

ALEXANDER C. MICHELS

Curriculum Vitae

CONTACT INFORMATION

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RESEARCH INTERESTS

- CyberGIS & GIScience
- Health Geography
- Spatial Analysis & Statistics
- Urban Informatics

EDUCATION

- Ph.D. University of Illinois Urbana-Champaign, Urbana, IL. 2025
Informatics, **Advisor:** Shaowen Wang
- M.S. University of Illinois Urbana-Champaign, Urbana, IL. 2024
Geography
- B.S. Westminster College, New Wilmington, PA. 2019
Mathematics and Financial Economics

PROFESSIONAL EXPERIENCE

- 2025 **Postdoctoral Research Associate**
Department of Geography and Geographic Information Science, University of Illinois Urbana-Champaign
- 2023-25 **Research Assistant**, CyberGIS Center for Advanced Digital and Spatial Studies, University of Illinois Urbana-Champaign
- 2023 **Teaching Assistant**
Department of Geography and Geographic Information Science, University of Illinois Urbana-Champaign
- 2019-23 **Research Assistant**
CyberGIS Center for Advanced Digital and Spatial Studies, University of Illinois Urbana-Champaign

PUBLICATIONS (*underline indicates student mentee*)

Journal Articles

- [J9] **A. Michels**, J. Park, J.-Y. Kang, and S. Wang. “An Areal Approach to Spatial Accessibility Analysis”. *Geographical Analysis* (Oct. 2024). DOI: 10.1111/gean.12415.
- [J8] **A. Michels**, A. Padmanabhan, Z. Xiao, M. Kotak, F. Baig, and S. Wang. “CyberGIS-Compute: Middleware for democratizing scalable geocomputation”. *SoftwareX* 26 (May 2024). DOI: 10.1016/j.softx.2024.101691.

- [J7] **A. Michels**, J. Park, J.-Y. Kang, and S. Wang. “SPASTC: A Spatial Partitioning Algorithm for Scalable Travel-time Computation”. *International Journal of Geographical Information Science* 38.5 (Mar. 2024). DOI: 10.1080/13658816.2024.2326445.
- [J6] **A. Michels**, A. Padmanabhan, Z. Li, and S. Wang. “EasyScienceGateway: A New Framework for Providing Reproducible User Environments on Science Gateways”. *Concurrency and Computation: Practice and Experience* 36.4 (Oct. 2023). DOI: 10.1002/cpe.7929.
- [J5] J. Park, **A. Michels**, F. Lyu, S. Y. Han, and S. Wang. “Daily Changes in Spatial Accessibility to ICU Beds and Their Relationship with the Case-Fatality Ratio of COVID-19 in the State of Texas, USA”. *Applied Geography* (Mar. 2023). DOI: 10.1016/j.apgeog.2023.102929.
- [J4] J.-Y. Kang, B. F. Farkhad, M.-p. S. Chan, **A. Michels**, D. Albarracin, and S. Wang. “Spatial Accessibility to HIV Testing, Treatment, and Prevention Services in Illinois and Chicago, USA”. *PLOS ONE* 17.7 (July 2022). DOI: 10.1371/journal.pone.0270404.
- [J3] **A. Michels**, J.-Y. Kang, and S. Wang. “Particle Swarm Optimization for Calibration in Spatially Explicit Agent-Based Modeling”. *Journal of Artificial Societies and Social Simulation* 25.2 (Mar. 2022). DOI: 10.18564/jasss.4796.
- [J2] J.-Y. Kang, **A. Michels**, A. Crooks, J. Aldstadt, and S. Wang. “An Integrated Framework of Global Sensitivity Analysis and Calibration for Spatially Explicit Agent-Based Models”. *Transactions in GIS* 26.1 (Sept. 2021). DOI: 10.1111/tgis.12837.
- [J1] J.-Y. Kang, **A. Michels**, F. Lyu, S. Wang, N. Agbodo, V. L. Freeman, and S. Wang. “Rapidly Measuring Spatial Accessibility of COVID-19 Healthcare Resources: A Case Study of Illinois, USA”. *International Journal of Health Geographics* (2020). DOI: 10.1186/s12942-020-00229-x.

Peer-Reviewed Conference Papers

- [C12] R. Vandewalle, **A. Michels**, Z. Li, N. Jaroenchai, and S. Wang. “Building Blocks for Geospatial Software Education Using the I-GUIDE Platform”. *I-GUIDE Forum 2024*. 2024. DOI: 10.5703/1288284317803.
- [C11] S. Han, J.-S. Kim, Y. Jiang, J.-Y. Kang, J. Park, C. Han, **A. Michels**, and S. Wang. “CyberGIS-Vis for Democratizing Access to Scalable Spatiotemporal Geovisual Analytics: A Case Study of COVID-19”. *5th ACM SIGSPATIAL International Workshop on Spatial Computing for Epidemiology (SpatialEpi’24)*. Nov. 2024. DOI: 10.1145/3681777.3698474.
- [C10] **A. Michels** and S. Wang. “Data-Intensive Convergence Science for Analyzing Place-Based Spatial Accessibility”. *I-GUIDE Forum 2024*. Oct. 2024. DOI: 10.5703/1288284317802.
- [C9] R. Vandewalle, **A. Michels**, F. Baig, and S. Wang. “Understanding Complex Socio-Environmental Systems with Spatial Agent-Based Models”. *I-GUIDE Forum 2024*. Oct. 2024. DOI: 10.5703/1288284317804.
- [C8] **A. Michels**, M. Kotak, A. Padmanabhan, J. Speaks, and S. Wang. “Providing Accessible Software Environments Across Science Gateways and HPC”. *Practice and Experience in Advanced Research Computing 2024: Human Powered Computing*. PEARC ’24. Providence, RI, USA: Association for Computing Machinery, July 2024. DOI: 10.1145/3626203.3670614.

- [C7] **A. Michels**, M. Kotak, A. Padmanabhan, and S. Wang. “Streamlined HPC Environments with CVMFS and CyberGIS-Compute”. *I-GUIDE Forum 2023*. Oct. 2023. DOI: 10.5703/1288284317677.
- [C6] **A. Michels** and S. Wang. “An Agent-Based Modeling Approach to Spatial Accessibility”. *I-GUIDE Forum 2023*. Oct. 2023. DOI: 10.5703/1288284317670.
- [C5] I. Haqiqi, W. Hu, R. Kumaran, P.-C. Li, N. Manning, **A. Michels**, A. Nassar, J. Park, J. Shi, A. Tonks, and Z. Wang. “I-GUIDE Climbers: A Model for Multidisciplinary Academic Labs for Early Career Development”. *I-GUIDE Forum 2023*. Oct. 2023. DOI: 10.5703/1288284317667.
- [C4] **A. Michels**, J. Park, B. Li, J.-Y. Kang, and S. Wang. “Impacts of Catchments Derived from Fine-Grained Mobility Data on Spatial Accessibility”. *12th International Conference on Geographic Information Science (GIScience 2023)*. Vol. 277. Sept. 2023. DOI: 10.4230/LIPIcs.GIScience.2023.52.
- [C3] F. Baig, **A. Michels**, Z. Xiao, S. Y. Han, A. Padmanabhan, Z. Li, and S. Wang. “CyberGIS-Cloud: A Unified Middleware Framework for Cloud-Based Geospatial Research and Education”. *Practice and Experience in Advanced Research Computing*. PEARC '22. Boston, MA, USA: Association for Computing Machinery, 2022. DOI: 10.1145/3491418.3535148.
- [C2] **A. Michels**, J.-Y. Kang, and S. Wang. “An Exploration of the Effect of Buyer Preference and Market Composition on the Rent Gradient Using the ALMA Framework”. *Proceedings of the 3rd ACM SIGSPATIAL International Workshop on GeoSpatial Simulation*. GeoSim '20. Seattle, Washington: ACM, 2020. DOI: 10.1145/3423335.3428167.
- [C1] J.-Y. Kang, J. Aldstadt, **A. Michels**, R. Vandewalle, and S. Wang. “CyberGIS-Jupyter for Spatially Explicit Agent-based Modeling: A Case Study on Influenza Transmission”. *GeoSim '19: Proceedings of the 2nd ACM SIGSPATIAL International Workshop on GeoSpatial Simulation*. Chicago, Illinois: ACM, 2019. DOI: 10.1145/3356470.3365531.

Conference Abstracts

- [A4] Z. Li, **A. Michels**, A. Padmanabhan, A. Nassar, D. G. Tarboton, and S. Wang. “CyberGIS-Jupyter for Water - An Open Geospatial Computing Platform for Collaborative Water Research”. *AGU Fall Meeting Abstracts*. Vol. 2022. Dec. 2022.
- [A3] A. Padmanabhan, Z. Xiao, R. Vandewalle, F. Baig, **A. Michels**, Z. Li, and S. Wang. “CyberGIS-Compute for Enabling Computationally Intensive Geospatial Research”. *SpatialAPI'21: Proceedings of the 3rd ACM SIGSPATIAL International Workshop on APIs and Libraries for Geospatial Data Science*. Nov. 2021. DOI: 10.1145/3486189.3490017.
- [A2] **A. Michels**, A. Padmanabhan, Z. Li, and S. Wang. “Towards Reproducible Research on CyberGISX with Lmod and Easybuild”. *Gateways 2021*. Oct. 2021. DOI: 10.5281/zenodo.5569659.
- [A1] A. Padmanabhan, Z. Xiao, R. Vandewalle, **A. Michels**, and S. Wang. “Enabling Computationally Intensive Geospatial Research on CyberGIS-Jupyter with CyberGIS-Compute”. *Gateways 2021*. Oct. 2021. DOI: 10.5281/zenodo.5570056.

RESEARCH FUNDING

- 2024 Social Determinants Of Health & Place Fellowship, Healthy Regions & Policies Lab
- 2023 PI (Co-PI: Shaowen Wang), 400,000 credits. Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support (ACCESS)
ACCESS Explore Allocation for “SPACTS: a spatial partitioning algorithm for computing travel-time zones at scale” (CIS230031)
- 2022 SESYNC Graduate Research Fellow, National Socio-Environmental Synthesis Center (SESYNC)

AWARDS

- 2024 First Place, Data Visualization Competition, Data Science for Everyone Workshop, Practice and Experience in Advanced Research Computing (PEARC) 2024
- 2023 Teacher Ranked as Excellent By Their Students, Center for Innovation in Teaching & Learning, University of Illinois Urbana-Champaign (UIUC)
- 2023 Student of the Year 2022, CyberGIS Center for Advanced Digital and Spatial Studies, UIUC
- 2020 Third Place, UIUC GIS Day Virtual Student Poster Competition, Department of Geography & Geographic Information Systems, UIUC
- 2020 Computational Research Techniques Fellowship, Texas Advanced Computing Center (TACC)
- 2020 First Place, Robert Raskin Student Competition, Cyberinfrastructure Group, American Association of Geographers (AAG)
- 2019 UCGIS Prize for Advances in Geospatial Problem Solving, American Association of Geographers (AAG) / University Consortium for Geographic Information Science (UCGIS)

SELECTED PRESENTATIONS

Invited Talks

- 2024 “CyberGIS for Scalable Spatial Accessibility Analysis”. *The SDOH & Place End of Year Celebration*. Chicago, IL. Dec 14, 2024.

Conference Talks

- 2025 “Measuring Temporally Dynamic Spatial Accessibility using Machine Learned Driving Times”. *American Association of Geographers (AAG) Annual Meeting*. Detroit, MI. Mar 28, 2025
- 2024 “Data-Intensive Convergence Science for Analyzing Place-Based Spatial Accessibility”. *I-GUIDE Forum 2024: Convergence Science and Geospatial AI for Environmental Sustainability*. Jackson, WY. Oct 15, 2024
- 2024 “Providing Accessible Software Environments Across Science Gateways and HPC”. *Practice and Experience in Advanced Research Computing (PEARC)*. Providence, RI. Jul 24, 2024

- 2024 “Spatial Accessibility with Machine-Learned Driving Times”. *Social Determinants Of Health (SDOH) & Place Symposium*. Chicago, IL. Jun 15, 2024
- 2024 “Putting the Area in Catchment Areas: An Areal Approach to Spatial Accessibility Analysis”. *American Association of Geographers (AAG) Annual Meeting*. Honolulu, HI. Apr 16, 2024
- 2023 “Streamlined HPC Environments with CVMFS and CyberGIS-Compute”. *I-GUIDE Forum*. New York City, NY. Oct 6, 2023
- 2023 “An Agent-Based Modeling Approach to Spatial Accessibility”. *I-GUIDE Forum*. New York City, NY. Oct 5, 2023
- 2023 “Impacts of Catchments Derived from Fine-Grained Mobility Data on Spatial Accessibility”. *International Conference on Geographic Information Science (GIScience)*. Leeds, UK. Sept 13, 2023
- 2023 “Exploring Road Infrastructure Inequities Across the Conterminous U.S.”. *American Association of Geographers (AAG) Annual Meeting*. Denver, CO. Mar 25, 2023
- 2022 “SCAMEL: Spatial Accessibility Analysis at Scale”. *American Association of Geographers (AAG) Annual Meeting*. Virtual. Feb 28, 2022
- 2021 “Towards Reproducible Research on CyberGISX with Lmod and Easybuild”. *Gateways*. Virtual. Oct 21, 2022
- 2020 “An Exploration of the Effect of Buyer Preference and Market Composition on the Rent Gradient using the ALMA Framework”. *3rd ACM SIGSPATIAL International Workshop on GeoSpatial Simulation*. Virtual. Nov 3, 2020
- 2020 “Particle Swarm Optimization for Calibration in Spatially Explicit ABMs”. *American Association of Geographers (AAG) Annual Meeting*. Virtual. Apr 10, 2020

Tutorials & Workshops

- 2024 “I-GUIDE Platform” with Anand Padmanabhan. *I-GUIDE Summer School 2024: Leveraging AI for Environmental Sustainability*. Boulder, CO. Aug 6, 2024.
- 2023 “Geospatial Knowledge Discovery Harnessing Pre-trained Language Models on CyberGISX” with Zhaonan Wang, Wei Hu, and Anand Padmanabhan. *2023 NSF HDR Ecosystem Conference*. Denver, CO. Oct 17, 2023.
- 2023 “CyberGIS-Compute: Geospatial Middleware for High-Performance Computing” with Anand Padmanabhan and Shaowen Wang. *I-GUIDE Forum 2023*. New York City, NY. Oct 4, 2023.
- 2023 “CyberGIS-Compute: Geospatial Middleware for Simplifying Access to High-Performance Computing” with Furqan Baig. *Accelerating Computing for Emerging Sciences (ACES) Workshop 2023*. League City, TX. Jul 15, 2023.
- 2023 “CyberGIS-Compute: Geospatial Middleware for High-Performance Computing”. *Annual Meeting of the American Association of Geographers (AAG) 2023*. Denver, CO. Mar 24, 2023.

- 2022 “CyberGIS-Compute: Enabling Simplified Access to High Performance Computing for your Geospatial Computation” with Anand Padmanabhan. *NSF Institute for Geospatial Understanding through an Integrative Discovery Environment (I-GUIDE) - Virtual Consulting Office*. Virtual. Nov. 2, 2022.
- 2022 “CyberGIS-Compute: Geospatial Middleware for Simplifying Access to High-Performance Computing” with Anand Padmanabhan. *NSF Institute for Geospatial Understanding through an Integrative Discovery Environment (I-GUIDE) - Virtual Consulting Office*. Virtual. Jul 27, 2022.

Poster Presentations

- 2024 “Measuring Road Network Equity and Resilience for Evacuations and Natural Hazards”. *I-GUIDE Forum 2024: Convergence Science and Geospatial AI for Environmental Sustainability*. Jackson, WY. Oct 15, 2024
- 2024 “Measuring Road Network Equity and Resilience for Evacuations and Natural Hazards”. *Geo-Resolution 2024*. St. Louis, MO. Sept 12, 2024
- 2023 “CyberGIS-Compute: Middleware for Democratizing Scalable Geocomputation”. *2023 NSF HDR Ecosystem Conference*. Denver, CO. Oct 16, 2023
- 2021 “ScalableAccess: Travel-Time Polygons for Accessibility at Scale”. *UIUC GIS Day*. Champaign, IL. Nov 17, 2021
- 2021 “Rapidly Measuring Spatial Accessibility of COVID-19 Healthcare Resources: A Case Study of Illinois, USA”. *UIUC School of Earth Society & Environment (SESE) Research Review*. Champaign, IL. Apr 23, 2021
- 2020 “Effect of Buyer Preference and Market Composition on the Rent Gradient”. *UIUC GIS Day*. Champaign, IL. Nov 18, 2020
- 2020 “Particle Swarm Optimization for Calibration in Spatially Explicit ABMs”. *UIUC SESE Research Review*. Champaign, IL. Feb 14, 2020
- 2019 “CyberGIS-Jupyter for Spatially Explicit Agent-based Modeling”. *UIUC GIS Day*. Champaign, IL. Nov 13, 2020

TEACHING AND MENTORING

Courses Taught as Instructor of Record

- Spring 2023 **Business Location Decisions (GGIS/BADM 205)**
Department of Geography and Geographic Information Science, UIUC

Undergraduate Student Mentees

- 2023-present Ian Zhang, B.S. in CS+Math, UIUC
- 2023-24 John Speaks, B.S. in CS+Linguistics, UIUC
- 2023-24 Jeffrey Huang, B.S. in CS+Statistics, UIUC
- 2022-23 Mit Kotak, B.S. in Physics, UIUC
- 2022-23 Taylor Ziegler, B.S. in CS, UIUC

2019-22 Zimo Xiao, B.S. in CS+GGIS, UIUC

Certificates and Workshops

May 2023 Certificate in Foundations of Teaching, The Center for Innovation in Teaching & Learning, UIUC

Jan 2023 Graduate Academy for College Teaching, The Center for Innovation in Teaching & Learning, UIUC

SERVICE

Professional Organizations

2022-26 **Director**, AAG CyberInfrastructure Specialty Group (CISG)

2021-22 **Student Director**, AAG CyberInfrastructure Specialty Group

Conferences and Workshops

2025 **Reviewer**, Institute for Geospatial Understanding through an Integrative Discovery Environment (I-GUIDE) Forum 2025

2025 **Symposium Co-Organizer**, AAG 2025 Symposium on Spatial AI & Data Science for Sustainability

2025 **Session Chair**, “Challenges and Opportunities of Spatial Accessibility” AAG 2025 Symposium on Spatial AI & Data Science for Sustainability

2024 **Symposium Co-Organizer**, AAG 2024 Symposium on Geospatial Data Science for Sustainability

2024 **Session Organizer**, “Challenges and Opportunities of Spatial Accessibility” AAG 2024 Symposium on Geospatial Data Science for Sustainability

2023 **Reviewer**, Institute for Geospatial Understanding through an Integrative Discovery Environment (I-GUIDE) Forum 2023

2023 **Symposium Program Co-Chair**, AAG 2023 Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions

2023 **Session Chair**, “Data-intensive and Computational Geography,” AAG 2023 Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions

2022 **Session Organizer**, “Computation and Uncertainty of Spatial Accessibility,” AAG 2022 Symposium on Data-Intensive Geospatial Understanding in the Era of CyberGIS

Journal Reviewer

- Geocarto International, Taylor & Francis
- International Journal of Geographical Information Science (IJGIS), Taylor & Francis
- ISPRS International Journal of Geo-Information, MDPI
- Quality & Quantity, Springer

PROFESSIONAL ASSOCIATIONS

- American Association of Geographers (AAG)
- Association for Computing Machinery (ACM)
- Campus Research Computing Consortium (CaRCC)
- United States Research Software Engineer Association (US-RSE)