/tgis.12679.

5. **Zhang, G.**, Zhu, A.X, He, Y.C., Huang, Z.P., Ren, G.P., and Xiao, W., **2020**. Integrating multi-source data for wildlife habitat mapping: A case study of the black-and-white snub-nosed monkey (Rhinopithecus bieti) in Yunnan, China. *Ecological Indicators*, 118: 106735. doi: 10.1016/j.ecolind.2020.106735.

6. **Zhang, G., 2019.** Enhancing VGI application semantics by accounting for spatial bias. *Big Earth Data*. doi: 10.1080/20964471.2019.1645995.

7. **Zhang, G.** and Zhu, A.X., **2019**. A representativeness heuristic for mitigating spatial bias in existing soil samples for digital soil mapping. *Geoderma* 351: 130-143. doi: 10.1016/j.geoderma.2019.05.024.

8. **Zhang, G.** and Zhu, A.X., **2019**. A representativeness-directed approach to mitigate spatial bias in VGI for the predictive mapping of geographic phenomena. *International Journal of Geographical Information Science* 33 (9): 1873-1893. doi: 10.1080/13658816.2019.1615071.

9. **Zhang, G.**, and Zhu, A.X., **2018**. The representativeness and spatial bias of volunteered geographic information: a review. *Annals of GIS* 24(3): 151–162. doi:10.1080/19475683.2018.1501607.

10. **Zhang, G.**, Zhu, A.X., Windels, S.K., and Qin, C.Z., **2018**. Modelling species habitat suitability from presence-only data using kernel density estimation. *Ecological Indicators* 93: 387–396. doi:10.1016/j.ecolind.2018.04.002.

11. **Zhang, G.**, Zhu, A.X., Huang, Z.P., and Xiao, W., **2018**. A heuristic-based approach to mitigating positional errors in patrol data for species distribution modeling. *Transactions in GIS* 22(1): 202–216. doi: 10.1111/tgis.12303.

12. **Zhang, G.**, Zhu, A.X., Huang, Z.P., Ren, G., Qin, C.Z., and Xiao, W., **2018**. Validity of historical volunteered geographic information: Evaluating citizen data for mapping historical geographic phenomena. *Transactions in GIS* 22(1): 149–164. doi: 10.1111/tgis.12300.

13. **Zhang, G.**, Zhu, A.X., and Huang, Q., **2017**. A GPU-accelerated adaptive kernel density estimation approach for efficient point pattern analysis on spatial big data. *International Journal of Geographical Information Science* 31(10): 2068-2097. doi: 10.1080/13658816.2017.1324975.

14. **Zhang, G.**, Huang, Q., Zhu, A.X., and Keel, J., **2016**. Enabling point pattern analysis on spatial big data using cloud computing: Optimizing and accelerating Ripley's K function. *International Journal of Geographical Information Science* 30(11):2230–2252.doi: 10.1080/13658816.2016.1170836.

15. Zhu, A.X., **Zhang, G.** (**corresponding author**), Wang, W., Xiao, W., Huang, Z.P., Dunzhu, G.S., Ren, G., Qin, C.Z., Yang, L., Pei, T., and Yang, S.T., **2015**. A citizen data-based approach to predictive mapping of spatial variation of natural phenomena. *International Journal of Geographical Information Science* 29(10):1864–1886. doi: 10.1080/13658816.2015.1058387.

16. Huang, Q., Cervone, G., and **Zhang, G.**, **2017**. A cloud-enabled automatic disaster analysis system of multi-sourced data streams: An example synthesizing social media, remote sensing and Wikipedia data. *Computers, Environment and Urban Systems* 66: 23–37. doi: 10.1016/j.compenvurbsys.2017.06.004.

17. Roth, R.E., Young, S., Nestel, C., Sack, C.M., Davidson, B., Janicki, J., Knoppe-Wetzel, V., Ma, F., Mead, R., Rose, C., and **Zhang, G.**, **2018**. Global landscapes: Teaching globalization through responsive mobile map design. *The Professional Geographer*. 70(3): 395-411. doi: 10.1080/00330124.2017.1416297.

18. Jiang, J., Zhu, A.X., Qin, C.Z., Zhu, T., Liu, J., Du, F., Liu, J., **Zhang, G.** and An, Y., **2016**. CyberSoLIM: A cyber platform for digital soil mapping. *Geoderma* 263:234–243. doi: 10.1016/j.geoderma.2015.04.018.

19. Guo, S., Zhu, A.X., Meng, L., Burt, J., Du, F., Liu, J., and **Zhang, G.**, **2015**. Unification of soil feedback patterns under different evaporation conditions to improve soil differentiation over flat area. *International Journal of Applied Earth Observation and Geoinformation* 49:126-137. doi: 10.1016/j.jag.2016.02.002.

20. Guo, S., Meng, L., Zhu, A.X., Burt, J., Du, F., Liu, J., and **Zhang, G.**, **2015**. Data-gap filling to understand the dynamic feedback pattern of soil. *Remote Sensing* 7:11801–11820. doi: 10.3390/rs70911801.

21. **Zhang, G.**, Zhu, A.X., Yang, S., Qin, C.Z., Xiao, W., and Windels, S. K., **2013**. Mapping wildlife habitat suitability using kernel density estimation. *Acta Ecologica Sinica* 33(23):7590–7600 (In Chinese). doi: 10.5846/stxb201208221185.

Refereed Book Chapters

1. **Zhang, G., 2019**. Integrating citizen science and GIS for wildlife population monitoring and habitat assessment. in: Ferretti, M. (Eds.), *Wildlife Population Monitoring*. IntechOpen Limited, London, UK. ISBN: 978-1-78984-170-1. doi: 10.5772/intechopen.83681.

CONFERENCE PRESENTATIONS

1. **Zhang, G.,** and Thomson, S., **2020.** Integrating VGI and authoritative data for wildlife habitat mapping (Recording: https://www.youtube.com/watch?v=xOIQRAcheaw). Virtual Session: Physical Geography, Biogeography. *The 2020 Annual Meeting of the American Association of Geographers (AAG)*. Denver, Colorado, USA: April 6-10, 2020. [All in-person meetings were cancelled due to COVID-19].

2. Zhu, A.X., **Zhang, G.**, Gao, S., 2019. A similarity approach to spatial bias mitigation in VGI: a case study of suitability mapping using eBird data. *International Symposium on Location-Based Big Data 2019 (LocBigData 2019)*. Tokyo, Japan: July 15, 2019.

3. **Zhang, G.**, Zhu, A.X., Windels, S.K., Qin, C.Z., **2019**. Modelling species habitat suitability from presence-only data using kernel density estimation. Session: Modeling for Sustainability 2: Past and Present. *The 2019 Annual Meeting of the American Association of Geographers (AAG)*. Washington, District of Columbia, USA: April 3-7, 2019.

4. **Zhang, G.**, and Zhu, A.X., **2018**. Representativeness-directed sample spatial bias mitigation for predictive mapping. Session: Artificial Intelligence and Deep Learning Symposium: AI for Spatial Optimization. *The 2018 Annual Meeting of the American Association of Geographers (AAG)*. New Orleans, Louisiana, USA: April 10-14, 2018.

5. **Zhang, G.**, Zhu, A.X., and Huang, Q., **2017**. GPU-accelerated adaptive kernel density estimation for point pattern analysis on spatial big data. Extended Abstract. *The 25th International Conference on Geoinformatics*. Buffalo, New York, USA: August 2-4, 2017.

6. **Zhang, G.**, Zhu, A.X., and Huang, Q., **2017**. A GPU-accelerated adaptive kernel density estimation approach for efficient point pattern analysis on spatial big data. *2017 2nd International Symposium on Spatiotemporal Computing (ISSC)*. Harvard University, Cambridge, Massachusetts, USA: August 7-9, 2017.

INVITED TALKS

1. **Zhang, G.**, **2019**. A representativeness directed approach to spatial bias mitigation in VGI for predictive mapping. Institute of Eastern-Himalaya Biodiversity Research, Dali University. Dali, Yunnan, China: August 2, 2019.

2. **Zhang, G.**, **2018**. A representativeness directed approach to spatial bias mitigation in VGI for predictive mapping. *The 4th Hanhong International Forum for Young Scholars*.

Department of Geography, Southwest University. Beibei, Chongqing, China: November 29 – December 2, 2018.

GRANTS

1. Integrating local ecological knowledge and patrol records for wildlife habitat mapping using GIS. *DU Internationalization Grant*. $4000. PI: Guiming Zhang. 05/1/2019 – 06/15/2020.

2. Detecting observation hot-spots in massive citizen-contributed geographic data, *DU Faculty Research Fund*. $2291. PI: Guiming Zhang. 05/20/2019 – 05/19/2021.

3. Building a citizen-centric digital urban environmental observatory with Nature Kids. *DU Public Good Grant Fund*. $13,719. Co-PIs: Jing Li, Paul Sutton, and Guiming Zhang. 05/09/2019 – 12/15/2020. [Cancelled due to COVID-19].

4. Using public participatory GIS for engaging local villagers to support long-term wildlife monitoring and conservation in remote mountainous regions. *DU Public Good Grant Fund*. $12,070 requested. PI: Guiming Zhang. 2019. UNFUNDED.

5. Using deep convolutional neural networks and big data to model the distribution of birds in the Americas. *Microsoft AI for Earth - Azure Compute Credit Grants*. $10,000 *credits*. PI: Guiming Zhang. 11/01/2019 – 11/01/2020.

PROFESSIONAL SERVICES

Board Member

- Director, American Association of Geographers (AAG) Cyberinfrastructure Specialty Group (2019-2021)

Prize Judge

- The Jacques May Thesis Prize, AAG Health and Medical Geography Specialty Group, 2019

Guest Editor

- Special Issue: Mapping, Modeling and Prediction with VGI. *ISPRS International Journal of Geo-Information*. 2020.

- Special Issue: Geospatial semantic, ontology and knowledge graph. *Big Earth Data*. 2019

Peer Reviewer (Publons)

* In parentheses: year - # of manuscripts reviewed.

- International Journal of Geographical Information Science (2018-1, 2020-1)

- Transactions in GIS (2017-2, 2018-1, 2020-1)

- ISPRS International Journal of Geo-Information (2019-3, 2020-3)

- Annals of GIS (2018-1, 2019-2, 2020-5)

- Computers & Geosciences (2019-1)

- The Professional Geographers (2019-1)

- Journal of Maps (2019-1)

- Sustainability (2019-1)

- Remote Sensing (2019-2, 2020-1)

- Big Earth Data (2019-2)

- Big Data and Cognitive Computing (2020-1)

- PlosOne (2019-1, 2020-1)

- Ecological Indicators (2019-1, 2020-2)

- Earth Science Informatics (2019-2)

- Diversity and Distributions (2020-1)

- IEEE Access (2019-2)

- International Journal of Image and Data Fusion (2017-2)

- Pedosphere (2018-1)

- Applied Sciences (2019-1, 2020-1)

- Sensors (2019-1)

- Data (2019-1)

- The Second International Conference on Physics, Mathematics and Statistics (2019-1)

Others

- Graduate student representative in the search committee of GIS/Physical faculty hire, Department of Geography, UW-Madison, 2017

PROFESSIONAL MEMBERSHIPS

- American Association of Geographers (AAG)

- International Association of Chinese Professionals in Geographic Information Sciences (CPGIS)