

# Junjun Yin, Ph.D

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## Contact Information

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URL: <https://yinjunjun.github.io/home/>

## Current Position

*Assistant Research Professor*  
Social Science Research Institute

*ICS Associate*  
Institute for CyberScience  
The Pennsylvania State University, University Park, PA, USA

## 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; Computational Geography; Urban 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><i>Advisors:</i> Dr. James D. Carswell (Dublin Institute of Technology), Dr. Michela Bertolotto (University College Dublin) |
| 2006 - 2009 | <i>MSc</i> in Geomatics, University of Gävle, Sweden<br><i>Advisor:</i> Dr. Bin Jiang (University of Gävle)  |
| 2002 - 2006 | <i>BSc</i> in Electronic Engineering, University of Electronic Science and Technology of China   |

## Academic Experience

2016-present	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	Senior Demonstrator, Dublin Institute of Technology, Ireland
2007-2008	Research Assistant, Hong Kong Polytechnic University, Hong Kong SAR, China

## Research Grants and Projects

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

**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, lead PI: Prof. Zhen Lei, \$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, lead I: Prof. Sheri A. Berenbaum, \$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, lead PI: Prof. Guangqing Chi, \$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, lead PI: Prof. Guangqing Chi, \$25,000. Project dates: 04/15/2017–06/30-2018

**PI.** “Mining Twitter User Demographics as a First-Step in Big Data for Population Research”. 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), lead PI: Prof. Stephen Matthews.

## Publications

### PEER REVIEWED JOURNALS

- 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

- 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

## INVITED TALKS

- 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, <i>Lead</i> , University of Illinois at Urbana-Champaign, 2014 - 2016
2013	Programming in C, <i>assistant lecturer</i> , Dublin Institute of Technology, 2013 - 2014
2013	Object oriented programming for game development, <i>senior demonstrator/assistant lecturer</i> , Dublin Institute of Technology, 2013 - 2014
2013	User interface design and GUI programming with Java, <i>senior demonstrator/assistant lecturer</i> , 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	<i>Fiosraigh Head of School Research Award</i> : 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

### GUEST EDITORS

Guest editor for Special Issue of “Chinese Sociological Dialogue”: Spatiotemporal Big Data and Sustainable Social Development (2017)

### PROGRAM COMMITTEES AND ORGANIZERS

- **PC** member for W2GIS 2019: 17th International Symposium on Web and Wireless Geographical Information Systems, May 16-17, 2019, Kyoto, Japan
- **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 JOURNALS

Has reviewed for **21** journals

- *Annals of the American Association of Geographers* (2018)
- *International Journal of Geographical Information Science (IJGIS)* (2010, 2014-2018)
- *Journal of Geovisualization and Spatial Analysis* (2018)
- *Cartography and Geographic Information Science* (2018)
- *Computers, Environment and Urban Systems (CEUS)* (2009-2010, 2013-2017)
- *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)
- *Journal of Geographical Systems* (2016-2017)
- *Demography* (2016-2018)
- *Environment and Planning B: Planning and Design* (2016-2017)
- *Science China Information Science* (2015)
- *PLOS One* (2013, 2015, 2017)
- *Cities* (2014)
- *ISPRS International Journal of Geo-Information* (2013-2015)
- *Journal of Location Based Services* (2013)

#### REVIEWER FOR CONFERENCES

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

## Referees

### **Dr. Bin Jiang**

Professor  
Department of Technology and Built Environment  
University of Gävle, SE-801 76  
Gävle, Sweden, Office: 11:232  
Email: bin.jiang@hig.se  
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### **Dr. James D. Carswell**

Principal Investigator  
Head of Spatial Information Technologies Research  
Digital Media Centre  
Dublin Institute of Technology, DIT Aungier Street, Dublin 2, Ireland  
Email: jcarswell@dit.ie  
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### **Dr. Shaowen Wang**

Professor and Department Head  
Richard and Margaret Romano Professorial Scholar  
CyberGIS Center for Advanced Digital and Spatial Studies  
CyberInfrastructure and Geospatial Information Laboratory  
Department of Geography and Geographic Information Science  
University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA  
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### **Dr. Guangqing Chi**

Associate Professor  
Department of Agricultural Economics, Sociology, and Education (112E Armsby)  
Population Research Institute (803 Oswald)  
The Pennsylvania State University, University Park, PA 16802  
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