

Alexander C. Michels

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📖 Research Interests

- CyberInfrastructure & HPC
- Health Geography
- Spatial Analysis & Statistics
- CyberGIS & GIScience
- Network Science
- Spatial Accessibility

🎓 Education

- Ph.D. in Informatics** In Progress
University of Illinois at Urbana-Champaign
– Advised by Dr. Shaowen Wang in Spatial Informatics concentration.
- M.S. in Geography and G.I.S.** In Progress
University of Illinois at Urbana-Champaign
- B.S. in Mathematics and Financial Economics** Aug 2015 - May 2019
Westminster College

🔍 Research Experience

- Research Assistant** 📍 Champaign, IL
CyberGIS Center & Geospatial Information Laboratory (CIGI) *June 2019 - Present*
- SESYNC Graduate Research Fellow** 📍 Annapolis, MD
National Socio-Environmental Synthesis Center (SESYNC) *Feb 2020 - Jan 2022*
- Informatics Researcher** 📍 Los Angeles, CA
Institute for Pure and Applied Mathematics at UCLA / Praedicat, Inc. *June 2018 - Aug 2018*

📖 Publications

Journal Articles

- [1] **A. Michels**, J.-Y. Kang, and S. Wang. “Particle Swarm Optimization for Calibration in Spatially Explicit Agent-Based Modeling”. In: *Journal of Artificial Societies and Social Simulation* 25.2 (2022), p. 8. URL: <https://www.jasss.org/25/2/8.html>.
- [2] 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”. In: *Transactions in GIS* 26.1 (2022), pp. 100–128. URL: <https://doi.org/10.1111/tgis.12837>.
- [3] 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”. In: *International Journal of Health Geographics* (2020). URL: <https://doi.org/10.1186/s12942-020-00229-x>.

Conference Papers

- [4] **Michels, A.**, A. Padmanabhan, Z. Li, and S. Wang. “Towards Reproducible Research on CyberGISX with Lmod and Easybuild”. In: *Gateways 2021*. Oct. 2021. URL: <https://doi.org/10.5281/zenodo.5569659>.
- [5] A. Padmanabhan, Z. Xiao, R. Vandewalle, **A. Michels**, and S. Wang. “Enabling Computationally Intensive Geospatial Research on CyberGIS-Jupyter with CyberGIS-Compute”. In: *Gateways 2021*. Zenodo, Oct. 2021. URL: <https://doi.org/10.5281/zenodo.5570056>.
- [6] A. Padmanabhan, Z. Xiao, R. Vandewalle, F. Baig, **A. Michels**, Z. Li, and S. Wang. “CyberGIS-Compute for Enabling Computationally Intensive Geospatial Research”. In: *SpatialAPI’21: Proceedings of the 3rd ACM SIGSPATIAL International Workshop on APIs and Libraries for Geospatial Data Science*. Nov. 2021. DOI: <https://doi.org/10.1145/3486189.3490017>.
- [7] **Michels, A.**, 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”. In: *Proceedings of the 3rd ACM SIGSPATIAL International Workshop on GeoSpatial Simulation*. GeoSim ’20. Seattle, Washington: ACM, 2020, pp. 48–51. ISBN: 9781450381611. URL: <https://doi.org/10.1145/3423335.3428167>.
- [8] 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”. In: *GeoSim ’19: Proceedings of the 2nd ACM SIGSPATIAL International Workshop on GeoSpatial Simulation*. Chicago, Illinois: ACM, 2019, pp. 32–35. ISBN: 978-1-4503-6956-5. URL: <https://doi.org/10.1145/3356470.3365531>.

Industry Experience

Systems Administrator and Software Engineer

Titan Radio and WCN 24/7

 New Wilmington, PA

May 2018 - May 2019

Data Scientist

Treloar & Heisel

 New Castle, PA

Sept 2018 - Dec 2018

Data Scientist and Informatics Reseacher

Institute for Pure and Applied Mathematics at UCLA & Praedicat, Inc. June 2018 -August 2018

 Los Angeles, CA

Awards

SESYNC Graduate Research Fellow

Jan 2022

“Graduate Pursuit Member”

National Socio-Environmental Synthesis Center (SESYNC)

Computational Research Techniques Fellowship

June 2020

“Awarded funds to attend the TACC Summer Institute on Applied Parallel Programming” TACC

UIUC GIS Day Virtual Student Poster Competition

Nov 2020

“Third Place”

UIUC Department of Geography & Geographic Information Systems

Cyberinfrastructure Specialty Group Robert Raskin Student Competition April 2020
"First Place" American Association of Geographers (AAG)

UCGIS Prize for Advances in Geospatial Problem Solving July 2019
"Advancing Reproducibility in Geospatial Research" AAG-UCGIS

Best Robot in Division Prize for Senior Unique Division April 2018
"Robot in the Division with the lowest Total Final Scores" Trinity Fire Fighting Robot Contest

North America Award for Level 2 April 2018
"The top North American robot in Level 2" Trinity Fire Fighting Robot Contest

COMAP International Math Modeling Competition Honorable Mention Jan 2017
"excellent modeling and sensitivity analysis" COMAP International Math Modeling Competition



Presentations

Conference Talks

SCAMEL: Spatial Accessibility Analysis at Scale Feb 2022
American Association of Geographers (AAG) ♥ Virtual

Towards Reproducible Research on CyberGISX with Lmod and Easybuild Oct 2021
Gateways 2021 ♥ Virtual

An Exploration of the Rent Gradient using the ALMA Framework Nov 2020
3rd ACM SIGSPATIAL International Workshop on GeoSpatial Simulation ♥ Virtual

Particle Swarm Optimization for Calibration in Spatially Explicit ABMs April 2020
American Association of Geographers (AAG) ♥ Virtual

Capturing the Predictive Power of Cortical Learning Algorithms April 2019
National Conference on Undergraduate Research ♥ Atlanta, GA

Computational Fact-Checking through Knowledge Graphs Jan 2019
AMS Contributed Paper Session at 2019 Joint Mathematics Meeting ♥ Baltimore, MD

Information Extraction and Aggregation for Business Profiling July 2018
Invited Talk at Institute for Pure and Applied Mathematics ♥ Los Angeles, CA

Repeated Play Games April 2017
MAA, Allegheny Mountain Section Meeting ♥ Pittsburgh, PA

Optimizing Throughput, Cost, and Safety in Toll Booth Plazas Feb 2017
Pi Mu Epsilon Regional Conference ♥ Youngstown, OH

Poster Presentations

ScalableAccess: Travel-Time Polygons for Accessibility at Scale Nov 2021
UIUC GIS Day ♥ Champaign, IL

Effect of Buyer Preference and Market Composition on the Rent Gradient Nov 2020
UIUC GIS Day ♥ Champaign, IL

Particle Swarm Optimization for Calibration in Spatially Explicit ABMs Feb 2020
UIUC SESE Research Review ♥ Champaign, IL

CyberGIS-Jupyter for Spatially Explicit Agent-based Modeling *Nov 2019*
UIUC GIS Day ♥ Champaign, IL

CyberGIS-Jupyter for Sustainable and Reproducible Geospatial Analytics *Nov 2019*
UIUC GIS Day ♥ Champaign, IL

Computational Fact-Checking through Knowledge Graphs *Jan 2019*
Undergraduate Research Poster Session at 2019 Joint Mathematics Meeting ♥ Baltimore, MD

🏛 Teaching Experience

Teaching Assistant and Tutor ♥ New Wilmington, PA
Westminster College *Aug 2015 - Dec 2018*

- Assisted professors in grading, working with students individually, and developing curriculum for classes covering coursework in Calculus, Computer Science, and Operations Research.

👥 Professional Associations

American Association of Geographers (AAG)

Specialty Groups:

- Cyberinfrastructure
- Economic Geography
- Socialist and Critical Geography
- Spatial Analysis and Modeling
- Transportation Geography

Association for Computing Machinery (ACM)

Special Interest Groups:

- SIGSPATIAL (Spatial Information)

🔧 Professional Service

Director, AAG CyberInfrastructure Specialty Group (CISG) *Feb 2022 - Present*
American Association of Geographers (AAG)

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

Student Director, AAG CyberInfrastructure Specialty Group *April 2021 - Feb 2022*
American Association of Geographers (AAG)

⚙ Technical Skills

📊 **Data Science:** G.I.S., Git, Machine Learning, Parallel Programming, Network Science

🔗 **Languages:** Python, Bash, C++, R, SQL

📦 **Technologies:** Cloud Computing, Docker, Easybuild, Hadoop (HDFS/Spark/Yarn),
Kubernetes, OpenStack, Terraform

💻 **Operating Systems:** Linux, Windows