

Inho Hong

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Personal Information

Date of Birth: 11/16/1988
Gender: M
Citizenship: Republic of Korea

Education

Pohang University of Science and Technology
Ph.D., Physics, 2013 - 2019 (advisor: Prof. Woo-Sung Jung).
Complexity in Social System Lab.
Field: complex systems

Pohang University of Science and Technology
M.S., Physics, 2010 - 2012 (advisor: Prof. Hyeon K. Park).

Pohang University of Science and Technology
B.S., Physics, 2006 - 2010.

Work Experience

Max Planck Institute for Human Development, Germany
Postdoctoral Research Fellow, Center for Humans & Machines
(collaborators: Iyad Rahwan, Alex Rutherford and Manucel Cebrian), March 2020 - Present.

Asia Pacific Center for Theoretical Physics, Korea
Postdoctoral Research Fellow, Statistical Physics of Complex Dynamics Lab.
(advior: Prof. Hang-Hyun Jo), September 2019 - February 2020.

Kellogg School of Management & Northwestern Institute on Complex Systems, Northwestern University, USA
Visiting predoctoral fellow (advisor: Prof. Hyejin Youn), October 2017 - August 2018.

Research Interests

Social mobilization
Social networks, polarized mobilization, social influence, open challenges.

Urban complexity

Urban scaling, urban economy, intracity mobility, population distribution, urban recapitulation, universality.

Human mobility

Gravity model, radiation model, numerical simulation, transportation network, migration.

Science of science

Knowledge space, topic modelling, citation network, collaboration network, bibliometric dataset.

Economic complexity

Product (industry) space, innovation, occupation and skill, employment, revealed comparative advantage.

**Visiting
Experience****Institute for Basic Science, Korea.**

Data Science Group, February 2020.

Harvard Kennedy School, Harvard University, USA.

Center for International Development, June 2017.

Santa Fe Institute, USA.

Graduate Studies program, February 2016.

Aalto University, Finland.

Department of Biomedical Engineering and Computational Science, February 2015.

**Teaching
Experience****Department of Physics, POSTECH**

Teaching assistant, Analytical Mechanics, Spring 2013.

Teaching assistant, Electrodynamics I, Spring 2011.

Teaching assistant, Electronics & Instrumentation Lab, Fall 2010.

Teaching assistant, Electronics & Instrumentation Lab, Spring 2010.

**Project
Experience****Physicia upgrade**

Upgrade and develop educational software “Physicia” for demonstrating simulations on statistical physics and nonlinear dynamics, March 2016 - September 2016. [LINK].

Awards and**Global Ph.D. Fellowship Program**

Honors National Research Foundation of Korea (NRF), March 2014–February 2017 (USD 25,000/yr, USD 75,000 in total).

Samsung Undergraduate Scholarship
Samsung Electro-Mechanics, March 2006-February 2010.

Excellent Poster Presentation Award
2017 Korean Physical Society Spring Meeting, April 2017.
2013 Korean Physical Society Fall Meeting, October 2013.

Excellent Oral Presentation Award
2016 Korean Physical Society Fall Meeting, October 2016.

Excellent Teaching Assistant Award
Electronics & Instrumentation Lab, Dept. of Physics, POSTECH, Fall 2010.
Electronics & Instrumentation Lab, Dept. of Physics, POSTECH, Spring 2010.

Best Paper Award
Undergraduate Research Program, POSTECH, 2009.

Excellent Bachelor Thesis Award
Department of Physics, POSTECH, 2009.

Skills **Programming languages**
MATLAB, Python, C

Language
Korean (native), English (advanced)

Analytics
Network analysis, natural language processing, machine learning, numerical simulation, analytical modeling and statistics.

Multidimensional and large-scale datasets
Multidimensional urban employment data, transportation data scrapped from web, large-scale simulated mobility data and large-scale publication data.

Working Paper • I. Hong, M. R. Frank, I. Rahwan, W.-S. Jung and H. Youn, “A common trajectory recapitulated by urban economies”, *arXiv preprint arXiv:1810.08330*. [LINK]

Publications **Ph.D.**

- 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). SCIE. [LINK]
- H. Kim[†], I. Hong[†] and W.-S. Jung, “Measuring national capability over big science’s multidisciplinary: A case study of nuclear fusion research”, *PLoS ONE* **14**, e0211963 (2019). SCIE. [LINK] - [†]*Equally contributed*
- I. Hong and W.-S. Jung, “Application of gravity model on the Korean urban bus network”, *Physica A* **462**, 48-55 (2016). SCI. [LINK]
- S. Lee, I. Hong, W.-S. Jung, “A network approach to the transfer market of European football leagues”, *New Physics: Sae Mulli* **65**, 402-409 (2015). SCOPUS. [LINK]

M.S.

- I. Hong *et al.*, “Evaluation of the imaging properties of Microwave Imaging Reflectometry”, *Journal of Instrumentation* **7**, C01077 (2012). SCIE.
- W. Lee *et al.*, “Microwave imaging reflectometry system for KSTAR”, *Plasma and Fusion Research* **6**, 2402037-2402037 (2011).
- W. Lee *et al.*, “Comparative study between the reflective optics and lens based system for microwave imaging system on KSTAR”, *Review of Scientific Instruments* **81**, 10D932 (2010). SCI.
- H. K. Park *et al.*, “Microwave imaging reflectometry studies for turbulence diagnostics on KSTAR”, *Review of Scientific Instruments* **81**, 10D933 (2010). SCI.

Presentations

- I. Hong *et al.*, “Cities recapitulate a universal pathway to innovative economies”, *NetSci-X 2020*, Jan 20-23, 2020.
- I. Hong *et al.*, “Urban economies recapitulate a common trajectory”, *4th Annual International Conference on Computational Social Science*, Jul 12-15, 2018.
- 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 17-22, 2017.
- 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.

- I. Hong, W.-S. Jung and H.-H. Jo, “Unifying Framework of Mobility Models on Population Landscape”, *2017 Korean Physical Society Spring Meeting* (Excellent Poster Presentation Award), Apr 19-21, 2017.
- 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.
- I. Hong, W.-S. Jung and H. Youn, “Structural change in urban economy through creative destruction”, *DISC 2016*, Dec 9, 2016.
- I. Hong, H. Kim and W.-S. Jung, “Knowledge Structure of Nuclear Fusion Research”, *2016 Korean Physical Society Fall Meeting* (Excellent Oral Presentation Award), Oct 20, 2016.
- 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.
- 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.
- I. Hong *et al.*, “Industrial Dynamics in Urban Areas”, *Application of Econophysics and Social Physics: Winter Workshop*, Feb 22-23, 2016.
- I. Hong and W.-S. Jung, “Gravity and Radiation Models for the Korean Bus Network”, *Physics of Social Complexity Workshop*, Nov 2-4, 2015.
- I. Hong, W.-S. Jung, “Comparison of Traffic Models for the Korean Bus System”, *2015 Korean Physical Society Fall Meeting*, Oct 22, 2015.
- 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.
- 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.
- 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.

- I. Hong and W.-S. Jung, “Network Modeling of the Korean Urban Bus Network”, *2014 Korean Physical Society Fall Meeting*, Oct 23, 2014.
 - 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.
 - B.-H. Lee *et al.*, “Statistical Properties of the Korean Transportation Network as a Complex Network”, *European Conference on Complex Systems '14*, Sep 23, 2014.
 - 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.
 - I. Hong, 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.
 - I. Hong and W.-S. Jung, “Intra-City Bus Network Analysis on the Korean Cities for Understanding Urban Structures”, *Korean Physical Society 2013 Fall Meeting* (Excellent Poster Presentation Award), Oct 31, 2013.
 - 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.
 - I. Hong, “Investigation on Intra-city Bus Network in Cheongju”, *The 5th International Symposium on IT Convergence Engineering*, Jul 11-12, 2013.
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