

# Junjun Yin, Ph.D

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## Contact Information

Room 813, Oswald Tower  
The Pennsylvania State University  
University Park, PA, 16802, United States

Phone: +1 217-819-6366  
Email: [jyin@psu.edu](mailto:jyin@psu.edu)  
URL: <https://yinjunjun.github.io>

## Current Position

*Assistant Research Professor*  
Social Science Research Institute  
The Pennsylvania State University

*ICDS Associate*  
Institute for Computational and Data  
Sciences

## Previous Position

*Postdoctoral Research Fellow*  
CyberGIS Center for Advanced Digital and Spatial Studies  
Department of Geography and Geographic Information Science  
National Center for Supercomputing Applications (NCSA)  
University of Illinois at Urbana-Champaign, IL, USA

## Research Interests

GIScience; Spatial Analysis and Modeling; Urban Informatics; Computational Geography;  
Geo-Complexity and Human Mobility; (Geo)Visual-Analytics and Data Mining; GeoSpatial Big Data; GeoComputing; Spatial Interaction; High-performance (cyberGIS), Web and Mobile GIS

## Education

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| 2009 - 2013 | <i>Ph.D</i> in Spatial Information Science, Dublin Institute of Technology, Ireland<br>Scince Fundation Ireland Scholarship<br><i>Advisors: Dr. James D. Carswell (Dublin Institute of Technology), Dr. Michela Bertolotto (University College Dublin)</i> |
| 2006 - 2009 | <i>MSc</i> in Geoinformatics, University of Gävle, Sweden<br><i>Advisor: Dr. Bin Jiang (University of Gävle)</i>   |
| 2002 - 2006 | <i>BSc</i> in Electronics Engineering, University of Electronic Science and Technology of China  |

## Academic Experience

2017-	Social Science Big Data Research Scientist, Pennsylvania State University, USA
2016	Lecturer, Department of Geography and Geographic Information Science; University of Illinois at Urbana-Champaign, USA
2014-2016	Postdoctoral Research Associate, CyberGIS Center for Advanced Digital and Spatial Studies; National Center for Supercomputing Applications; University of Illinois at Urbana-Champaign, USA
2013-2014	Assistant Lecturer, Dublin Institute of Technology, Ireland
2007-2008	Research Assistant, Hong Kong Polytechnic University, Hong Kong SAR, China

## Research Grants and Projects

**Senior Personnel.** “Frameworks: CyberGISX for Advancing Knowledge Frontiers of Social Resilience and Equity”. NSF (National Science Foundation) NNA grant, \$5,000,000 (**pending**)

**PI.** “Identifying Discrimination During COVID-19 Pandemic on Twitter”, ICDS (Institute for Computational and Data Sciences) COVID-19 explore grant, \$50,000. Project dates: 07/01/2020—06/30-2022

**Co-PI.** “Are we more willing to speak up through mobile phones? A comparison of desktop vs. mobile political sharing on Facebook”. SSRC (Social Science Research Council) grant, \$49,017. Project dates: 02/01/2020—01/31-2021

**Senior Personnel.** “Pursuing Opportunities for Long-term Arctic Resilience for Infrastructure and Society”. NSF (National Science Foundation) NNA grant, \$3,000,000. Project dates: 01/01/2020—12/31-2022

**Co-PI.** “RR: The Generalizability and Replicability of Twitter Data for Population Research”. NSF (National Science Foundation) SOC grant, \$500,000. Project dates: 07/15/2018—06/30-2021

**Co-PI.** “Understanding National Park Visitors’ Spatial Behavior with Twitter Data”. Penn State Seed Grant (SSRI, ICS, and IST), \$20,000. Project dates: 03/01/2019—02/28-2021

**PI.** “Data Science: Mining sequential mobility patterns from semantic Twitter user trajectories”. Microsoft Azure Data Science Research Award, \$10,000. Project dates: 05/01/2018—04/30/2019

**Co-PI.** “An Innovative Approach to Tackle the Opioid Epidemic: Utilizing Twitter Data and Integrating Big Data Analytics and Spatial and Social Network Analyses”. Social Science Research Institute Level 2 Research Award, \$20,000. Project dates: 09/01/2018—08/30-2020

**Co-I.** “Cognitive Changes Associated with Hormonal Treatment for Breast Cancer”. Health & Environment initiative seed grant award, \$49,972. Project dates: 07/01/2017—06/30-2019

**Co-PI.** “The Generalizability and Replicability of Twitter Data for Population Research”. ICS seed grant award, \$35,000. Project dates: 07/01/2018—06/30-2019

**Co-PI.** “Ecological Migration in a Large-Scale Quasi-Experiment Design in China: Implications of Climate Change, Landscape Structure, Ecosystem Services and Government Intervention”. IEEE seed grant award, \$25,000. Project dates: 04/15/2017—06/30-2018

**PI.** “Mining Twitter User Demographics as a First-Step in Big Data for Population Re-

search”. XSEDE (Extreme Science and Engineering Discovery Environment) Startup computational resource allocation award, 50,000 SUs & 40 TB storage (estimated \$2,794.78). Project dates: 03/27/2017–03/26-2019

**PI.** “A cloud computing enabled GIS platform for the integration and synthesis of multi-layer geospatial data sources in urban studies: Understanding urban dynamics from geospatial Big Data”. Microsoft Azure Data Science Research Award, \$20,000. Project dates: 12/04/2016–12/03/2017

**SP/Research Scientist.** “Activity space contexts and measuring environmental exposure in behavioral research”. R21 NCI grant (ASCMEE Study).

## Publications

### SUBMITTED

- 2020 Chi, G., **Yin, J.**, Van Hook, J., Plutzer, E. and Xu, H. The Mis-representativeness of Twitter Data. (*submitted to Demography*)
- 2020 **Yin, J.**, Gao, Y., Chi, G. and Van Hook, J., An Evaluation of Geo-located Twitter Data for Measuring Human Migration. (*submitted to Annals of the Association of American Geographers*)
- 2020 Zheng, K., **Yin, J.**, Liu, M., Zhang, M. and Xie, M., A joint neural network model for geographical entity relation extraction from Chinese texts. (*submitted to Knowledge and Information Systems*)
- 2020 **Yin, J.** and Chi, G., Understanding Spatiotemporal Urban Activity Patterns: A GIS-based Data Synthesis Approach. (*In preparation*)
- 2020 **Yin, J.**, Brooks, M., Wang, D. and Chi, G., Characterizing Climate-Change Sentiment in Alaska with Twitter Data. (*In preparation*)

### PEER REVIEWED JOURNALS

- 2020 **Yin, J.** and Chi, G., Characterizing People’s Daily Activity Patterns in the Urban Environment: A mobility network approach with geographic context-aware Twitter data. *Annals of the Association of American Geographers*, (forthcoming)
- 2020 Abdar, M., Basiri, M.E., **Yin, J.**, Asadi, S. and Chi, G., Energy Choices in Alaska: Mining People’s Perception and Attitudes from Geotagged Tweets. *Renewable & Sustainable Energy Reviews*, 124, p.109781
- 2019 Pu, Y., Zhao, X., Chi, G., Zhao, S., Wang, J., Jin, Z. and **Yin, J.** (2019). Design and implementation of a parallel geographically weighted k-nearest neighbor classifier. *Computers & Geosciences*, 127, pp. 111-122
- 2018 Gao, Y., Wang, S. Padmanabhan, A., **Yin, J.** and Cao, G. (2018). Mapping Spatiotemporal Patterns of Events Using Social Media: A Case Study of Influenza Trends. *International Journal of Geographical Information Science*, 32(3), pp. 425-449
- 2017 **Yin, J.**, Soliman, A., Yin, D. and Wang, S. (2017). Delineate Urban Boundaries in Great Britain from the Network of Large Scale Twitter User Spatial Interactions. *International Journal of Geographical Information Science*, 31(7), pp. 1293-1313

- 2017 Soliman, A., Soltani, Q., **Yin, J.**, Padmanabhan, A., and Wang, S (2017). Social sensing of urban land use based on analysis of Twitter users' mobility patterns. *PLoS ONE*, 12(7): e0181657. DOI:10.1371/journal.pone.0181657
- 2017 Zheng, K., Kwan, M.P., Fang, L., **Yin, J.**, Gu, D. and Fu, Y. (2017). A Topology-concerned Spatial Vector Data Model for Column-oriented Databases. *International Journal of Database Theory and Application*, 10(5), pp. 33-46
- 2016 **Yin, J.**, Gao, Y., Du, Z. and Wang, S. (2016). Exploring Multi-Scale Spatiotemporal Twitter User Mobility Patterns with a Visual-Analytics Approach. *ISPRS International Journal of Geo-Information*, 5(10):187.
- 2016 Jiang, B., Ma, D., **Yin, J.** and Sandberg, M. (2016). Spatial Distribution of Tweet Numbers and Densities in Cities. *Geographical Analysis*, 48(3), pp. 337-351
- 2015 Jiang, B., **Yin, J.** and Liu, Q. (2015). Zipf's Law for All the Natural Cities around the World. *International Journal of Geographical Information Science*, 29(3), pp. 498-522
- 2014 Jiang, B. and **Yin, J.** (2014). Ht-Index to Quantify the Fractal or Scaling Structure of Geographic Features. *Annals of the Association of American Geographers*, 104(3), pp. 530-540
- 2013 **Yin, J.** and Carswell, J.D. (2013). Spatial Search Techniques for Mobile 3D Queries in Sensor Web Environments. *ISPRS International Journal of Geo-Information*, 2(1): pp.135-154
- 2010 Carswell, J. D., **Yin, J.** and Gardiner, K. (2010). 3DQ: Threat Dome Visibility Querying on Mobile Devices *GIM International*, 24(8)
- 2010 Carswell, J.D., Gardiner, K. and **Yin, J.** (2010). Mobile Visibility Querying for LBS. *Transactions in GIS*, 14(6): pp. 791-809, Wiley online library
- 2009 Jiang, B., **Yin, J.** and Zhao, S. (2009). Characterizing the human mobility pattern in a large street network. *Physical Review E*, 80(2), 021136
- 2008 Jiang, B., Zhao, S. and **Yin, J.** (2008). Self-organized natural roads for predicting traffic flow: a sensitivity study. *Journal of statistical mechanics: Theory and experiment*, P07008, IOP Publishing

#### PEER REVIEWED CONFERENCES AND LECTURE NOTES

- 2021 **Yin, J.**, Brooks, M., Wang, D. and Chi, G., Characterizing Climate-Change Sentiment in Alaska with Twitter Data. *Population Association of America (PAA) Annual Meeting*, May 5-8, 2021 (full paper, oral presentation)
- 2021 **Yin, J.**, Gao, Y., Chi, G. and Van Hook, J., An Evaluation of Geo-located Twitter Data for Measuring Human Migration. *Population Association of America (PAA) Annual Meeting*, May 5-8, 2021 (full paper, oral presentation)
- 2020 Liang, Y., **Yin, J.**, Pan, B., Chi, G., Andris, C., Miller, Z., Jorgenson, J. and Nickerson, N. (2020). Understanding Demographics and Experience of Tourists in Yellowstone National Park through Social Media. *Travel and Tourism Research Association: Advancing Tourism Research Globally*. 54
- 2019 **Yin, J.**, and Chi, G. (2019). Understanding Spatiotemporal Urban Activity Patterns with Geo-located Twitter data: A GIS-based Synthesis Approach. *66th Annual North American Meetings of the Regional Science Association International (NARSC)*, November 13-16, 2019, Pittsburg, Pennsylvania
- 2019 **Yin, J.**, and Chi, G. (2019). An Evaluation of Geo-located Twitter Data as Indicators for Human Migration. *IUSSP Research Workshop on Digital Demography in the Era of Big Data*,

June 6-7, 2019, Seville, Spain

- 2019 Chi, G., **Yin, J.**, Van Hook, J., Plutzer, E. and Heng, X. (2019). The Generalizability of Twitter Data for Population Research. *Population Association of America (PAA) Annual Meeting*, April 22-25, Washington, DC, USA
- 2018 **Yin, J.**, Chi, G. and Van Hook, J. (2018). Evaluating the Representativeness in the Geographic Distribution of Twitter User Population. *The 12th Workshop on Geographic Information Retrieval in ACM SIGSPATIAL 2018*, November 6-9, 2018, Seattle, Washington, USA
- 2018 Jeong, M., **Yin, J.**, and Wang, S. (2018). Outliers Detection and Comparison of Origin-Destination Flows with Data Depth. *The 10th International Conference on Geographic Information Science (GIScience 2018)*, August 28-31, 2018, Melbourne, Australia
- 2017 **Yin, J.** (2017). Mining sequential mobility pattern from semantics enriched Twitter user trajectories. *NSF Mobility Workshop on Analyzing Movement and Mobility within Geographic Context*, May 11-12, 2017, The Ohio State University, Columbus, Ohio
- 2017 Chi, G., **Yin, J.** and Hook, J.V. (2017). Predicting Twitter User Demographics as a First Step in Big Data for Population Research. *The 28th International Population Conference of the International Union for the Scientific Study of Population*, October 29-November 4, 2017, Cape Town, South Africa
- 2016 **Yin, J.**, Lu, B., Yin, D. and Wang, S. (2016). A scalable visual-analytics approach for studying mobility networks: Revealing hierarchical structures in taxi mobility flows of New York, *The Third International Conference on CyberGIS and Geospatial Data Science*, July 26-28, 2016, Urbana, Illinois
- 2016 **Yin, J.**, Gao, Y. and Wang, S. (2016). Urban Sensing from Volunteered Citizen Participation using Mobile Devices. In *Seeing Cities through Big Data: Research, Methods and Applications in Urban Informatics*, Springer
- 2015 Soliman, A., **Yin, J.**, Soltani, K., Padmanabhan, A., and Wang, S. (2015). Where Chicagoans tweet the most: Semantic analysis of preferential return locations of Twitter users, *1st International Workshop on Smart Cities and Urban Analytics 2015, 23rd ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*
- 2014 **Yin, J.** and Wang, S. (2014). Understanding the Evolvments of Natural Cities from Night-time Light Images: A CyberGIS-Enhanced Approach to Large Scale Geospatial Data Analysis, *The Second International Conference on CyberGIS and Geodesign*, August 19-21, 2014, Redlands, California
- 2014 **Yin, J.**, Gao, Y. and Wang, S. (2014). CyberGIS Enabled Urban Sensing from Volunteered Citizen Participation using Mobile Devices. *NSF Workshop on Big Data and Urban Informatics 2014*
- 2013 Truong-Hong, L., Thi, T.T.P, **Yin, J.** and Carswell, J.D. (2013). Detailed 3D building models for Google Earth integration. In *Proceedings of the 13th International Conference on Computational Science and Its Applications (ICCSA 2013)*, Ho Chi Minh City, Vietnam: Springer (**\*Best paper award**)
- 2013 Thi, T.T.P, Truong-Hong, L., **Yin, J.** and Carswell, J.D. (2013). Exploring Spatial Business Data: A ROA based eCampus application. In *Proceedings of the 11th International conference on Web and Wireless Geographical Information Systems*, Banff, AB: Springer Berlin Heidelberg, pp. 164-179
- 2012 **Yin, J.** and Carswell, J.D. (2012). Effects of Variations in 3D Spatial Search Techniques on Mobile Query Speed vs Accuracy. *Web and Wireless Geographical Information Systems*,

Naples, Italy. (\***Best paper award**)

- 2012 Carswell, J.D. and **Yin, J.** (2012). Mobile Spatial Interaction in the Future Internet of Things. In *Proceedings of the 20th International Conference on Geoinformatics (GEOINFORMATICS)*, 2012, pp. 1-6
- 2012 **Yin, J.** and Carswell, J.D. (2012). MobiSpatial: Open-source for Mobile Spatial Interaction. *Proceedings of the 27th Annual ACM Symposium on Applied Computing*, pp. 572-573
- 2012 **Yin, J.** and Carswell, J.D. (2011). Touch2Query enabled mobile devices: A case study using OpenStreetMap and iPhone. *Web and Wireless Geographical Information Systems*, pp. 203-218, Springer
- 2009 Gardiner, K., **Yin, J.** and Carswell, J.D. (2009). EgoViz: A mobile based spatial interaction system. *Web and Wireless Geographical Information Systems*, pp. 135-152, Springer

#### BOOKS

- 2009 **Yin, J.** (2009), *The Topological Patterns of Urban Street Networks: Exploring the topological patterns of urban street networks from analytical and visual perspectives*, VDM: Germany, ISBN: 3639161734

#### DATA

- 2020 Chi, G., **Yin, J.**, Van Hook, J., Plutzer, E. and Xu, H. Estimation of Twitter user demographics in the USA, 2014. *Harvard Dataverse*, doi:10.7910/DVN/PKKAPK

#### INVITED TALKS

- 2020 Yin, J. (2020). Uncovering universal human activity patterns with geospatial big data: complexity, unity, and regularity. Mar, 2020, Auburn University, Auburn, AL, USA
- 2020 Yin, J. (2020). Computational Social Sciences: spatial interactions and geo-complexity. Feb, 2020, University of Arkansas, Fayetteville, AR, USA
- 2019 Yin, J. (2019). Spatial Networks: A computational geography approach to new insights into spatial interactions and geo-complexity. Jan, 2019, University of Florida, Gainesville, FL, USA
- 2018 Yin, J. (2018). Computational Geography for Capturing Geo-Complexity in Urban Studies. June, 2018, Newcastle University, Newcastle upon Tyne, UK
- 2018 Yin, J. (2018). Advanced Methods and Techniques for Big GeoData. June, 2018, ITC, University of Twente, Enschede, the Netherlands
- 2018 Yin, J. (2018). Geo-Complexity and Human mobility: Through the lens of spatial Big Data to understand urban dynamics. February, 2018, University of Denver, Denver, USA
- 2018 Yin, J. (2018). High-performance Computing with Hadoop. Software in the Humanities and Social Sciences Workshop. February, 2018, Penn State, University Park, USA

#### PRESENTATIONS

- 2018 Yin, J. (2018). Spatial Interaction Patterns of Preferential Return Behaviors in People's Daily Life. The Association of American Geographers Annual Meeting, April 10-14, 2018,

New Orleans, Louisiana, USA

- 2017 Yin, J. (2017). A mobility network approach to modeling urban spatial interactions: Insights from the movement Big Data in New York City. The Association of American Geographers Annual Meeting, April 5-9, 2016, Boston, Massachusetts, USA
- 2016 Yin, J. and Wang, S. (2016). Mining Mobility Patterns From Semantic Twitter User Trajectories. The Association of American Geographers Annual Meeting, March 29-April 2, 2016, San Francisco, California, USA
- 2015 Yin, J. and Wang, S. (2015). Finding community structures of UK cities based on large-scale Twitter user mobility patterns, *Association of American Geographers Annual Meeting, Chicago, 2015*, April 21-25, 2015, Chicago, Illinois, USA
- 2011 Yin, J. (2011). Web-service based Mobile Geospatial Application Development using Python, *PyCon 2011*, Dublin, Oct 8-9

## Teaching Experience as Instructor

- 2016 - GEOG 479: Advanced Topics in GIS – CyberGIS, Spring, 2016, *Lecturer*, Department of Geography and Geographic Information Science, UIUC
- 2015 - Parallel Databases, *workshop/short course series*, CyberGIS Center, UIUC
- 2015 - Interactive Visualization of Large-scale Movement Data using Apache Spark, *Summer school series*, CyberGIS Center, UIUC
- 2015 - Introducing the CyberGIS Toolkit in high performance computing environment, *workshop/short course series*, CyberGIS Center, UIUC
- 2015 - Taming with geospatial Big Data with Hadoop, *workshop/short course series*, CyberGIS Center, UIUC
- 2014 - Getting to know CyberGIS, *workshop/short course series*, CyberGIS Center, UIUC
- 2014 - 2016 Education and outreach at the CyberGIS Commons, *Lead*, University of Illinois at Urbana-Champaign, 2014 - 2016
- 2013 Programming in C, *assistant lecturer*, Dublin Institute of Technology, 2013 - 2014
- 2013 Object oriented programming for game development, *senior demonstrator/assistant lecturer*, Dublin Institute of Technology, 2013 - 2014
- 2013 User interface design and GUI programming with Java, *senior demonstrator/assistant lecturer*, Dublin Institute of Technology, 2013 - 2014

## Skills

Programming languages: Java, Python, Objective-C, Matlab, R, JavaScript, NoSQL

High performance computing: Apache Hadoop, Apache Spark, MongoDB

Mobile and Web development: iOS and Android, Cesium 3D Globe, D3.js

Spatial databases: PostGIS, Oracle Spatial, SpatiaLite, ArcGIS

## Honors and Awards

- 2013 *Fiosraigh Head of School Research Award*: for excellence in research, Dublin Institute of Technology

2013	<i>EU Future Internet Award</i> : for excellence in Future Internet research
2009	<i>PhD scholarship from Science Foundation Ireland (SFI)</i> : StratAG PhD scholarship
2006	<i>Outstanding Graduate Student Award</i> : University of Electronic Science and Technology of China
2006	<i>Best Undergraduate Dissertation Award</i> : Department of Electronic Engineering, University of Electronic Science and Technology of China
2005	<i>National Undergraduate Electronic Design Contest: Second prize</i> : Embedded system for Multi-channel and frequency wave generating, (Team: Junjun Yin, Yu Chen, and Xia Yu)

## Service to the Profession

### EDITORIAL BOARD

- **Topic editor** Geosciences, MDPI, (2020-2022)
- **Guest editor** Special Issue of “Chinese Sociological Dialogue”: Spatiotemporal Big Data and Sustainable Social Development (2017)

### PROGRAM COMMITTEES AND ORGANIZERS

- **PC** member for W2GIS 2020: 18th International Symposium on Web and Wireless Geographical Information Systems, Wuhan, China, May 14-15, 2020
- **Chair** for Innovations in Spatial Data Analysis and Modeling, 66th Annual North American Meetings of the Regional Science Association International (NARSC), Pittsburgh, Pennsylvania, November 13-16, 2019
- **PC** member for W2GIS 2019: 17th International Symposium on Web and Wireless Geographical Information Systems, Kyoto, Japan, May 16-17, 2019
- **PC** member for International Conference on Location-based Social Media Data, March 5-7, 2015, Athens, Georgia, USA
- **Co-chair** for Advances in Spatial Interaction Models and Methods in the Big Data Era I, Spatiotemporal Symposium, 2018 AAG Annual Meeting, New Orleans, April 10 – April 14, 2018
- **Chair** for Big Movement Data for Geospatial Analytics on Urban Interactions, Symposium on Human Dynamics in Smart and Connected Communities, 2017 AAG Annual Meeting, Boston, Massachusetts, April 5 - April 9, 2017
- **Chair** for Understanding Urban Dynamics Based on Movement Big Data, 2016 AAG Annual Meeting, San Francisco, California, March 29 - April 2, 2016

### REVIEWER FOR PROPOSALS

- *Methodology, Measurement, and Statistics Program, National Science Foundation* (2019)



#### REVIEWER FOR JOURNALS

Has reviewed for **28** journals

- *Annals of the American Association of Geographers* (2018-2020)
- *International Journal of Geographical Information Science (IJGIS)* (2010, 2014-2018)
- *Applied Geography* (2020)
- *Journal of Geovisualization and Spatial Analysis* (2018)
- *Cartography and Geographic Information Science* (2018)
- *Computers, Environment and Urban Systems (CEUS)* (2009-2010, 2013-2019)
- *Journal of Urban Technology* (2019-2020)
- *Transactions on Intelligent Transportation Systems* (2019-2020)
- *EPJ Data Science* (2017)
- *Geomatica* (2018)
- *GeoJournal* (2018)
- *Chinese Sociological Dialogue* (2018)
- *Spatial Information Research* (2018)
- *Sensors* (2018)
- *Geographical Analysis* (2016-2018)
- *Cluster Computing* (2017-2020)
- *Journal of Geographical Systems* (2016-2017)
- *Demography* (2016-2019)
- *Environment and Planning B: Planning and Design* (2016-2017)
- *Science China Information Science* (2015)
- *PLOS One* (2013-2020)
- *Cities* (2014)
- *ISPRS International Journal of Geo-Information* (2013-2020)
- *Electronics* (2020)
- *Journal of Location Based Services* (2013)

#### REVIEWER FOR CONFERENCES

- *GIScience* (2014, 2016)
- *UbiComp* (2016)
- *W2GIS* (2019)

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