

# LU ZHONG

Postdoctoral associate at Rensselaer Polytechnic Institute, Troy, NY

Department of Computer Science and Network Science and Technology Center

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## EDUCATION

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<b>City University of Hong Kong</b> <i>Doctor of Philosophy, School of Data Science</i>	<i>Hong Kong SAR</i> <i>Sep 2015–Oct 2019</i>
<b>Southwest University</b> <i>Bachelor of Engineering, Department of Computer Science</i>	<i>Chongqing</i> <i>Sep 2011–Jul 2015</i>

## RESEARCH INTERESTS

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My research interests in the intersection on data science, public health, and social science. I develop data-driven models (Big Data/ML/AI) with network science theory to improve public health, understand human behavior, and inform data-driven policymaking for preparedness and response for disease outbreaks and other crisis. My current ongoing studies primarily focus on computational/social epidemiology, healthcare resilience, and health equity.

## RESEARCH EXPERIENCE

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<b>Rensselaer Polytechnic Institute</b> Department of Computer Science <i>Postdoctoral Research Associate</i> <i>Advisor: Dr. Jianxi Gao (Network Science and Resilience)</i>	<i>New York, USA</i> <i>Dec 2019–Now</i>
<b>Northeastern University</b> <i>Visiting Researcher</i>	<i>Massachusetts, USA</i> <i>Feb 2023–May 2023</i>
<b>City University of Hong Kong</b> School of Data Science <i>Doctoral Research Assistant</i> <i>Committee Members: Dr. Qingpeng Zhang (Health informatics and Network epidemiology), Dr. Min Xie (Applied Statistics), Dr. Chuangyin Dang (Optimization), Dr. Jiming Liu (Data-Driven and Network Modeling).</i>	<i>Hong Kong SAR</i> <i>Sep 2015–Oct 2019</i>
<b>Southwest University</b> Department of Computer Science <i>Undergraduate Research Assistant</i> <i>Committee Members: Dr. Chao Gao (Social Network Analysis), Dr. Zili Zhang (Big Data).</i>	<i>Chongqing</i> <i>Sep 2012–Dec 2014</i>

## RESEARCH GRANTS

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<b>Bill &amp; Melinda Gates Foundation, COVID-19 Research Database, Healthcare Cost Institute</b> Harness network science to reduce treatment resource disparities and social disadvantage (\$90,000) Role: co-Principal Investigator	<i>Jul 2021–now</i>
<b>National Training Programs of Innovation and Entrepreneurism for Undergraduates</b> A recommended information transmission system based on user behaviour (\$3,000) Role: Principal Investigator	<i>May 2013–Dec 2014</i>

## MAJOR PUBLICATIONS

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### • Healthcare resilience/Health equity:

[17] **Zhong, L.**, Lopez, D., Pei, S., Gao, J. Healthcare system resilience and adaptability to pandemic disruptions in the United States. *Nature Medicine*. (2024). See [dashboard](#). [To study disrupted impact of COVID-19 on healthcare utilization and disparity]

[16] **Zhong, L.**, Patient flow networks absorb healthcare stress during crises. 2024. (working paper).

[15] **Zhong, L.**, et al. Reinforcement learning enhances healthcare resilience to recurrent disruptions from crisis. 2024. (working paper).

### • Computational epidemiology:

[14] **Zhong, L.**, Dong, L., Wang, Q., Song, C., Gao, J. Universal spatial inflation of human mobility. 2023. (under review). [To study urban mobility behavior and its impact on disease spread]

[13] **Zhong, L.**, Dong, L., Wang, Q., Song, C., Gao, J. Human trajectory network unveils exploration mode transitions. 2023. (under review). [To study urban mobility behavior and its impact on disease spread]

[12] **Zhong, L.**, Diagne, M., Wang, Q., & Gao, J. Vaccination and three non-pharmaceutical interventions determine the dynamics of COVID-19 at 381 metropolitan statistical areas in the US. *Humanities and Social Sciences Communications* (2022). .

[11] Wang, Y., **Zhong, L.**, Du, J., Gao, J., & Wang, Q. Identifying the shifting sources predicts the dynamics of COVID-19 in US. *Chaos* (2021) .

[10] **Zhong, L.**, Diagne, M., Wang, W., & Gao, J. Country distancing increase reveals the effectiveness of travel restrictions in stopping COVID-19 transmission. *Nature Communications Physics* (2020) [[cover story](#)].

[9] Zhang, Q., **Zhong, L.**, Gao, S., & Li, X. Optimizing HIV Interventions for Multiplex Social Networks Via Partition-Based Random Search. *IEEE Transactions on Cybernetics* (2018).

[8] **Zhong, L.**, Zhang, Q., Li, X. Modeling the Intervention of HIV Transmission across Intertwined At-Risk Populations. *Scientific Reports* (2018).

[7] Yang, J., Zhang, Q., Cao, Z., Gao, J., Pfeiffer, D., **Zhong, L.**, Zeng, D. The impact of non-pharmaceutical interventions on the prevention and control of COVID-19 in New York City. *Chaos: An Interdisciplinary Journal of Nonlinear Science* (2021) [[editor's pick](#)].

[6] Yang, D., Chow, T., **Zhong, L.** et al. "The Competitive Information Spreading over Multiplex Social Networks." *Physica A: Statistical Mechanics and its Applications*(2018).

[5] Yang, D., Chow, T., **Zhong, L.** et al. "True and fake information spreading over the Facebook." *Physica A: Statistical Mechanics and its Applications* (2018).

[4] Gao, C., **Zhong, L.** et al. Combination methods for identifying influential nodes in networks. *International Journal of Modern Physics C* (2015).

[3] **Zhong, L.** Gao, C., Zhang, Z., Shi, N., Huang, J. Identifying influential nodes in complex networks for network immunization. *Journal of Computational Information Systems* (2014). [Journal Impact factor: 3.2]

[2] **Zhong, L.** Gao, C., Zhang, Z., Shi, N., Huang, J. Identifying influential nodes in complex networks: A multiple attributes fusion method. *International conference on active media technology*. (2014).

[1] Ning, S., Gao, C., Zhang, Z. **Zhong, L.** et al. The spontaneous behavior in extreme events: A clustering-based quantitative analysis. *International Conference on Advanced Data Mining and Applications*. (2013).

## MENTORSHIP

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### Graduate students:

- Dimitri Lopez, Rensselaer Polytechnic Institute 202206-now
- Hong Chen, University of Michigan—Ann Arbor 202112-now

### Undergraduate students:

- Tarun Venkatasamy, Rensselaer Polytechnic Institute 202209-202212

## TEACHING EXPERIENCE

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**Guest lecturer, Rensselaer Polytechnic Institute** *New York, USA*

Introduction to Network Science/Resilience (Network epidemiology lecture) *Jan 2023-Now*

**Guest lecturer, Northeastern University** *Massachusetts, USA*

Urban Informatics and Processing (Spatial epidemiology lecture) *Jan 2023-May 2023*

**Teaching Assistant, City University of Hong Kong** *Hong Kong SAR, China*

Logistics and Materials Management *Sep 2017-Dec 2017*

Quality Engineering *Feb 2017-Jun 2017*

Supply Chain Management *Sep 2016-Dec 2016*

## PROFESSIONAL ACTIVITIES

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### Membership:

- The Network Science Society, INFORMS

### Guest editor:

- Special Issue "Dynamics of Complex Networks" of Entropy (ISSN 1099-4300)

**Reviewer for Journal/Conferences:** Transactions on Computational Social Systems, Scientific Reports, Humanities and Social Sciences Communications, Philosophical Transactions of the Royal Society A, Physica A, Communications Physics, Frontiers of Medicine, BMC Medical Research Methodology, Social Psychiatry and Psychiatric Epidemiology, and etc.

## INVITED TALKS AND SEMINARS

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**NERCCS 2024** *New York, USA*

"Adaptability reveals the healthcare resilience to pandemics" *2024*

**NERCCS 2024** *New York, USA*

"Revealing the transition of exploration modes in human mobility networks" *2024*

**INFORMS Annual Meeting** *Arizona, USA*

"Global supply chain network analysis and its resilience." *2023*

**COVID-19 Modeling - Interventions (CDC)** *Atlanta, USA*

"Vaccination and three non-pharmaceutical interventions determine the end of COVID-19 in the US" *2021*

**NetSci Conference** *Paris, France*

"Optimizing HIV Interventions for Multiplex Social Networks Via Partition-Based Random Search" *2018*

**NetSci-X Conference.** *Hangzhou, China*

"Modeling the Intervention of HIV Transmission across Intertwined At-Risk Populations.." *2018*

**INFORMS Annual Meeting** *Houston, USA*

"Modeling the Intervention of HIV Transmission across Intertwined At-Risk Populations." *2017*

## MEDIA COVERAGE

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<b>Healthcare Cost Institute</b> "Winners of COVID-19 Research Accelerator Grants Announced"	2021
<b>RPI news</b> "Model Sets Minimum Restrictions Needed To Control COVID-19 Given Vaccination Rate"	2021
<b>News Medical</b> "New model reveals the effectiveness of travel restrictions to slow COVID-19 transmission"	2020
<b>RPI news</b> "New COVID-19 Model Reveals Need for Better Travel Restriction Implementation"	2020

## AWARDS & SCHOLARSHIPS

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Outstanding Academic Performance Award, City University of Hong Kong	2018
Research Tuition Scholarship, City University of Hong Kong	2018
National Encouragement Scholarship, Southwest University	2014
First-Class Scholarship in Southwest University, Southwest University	2013

## SKILLS

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**Expertise:** Big Data Analytics, Complex Networks, System Resilience, Machine Learning, Computational Modeling, Health Informatics, Geoinformatics.

**Tools:** Apache Spark, Minitab, Plotly, Gephi, Cytoscape, Pajek

**Programming:** Python, C/C++, SQL, JAVA, MATLAB, LATEX

## REFERENCES

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### **Dr. Jianxi Gao**

Associate Professor

Department of Computer Science

Rensselaer Polytechnic Institute

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### **Dr. Qingpeng Zhang**

Associate Professor

Musketeers Foundation Institute of Data Science

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### **Dr. Ryan Wang**

Associate Professor

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### **Dr. Sen Pei**

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