Wei Kang

Research Scientist
Inland Center for Sustainable Development
School of Public Policy
University of California, Riverside
weikang@ucr.edu
(480)823-5277
@weikang9009

Education

Ph.D. in Geography Aug.2018
School of Geographical Science and Urban Planning
Arizona State University *Tempe, USA*
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

M.Sc. in Cartology and GIS Jun.2014
School of Space and Earth Science
Peking University *Beijing, China*

B.Sc. in Geographic Information System Jun.2011
School of Resource and Environmental Science
Wuhan University *Wuhan, China*

Areas of Research Interests

- ✧ GIScience & Spatial Statistics & Spatial Econometrics.
- ✧ Local and Regional Development & Urban Data Science.
- ✧ Housing & Poverty & Inequality.

Academic Appointments

Research Scientist Feb.2020-Apr.2021
University of California Riverside *Riverside, USA*
Postdoctoral Scholar May.2018-Apr.2020
University of California Riverside *Riverside, USA*
Graduate Research Assistant Jan.2015-Apr.2018
Arizona State University *Tempe, USA*
Graduate Teaching Assistant Aug.2014-Dec.2014
Arizona State University *Tempe, USA*
GIS 470: Statistics for Geographers
Graduate Research Assistant Sept.2011-Jun.2014
Peking University *Beijing, China*

Certificates

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning
Coursera Oct.2020
Neural Networks and Deep Learning
Coursera Sept.2019

Machine Learning
Coursera Jan.2019

Research Grants

NSF #1733705 2017-Present
Neighborhoods in Space-Time Contexts
Sergio Rey (PI), Levi Wolf and **Wei Kang** (Coauthor, Contributor)

Publications

Refereed Journal Articles

2020 **Kang, W.**, S. J. Rey, L. J. Wolf, E. Knaap, and S. Y. Han. Sensitivity of Sequence Methods in the Study of Neighborhood Change in the United States. *Computers, Environment and Urban Systems*, 81. DOI: 10.1016/j.compenvurbsys.2020.101480.

Kang, W., and S. J. Rey. "Inference for Income Mobility Measures in the Presence of Spatial Dependence." *International Regional Science Review*, 43(1-2): 10-39. DOI: 10.1177/0160017619826291.

Kang, W. "PySAL and Spatial Statistics Libraries." *The Geographic Information Science & Technology Body of Knowledge* (3rd Quarter 2020 Edition), John P. Wilson (ed.). DOI: 10.22224/gistbok/2020.3.1.

Shao, H., W. Li, **W. Kang**, and 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. DOI: 10.1007/s41651-020-00056-5.

Wei, R., T. H. Grubesic, and **W. Kang**. "Spatiotemporal patterns of alcohol outlets and violence: A Spatially Heterogeneous Markov Chain Analysis." *Environment and Planning B: Urban Analytics and City Science.* DOI:10.1177/2399808320965569.

Rey, S. J., S. Y. Han, **W. Kang**, E. Knaap, and 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*. DOI: 10.1111/gean.12239.

Lumnitz, S., D. Arribas-Bell, R. Cortes, J. Gaboardi, V. Griess, **W. Kang**, T. Oshan, L. Wolf, and S. Rey. 'splot' - visual analytics for spatial statistics. *Journal of Open Source Software*, 5(47): 1882, 2020. DOI:10.21105/joss.01882.

Yousif, A., K. Ibrahim, **W. Kang**, and 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. DOI:10.1007/s10661-020-08666-8.

2019 Yousif, A., K. Ibrahim, **W. Kang**, and 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. DOI:10.1007/s11869-019-00764-y.

Organizers, **W. Kang,** T. Oshan, L. J. Wolf, Discussants, G. Boeing, V. Frias-Martinez, S. Gao, A. Poorthuis, and W. Xu. "A roundtable discussion: Defining urban data science." *Environment and Planning B: Urban Analytics and City Science*, 46(9):1756–1768. DOI:

10.1177/2399808319882826.

Han, S. Y., S. Rey, E. Knaap, **W. Kang**, and 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). DOI: 10.3390/ijgi8110509.

Kang, W., and S. J. Rey. “Smoothed Estimators for Markov Chains with Sparse Spatial Observations.” *Geographical Analysis*. DOI: 10.1111/gean.12222.

Oshan, T., Z. Li, **W. Kang**, L. J. Wolf, and 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). DOI: 10.3390/ijgi8060269.

Oshan, T., L. J. Wolf, A. S. Fotheringham, **W. Kang**, Z. Li, and H. Yu. “A comment on geographically weighted regression with parameter-specific distance metrics.” *International Journal of Geographical Information Science*, 0(0): 1-12. DOI:10.1080/13658816.2019.1572895.

Yu, H., A. S. Fotheringham, Z. Li, T. Oshan, **W. Kang**, and L. J. Wolf. “Inference in Multiscale Geographically Weighted Regression.” *Geographical Analysis*, 52(1): 87-106. DOI: 10.1111/gean.12189.

Rey, S. J., **W. Kang**, and L. J. Wolf. “Regional Inequality Dynamics, Stochastic Dominance, and Spatial Dependence.” *Papers in Regional Science*, 98(2): 861-881. DOI: 10.1111/pirs.12393

2018 **Kang, W**., and 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. DOI: 10.1007/s00168-017-0859-9.

2017 Fotheringham, A. S., W., Yang, and **W. Kang**. “Multiscale Geographically Weighted Regression (MGWR).” *Annals of the American Association of Geographers*, 107(6): 1247–1265. DOI: 10.1080/24694452.2017.1352480.

2016 Rey, S. J., **W. Kang**, and L. Wolf. “The Properties of Tests for Spatial Effects in Discrete Markov Chain Models of Regional Income Distribution Dynamics.” *Journal of Geographical Systems*, 18(4): 377–398. DOI: 10.1007/s10109-016-0234-x.

2015 Liu, Y., and **W. Kang**. “An Atomic Model of Spatiotemporal Query Based on Object-Oriented Snapshot Model.” *Acta Scientiarum Naturalium Universitatis Pekinensis*, 51(4): 755-762. DOI: 10.13209/j.0479-8023.2015.008.

2014 Liu, Y., R. Si, and **W. Kang**. “Research on the Complex Structural Properties of Urban Taxi Passenger Flow Network.” *Acta Scientiarum Naturalium Universitatis Pekinensis*, 50(5): 873-879. DOI: 10.13209/j.0479-8023.2014.086.

Conference Proceedings

2018 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).” In

Fatih Akici, David Lippa, Dillon Niederhu, and M Pacer, editors, *Proceeding of the 17th Python in Science Conference*, 121-128. DOI: 10.25080/Majora-4af1f417-012.

Refereed Articles (under review/revision)

(Under review) **Kang, W**. "Spatial Dynamics." *Handbook of Spatial Analysis in the Social Sciences*.

(Under revision) **Kang, W**., S. J. Rey, and E. Knaap. "Urban income mobility patterns in the United States: 1980-2010." *Urban Studies.*

(Under review) Wang, Q., and **W. Kang.** "What Are the Impacts of COVID-19 on Small Businesses in the US? Early Evidence from Small Business Pulse Survey." *Geographical Review.*

(Under review) 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*.

(Under revision) Knaap, E., L. J. Wolf, S. J. Rey, **W. Kang**, and S. Y. Han. "The Dynamics of Urban Neighborhoods: A Survey of Approaches for Modeling Socio-Spatial Structure." *Geography Compass*.

Reports

Kang, W., and K. Kopko. "Housing Insecurity & the COVID-19 Pandemic." July 2020. UCR Inland Center for Sustainable Development.

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

Manuscripts under preparation

Kang, W., and Q. Wang. "Modeling housing insecurity amid the COVID-19 crisis."

Kang, W., S. J. Rey, and H. Shao. "Assessing performance of global and local indicators of mobility association under spatial autocorrelation."

Kang, W., and T. Oshan. "Multicollinearity in Multiscale Geographically Weighted Regression."

Knaap, E., S. J. Rey, R. X. Cortes, and **W. Kang**. "Spatio-Temporal Segregation Dynamics in U.S. Neighborhoods and Laborhoods."

Presentations

Invited Talks

2019 **Kang, W**. "Space-Time Statistics for Economic Inequality Dynamics." University of Arizona. Tucson, AZ. March.

Kang, W. "Space-Time Statistics for Economic Inequality Dynamics." University of Tennessee, Knoxville. Knoxville, TN. February.

2017 **Kang, W**. "Spatial dynamics: Markov methods." Arizona State University. Tempe, AZ. February.

Conference Participation and Presentations

2020 (Organizer) "Sessions on Urban Data Science: Methods & Models for our Changing

Cities." Association of American Geographers. Denver, CO. April.

(Collaborator) Wei, R., T. H. Grubesic, 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.

(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.

(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.

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

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

(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.

(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.

(Organizer, Chair, Panelist) "Symposium on Integrating Spatial Statistics within Open Source & Open Science." Association of American Geographers. New Orleans, LA. April.

(Presenter) **Kang, W**. and S.J. Rey. "Smoothed Estimators for Markov Chains with Sparse Spatial Observations." Association of American Geographers. New Orleans, LA. April.

(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.

(Presenter) Rey, S.J., X. Ye and **W. Kang**. “Spatial economic inequality dynamics in China, 1978-2012.” Association of American Geographers. Boston, MA. April.

(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.

(Presenter) **Kang, W.** and S.J. Rey. “Spatial effects in Solow growth model - a simulation analysis.” Association of American Geographers. San Francisco, CA. April.

(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.

(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.

Teaching

Workshops

2019 Rey, S.J. and **W. Kang.** Spatial Data Analysis with PySAL (Python Spatial Analysis Library) Workshop. *66th Annual North American Meetings of the Regional Science Association International*. Pittsburgh, PA.

2018 Rey, S.J. and **W. Kang.** Spatial Data Analysis with PySAL (Python Spatial Analysis Library) Workshop. *65th Annual North American Meetings of the Regional Science Association International*. San Antonio, TX. (19 Participants, 8 hours)

2017 Rey, S.J. and **W. Kang.** Spatial Data Analysis with PySAL (Python Spatial Analysis Library) Workshop. *64th Annual North American Meetings of the Regional Science Association International*. Vancouver, BC. (20 Participants, 8 hours.)

Mentorship

Mentor, Google Summer of Code 2020
Project: “PySAL Project on Panel Data Spatial Econometrics”

Mentor, Google Summer of Code 2019
Project: “mgwr: Generalized Modeling and Predictions in Multiscale Geographically Weighted Regression”

Teaching Assistant

Graduate Teaching Assistant Aug.2014-Dec.2014
Arizona State University *Tempe, USA*
GIS 470: Statistics for Geographers

Service

Board Membership

Board member, Spatial Analysis and Modeling Specialty Group, AAG 2019-2022

Open Source Python Package Developer and Maintainer

PySAL	The widely used 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.

Grant Reviewer

ASU GPSA travel grant reviewer Aug.2017 - Jul.2018

Journal Referee

Housing Policy Debate, The Annals of Regional Science, Papers in Regional Science, International Regional Science Review, Geographical analysis, 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

University Service

University of California Riverside 2019 GIS Day Planning Committee

Conference Volunteer

Association of American Geographers. San Francisco, CA. Apr.2016
Western Regional Science Association. Waikoloa, HA. Feb.2016

Volunteer Teaching Service

Volunteer Teacher Jan.2010-Feb.2010
Action & Knowledge Nonprofit League *Aba, Sichuan, China*

- Volunteered to go to one of 2008 earthquake-stricken areas——Heishui county, Sichuan, China, to investigate conditions of education.
- Taught math, music, geography and sports in hope of broadening students' horizon and make them feel loved and cared.

Volunteered Teacher of "Loving Teaching" Department Sept.2007-Jun.2009
Youth Volunteer Association of College Students, Wuhan University *Wuhan, China*

- Held weekly "English Corner" program at Wuhan School for the Blind.

Honors & Awards

Graduate and Professional Student Association (GPSA) Individual Travel Grant 2016, 2017, 2018
Arizona State University *Tempe, USA*
Graduate College Travel Award 2017
Arizona State University *Tempe, USA*
John F. Lounsbury Student Travel Fellowship 2015
Arizona State University *Tempe, USA*
University Graduate Fellowship 2014, 2018
Arizona State University *Tempe, USA*
University Fellowship 2011, 2012, 2013
Peking University *Beijing, China*
Outstanding Graduate student 2011
Wuhan University *Wuhan, China*
Outstanding Student 2008, 2010
Wuhan University *Wuhan, China*
First-class University Fellowship 2008, 2009, 2010
Wuhan University *Wuhan, China*
Pacemaker to Outstanding Students 2009
Wuhan University *Wuhan, China*
- Highest honor for students in Wuhan University.

Science & Education & Prosperity Geomatics Scholarship 2009
Wuhan University *Wuhan, China*
Third Prize of First National GIS Skills Contest 2009
Engineer Research Center for GIS Software & Application, Ministry of Education *Beijing, China*
National Scholarship 2008
Ministry of Education of the People's Republic of China *Beijing, China*
- Highest national-level scholarship for undergraduate students in China.

Third Prize of Thirtieth College Students Mathematics Application Ability Contest 2008
Wuhan University *Wuhan, China*

Research Experiences

Comparative Regional Inequality Dynamics: Multiscalar and Multinational Perspectives
Aug.2018-Apr.2020
National Science Foundation *USA*
- Aimed at developing spatially explicit measures to effectively compare the dynamics of regional inequality in the United States and China from a multiscale perspective.
- Supervised by Principal Investigator: Sergio Rey.

Neighborhoods in Space-Time Contexts May.2018- Apr.2020
National Science Foundation *USA*
- Aimed at developing new methods for neighborhood identification and neighborhood change analysis that draw on recent developments in geographic information science and spatial statistics.
- Supervised by Principal Investigator: Sergio Rey.

New Approaches for Spatial Distribution Dynamics Jan.2015-Aug.2018

National Science Foundation *USA*

- Aimed at developing a set of spatially explicit methods for the study of regional income (and other variants) distribution dynamics.
- Supervised by Principal Investigator: Sergio Rey.

Application of Temporal GIS to Spatio-Temporal Land & Resources Data Management

Sept.2013-Jun.2014

Beijing Municipal Bureau of Land and Resources Funds *Beijing, China*

- Design and implementation of an event-based & geographic object-oriented spatiotemporal data model.
- Spatiotemporal data management and visualization system.
- Supervised by Principal Investigator: Yuefeng Liu.