Inho Hong

Assistant Professor, **Graduate School of Data Science**
Chonnam National University
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Education

Ph.D. in Physics, POSTECH, 2019.
- Thesis: Complexity and Scaling in Cities

M.S. in Physics, POSTECH, 2012.
B.S. in Physics, POSTECH, 2010.

Professional appointments

Chonnam National University, Gwangju, Korea
Assistant Professor — 2023.03 - present
- Graduate School of Data Science

Max Planck Institute for Human Development, Berlin, Germany
Associate Research Scientist — 2023.03 - 2025.02
Postdoctoral Fellow — 2020.03 - 2023.02
- Center for Humans and Machines (Director: Iyad Rahwan)
- Machines and the Future of Work Group (PI: Alex Rutherford)

Asia Pacific Center for Theoretical Physics, Pohang, Korea — 2019.09 - 2020.02
Postdoctoral Fellow
- Statistical Physics of Complex Dynamics (Leader: Hang-Hyun Jo)

Kellogg School of Management, Northwestern University & **Northwestern Institute on Complex Systems**, Evanston, IL, USA — 2017.10 - 2018.08
Visiting Predoctoral Fellow (hosted by: Hyejin Youn)

Research interests

Computational Social Science, Complex Systems, Urban Data Science, Human Mobility, Social Impact of AI, Future of Work, Bibliographic Analysis, and Science of Science

Selected publications

1. "The universal pathway to innovative urban economies", ***Science Advances*** (2020). (**IF=14.972**)
   https://doi.org/10.1126/sciadv.aba4934
2. "Urban green space and happiness in developed countries", ***EPJ Data Science*** (2021). (**IF=3.630**)
   https://doi.org/10.1140/epjds/s13688-021-00278-7
3. "Measuring national capability over big science's multidisciplinarity: A case study of nuclear fusion research", ***PLoS One*** (2019). (**IF=3.752**)
   https://doi.org/10.1371/journal.pone.0211963

Visiting research

Institute for Basic Science, Daejeon, Korea — 2020.02
Data Science Group (Chief Investigator: Meeyoung Cha)

Harvard Kennedy School, Harvard University, Cambridge, MA, USA — 2017.06

Growth Lab (Director: Ricardo Hausmann)

Santa Fe Institute, Santa Fe, NM, USA 2016.02
Graduate Studies Program

Aalto University, Espoo, Finland 2015.02
Department of Biomedical Engineering and Computational Science

Honors

Awards

Young Statistical Physicist Award, The Korean Physical Society [News]. 2021.04
Best Paper Award, Korea Computer Congress. 2021.06
Excellent Poster Presentation Award, The Korean Physical Society. 2017.04
Excellent Oral Presentation Award, The Korean Physical Society. 2016.10
Excellent Poster Presentation Award, The Korean Physical Society. 2013.10
Excellent Teaching Assistant Award, Dept. of Physics, POSTECH. Fall 2010
Excellent Teaching Assistant Award, Dept. of Physics, POSTECH. Spring 2010
Best Paper Award, Undergraduate Research Program, POSTECH. 2010.02
Excellent Bachelor Thesis Award, Dept. of Physics, POSTECH. 2009.11

Fellowships

Global Ph.D. Fellowship, National Research Foundation of Korea. 2014.03 - 2017.02
• Principal Investigator, 90,000,000 KRW in total.
Samsung Undergraduate Scholarship. 2006.03 - 2010.02

Journal publications

Google Scholar: https://scholar.google.com/citations?user=kmN6l-AAAAAJ
†Corresponding author. *Equally contributed.

1. **I. Hong**, J. E. Kim, J. Park, S. Joo, M. I. Ji, "Analysis of news trends of UNESCO World Heritage sites in Korea through text embedding and keyword networks", *Smart Media Journal* 13, 201 (2024). (KCI) https://doi.org/10.30693/SMJ.2024.13.12.201

2. O.-H. Kwon, **I. Hong**, W.-S. Jung, H.-H. Jo, "Multiple gravity laws for human mobility within cities", *EPJ Data Science* 12, 57 (2023). https://doi.org/10.1140/epjds/s13688-023-00438-x (SCI, **IF=3.630**)

3. D. Kim, D. Lee, J. Myung, C. Jung, **I. Hong**, D. Sáez-Trumper, J. Yun, W.-S. Jung, and M. Cha, "Information collection of COVID-19 pandemic using Wikipedia template network", *Journal of KIISE* 49, 347 (2022). (KCI) https://doi.org/10.5626/JOK.2022.49.5.347

4. L. N. Ferreira, **I. Hong**, A. Rutherford, and M. Cebrian, "The small-world network of global protests", *Scientific Reports* 11, 19215 (2021). (SCI, **IF=4.996**) https://doi.org/10.1038/s41598-021-98628-y

5. O.-H. Kwon*, **I. Hong***, J. Yang, D. Y. Wohn, W.-S. Jung, and M. Cha, "Urban green space and happiness in developed countries", *EPJ Data Science* 10, 28 (2021). (SCI, **IF=3.630**) https://doi.org/10.1140/epjds/s13688-021-00278-7
• Featured in **UNICEF Report**, Phys.org, Science Daily, The Science Times, and Joongang Ilbo.

6. **I. Hong**†, A. Rutherford, and M. Cebrian, "Social mobilization and polarization can create volatility in COVID-19 pandemic control", *Applied Network Science* 6, 1 (2021). (Scopus, ESCI)

https://doi.org/10.1007/s41109-021-00356-9
• Featured in Deutschlandfunk, IDW Online, Heise Online, Berliner Zeitung, and Max-Planck-Gesellschaft.

7. **I. Hong**, M. R. Frank, I. Rahwan, W.-S. Jung, and H. Youn, "The universal pathway to innovative urban economies", *Science Advances* 6, eaba4934 (2020). (SCI, **IF=14.972**)
https://doi.org/10.1126/sciadv.aba4934
• Featured in **Forbes**, Quartz, Fast Company, Northwestern Magazine, and Northwestern Now.

8. **I. Hong**, W.-S. Jung, and H.-H. Jo, "Gravity model explained by the radiation model on a population landscape", *PLoS One* 14, e0218028 (2019). (SCI, **IF=3.752**)
https://doi.org/10.1371/journal.pone.0218028

9. H. Kim*, **I. Hong***, and W.-S. Jung, "Measuring national capability over big science's multidisciplinarity: A case study of nuclear fusion research", *PLoS One* 14, e0211963 (2019). (SCI, **IF=3.752**)
https://doi.org/10.1371/journal.pone.0211963

10. **I. Hong** and W.-S. Jung, "Application of gravity model on the Korean urban bus network", *Physica A: Statistical Mechanics and its Applications* 462, 48-55 (2016). (SCI, **IF=3.778**)
https://doi.org/10.1016/j.physa.2016.06.055

11. S. Lee, **I. Hong**, and W.-S. Jung, "A network approach to the transfer market of European football leagues", *New Physics: Sae Mulli* 65, 402-409 (2015). (Scopus)
https://doi.org/10.3938/NPSM.65.402

12. **I. Hong**†, W. Lee, J. Leem, Y. Nam, M. Kim, G. S. Yun, H. K. Park, C. W. Domier, and N. C. Luhmann Jr., "Evaluation of the imaging properties of Microwave Imaging Reflectometry", *Journal of Instrumentation* 7, C01077 (2012). (SCI)
https://doi.org/10.1088/1748-0221/7/01/C01077

13. W. Lee, **I. Hong**, J. Leem, M. Kim, Y. Nam, G. S. Yun, H. K. Park, Y. G. Kim, K. W. Kim, C. W. Domier, and N. C. Luhmann Jr., "Microwave imaging reflectometry for KSTAR", *Journal of Instrumentation* 7, C01070 (2012). (SCI)
https://doi.org/10.1088/1748-0221/7/01/C01070

14. W. Lee, G. S. Yun, **I. Hong**, M. Kim, J. B. Kim, Y. Nam, H. K. Park, Y. G. Kim, K. W. Kim, B. Tobias, C. W. Domier, and N. C. Luhmann Jr., "Microwave imaging reflectometry system for KSTAR", *Plasma and Fusion Research* 6, 2402037-2402037 (2011). (Scopus, ESCI)
https://doi.org/10.1585/pfr.6.2402037

15. W. Lee, G. S. Yun, Y. Nam, **I. Hong**, J. B. Kim, H. K. Park, B. Tobias, T. Liang, C. W. Domier, and N. C. Luhmann Jr., "Comparative study between the reflective optics and lens based system for microwave imaging system on KSTAR", *Review of Scientific Instruments* 81, 10D932 (2010). (SCI)
https://doi.org/10.1063/1.3491189

16. H. K. Park, **I. Hong**, M. Kim, G. S. Yun, W. Lee, J. Kim, B. Tobias, C. W. Domier, N. C. Luhmann Jr., and K. W. Kim, "Microwave imaging reflectometry studies for turbulence diagnostics on KSTAR", *Review of Scientific Instruments* 81, 10D933 (2010). (SCI)
https://doi.org/10.1063/1.3499606

Conference proceedings

1. C. Jung, **I. Hong**, D. Sáez-Trumper, D. Lee, J. Myung, D. Kim, J. Yun, W.-S. Jung, and M. Cha, "Information flow on COVID-19 over Wikipedia: A case study of 11 languages", *Companion Proceedings of the Web Conference 2021*, pp. 627 (2021).
https://doi.org/10.1145/3442442.3452352

Preprints

1. A. Rutherford[†], M. Cebrian[†], **I. Hong**[†], and I. Rahwan, "Impossible by Conventional Means: Ten Years on from the DARPA Red Balloon Challenge", *arXiv:2008.05940*.
https://arxiv.org/abs/2008.05940 (arXiv preprint)

2. **I. Hong**[†], L. N. Ferreira, A. Rutherford, and M. Cebrian, "Assessing the epidemic impact of protests during the COVID-19 pandemic".
https://doi.org/10.1101/2022.10.10.22280896 (medRxiv preprint)

[†]Corresponding authors.

Teaching

Chonnam National University

Natural Language Processing (GSDS0016, 3-credit)	2024 Fall, 2023 Spring/Fall
Graph Data and Network Analysis (GSDS0027, 3-credit)	2025 Spring
Network Analysis (GSDS0027, 3-credit)	2024 Spring
Advanced Statistics for Data Science (GSDS0022, 3-credit)	2023-2024 Fall
Creative Interdisciplinary Capstone Project (GSDS0018, 3-credit)	2024 Fall
Social Data Analysis and Visualization (DSC0002, 3-credit)	2024-2025 Spring
Topics in Computing for Data Science (GSDS0014, 3-credit)	2023-2025 Spring
Python Programming and Practice (SAI0030, 3-credit)	2023 Fall

Services

Peer review for journals

Scientific Reports, Journal of Royal Society Interface, PLoS One, Complexity, Physica A, Socio-Economic Planning Sciences.

List of Presentations

INVITED TALKS

1. **I. Hong**, "Unraveling employment growth and human mobility in cities with scaling relations", *STATPHYS28 Satellite Meeting: New Frontiers in Complex Networks*, Aug 2, 2023.
2. **I. Hong**, "Explaining complex interactions in socio-spatial systems with data science", *2023 Korean Physical Society Spring Meeting*, Apr 19, 2023.
3. **I. Hong**, "Complex interplay between socio-spatial components of cities", *2021 Korean Physical Society Fall Meeting*, Oct 20, 2021 **(Young Statistical Physicist Award Lecture)**.
4. **I. Hong**, "The universal pathway to innovative urban economies", *Application of Econophysics and Social Physics*, Aug 10, 2021.
5. **I. Hong**, "The universal pathway to innovative urban economies", *National Institute for Mathematical Sciences*, Jul 09, 2021.
6. **I. Hong**, "The universal pathway to innovative urban economies", *Northwestern Institute on Complex Systems*, Aug 14, 2020.
7. **I. Hong**, "The universal pathway to innovative urban economies", *Growth Lab at Harvard Kennedy School*, Aug 10, 2020.
8. **I. Hong**, "Complexity and scaling in urban economies", *Seoul Institute of Technology*, Feb 21, 2020.

ORAL TALKS

1. H. Lee, **I. Hong**, "Quantifying the influence of vocational education with text embedding and similarity-based networks", *2023 Korea Academy of Complexity Studies Conference*, Dec 16, 2023.
2. D. Lee, O.-H. Kwon, **I. Hong**, J. Park, W.-S. Jung, H. Youn, "Mobility Connectedness: Uncovering socioeconomic bias and connectivity in urban mobility", *9th International Conference on Computational Social Science (IC2S2)*, Jul 18, 2023.
3. O.-H. Kwon, D. Lee, **I. Hong**, J. Park, H. Youn, W.-S. Jung, "Mobility potential as a window to explore social capital in urban systems", *9th International Conference on Computational Social Science (IC2S2)*, Jul 18, 2023.
4. **I. Hong**, L. N. Ferreira, A. Rutherford, and M. Cebrian, "Assessing the impact of protests on the COVID-19 spread", *Conference on Complex Systems 2022*, Oct 21, 2022.
5. **I. Hong**, L. N. Ferreira, A. Rutherford, and M. Cebrian, "Protest-driven epidemics during the COVID-19 pandemic", *Complex Networks 2021*, Dec 1, 2021.
6. **I. Hong**, L. N. Ferreira, A. Rutherford, and M. Cebrian, "Epidemic-driven protests and protest-driven epidemics", *7th International Conference on Computational Social Science (IC^2S^2)*, Jul 30, 2021.
7. **I. Hong**, L. N. Ferreira, A. Rutherford, and M. Cebrian, "Interplay of protests and epidemics during the COVID-19 pandemic", *Networks 2021*, Jul 10, 2021.
8. L. N. Ferreira, **I. Hong**, A. Rutherford, and M. Cebrian, "The small-world network of protests", *Networks 2021*, Jul 9, 2021.

9. D. Kim, D. Lee, J. Myung, C. Jung, **I. Hong**, D. Sáez-Trumper, J. Yun, W.-S. Jung, M. Cha, "Information structure analysis of COVID-19 pandemic using Wikipedia data", *Korea Computer Congress 2021*, Jun 23, 2021 (**Best Paper Award**).

10. **I. Hong**, A. Rutherford, and M. Cebrian, "Polarized social mobilization for pandemic control", *2021 Korean Physical Society Spring Meeting*, Apr 22, 2021.

11. **I. Hong**, A. Rutherford, L. N. Ferreira, and M. Cebrian, "Epidemic-driven conflict and conflict-driven epidemics", *Complex Networks 2020*, Dec 2, 2020.

12. A. Rutherford, M. Cebrian, **I. Hong**, and I. Rahwan, "Social mobilization impeded by political polarization", *NetSci 2020*, Sep 25, 2020.

13. **I. Hong**, A. Rutherford, L. N. Ferreira, and M. Cebrian, "Epidemic-driven conflict and conflict-driven epidemics", *NetSci 2020*, Sep 23, 2020.

14. T. You, O.-H. Kwon, **I. Hong**, and W.-S. Jung, "Alliance structure between UN Security Council members from debates", *NetSci 2020*, Sep 22, 2020.

15. **I. Hong**, M. R. Frank, I. Rahwan, W.-S. Jung, and H. Youn, "Urban economies recapitulate a common trajectory", *4th Annual International Conference on Computational Social Science (IC^2S^2)*, Jul 14, 2018.

16. **I. Hong**, W.-S. Jung, and H. Youn, "Who is the shepherd? Small city follows trajectory of larger cities in their economic compositions", *Conference on Complex Systems 2017*, Sep 17, 2017.

17. **I. Hong**, W.-S. Jung, and H. Youn, "Small city follows larger city's trajectory in urban economy", *The 19th Workshop for Statistical Physics*, Aug 28-30, 2017.

18. **I. Hong**, W.-S. Jung, and H. Youn, "Structural change in urban industry", *APCTP 2016 Workshop on Frontiers of Physics: Push the Envelope of Statistical Physics: Econo, Social, Bio and Beyond*, Dec 14, 2016.

19. **I. Hong**, W.-S. Jung, and H. Youn, "Structural change in urban economy through creative destruction", *DISC 2016*, Dec 9, 2016.

20. **I. Hong**, H. Kim, and W.-S. Jung, "Knowledge Structure of Nuclear Fusion Research", *2016 Korean Physical Society Fall Meeting*, Oct 20, 2016 (**Excellent Oral Presentation Award**).

21. H. Kim, **I. Hong**, and W.-S. Jung, "Fusion of nations, fusion of disciplines: network evolution in nuclear fusion research", *2016 Conference on Complex Systems*, Sep 20, 2016.

22. **I. Hong**, W.-S. Jung, and H. Youn, "Creative destruction in urban economy: industrial trajectory in time and space", *NetSci 2016 Satellite Meeting, May 30*, 2016.

23. **I. Hong**, W.-S. Jung, and H. Youn, "Industrial Dynamics in Urban Areas", *Application of Econophysics and Social Physics: Winter Workshop*, Feb 22-23, 2016.

24. **I. Hong** and W.-S. Jung, "Gravity and Radiation Models for the Korean Bus Network", *Physics of Social Complexity Workshop*, Nov 2-4, 2015.

25. **I. Hong** and W.-S. Jung, "Gravity and Radiation Models for Intra-Urban Mobility by the Korean Urban Bus System", *The 18th Workshop for Statistical Physics*, Aug 21, 2015.

26. **I. Hong** and W.-S. Jung, "Application of the Gravity and Radiation Models on the Korean Urban Bus Network", *2015 Korean Physical Society Spring Meeting*, Apr 22, 2015.

27. **I. Hong** and W.-S. Jung, "Statistical Analysis and Modeling of the Korean Urban Bus Network", *Social Modeling and Simulations + Econophysics Colloquium 2014*, Nov 4, 2014.

28. **I. Hong** and W.-S. Jung, "Network Analysis of the Urban Bus System in Korea", *Application of Econophysics and Social Physics: Summer Workshop*, Aug 22, 2014.

29. **I. Hong** and W.-S. Jung, "Intra-City Bus Network Analysis on the Korean Cities for Understanding Urban Structures", *The 17th Workshop for Statistical Physics*, Nov 2, 2013.

30. **I. Hong** and W.-S. Jung, "Intra-city Bus Network in Korean Mid-size Cities", *Econophysics Colloquium 2013 & Asia Pacific Econophysics Conference 2013*, Jul 30, 2013.

POSTERS

1. H. Lee, I. Hong, "Measuring the influence of Vocational Education on Singapore labor market with LLM and similarity-based networks", *10th International Conference on Computational Social Science*, Jul 17-20, 2024.

2. H. Lee, I. Hong, "Quantifying the impact of Vocational Education and Training on the Singapore labor market with text embedding and similarity-based networks", *2024 Korean Physical Society Spring Meeting*, Apr 23-26, 2024.

3. W. Goh, H. Lee, I. Hong, "Unraveling the copying practices, 'Urakai', in Korean digital media through similarity-based network analysis", *2024 Korean Physical Society Spring Meeting*, Apr 23-26, 2024.

4. O.-H. Kwon, D. Lee, **I. Hong**, J. Park, W.-S. Jung, and H. Youn, "Urban mobility potential explained by socioeconomic status", *8th International Conference on Computational Social Science (IC^2S^2)*, Jul 21, 2022.

5. **I. Hong**, M. Kwon, J. Kim, S. Na, and W.-S. Jung, "Urban scaling and transition in Korean economy", *2020 Korean Physical Society Fall Meeting*, Nov 5, 2020.

6. O.-H. Kwon, **I. Hong**, W.-S. Jung, and H.-H. Jo, "Explaining the varying exponent of gravity model on urban landscapes", *2020 Korean Physical Society Fall Meeting*, Nov 5, 2020.

7. **I. Hong**, M. R. Frank, I. Rahwan, W.-S. Jung, and H. Youn, "Cities recapitulate a universal pathway to innovative economies", *NetSci-X 2020*, Jan 21, 2020.

8. **I. Hong**, W.-S. Jung, and H.-H. Jo, "Unifying Framework of Mobility Models on Population Landscape", *2017 Korean Physical Society Spring Meeting*, Apr 19, 2017 (**Excellent Poster Presentation Award**).

9. **I. Hong** and W.-S. Jung, "Comparison of Traffic Models for the Korean Bus System", *2015 Korean Physical Society Fall Meeting*, Oct 22, 2015.

10. **I. Hong** and W.-S. Jung, "Network Modeling of the Korean Urban Bus Network", *2014 Korean Physical Society Fall Meeting*, Oct 23, 2014.

11. B.-H. Lee, **I. Hong**, and W.-S. Jung, "Complex Network Analysis of the Korean Transportation Network", *The 15th Asia Pacific Industrial Engineering and Management Systems Conference*, Oct 12-15, 2014.

12. B.-H. Lee, **I. Hong**, W.-S. Jung, and O. Kwon, "Statistical Properties of the Korean Transportation Network as a Complex Network", *European Conference on Complex Systems '14*, Sep 23, 2014.

13. **I. Hong** and W.-S. Jung, "Intra-City Bus Network Analysis on the Korean Cities for Understanding Urban Structures", *2013 Korean Physical Society Fall Meeting*, Oct 31, 2013 (**Excellent Poster Presentation Award**).

14. **I. Hong**, "Investigation on Intra-city Bus Network in Cheongju", *The 5th International Symposium on IT Convergence Engineering*, Jul 11-12, 2013.