

# Wei Kang

ASSISTANT PROFESSOR · DEPARTMENT OF GEOGRAPHY AND THE ENVIRONMENT

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## Education

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### Arizona State University

Tempe, AZ

#### PHD GEOGRAPHY

Aug 2014 - May 2018

- Committee: Sergio Rey (chair), Stewart Fotheringham, Xinyue Ye
- Dissertation Title: Issues in the Distribution Dynamics Approach to the Analysis of Regional Economic Growth and Convergence: Spatial Effects and Small Samples

### Peking University

Beijing, China

#### MS CARTOGRAPHY AND GIS

Sept 2011 - Jun 2014

- Advisor: Dr. Yuefeng Liu
- Thesis Title: An Atomic Model of Spatiotemporal Query and Its Implementation Method Based on Object-Oriented Snapshot Model

### Wuhan University

Wuhan, China

#### BS GEOGRAPHIC INFORMATION SYSTEM

Sept 2007 - Jun 2011

- Thesis advisor: Dr. Wenping Jiang
- Thesis Title: Spatial Cognitive Research of 3D Map Scene

## Academic Appointments

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2022- **Assistant Professor**, University of North Texas

2020-2022 **Research Scientist**, Inland Center for Sustainable Development, School of Public Policy, University of California Riverside

2018-2020 **Postdoctoral Scholar**, Center for Geospatial Sciences, University of California Riverside

## Publications

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### REFEREED JOURNAL ARTICLES AND BOOK CHAPTERS

(Forthcoming) **Kang, W.** 2022. Spatial Dynamics. Handbook of Spatial Analysis in the Social Sciences, Rey, S. J., and R. Franklin (eds.) Edward: Elgar Cheltenham.

2022 **Kang, W.**, Q. Wang. "The impact of covid-19 on small businesses in the us: A longitudinal study from a regional perspective." International Regional Science Review.

2022 Rey, S. J., L. Anselin, P. Amaral, D. Arribas-Bel, R.X. Cortes, J.D. Gaboardi, **W. Kang**, E. Knaap, Z. Li, S. Lumnitz, T.M. Oshan, H. Shao, L.J. Wolf. "The PySAL ecosystem: philosophy and implementation." Geographical Analysis, 54(3): 467-487.

2022 **Kang, W.**, E. Knaap, S.J. Rey. "Changes in the economic status of neighborhoods in U.S. metropolitan areas from 1980 to 2010: stability, growth, and polarization." Urban Studies, 59(13): 2774-2800.

2021 Wang, Q., **W. Kang**. "What Are the Impacts of COVID-19 on Small Businesses in the U.S.? Early Evidence based on the Largest 50 MSAs." Geographical Review.

2021 Yousif, A., K. Ibrahim, **W. Kang**, W.Z.W. Zin. "Robust empirical Bayes approach for Markov chain modeling of air pollution index." Journal of Environmental Health Science and Engineering, 19(1): 343-356.

2021 **Kang, W.**, S.J. Rey. "Smoothed Estimators for Markov Chains with Sparse Spatial Observations." Geographical Analysis, 53(2): 307-328.

2021 Wei, R., T.H. Grubestic, **W. Kang**. "Spatiotemporal patterns of alcohol outlets and violence: A Spatially Heterogeneous Markov Chain Analysis." Environment and Planning B: Urban Analytics and City Science, 48(8): 2151-2166.

- 2020 **Kang, W.**, S.J. Rey, L.J. Wolf, E. Knaap, S.Y. Han. "Sensitivity of Sequence Methods in the Study of Neighborhood Change in the United States." *Computers, Environment and Urban Systems*, 81.
- 2020 **Kang, W.**, S.J. Rey. "Inference for Income Mobility Measures in the Presence of Spatial Dependence." *International Regional Science Review*, 43(1-2): 10-39.
- 2020 **Kang, W.**. "PySAL and Spatial Statistics Libraries." *The Geographic Information Science & Technology Body of Knowledge* (3rd Quarter 2020 Edition), John P. W. (eds.)
- 2020 Shao, H., W. Li, **W. Kang**, S.J. Rey. "When PySAL Meets CI: Towards an Interoperable and Replicable Cyberinfrastructure for Online Spatial-Statistical-Visual Analytics." *Journal of Geovisualization and Spatial Analysis*, 4(2): 1-16.
- 2020 Rey, S.J., S.Y. Han, **W. Kang**, E. Knaap, R.X. Cortes. "A Visual Analytics System for Space-Time Dynamics of Regional Income Distributions Utilizing Animated Flow Maps and Rank-based Markov Chains." *Geographical Analysis*, 52(4): 537-557.
- 2020 Lumnitz, S., D. Arribas-Bell, R.X. Cortes, J. Gaboardi, V. Griess, **W. Kang**, T. Oshan, L. Wolf, S. Rey. "'splot' - visual analytics for spatial statistics." *Journal of Open Source Software*, 5(47): 1882.
- 2020 Yousif, A., K. Ibrahim, **W. Kang**, W.Z.W. Zin. "Modeling the Spatio-Temporal Dynamics of Air Pollution Index Based on Spatial Markov Chain Model." *Environmental Monitoring and Assessment*, 192(11): 1-24.
- 2019 Yousif, A., K. Ibrahim, **W. Kang**, W.Z.W. Zin. "Markov Chain Modeling for Air Pollution Index Based on Maximum A Posteriori Method." *Air Quality, Atmosphere and Health*, 12: 1521-1531.
- 2019 Organizers, **W. Kang**, T. Oshan, L.J. Wolf, Discussants, G. Boeing, V. Frias-Martinez, S. Gao, A. Poorthuis, W. Xu. "A roundtable discussion: Defining urban data science." *Environment and Planning B: Urban Analytics and City Science*, 46(9):1756-1768.
- 2019 Han, S.Y., S. Rey, E. Knaap, **W. Kang**, L.J. Wolf. "Adaptive choropleth mapper: An open-source web-based tool for synchronous exploration of multiple variables at multiple spatial extents." *ISPRS International Journal of Geo-Information*, 8(11).
- 2019 Oshan, T., Z. Li, **W. Kang**, L.J. Wolf, A.S. Fotheringham. "MGWR: A Python Implementation of Multiscale Geographically Weighted Regression for Investigating Process Spatial Heterogeneity and Scale." *ISPRS International Journal of Geo-Information*, 8(6).
- 2019 Oshan, T., L.J. Wolf, A.S. Fotheringham, **W. Kang**, Z. Li, H. Yu. "A comment on geographically weighted regression with parameter-specific distance metrics." *International Journal of Geographical Information Science*, 33(7): 1289-1299.
- 2019 Yu, H., A.S. Fotheringham, Z. Li, T. Oshan, **W. Kang**, L.J. Wolf. "Inference in Multiscale Geographically Weighted Regression." *Geographical Analysis*, 52(1): 87-106.
- 2019 Rey, S.J., **W. Kang**, L.J. Wolf. "Regional Inequality Dynamics, Stochastic Dominance, and Spatial Dependence." *Papers in Regional Science*, 98(2): 861-881.
- 2018 **Kang, W.**, S.J. Rey. "Conditional and Joint Tests for Spatial Effects in Discrete Markov Chain Models of Regional Income Distribution Dynamics." *The Annals of Regional Science*, 61(1): 73-93.
- 2017 Fotheringham, A.S., W. Yang, **W. Kang**. "Multiscale Geographically Weighted Regression (MGWR)." *Annals of the American Association of Geographers*, 107(6): 1247-1265.
- 2016 Rey, S.J., **W. Kang**, L.J. Wolf. "The Properties of Tests for Spatial Effects in Discrete Markov Chain Models of Regional Income Distribution Dynamics." *Journal of Geographical Systems*, 18(4): 377-3985.
- 2015 Liu, Y., **W. Kang**. "An Atomic Model of Spatiotemporal Query Based on Object-Oriented Snapshot Model." *Acta Scientiarum Naturalium Universitatis Pekinensis*, 51(4): 755-762.
- 2014 Liu, Y., R. Si, **W. Kang**. "Research on the Complex Structural Properties of Urban Taxi Passenger Flow Network." *Acta Scientiarum Naturalium Universitatis Pekinensis*, 50(5): 873-879.

## IN REVIEW OR REVISION

- Wang, Q., **W. Kang**. "Distribution of Paycheck Protection Program and Small Businesses in Underserved Communities."
- Knaap, E., L. J. Wolf, S. J. Rey, **W. Kang**, S. Y. Han. "The Dynamics of Urban Neighborhoods: A Survey of Approaches for Modeling Socio-Spatial Structure."
- Knaap, E., S. J. Rey, R. X. Cortes, **W. Kang**. "The Daily Ballet of Temporary Integration: Spatio-Temporal Segregation Dynamics in Metropolitan U.S.A."

## IN PREP

**Kang, W.**, Q. Wang. “Racial and ethnic disparities in multidimensional housing insecurity amid COVID-19.”

**Kang, W.**, S. J. Rey. “A New Optimal Matching Approach to Uncovering Neighborhood Sequencing Structure.”

Wang, Q., **W. Kang**. “Are Families with Business Ownership More Resilient? Evidence from COVID-19 in the U.S.”

Wang, Q., **W. Kang**. “Race/Ethnicity, Gender, and Employment Security: Impacts of COVID-19 in the U.S.”

## TECHNICAL REPORTS

2022 **Kang, W.**, Y. White. “Overcrowdedness, Housing Insecurity, and COVID-19: The Case of Inland Southern California.” UCR Inland Center for Sustainable Development.

2022 **Kang, W.**, Y. White. “Housing Affordability in Riverside and San Bernardino Counties.” UCR Inland Center for Sustainable Development.

2021 **Kang, W.**, K. Kopko. “Living with the COVID-19 Pandemic for a Year: The Exacerbated Housing Insecurity Issue.” UCR Inland Center for Sustainable Development.

2020 **Kang, W.**, K. Kopko. “Housing Insecurity & the COVID-19 Pandemic.” UCR Inland Center for Sustainable Development.

2020 **Kang, W.**, K. Kopko. “Economic Impacts of COVID-19 on Small Businesses in the Inland Region.” UCR Inland Center for Sustainable Development.

## Presentations

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### CONFERENCE PARTICIPATION AND PRESENTATIONS

2022 (Organizer) “Sessions on Spatial Data Science for Impact: Advances in open source, open science frameworks, methods, applications, and infrastructures for the public good.” Association of American Geographers. New York, NY. Feb 25-Mar 1.

2021 (Organizer) “Sessions on Urban Data Science: Methods & Models for our Changing Cities.” Association of American Geographers. Virtual Conference. April.

2020 (Organizer) “Sessions on Urban Data Science: Methods & Models for our Changing Cities.” Association of American Geographers. Denver, CO. April.

2020 (Collaborator) Wei, R., T. H. Grubestic, and **W. Kang**. “Spatiotemporal patterns of alcohol outlets and violence: A Markov Chain Analysis.” Western Regional Science Association 59th Annual Meeting. Waikiki, HI. March.

2019 (Presenter) **Kang, W.**, and S. J. Rey. “A New Optimal Matching Approach to Uncovering Neighborhood Sequencing Structure.” 66th Annual North American Meetings of the Regional Science Association International. Pittsburgh, PA. November.

2019 (Presenter) **Kang, W.**, and S. J. Rey. “Urban income mobility as a multifaceted concept in the United States.” Association of American Geographers. Washington, DC. April.

2019 (Collaborator) Rey, S.J., and **W. Kang**. “Spatial Inequality, Mobility, and Equalization Dynamics for U.S. Metropolitan Areas 1970-2010.” Association of American Geographers. Washington, DC. April.

2019 (Organizer, Chair) “Sessions on Methods and Motivations for Measuring Spatial Inequality & Socioeconomic Mobility.” Association of American Geographers. Washington, DC. April.

2019 (Organizer, Chair) “Sessions on Urban Data Science: Methods & Models for our Changing Cities.” Association of American Geographers. Washington, DC. April.

2019 (Collaborator) **Kang, W.**, S.J. Rey, L.J. Wolf, E. Knaap, and S. Han. “Fishing for neighborhood trajectory patterns in the United States - a comparison of sequence analysis methods.” Western Regional Science Association 58th Annual Meeting. Napa Valley, CA. February.

2018 (Presenter) **Kang, W.**, S. J. Rey, L. J. Wolf, E. Knaap, and S. Han. “Fishing for neighborhood trajectory patterns - a comparison of sequence analysis methods.” 65th Annual North American Meetings of the Regional Science Association International. San Antonio, TX. November.

- 2018 (Collaborator) Rey, S.J., E. Knaap, S. Han, L. Wolf, and **W. Kang**. “Spatio-temporal Analysis of Socioeconomic Neighborhoods: The Open Source Longitudinal Neighborhood Analysis Package (OSLNAP).” Scientific Computing with Python. Austin. July.
- 2018 (Organizer, Chair, Panelist) “Symposium on Integrating Spatial Statistics within Open Source & Open Science.” Association of American Geographers. New Orleans, LA. April.
- 2018 (Presenter) **Kang, W.** and S.J. Rey. “Smoothed Estimators for Markov Chains with Sparse Spatial Observations.” Association of American Geographers. New Orleans, LA. April.
- 2018 (Presenter) **Kang, W.** and S.J. Rey. “Assessing performance of global and local indicators of mobility association under spatial autocorrelation.” Western Regional Science Association 57th Annual Meeting. Pasadena, CA. February.
- 2017 (Presenter) **Kang, W.** and S.J. Rey. “Regional income mobility and spatial dependence.” 64th Annual North American Meetings of the Regional Science Association International. Vancouver, BC. November.
- 2017 (Presenter) Rey, S.J., X. Ye and **W. Kang**. “Spatial economic inequality dynamics in China, 1978-2012.” Association of American Geographers. Boston, MA. April.
- 2017 (Presenter) Rey, S.J., X. Ye and **W. Kang**. “Spatial economic inequality dynamics in China, 1978-2012.” Association of American Geographers. Boston, MA. April.
- 2017 (Presenter) **Kang, W.** and S.J. Rey. “Regional income mobility and spatial dependence.” Western Regional Science Association 56th Annual Meeting. Santa Fe, NM. February.
- 2016 (Collaborator) Rey, S.J., **W. Kang** and L.J. Wolf. “Regional inequality dynamics, stochastic dominance, and spatial dependence.” 63th Annual North American Meetings of the Regional Science Association International. Minneapolis, Minnesota. November
- 2016 (Presenter) **Kang, W.** and S.J. Rey. “Spatial effects in Solow growth model - a simulation analysis.” Association of American Geographers. San Francisco, CA. April.
- 2016 (Presenter) **Kang, W.** and S.J. Rey. “A comparison of tests for spatial effects in discrete Markov chain models of regional income distribution dynamics.” Western Regional Science Association 55th Annual Meeting. Waikoloa, HA. February.
- 2015 (Collaborator) Rey, S.J., **W. Kang**, and L.J. Wolf. “Properties of tests for spatial effects in discrete Markov chain models of regional income distribution dynamics.” 62th Annual North American Meetings of the Regional Science Association International. Portland. November.
- 2015 (Presenter) Rey, S.J., **W. Kang**, and L.J. Wolf. “Properties of tests for spatial effects in discrete Markov chain models of regional income distribution dynamics.” Scientific Computing with Python. Austin. July.
- 2012 (Presenter) **Kang, W.** “Preliminary Analysis of Spatial Cognition Characteristics under Ubiquitous Mapping Environment.” ICA Workshop on Ubiquitous Mapping. The University of Tokyo, Japan. July.

## INVITED TALKS

- Spring 2022. “Sequence Methods in the Study of Neighborhood Change.” University of Toledo.
- Spring 2022. “Sequence Methods in the Study of Neighborhood Change.” University of Arkansas.
- Spring 2022. “Advancing & Integrating Open Source Spatial Data Science to Promote Equitable Regions and Policies.” University of North Texas.
- Spring 2022. “Sequence Methods in the Study of Neighborhood Change.” Virginia Tech.
- Fall 2021. “Sequence Methods in the Study of Neighborhood Change.” University of Chicago.
- Spring 2019. “Space-Time Statistics for Economic Inequality Dynamics.” University of Arizona.
- Spring 2019. “Space-Time Statistics for Economic Inequality Dynamics.” University of Tennessee, Knoxville.
- Spring 2017. “Spatial dynamics: Markov methods.” Arizona State University.

## Research Grants

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<b>Forced Displacement and Community Resilience: Housing Insecurity under COVID-19 in Inland Southern California</b> , Co-Principal Investigator. Sponsor: National Science Foundation #2151970		
2022-2025		\$ 336,050

## Courses Taught

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### SHORT AND INVITED COURSES

2019	<b>Spatial Data Science with PySAL (Python Spatial Analysis Library)</b> , Co-Instructor	<i>Pittsburgh, PA</i>
2018	<b>Spatial Data Science with PySAL (Python Spatial Analysis Library)</b> , Co-Instructor	<i>San Antonio, TX</i>
2017	<b>Spatial Data Science with PySAL (Python Spatial Analysis Library)</b> , Co-Instructor	<i>Vancouver, BC</i>

### UNIVERSITY OF NORTH TEXAS

Fall 2022	<b>GEOG 5560 - Application Development with Python Programming</b> , Instructor	<i>Denton, TX</i>
Spring 2023	<b>GEOG 5550 - Advanced Geographic Information Systems</b> , Instructor	<i>Denton, TX</i>
Spring 2023	<b>GEOG 4560 - Introduction to Python Programming</b> , Instructor	<i>Denton, TX</i>
Fall 2023	<b>GEOG 5560 - Application Development with Python Programming</b> , Instructor	<i>Denton, TX</i>
Fall 2023	<b>GEOG 5190 - Spatial Statistics and Geographic Data Analysis</b> , Instructor	<i>Denton, TX</i>

### ARIZONA STATE UNIVERSITY

Fall 2014	<b>Statistics for Geographers</b> , Graduate Teaching Assistant	<i>Tempe, AZ</i>
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## Mentoring

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2022-2023	<b>Noah Ray, Master Student in Geography, UNT</b> , Committee Member	<i>Denton, TX</i>
2022-2023	<b>Michael Biancardi, Undergraduate Student in Computer Science, UNT</b> , Honor thesis Committee Member	<i>Denton, TX</i>
2022-2023	<b>Kaitlin Stewart, Master Student in Geography, UNT</b> , Committee Member	<i>Denton, TX</i>
2022-2023	<b>Shwarnali Bhattacharjee, Master Student in Geography, UNT</b> , Committee Member	<i>Denton, TX</i>

## Outreach & Professional Development

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### SERVICE AND OUTREACH

2019-2022	<b>AAG Spatial Analysis and Modeling Specialty Group</b> , Board member
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### CERTIFICATES

2021	<b>Framework for Data Collection and Analysis</b> , Coursera
2020	<b>DeepLearning.AI TensorFlow Developer Professional Certificate</b> , Coursera
2019	<b>Neural Networks and Deep Learning</b> , Coursera
2019	<b>Machine Learning</b> , Coursera

### OPEN SOURCE PYTHON PACKAGE DEVELOPMENT

**PySAL**: Open source python spatial analysis library for geospatial data science.

**giddy**: Library for the statistics and algorithms of spatial distribution dynamics analysis.

**mgwr**: Library for the calibration and inference of multiscale geographically weighted regression.

**geosnap**: Library for the exploration, modeling, analysis, and visualization of the social and spatial dynamics of neighborhoods.

**cenpy**: A python interface to explore and query the U.S. Census API.

### JOURNAL REFEREE

Annals of the American Association of Geographers  
Geographical analysis

Journal of Planning Education and Research  
Housing Policy Debate  
The Annals of Regional Science  
Papers in Regional Science  
International Regional Science Review  
Socio-Economic Planning Sciences  
Environment and Planning A: Economy and Space  
International Journal of Geographical Information Science  
Cartography and Geographic Information Science  
Forests  
The Journal of Open Source Software  
Spatial Statistics  
Sustainability  
Arabian Journal of Geosciences  
Environmental and Ecological Statistics  
Computational Urban Science

## PROFESSIONAL ASSOCIATIONS

Association of American Geographers  
Regional Science Association International  
Western Regional Science Association  
Spatial Econometrics Association

## Service to University and Community

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### DEPARTMENT

2022-2025 **UNT Geography Department Graduate Studies Committee**, Member

*Denton, TX*

### UNIVERSITY

2022- **UNT Faculty Committee for Upsilon Sigma, the Urban Affairs Honor Society**, Member

*Denton, TX*

2019 **UCR GIS Day Planning Committee**, Member

*Riverside, CA*