

# Jian Gao

## Contact Information

Affiliation Northwestern University  
Kellogg School of Management  
Center for Science of Science and Innovation (CSSI)  
Northwestern Institute on Complex Systems (NICO)  
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📅 : 2020/01/01

## Research Interests

Summary I am working in the emerging field **Computational Socioeconomics**, focusing on studying social and economic phenomena using data-driven methods. I have published **20+ papers** in peer-reviewed journals including **Physics Reports** (IF: 28.3), **Scientific Reports** (IF: 5.6), **Journal of the Royal Society Interface** (IF: 3.4), **Physica A** (IF: 2.1), **EPL** (IF: 2.0), etc.

Impact My works have received in total **290+ citations**, with an **H-index: 10** (by [Google Scholar](#))

Keywords Computational Socioeconomics, Science of Science, Computational Social Science, Networks

## Academic Positions

**Northwestern University** Evanston, USA  
2019/09-Present Postdoctoral Research Fellow, Kellogg School of Management, CSSI & NICO  
working with: Prof. Dashun Wang

**Massachusetts Institute of Technology** Cambridge, USA  
2016/09-2017/09 Research Assistant, The MIT Media Lab, Collective Learning Group  
working with: Prof. César A. Hidalgo

**Boston University** Boston, USA  
2016/02-2016/04 Visiting Scholar, Department of Physics, Center for Polymer Studies  
working with: Prof. H. Eugene Stanley

**University of Electronic Science and Technology of China** Chengdu, China  
2014/09-2019/07 Research Assistant, CompleX Lab & Big Data Research Center  
working with: Prof. Tao Zhou

2012/09-2014/08 Research Assistant, School of Computer Science and Engineering  
working with: Prof. Ming-Sheng Shang

## Five Representative Publications

- [1] **Jian Gao**, Yi-Cheng Zhang & Tao Zhou. Computational socioeconomics. **Physics Reports**, 817: 1–104, 2019.
- [2] **Jian Gao** & Tao Zhou. Quantifying China's regional economic complexity. **Physica A**, 492: 1591–1603, 2018.
- [3] Yi Cao<sup>‡</sup>, **Jian Gao**<sup>‡</sup>, De-Fu Lian, Zhi-Hai Rong, Jia-Tu Shi, Qing Wang, Yi-Fan Wu<sup>‡</sup>, Hua-Xiu Yao<sup>‡</sup> & Tao Zhou<sup>‡</sup>. Orderliness predicts academic performance: Behavioral analysis on campus lifestyle. **Journal of the Royal Society Interface**, 15: 20180210, 2018.
- [4] **Jian Gao**, Tao Zhou & Yanqing Hu. Bootstrap percolation on spatial networks. **Scientific Reports**, 5: 14662, 2015.
- [5] **Jian Gao**, Yu-Wei Dong, Ming-Sheng Shang, Shi-Min Cai & Tao Zhou. Group-based ranking method for online rating systems with spamming attacks. **EPL**, 110(2): 28003, 2015.





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## Education

- 2014/09-2019/07 **University of Electronic Science and Technology of China** Chengdu, China  
Ph.D. in *Computer Science*. School of Computer Science and Engineering  
Thesis title: Research on the spatial structure and dynamics of socio-economic systems  
advisor: Prof. Tao Zhou
- 2012/09-2014/08 **University of Electronic Science and Technology of China** Chengdu, China  
Master in *Computer Science*. School of Computer Science and Engineering  
advisor: Prof. Tao Zhou
- 2008/09-2012/07 **University of Electronic Science and Technology of China** Chengdu, China  
B.Sc. in *Information and Computing Science*. School of Mathematical Sciences  
GPA: 88.6/100 (3.88/4)

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## Publications (Full List)

‡ : equal contribution      † : corresponding author      Profiles:    

### arXiv Pre-Print

- [1] **Jian Gao**, Bogang Jun, Alex ‘Sandy’ Pentland, Tao Zhou & César A. Hidalgo. Collective learning in China’s regional economic development. arXiv:1703.01369, 2017. Under review.

### Peer-reviewed Papers

- [23] **Jian Gao**, Yi-Cheng Zhang & Tao Zhou. Computational socioeconomics. *Physics Reports*, 817: 1–104, 2019.
- [22] Yi Cao<sup>‡</sup>, **Jian Gao<sup>‡</sup>, De-Fu Lian, Zhi-Hai Rong, Jia-Tu Shi, Qing Wang, Yi-Fan Wu<sup>‡</sup>, Hua-Xiu Yao<sup>‡</sup> & Tao Zhou<sup>‡</sup>. Orderliness predicts academic performance: Behavioral analysis on campus lifestyle. *Journal of the Royal Society Interface*, 15: 20180210, 2018.**
- [21] **Jian Gao<sup>†</sup> & Tao Zhou. Quantifying China’s regional economic complexity. *Physica A*, 492: 1591–1603, 2018.**
- [20] **Jian Gao<sup>†</sup> & Tao Zhou. Stamp out fake peer review. *Nature*, 546(7656): 33–33, 2017. Opinion piece (Replied by T. Welschot. *Nature*, 546(7657): 210-210, 2017).**
- [19] **Jian Gao<sup>†</sup> & Tao Zhou. Evaluating user reputation in online rating systems via an iterative group-based ranking method. *Physica A*, 473: 546–560, 2017.**
- [18] **Jian Gao**, Tao Zhou & Yanqing Hu. Bootstrap percolation on spatial networks. *Scientific Reports*, 5: 14662, 2015.
- [17] **Jian Gao**, Yu-Wei Dong, Ming-Sheng Shang, Shi-Min Cai & Tao Zhou. Group-based ranking method for online rating systems with spamming attacks. *EPL*, 110(2): 28003, 2015.
- [16] **Jian Gao<sup>†</sup>. Maximizing the collective learning effects in regional economic development. In: *2017 14th International Computer Conference on Wavelet Active Media Technology and Information Processing (ICCWAMTIP)*, IEEE Press, 2017, pp. 337–341.**
- [15] **Jian Gao<sup>†</sup> & Tao Zhou. Big data reveal the status of economic development. *Journal of University of Electronic Science and Technology of China*, 45(4): 625–633, 2016. In Chinese.**
- [14] Jun Wang, **Jian Gao<sup>†</sup>, Jin-Hu Liu, Dan Yang & Tao Zhou. Regional economic status inference from online information flow and offline talent mobility. *EPL*, 125(6): 68002, 2019.**
- [13] Ling-Jiao Chen & **Jian Gao<sup>†</sup>. A trust-based recommendation method using network diffusion processes. *Physica A*, 506: 679–691, 2018.**
- [12] Xiao Yang, **Jian Gao<sup>†</sup>, Jin-Hu Liu & Tao Zhou. Height conditions salary expectations: Evidence from large-scale data in China. *Physica A*, 501: 86–97, 2018.**
- [11] Ling-Jiao Chen, Zi-Ke Zhang, Jin-Hu Liu, **Jian Gao<sup>†</sup> & Tao Zhou. A vertex similarity index for better personalized recommendation. *Physica A*, 466: 607–615, 2017.**

- [10] Jun Wang, **Jian Gao**, Xiao Yang, Jin-Hu Liu & Tao Zhou. Online data reveal key factors on salary expectation. *Journal of University of Electronic Science and Technology of China*, 48(2): 307–314, 2019.
- [9] Qing Wang, **Jian Gao**, Tao Zhou, Zheng Hu & Hui Tian. Critical size of ego communication networks. *EPL*, 114(5): 58004, 2016.
- [8] Wei-Jie You, **Jian Gao** & Tao Zhou. Application of carrier data on precise poverty alleviation and emergency management. *Journal of University of Electronic Science and Technology of China (Social Sciences Edition)*, 20(6): 83–88, 2018. In Chinese.
- [7] Linyan Zhang, **Jian Gao**, Xiang Hong & Tao Zhou. Human resource management based on big data. *Big Data Research*, 1: 2015012, 2015. In Chinese.
- [6] Bogang Jun, Aamena Alshamsi, **Jian Gao** & César A. Hidalgo. Bilateral relatedness: Knowledge diffusion and the evolution of bilateral trade. *Journal of Evolutionary Economics*. In press, 2019. DOI: 10.1007/s00191-019-00638-7
- [5] Jia Yuan, Qian-Ming Zhang, **Jian Gao**, Linyan Zhang, Xue-Song Wan, Xiao-Jun Yu & Tao Zhou. Promotion and resignation in employee networks. *Physica A*, 444: 442–447, 2016.
- [4] Liming Pan, Lei Gao & **Jian Gao**. Link prediction in weighted networks via structural perturbations. In: *2017 14th International Computer Conference on Wavelet Active Media Technology and Information Processing (ICCWAMTIP)*, IEEE Press, 2017, pp. 5–8.
- [3] Dan-Dan Zhao, An Zeng, Ming-Sheng Shang & **Jian Gao**. Long-term effects of recommendation on the evolution of online systems. *Chinese Physics Letters*, 30: 8901, 2013.
- [2] Fangjian Guo, Jiang Su & **Jian Gao**. Finding conspirators in the network via machine learning. *The UMAP Journal*, 33(3): 275–292, 2012. Outstanding paper (MCM/ICM 2011).
- [1] **Jian Gao**<sup>†</sup> & Xi-Nan Zhang. Comprehensive scholarship evaluation model in colleges and universities. *Journal of CTBU (Natural Science Edition)*, 29(1): 36–41, 2012. In Chinese.

### Book Chapters

- [2] Yi Cao, **Jian Gao** & Tao Zhou. Orderliness of campus lifestyle predicts academic performance: A case study in Chinese university. In *Digital Phenotyping and Mobile Sensing: New Developments in Psychoinformatics*, H. Baumeister & C. Montag (Eds). Springer: Berlin, Germany, Ch. 8, pp. 125–137, 2019.
- [1] **Jian Gao**, Linyan Zhang, Qian-Ming Zhang & Tao Zhou. Big data human resources: Performance analysis and promotion/resignation in employee networks. *Social Physics: Social Governance*, Yi-Jun Liu (Eds). Beijing: Science Press, Ch. 4, pp. 38–56, 2014. In Chinese.

### Work in Progress

- [2] **Jian Gao** & Tao Zhou. Vertex similarity in complex networks, 2018.
- [1] **Jian Gao**, Bogang Jun, Tao Zhou & César A. Hidalgo. Collective learning among industries and regions in Brazilian economic development, 2017.

### Academic Presentations

2019/07	Complexity 2019–Complex Science Annual Meeting (Invited Talk)	Shanghai, China
2019/05	CNetSci 2019–China Forum of Network Science	Dalian, China
2018/11	AI&S 2018–AI & Society Academic Salon (Invited Talk)	Chengdu, China
2018/08	BDSC 2018–National Conference on Big Data & Social Computing	Shijiazhuang, China
2018/08	CCDM 2018–China Conference on Data Mining	Jinan, China
2018/01	NetSciX 2018–International School and Conference on Network Science	Hangzhou, China
2017/04	AAG 2017–Economic Geography Sessions	Boston, USA
2017/01	B4 Event–Universidad del Desarrollo	Valparaiso, Chile
2016/03	Interdisciplinary Complex Systems Science Seminar in BU	Boston, USA
2015/10	Symposium on Complexity Science in SWUST	Mianyang, China

2015/06	The Statistical Physics and Complex Systems Conference	Lanzhou, China
2015/06	Symposium of China Inter-discipline Association for Complex Economy	Yantai, China
2014/10	The 10th Chinese Conference on Complex Networks	Changsha, China
2014/07	The 2nd Academic Conference on Complexity Science	Wenzhou, China
2013/10	The 9th Chinese Conference on Complex Networks	Hangzhou, China

## Grant Participation

- [10] Investigator. Perception and prediction of socioeconomic states based on large-scale data about enterprises, human resources, etc. National Natural Science Foundation of China (No. 11975071). \$85,632. PI: Tao Zhou. 2020-2023.
- [9] Investigator. Information confusion in visual analysis of spatio-temporal big data. National Natural Science Foundation of China (No. 61872066). \$92,768. PI: Jiansu Pu. 2019-2019.
- [8] Investigator. Relationship between scientific and technological human resources and industrial or economic structure. China Association for Science and Technology (No. 2018ysxh1-4-5-5). \$28,544. PI: Tao Zhou. 2018-2019.
- [7] Investigator. Cultural evolution based on complex network analysis. National Natural Science Foundation of China (No. 61703074). \$35,680. PI: Qian-Ming Zhang. 2017-2019.
- [6] Investigator. Behavioral pattern analysis of information subject in social networks. National Natural Science Foundation of China (No. 61673086). \$22,835. PI: Shi-Min Cai. 2017-2017.
- [5] Investigator. Human space-time coupling behavior. National Natural Science Foundation of China (No. 61603074). \$31,398. PI: Zhi-Dan Zhao. 2016-2017.
- [4] Investigator. Performance and behavior predication of employees using big data. National Social Science Foundation of China (No. 15CGL029). \$28,544. PI: Jia Yuan. 2015-2019.
- [3] Investigator. Information recommendation in dynamic online system. National Natural Science Foundation of China (No. 61370150). \$676,895. PI: Ming-Sheng Shang. 2014-2017.
- [2] Investigator. Social network and spreading dynamics. National Natural Science Foundation of China (No. 91324002). \$135,379. PI: Ming-Sheng Shang. 2014-2014.
- [1] Investigator. Statistical physics and information science. National Natural Science Foundation of China (No. 11222543). \$902,527. PI: Tao Zhou. 2013-2015.

## Selected Honors & Awards & Scholarships

2019	Provincial Excellent Graduate Student, <i>Education Department in Sichuan</i>	(1%)
2019	University Excellent Graduate Student, <i>UESTC</i>	(5%)
2012	University Excellent Undergraduate Student, <i>UESTC</i>	(7%)
2011	<b>Outstanding Student</b> of the University, <i>UESTC</i> <i>awarded by the chancellor's office, the highest university honor for undergraduates</i>	(0.2%)
2018	<b>Best Poster Award</b> in the 2018 NetSciX Conference on Network Science	(Top 6)
2014	Best Poster Award in the 2nd Conference on Complexity Science	(Top 3)
2012	<b>Outstanding Winner</b> in 2012 Interdisciplinary Contest in Modeling (ICM) <i>COMAP, sponsored by SIAM, NSA and INFORMS</i>	(0.3%)
2010	Second Prize in National Mathematical Contest in Modeling (MCM)	(5%)
2014-2019	University Education Group & Tang Lixin Scholarship, <i>UESTC</i>	(0.5%)
2016	<b>National Scholarship</b> for Graduate Student, <i>Ministry of Education</i>	(5%)
2016	First-class Scholarship for Graduate Student, <i>UESTC</i>	(5%)
2016-2017	CSC Scholarship, <i>China Scholarship Council &amp; Ministry of Education</i>	NaN
2012-2014	University Graduate Student Scholarship, <i>UESTC</i>	(10%)
2009-2011	National Inspiration Scholarship, <i>Ministry of Education</i>	(5%)

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## Industry Experiences

2018-2019	Research Intern. Institution of New Economic Development (iNED)	Chengdu, China
2015-2016	Research Intern. Business Big Data (BBD) Technology Ltd.	Chengdu, China
2013-2014	Research Intern & Algorithm Engineer. Hire Big Data Ltd.	Chengdu, China

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## Teaching Experiences

Spring 2018	Invited Lecturer, Computational Socioeconomics, School of Statistics	SWUFE
Fall 2013	TA & Grader, Calculus I (undergraduate), School of Mathematical Sciences	UESTC
Fall 2012	TA, Mathematical Modeling (undergraduate), School of Mathematical Sciences	UESTC

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## Peer Review Services

	◇ Verified Reviews: 48	◇ Ave. Review: 800+ words (by <a href="#">Publons</a> )
Reviewer	Area Development and Policy	2019–
	Marine Policy	2019–
	Heliyon	2019–
	IEEE Access	2019–
	PLoS ONE	2019–
	Journal of the Royal Society Interface	2018–
	International Journal of Modern Physics C (IJMPC)	2018–
	Physica Scripta	2018–
	Knowledge-Based Systems (KBS)	2017–
	Computer Standards and Interface (CSI)	2017–
	Physics Letters A (PLA)	2017–
	Journal of Computational Methods in Sciences and Engineering	2017–
	Physica A: Statistical Mechanics and its Applications	2016–
	IEEE Transactions on Knowledge and Data Engineering (TKDE)	2016–
	Journal of UESTC	2014–

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## Media and Blog Coverage

- 2019 Paper “Computational socioeconomics” (*Physics Reports*) was covered in [UESTC News](#), [Sichuan Observer](#), [Science Net Daily](#), and [Swarma Club](#)
- 2018 Paper “Orderliness predicts academic performance” (*Journal of the Royal Society Interface*) was covered in [China Daily](#), [Teach Wire Daily](#), [New Scientist](#), [Science and Technology Daily](#), [Science Net Daily](#), [Chengdu Economic Daily](#), and [The Beijing News](#)
- 2018 Paper “Height conditions salary expectations” (*Physica A*) was covered in [Merry for Money](#), [Science Net Blog](#), and [Sohu Blog](#)
- 2017 Opinion piece “Stamp out fake peer review” (*Nature*) was replied by Springer Nature (Tamara Welschot. [Springer Nature’s reply on fake review](#). *Nature*, 546(7657): 210-210, 2017) and was covered in [UESTC News](#), [Sohu Blog](#), and [Science Net Blog](#)
- 2016 Paper “Promotion and resignation in employee networks” (*Physica A*) was covered in [Collazo & Keil Blog](#) and [Science Net Blog](#)

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## Computer and Communication Skills

Computing	Python, MATLAB, Stata	◇ Visualization: OriginLab, Gephi, AI, D3
Language	English (fluent), Chinese (native)	◇ Typesetting: $\LaTeX$ , MS Office

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## References

Available upon request