Lingfei Wu

CONTACT INFORMATION

School of Computing and Information
The University of Pittsburgh
Pittsburgh, PA 15260, USA

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RESEARCH INTERESTS

My research centers on the ***Science of Team Science and Innovation***, a new field that uses big data, complexity sciences, and artificial intelligence to understand how collaborative teamwork drives advances in science and technology.

ACADEMIC POSITIONS

The University of Pittsburgh
Assistant Professor, School of Computing and Information, 2019–*present*
The University of Chicago
Postdoctoral Fellow, Department of Sociology, 2016–19
Arizona State University & Santa Fe Institute
Postdoctoral Researcher, ASU-SFI Center for Biosocial Complex Systems, 2014–15

EDUCATION

City University of Hong Kong	Communication	Ph.D., 2013
Peking University	Communication	M.A., 2009
China University of Political Science and Law	Political Science	B. A., 2006

REPRESENTATIVE RESEARCH PUBLICATIONS

- Lin, Y., Frey, C. B., & Wu, L. (2023). Remote Collaboration Fuses Fewer Breakthrough Ideas. ***Nature***, forthcoming.
- Wu, L., Wang, D., & Evans, J. A. (2019). Large teams develop and small teams disrupt science and technology. ***Nature***, 566(7744), 378-382.

The New York Times Can Big Science Be Too Big?
The Atlantic Small Teams of Scientists Have Fresher Ideas
Forbes It Takes More Than Members to Make a Team
Harvard Business Review When Small Teams Are Better Than Big Ones

- Xu, F., Wu, L., & Evans, J. (2022). Flat Teams Drive Scientific Innovation. ***Proceedings of the National Academy of Sciences (PNAS)***, 119(23), e2200927119.
- Börner, K., Scrivner, O., Gallant, M., Ma, S., Liu, X., Chewning, K., Wu, L., Evans, J. A. (2018). Skill discrepancies between research, education, and jobs reveal the critical need to supply soft skills for the data economy. ***Proceedings of the National Academy of Sciences (PNAS)***, 115(50), 12630-12637.

The Conversation How to fix the gap between school and work in South Africa
Complexity Science In an Age of Workplace Automation, Being Human Matters
Open Science Learning as Part of a Community Is a Powerful Skill

- Wu, L., & Zhang, J. (2011). Accelerating growth and size-dependent distribution of human online activities. ***Physical Review E***, 84(2), 026113.
- Wu, L. (2011), The accelerating growth of online tagging systems. ***European Physical Journal B***, 83(2), 283.

New Scientist Why Social Networks Are Sucking up More of Your Time
Science Daily Online Activity Grows in a Similar Pattern to Real-Life Networks
Springer Select Predicting Collective Online Behavior

GRANTS

PI, "CAREER: How Does Core Scientific Knowledge Advance? Understanding Team Innovation at the Foundations of Sciences," $565,087, 2023–28.

PI, "Understanding Team Age Dynamics and Scientific Innovation," Alfred P. Sloan Foundation, $250,000, 2023–26 (in Progress).

PI, "Sideline to Frontline: Data-driven Technologies to Reskill Displaced Workers for Healthcare Economy and Beyond," Richard King Mellon Foundation, $100,000, 2020–21.

Co-PI, "Quantifying Hyperlocal Digital Disadvantage: A Path to Supporting Digital Participation," NSF RAPID, $196,271, 2020–23.

PI, "Measuring Worldviews: A Map of Stubborn Social Skills," Institute for Cyber Law, Policy, and Security, University of Pittsburgh, $6,500, 2020–21.

PI, "International Symposium on Complex Systems, Geometry, and Machine Learning," Kaifeng Foundation, $442,930, 2016–26.

PI, "International Symposium on Artificial Intelligence and Public Policy," Tencent Research Institute, $43,700, 2018–19.

Senior personnel, "Collaborative Research: Understanding Team Success and Failure," National Science Foundation (NSF) Award #1829344, $592,772, 2018–21.

Senior personnel, "Understanding Online Attention and User-generated Content Creation," Australian Research Council (ARC) Discovery Grant #140103688, $225,000, 2014–16.

AWARDS

NSF Career Award, 2023
Oxford Martin Fellowship, University of Oxford, 2021
Top 100 most-discussed papers across all sciences, Altmetric, 2019
Best Student Paper Award, Chinese Association for Journalism and Communication Annual Conference, 2009
Student Travel Award, Agricultural and Applied Economics Association Conference (AAEA), 2009
P&G Best Student Paper Award, China Marketing Research Association, 2008
China National Petroleum Corporation Scholarship, Peking University, 2006–09
National Scholarship, China University of Political Science and Law, 2002–06

BOOK

Wu, L. (2014). *Data Visualization*, https://lingfeiwu1.gitbooks.io/data-mining-in-social-science/

UNDER REVIEW

Cui, H., **Wu, L.**, & Evans, J. A. (2022). Aging Scientists and Slowed Advance. arXiv preprint arXiv:2202.04044. ***Nature***.

Tong, D., Wu, L., & Evans, J. A. (2021). Low-skilled Occupations Face the Highest Re-skilling Pressure. arXiv preprint arXiv:2101.11505. ***PNAS***.

Xu, F., Wu, L., & Evans, J. A. (2022). Quantifying Hierarchy in Scientific Teams. arXiv preprint arXiv:2210.05852.

IN PREPARATION

Risha, Z., Lin, Y., Leahey, E., & Wu, L. How Can Interdisciplinary Collaboration Be Disruptive?

PUBLICATIONS (FULL LIST)

1. Lin, Y., Frey, C. B., & Wu, L. (2023). Remote Collaboration Fuses Fewer Breakthrough Ideas. ***Nature,*** forthcoming.
2. Xu, F., Wu, L., & Evans, J. (2022). Flat Teams Drive Scientific Innovation. ***Proceedings of the National Academy of Sciences (PNAS)***, 119(23), e2200927119.
3. Wu, L., Kittur, A., Youn, H., Milojević, S., Leahey, E., Fiore, S. M., & Ahn, Y. Y. (2022). Metrics and Mechanisms: Measuring the Unmeasurable in the Science of Science. ***Journal of Informetrics,*** 16(2), 101290.
4. Lin, Y., Evans, J. A., & Wu, L. (2022). New directions in science emerge from disconnection and discord. ***Journal of Informetrics***, 16(1), 101234.
5. Li, L., Wu, L., & Evans, J. A. (2020). Social centralization and semantic collapse: Hyperbolic embeddings of networks and text. ***Poetics***, 101428.
6. Xu, H., Zhang, Z., Wu, L., & Wang, C. J. (2019). The Cinderella Complex: Word embeddings reveal gender stereotypes in movies and books. ***PLOS ONE***, 14(11).
7. Wu, L., Wang, D., & Evans, J. A. (2019). Large teams develop and small teams disrupt science and technology. ***Nature***, 566(7744), 378-382.
8. Börner, K., Scrivner, O., Gallant, M., Ma, S., Liu, X., Chewning, K., Wu, L., Evans, J. A. (2018). Skill discrepancies between research, education, and jobs reveal the critical need to supply soft skills for the data economy. ***Proceedings of the National Academy of Sciences (PNAS)***, 115(50), 12630-12637.
9. Wu, L., & Wang, C. J. (2016). Tracing the attention of moving citizens. ***Scientific Reports***, 6, 33103.
10. Wang, C. J., Wu, L., Zhang, J., & Janssen, M. A. (2016). The collective direction of attention diffusion. ***Scientific Reports***, 6, 34059.
11. Wang, C. J., & Wu, L. (2016). The scaling of attention networks. ***Physica A: Statistical Mechanics and its Applications***, 448, 196-204.
12. Wu, L., Baggio, J. A., & Janssen, M. A. (2016). The role of diverse strategies in sustainable knowledge production. ***PLOS ONE***, 11(3), e0149151.
13. Zhang, J., Li, X., Wang, X., Wang, W. X., & Wu, L. (2015). Scaling behaviours in the growth of networked systems and their geometric origins. ***Scientific reports***, 5, 9767.
14. Li, X., Wang, X., Zhang, J., & Wu, L. (2015). Allometric scaling, size distribution and pattern formation of natural cities. ***Palgrave Communications***, 1, 15017.
15. Wu, L., Zhang, J., & Zhao, M. (2014). The metabolism and growth of Web forums. ***PLOS ONE***, 9(8), e102646.
16. Wu, L., & Ackland, R. (2014). How Web 1.0 fails: The mismatch between hyperlinks and clickstreams. ***Social Network Analysis and Mining***, 4(1), 202.

17. Zhang J. and Wu, L. (2013), Allometry and dissipation of ecological networks. ***PLOS ONE***, 8(9), e72525.
18. Wu, L. and Zhang, J. (2013), The decentralized structure of collective attention on the Web. ***European Physical Journal B***, 86(6), 266.
19. **Wu, L.**, & Zhang, J. (2011). Accelerating growth and size-dependent distribution of human online activities. ***Physical Review E***, 84(2), 026113.
20. **Wu, L.** (2011), The accelerating growth of online tagging systems. ***European Physical Journal B***, 83(2), 283.
21. Wu, L., Cai, Y., and Liu, D. (2011), Online shopping among Chinese consumers: An exploratory investigation of demographics and value orientation. ***International Journal of Consumer Studies***, 35(4), 458.

TEACHING

- **Information Visualization**
  Information Visualization (INSCI2415), The Master of Science in Information Science Program, University of Pittsburgh, 2019–*present*

- **Computational Social Science**
  Science for Team Science and Innovation (INFSCI 3350), Doctoral Seminar, University of Pittsburgh, 2020–*present*
  Computational Social Science, Research Seminar, University of Pittsburgh, 2021–*present*
  Computational Communication Methods, Summer Program, Nanjing University, 2016, 2017, 2018
  Complex Network and Machine Learning, Workshop, Arizona State University, 2014

- **Quantitative Research Methods**
  Communication Research Methods, City University of Hong Kong, 2012
  Market Research and Analysis, Peking University, 2008

TALKS & VISITS

Research Institutions | Government Agencies | Think Tanks | Art Museums

Complexity Science Hub Vienna, Austria, 2022
National Bureau of Economic Research (NBER), DC, 2022
Zhejiang University, Department of Sociology, 2022
Wuhan University, School of Information Management, 2021, 2022
Monash University, Department of Economics, 2021
The University of Texas at Austin, School of Information, 2021
Carnegie Mellon University, Institute for Software Research, 2020, 2021, 2022
MIT Sloan, Future of Work Program, 2021
Peking University, The Office of Scientific Research, 2021
UC Davis, Computational Communication Research Lab, 2020
Pew Research Center, 2019
Harvard Kennedy School, Center for International Development. 2018
National Opinion Research Center (NORC), 2018
Tencent Research Institute, 2018, 2019
National Natural Science Foundation of China (NSFC), 2018
Nanjing University, School of Journalism & Communication, 2017, 2018, 2019
GESIS Leibniz Institute for the Social Sciences, 2016
Volkswagen Foundation, 2016
Santa Fe Institute, 2015
Arizona State University, Global Biosocial Complexity Initiative, 2014

C5ART Institute, 2013
Swarma Club, 2013, 2014, 2015
Baidu Inc., Department of Personal Recommendation, 2012
Nanyang Tech. University. School of Comm. and Information, 2011
The Commonwealth Scientific and Industrial Research Organisation, 2011
Australian National University, Demographic & Social Research Inst, 2011
Wolfram Research, 2010

Academic Conferences

Int. Conf on the Science of Science and Innovation (ICSSI), DC, 2022
Int. Conf on Computational Social Science (IC2S2), 2015, 2018, 2020, 2021
Network Science Society Annual Conference (NetSci), 2012, 2017, 2019
Science of Team Science Conference (SciTS), 2017, 2018
Chinese National Conference on Social Media Processing (SMP), 2016, 2018
Int. Conf on Social Informatics (SocInfo), 2014
Int. Conf on the Simulation and Synthesis of Living Systems (ALIFE), 2012
International Communication Association Conference (ICA), 2012
Agricultural and Applied Economics Association Conference (AAEA), 2009
ACM Web Science Conference, 2009

MEDIA COVERAGE

China Science Daily Fresh Team Members for New Ideas
SAGE Research Methods Ask a Researcher: Lingfei Wu on Networks and Computational Social Science
SAGE Big Data & Data Visualization in the Study of the Science of Science
The New York Times Can Big Science Be Too Big?
The Atlantic Small Teams of Scientists Have Fresher Ideas
Forbes It Takes More Than Members to Make a Team
Harvard Business Review When Small Teams Are Better Than Big Ones
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Springer Select Predicting Collective Online Behavior
The Conversation How to fix the gap between school and work in South Africa
Complexity Science In an Age of Workplace Automation, Being Human Matters
Open Science Learning as Part of a Community Is a Powerful Skill

SERVICE

Invited Reviewer for Federal Funding Agencies

National Science Foundation
U.S. Department of Energy

Research Consultant for Private Funding Agencies

Novo Nordisk Fonden
John Templeton Foundation

Invited Reviewer for Academic Journals

Nature Human Behavior (NHB), American Journal of Sociology (AJS), Scientific Reports, PLOS One, EPJ Data Science, Journal of the Association for Information Science and Technology (JASIST), Quantitative Science Studies (QSS), Scientometrics, Physica A

Organizer or Reviewer of Conferences

International Society for Scientometrics and Informetrics (ISSI) 2023
International Conference on Computational Social Science (IC2S2) 2022, 2023
International Science of Team Science Conference (SciTS) 2022
Network Science Society Annual Conference (NetSci) 2017, 2019, 2021, 2022
The Web Conference (WWW) 2020
Duke Forest Conference 2016
Conference on Complex Systems (CCS) 2015

MENTORING & ADVISING

Ph.D. Mentees

Yiling Lin, Information Science, University of Pittsburgh, 2021–*present*

Ph.D. Dissertation Advising

Zak Risha, Information Science, University of Pittsburgh, estimated 2024
Rongqian Ma, Library and Information Science, University of Pittsburgh, 2022
Assistant Professor, Indiana University Bloomington
Linzhuo Li, Sociology, The University of Chicago, 2020
Assistant Professor, Zhejiang University

Master Thesis Advising

Masters in Computational Social Science, The University of Chicago
Yiling Lin | Di Tong | Yuanhao Liu
Masters in Communication, Nanjing University
Huiming Xu

SKILLS

Python, R, Mathematica, STATA, SPSS, SQL, Adobe Illustrator, Processing