ALEXANDER C. MICHELS

Curriculum Vitae

CONTACT INFORMATION

Office & Mailing Address
The University of Texas at Dallas
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Richardson, TX 75080

Other
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RESEARCH & TEACHING INTERESTS

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

PROFESSIONAL EXPERIENCE

2025 **Assistant Professor**
School of Economic, Political and Policy Sciences, The University of Texas at Dallas

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

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

PUBLICATIONS *(underline indicates student mentee)*

Journal Articles

[J10] S. Y. Han, J. Yoo, **A. Michels**, J.-Y. Kang, S. Wang, and J.-S. Kim. "Vulnerable Neighborhood Explorer (VNE): An Open-Source Visual Analytics Tool for Exploring Social Vulnerability to Disasters across Different Neighborhoods". *SoftwareX* 31 (2025). DOI: 10.1016/j.softx.2025.102233.

[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.

Journal Articles Under Review / Pre-Prints

[R1] E. G. Campolongo et al. "Building Machine Learning Challenges for Anomaly Detection in Science" (2025). DOI: 10.48550/arXiv.2503.02112.

Peer-Reviewed Conference Papers

[C13] S. Wang, F. Baig, Y. Kang, E. Li, **Alexander Michels**, N. Jaroenchai, A. Padmanabhan, A. Kumar, R. Kalyanam, N. S. Oller Smith, X. C. Song, L. Zhao, S. Manson, M. Ramamurthy, S. Taghavikish, and D. Tarboton. "I-GUIDE Platform for Geospatial Data-intensive Convergence Research and Education". *Practice and Experience in Advanced Research Computing 2025: The Power of Collaboration*. PEARC '25. Association for Computing Machinery, 2025. DOI: 10.1145/3708035.3736108.

[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 "Expanding Access to CyberGIS-Compute through Support for Heterogeneous Workflows". *I-GUIDE Forum 2025: Geospatial AI and Innovation for Sustainability Solutions.* Chicago, IL. Jun 19, 2025

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

2025 "Introduction to the I-GUIDE Platform". *I-GUIDE Virtual Consulting Office (VCO)*. Virtual. Jul 9, 2025.

2025 "Introduction to the I-GUIDE Platform". *I-GUIDE Forum 2025*. Chicago, IL. Jun 17, 2025.

2025 "Calculating Spatial Accessibility in Python with the I-GUIDE Platform". *I-GUIDE Virtual Consulting Office (VCO)*. Virtual. May 28, 2025.

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. *I-GUIDE Virtual Consulting Office (VCO)*. Virtual. Nov. 2, 2022.

2022 "CyberGIS-Compute: Geospatial Middleware for Simplifying Access to High-Performance Computing" with Anand Padmanabhan. *I-GUIDE Virtual Consulting Office (VCO)*. 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

2025 Vaibhavi Srivastava, B.S. in CS+GGIS, UIUC

2025 Akriti Arora, B.S. in CS, UIUC

2023-2025 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)