# Alexander C. Michels

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## 🎓 Education

**University of Illinois at Urbana-Champaign**  📍 Champaign, IL
*Ph.D. in Informatics*  *June 2019-Present*
– Pursuing the Spatial Informatics concentration under Dr. Shaowen Wang

**Westminster College**  📍 New Wilmington, PA
*Bachelor of Science in Mathematics and Financial Economics*  *August 2015 - May 2019*
– Honors Thesis: "Capturing the Predictive Power of Cortical Learning Algorithms
– Minor in Computer Science — Graduated Cum Laude — Honors in Computer Science and Math — 3.7 GPA

## 💻 Research Experience

**CyberGIS and CyberInfrastructure Researcher**  📍 Champaign, IL
*CyberGIS Center and CyberInfrastructure & Geospatial Information Laboratory (CIGI)*  *June 2019-Present*
– Building cyberinfrastructure using Docker Swarm, Hadoop and Kubernetes clusters. I manage an
  undergraduate research assistant and maintain the development branch of CyberGIS-Jupyter
– Programming spatially-explicit models for disease and land-use change

**Informatics Researcher**  📍 Los Angeles, CA
*Institute for Pure and Applied Mathematics at UCLA / Praedicat, Inc.*  *June 2018 -August 2018*
– Worked for Praedicat, Inc. automating information extraction, classification, and aggregation from web data
  for business profiling of over 52,600 companies and corporate entities.
– Worked for IPAM to develop a novel algorithm for computational fact-checking on knowledge graphs and a
  self-supervised machine learning algorithm for sentence importance which outperformed TF-IDF.

**Computational Finance Research Assistant**  📍 New Wilmington, PA
*Dr. Charles Shaffer*  *January 2017 - May 2018*
– Integrated cryptocurrency trading into Dr. Shaffer's algorithmic currency trading application.

## 🏛 Teaching Experience

**Teaching Assistant and Tutor**  📍 New Wilmington, PA
*Westminster College*  *August 2015 - December 2018*
– Assisted professors in grading, working with students individually, and developing curriculum for classes
  covering coursework in Calculus, Computer Science, and Operations Research.

## 📰 Papers

[1] J.-Y. Kang, J. Aldstadt, **A. C. 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* (H. Kavak, J.-S. Kim, and
    S. Wise, eds.), (New York, NY, USA), pp. 32–35, ACM, 2019.

[2] **A. C. Michels**, "Capturing the Predictive Power of Cortical Learning Algorithms," May 2019. Bachelor's
    thesis.

[3] H. Ahuja and **A. C. Michels**, "Computational Fact-Checking through Relational Similarity based Path
    Mining," Jan 2019. AMS Contributed Paper Session at the 2019 Joint Mathematics Meeting.

[4] H. Ahuja, **A. C. Michels**, and L. Shi, "Information Extraction and Aggregation from Unstructured Web
    Data for Business Profiling," tech. rep., Institute for Pure and Applied Mathematics and Praedicat, Inc., Los
    Angeles, California, Aug 2018.

# 📖 Research Interests

- Agent-Based Models
- Complex Systems
- High-Performance Computing
- Economic Geography
- Network Science
- Spatial Optimization

# 🧑‍🏫 Selected Presentations

**Oral Presentations**

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

**Computational Fact-Checking through Knowledge Graphs** *January 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

**Decentralizing the World with Blockchain** *April 2018*
*Undergraduate Research & Arts Celebration* 📍 New Wilmington, PA

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

**Optimizing Throughput, Cost, and Safety in Toll Booth Plazas** *February 2017*
*Pi Mu Epsilon Regional Conference* 📍 Youngstown, OH

**Poster Presentations**

**CyberGIS-Jupyter for Spatially Explicit Agent-based Modeling** *November 2019*
*Illinois GIS Day* 📍 Champaign, IL

**Reproducible Spatial Data Science with Kubernetes on CyberGIS-Jupyter** *November 2019*
*Illinois GIS Day* 📍 Champaign, IL

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

**Agent-Based Simulations for Repeated Play Game Theory** *April 2017*
*Undergraduate Research & Arts Celebration* 📍 New Wilmington, PA

# 🎗 Awards

**Cyberinfrastructure Specialty Group Robert Raskin Student Competition Finalist** November 2019
*"research in geospatial cyberinfrastructure"* American Association of Geographers (AAG)

**UCGIS Prize for Advances in Geospatial Problem Solving** July 2019
*"Advancing Reproducibility in Geospatial Research at the AAG-UCGIS Summer School 2019"* 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

**Dr. Thomas R. Nealeigh Mathematics Scholarship** March 2018
*"awarded to an outstanding junior or senior mathematics major"* Westminster College

**Paul E. Brown Memorial Scholarship** March 2017
*"given based on merit and academic achievement"* Westminster College

**Honorable Mention** January 2017
*"excellent modeling and sensitivity analysis"* COMAP International Mathematical Modeling Competition

**Mathematics Book Award** March 2017
*"presented to the sophomore Mathematics major with the highest GPA"* Westminster College

# 👥 Professional Associations

**American Association of Geographers (AAG)**

Specialty Groups:

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