

# CURRICULUM VITAE

(last updated: April 08, 2024)

## Meesoon Ha

Professor

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### Research Interests

I am interested in the applications of statistical physics in terms of simple minimal model studies with essential features of complex systems. The below research topics are what I am currently involved in:

- **Phase transitions: Finite-size scaling and universality class; Quantum & Stochastic thermodynamics**
- **Kinetic roughening and multifractality in thin film growth processes; Multiscale nature**
- **Nonequilibrium stochastic processes: Self-organized criticality; Synchronization**
- **Dynamics on and of complex networks: Epidemic process; Social contagion; Neuroscience**
- **Patterns and collective behavior in granular media and/or colloidal particle systems**
- **Random constraint satisfaction (NP-complete) problems: K-SAT and Q-COL**
- **Glass and jamming transitions with dynamic heterogeneity; Disordered systems**

### Professional Experience

- 2022.09. - present Chairperson, Dept. of Physics Education, Chosun University
- 2022.03. - present Professor, Dept. of Physics Education, Chosun University
- 2019.08. - 2020.07. Visiting Associate Professor, Dept. of Physics, University of Washington
- 2017.03. - 2022.02. Associate Professor, Dept. of Physics Education, Chosun University
- 2017.03. - 2019.02. Chairperson, Dept. of Physics Education, Chosun University
- 2011.03. - 2017.02. Assistant Professor, Dept. of Physics Education, Chosun University
- 2007 - 2011 BK21 Research Professor, Dept. of Physics  
Korea Advanced Institute of Science and Technology (KAIST)
- 2006 - present Associate Member, School of Physics, KIAS
- 2006 - 2007 Brain Korea 21 (BK21) Endowed Professor  
Dept. of Physics, Chonbuk National University
- 2003 - 2006 Postdoctoral Research Fellow, School of Physics  
Korea Institute for Advanced Study (KIAS)
- 1997 - 2003 RA and TA, Dept. of Physics, University of Washington, U.S.A.
- 1995 - 1996 Part-time Lecturer & Staff of General Physics Lab
- 1993 - 1995 Research Assistant (RA) and Teaching Assistant (TA)  
Dept. of Physics, Korea University

### Official Visits

- 2018 summer; 2014; 2013; 2012 Prof. Bae-Yeun Ha's group  
Dept. of Physics and Astronomy, University of Waterloo, Waterloo, Canada
- 2019.02.06. - 14.; 2018.01.07. - 15.; 2017.01.21. - 27.; 2011.12.28. - 2012.01.20.  
Prof. Marcel den Nijs' group  
Dept. of Physics and Astronomy, University of Washington, Seattle, U.S.A.  
[see <http://faculty.washington.edu/london/index.html>]
- 2008.05.10. - 06.01. Nordic Institute for Theoretical Physics, Stockholm, Sweden  
"Physics of Distributed Information Systems" (PhysDIS) program and workshop  
[see <http://agenda.albanova.se/conferenceDisplay.py?confId=296>]
- 2006.11.06. - 12.01. Prof. M. Paczuski's complexity science group  
Dept. of Physics and Astronomy, University of Calgary, Calgary, Canada  
[see <http://www.ucalgary.ca/complexity/people/faculty/maya>]
- 2002.12.23. - 2003.01.23. Prof. H. Park's group, School of Physics, KIAS, Korea

## Education

- 1997 - 2003 Ph.D. in Physics at the University of Washington, Seattle, U.S.A.  
Specialty: Condensed-Matter Theory and Statistical Physics  
Ph.D. dissertation with Prof. Marcel den Nijs:  
*"Scaling and phase transitions in 1D nonequilibrium driven systems"*
- 1993 - 1995 M.S. in Physics at Korea University, Seoul, Korea  
Specialty: Statistical Physics  
M.S. thesis with Prof. In-mook Kim and Prof. Hyunggyu Park:  
*"Dynamic properties of one-dimensional nonequilibrium interfaces"*
- 1989 - 1993 B.S. in Physics at Inha University, Incheon, Korea

## Awards and Honors

- Award for the **Best Teacher (ABT)** for 2019-1, 2020-2, 2021-1,2 at EIC, Chosun University
- 2017.02.23. **Best Professor for Class Evaluation** in College of Education, Chosun University
- 2016.02.15. & 10.14. **ACE Best Teacher** at Fall 2015 & Spring 2016, Chosun University
- 2010.09.28. "Marquis Who's Who in the World 2011 (28th edition)" Selection & Inclusion
- 2010.04.21. **Yong-Bong Prize** (under 40-year-old stat. physicist) at Korean Physical Society
- 2001 Full scholarship at International Summer School (FPSPX), Altenberg, Germany
- 1994.03.26. & 09.10. Baekwoon private fellowships at Korea University, Seoul, Korea
- 1990 - 1992 Honor student scholarships at Inha University, Incheon, Korea

## Professional Memberships and Activities

- Chairperson, Dept. of Physics Education at Chosun University, March 2017 - February 2019; September 2022 ~
- Editor, PHYSICS & HIGH TECHNOLOGY, May 2021 - April 2024; NPSM (KPS), May 2016 - April 2025
- Appointed Admission Interviewer at Chosun University, 2013 - 2019
- Member of Local Organizing Committee, STATPHYS 25, July 22 - 26, 2013
- Reviewer, National Research Foundation (NRF - Korea) proposal since 2010
- Appointed Admission Interviewer at KAIST, 2009 & 2010
- Referee, NPSM, JKPS, PRL, PRE since 2007; JSTAT since 2008; CEJP, Phys. Lett. A, EPL since 2010; EPJB, JPA since 2015; Scientific Report since 2016; Aerospace and Sustainability since 2018
- Reviewer, National Science Foundation (NSF - U.S.A.) proposal since 2007
- Member, Molecular Dynamics simulation Research Group (MDRG), 2007
- Member, 2030 Kangwon Frontier Brain (youngman) Group since 2007
- Member, The APS since 1997 (NW section, 1998), The KPS since 1994 (Division of SP, 2003)
- Mentor, 1st year physics graduate students at the University of Washington (UW), 2002 - 2003
- Volunteer and member, The CDO for Physicists and Astronomers at the UW, 2001 - 2003

## Grants

\* National Research Foundation (NRF) of Korea, grant funded by the Korean government

*Senior Researchers* for 5 years (March 2020 - February 2025); *Qualified Scientists in Local Universities* for 3+3 years (June 2014 - May 2020); *Female Scientists* - since May 2011 for 3 years (May 2011 - April 2014).

\* Chosun University Research Fund (October 2020 - September 2021, 2019; 2018; 2013; 2011)

## Computer Skills

- Extensive knowledge: Unix, Linux, Windows/OS2, C/C++, LaTeX, Gnuplot, Xfig, Overleaf
- Working knowledge: Mathematica, Origin, Fortran, HTML, MacOS, MS Office, ZOOM
- Familiar with: MatLab, Maple, Photoshop, Xmgrace, Python, Julia, Colab, Jupyter, OBS

## Personal Data

- Date and Place of Birth: December 07, 1970, Seoul, Korea (ROK)
- Languages: Fluent in Korean and American English ● Marital status: Married, One child

## List of Publications

(last updated: April 08, 2024)

### Journal articles, preprints, and in preparation

(in preparation)

- [54] "Scaling analysis in range expansion of epidemic processes",  
M. Ha (in preparation)
- [53] "Role of initial conditions in dynamic scaling analysis of synchronization",  
W. Kwak, C. Choi, and M. Ha (in preparation)

(to be submitted soon)

- [52] "Inertial effect on synchronization of globally coupled oscillators",  
C. Choi and M. Ha (to be submitted)
- [51] "Dynamic crossover of Ising spins coupled to nonlinear growth",  
Y. Baek, M. Ha, H. Park, and M. den Nijs (to be submitted)
- [50] "Scaling properties in diffusive epidemic processes with relative bias",  
M. Ha (to be submitted)
- [49] "Spatio-temporal Pattern Analysis of Epidemic Processes with Temporal Feedbacks",  
M. Ha (to be submitted)
- [48] "Percolation transitions in spatial multiplex networks with long-range links",  
G. Son, M. Ha, and H. Jeong (to be submitted)

(submitted/accepted)

- [47] "Interplay of network structure and talent configuration on wealth dynamics"  
J. Hur, M. Ha, and H. Jeong (submitted to PRE; arXiv:2404.04175)

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(published journal articles)

- [46] "Hidden multiscale organization and robustness of real multiplex networks",  
G. Son, M. Ha, and H. Jeong [Physical Review E **109**, 024301 (2024)]
- [45] "Scaling Relations between Regional School-age Population Density and Densities of College  
Departments and Students by Majors" (written in Korean),  
J. Seo, G. Gim, S. Kim, M. Ha, and S.H. Lee [New Physics: Sae Mulli **73**, 853 (2023)]  
*Selected Highlight Paper*
- [44] "Quantumness and thermodynamic uncertainty relation of the finite-time Otto engine",  
S. Lee, M. Ha, and H. Jeong [Physical Review E **103**, 022136 (2021)]
- [43] "Driven Contact Process with Temporal Feedback",  
M. Ha [New Physics: Sae Mulli **70**, 613 (2020)]
- [42] "Finite-time quantum Otto engine: Surpassing the quasi-static efficiency due to friction",  
S. Lee, M. Ha, J.-M. Park, and H. Jeong [Physical Review E **101**, 022127 (2020)]
- [41] "Passive tracer dynamics in slow-bond problem",  
H. Soh, and M. Ha [Journal of Statistical Mechanics (2019) P09409]
- [40] "Impact on temporal connectivity patterns in epidemic process",  
H. Kim, M. Ha, and H. Jeong [Eur. Phys. J. B **91**, 161 (2019)]
- [39] "Critical Phenomena in Generalized Epidemic Process",  
M. Ha [New Physics: Sae Mulli **69**, 649 (2019)]
- [38] "Effect of Thermal Noise on Conserved Lattice Gas",  
W. Kwak and M. Ha [Journal of the Korean Physical Society **74**, 918 (2019)]
- [37] "Role of hubs in the synergistic spread of behavior",  
Y. Baek, K. Chung, M. Ha, H. Jeong, and D. Kim [Physical Review E **99**, 020301(R) (2019)]
- [36] "Dynamic topologies of activity-driven temporal networks with memory",  
H. Kim, M. Ha, and H. Jeong [Physical Review E **97**, 062148 (2018)]

- [35] "Role of Cutoff Scaling in Scale-Free Networks",  
M. Ha [New Physics: Sae Mulli **68**, 563 (2018)]
- [34] "Jamming and condensation in one-dimensional driven flow",  
H. Soh, M. Ha, and H. Jeong [Physical Review E **97**, 032120 (2018)]
- [33] "Finite-Size Scaling in  $q$ -Coloring Problems",  
M. Ha [New Physics: Sae Mulli **67**, 1023 (2017)]
- [32] "Effects of a local defect on one-dimensional nonlinear surface growth",  
H. Soh, Y. Baek, M. Ha, and H. Jeong [Physical Review E **95**, 042123 (2017)]
- [31] "Generalized Conserved Lattice Gas on Random Networks",  
W. Kwak, S. Park, and M. Ha [New Physics: Sae Mulli **66**, 1210 (2016)]
- [30] "Universality classes of generalized epidemic process on random networks",  
K. Chung, Y. Baek, M. Ha, H. Jeong [Physical Review E **93**, 052304 (2016)]
- [29] "Scaling properties in time-varying networks with memory",  
H. Kim, M. Ha, and H. Jeong [Eur. Phys. J. B **88**, 315 (2015)]
- [28] "Spatial Correlations and Extended Self-Similarity Properties in Sandpiles",  
M. Ha [New Physics: Sae Mulli **65**, 1009 (2015)]  
*Selected Highlight Paper*
- [27] "Effects of junctional correlations in the TASEP on random regular networks",  
Y. Baek, M. Ha, and H. Jeong [Physical Review E **90**, 062111 (2014)]
- [26] "Dynamic Scaling Analysis of Critical Behaviors in Nonequilibrium Processes",  
M. Ha [New Physics: Sae Mulli **64**, 819 (2014)]
- [25] "Generalized epidemic process on modular networks",  
K. Chung, Y. Baek, D. Kim, M. Ha, and H. Jeong [Physical Review E **89**, 052811 (2014)]
- [24] "Expansion dynamics of a self-avoiding polymer in a cylindrical pore",  
Y. Jung, C. Jeon, M. Ha, and B. Ha [EPL, **104** (2013) 68003]
- [23] "Extended finite-size scaling of synchronized coupled oscillators",  
C. Choi, M. Ha, and B. Kahng [Physical Review E **88**, 032126 (2013)]
- [22] "Stochastic Local Search in Random Constraint Satisfaction Problems",  
M. Ha [New Physics: Sae Mulli **63**, 995 (2013)]
- [21] "Impact of sequential disorder on the scaling behavior of airplane boarding time",  
Y. Baek, M. Ha, and H. Jeong [Physical Review E **87**, 052803 (2013)]
- [20] "Numerical Study of Synchronization in the Kuramoto Model with Finite Inertia",  
C. Choi and M. Ha [New Physics: Sae Mulli **62**, 958 (2012)]  
*Selected Highlight Paper*
- [19] "Fundamental Structural Constraint of Random Scale-Free Networks",  
Y. Baek, D. Kim, M. Ha, and H. Jeong [Physical Review Letters **109**, 118701 (2012)]
- [18] "Kinetic roughening in polymer thin film growth",  
M. Ha [Physics Procedia **64** (2012) pp. 44-48]
- [17] "Absorbing states of zero-temperature Glauber dynamics in random networks",  
Y. Baek, M. Ha, and H. Jeong [Physical Review E **85**, 031123 (2012)]
- [16] "Effect of Blockage on Driven Flow with Periodic Boundary Conditions",  
M. Ha [New Physics: Sae Mulli **61**, 909 (2011)]
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- [15] "Finite-size scaling in random  $K$ -satisfiability problems (K-SAT)",  
S.H. Lee, M. Ha, C. Jeon and H. Jeong [Physical Review E **82**, 061109 (2010)]
- [14] "Universality classes and crossover behaviors in non-Abelian directed sandpiles",  
H.-H. Jo and M. Ha [Physical Review E **82**, 041101 (2010)]
- [13] "Critical behavior of Ising model in annealed scale-free networks",  
S.H. Lee, M. Ha, H. Jeong, J.D. Noh, and H. Park [Physical Review E **80**, 051127 (2009)]
- [12] "Instability transitions and ensemble equivalence in diffusive flow",  
M. Ha [Central European Journal of Physics **7**, 575 (2009)]

- [11] "Anomalous scaling behavior in polymer thin film growth by vapor deposition",  
S.-W. Son, M. Ha, and H. Jeong **[Journal of Statistical Mechanics (2009) P02031]**
- [10] "Relevance of Abelian Symmetry and Stochasticity in Directed Sandpiles",  
H.-H. Jo, and M. Ha **[Physical Review Letters 101, 218001 (2008)]**
- [9] "Boundary-induced abrupt transition in the symmetric exclusion process",  
A.Nagar, M. Ha, and H. Park **[Physical Review E 77, 061118 (2008)]**
- [8] "Dynamic instability transitions in 1D driven diffusive flow with nonlocal hopping",  
M. Ha, H. Park, and M. den Nijs **[Physical Review E 75, 061131 (2007)]**
- [7] "Finite-Size Scaling in Complex Networks",  
H. Hong, M. Ha, and H. Park **[Physical Review Letters 98, 258701 (2007)]**
- [6] Comment on "Non-Mean-Field Behavior of the Contact Process on Scale-Free Networks",  
M. Ha, H. Hong, and H. Park **[Physical Review Letters 98, 029801 (2007)]**  
*Virtual Journal of Biological Physics Research 13, issue 2 (2007).*

- [5] "Queuing transitions in the asymmetric simple exclusion process",  
M. Ha, J. Timonen, and M. den Nijs **[Physical Review E 68, 056122 (2003)]**
- [4] "Effect of a columnar defect on the shape of slow-combustion fronts",  
M. Myllys, J. Maunuksela, J. Merikoski, J. Timonen, V.K. Horváth, M. Ha, and M. den Nijs  
**[Physical Review E 68, 051103 (2003)]**
- [3] "Macroscopic car condensation in a parking garage",  
M. Ha, and M. den Nijs **[Physical Review E 66, 036118 (2002)]**
- [2] "Particle dynamics in a mass-conserving coalescence process",  
M. Ha, H. Park, and M. den Nijs **[Journal of Physics A 32, L495 (1999)]**
- [1] "Exact solutions of a restricted ballistic deposition model on a 1D staircase",  
H. Park, M. Ha, and I.-M. Kim **[Physical Review E 51, 1047 (1995)]**

### **Unpublished Projects (Pj) & Preprints (Pp)**

- [Pj2] "Population dynamics of free antimicrobial peptides (AMPs) and growing bacteria",  
M. Ha, Y. Jung, and B.-Y. Ha
- [Pj1] "Universality class of (2+1)-d polymer thin film growth by vapor deposition",  
S.-W. Son, M. Ha, I.J. Lee, and H. Jeong  
(in revision/pending)
- [Pp3] Comment on "Fluctuation theorem for hidden entropy production",  
Y. Baek, M. Ha, H. Jeong, and H. Park (in revision; arXiv:1402.1235v3)
- [Pp2] "Nonlinear stability of phase-locked states for the Kuramoto model with finite inertia",  
Y.-P. Choi, C. Choi, M. Ha, S.-Y. Ha (in revision; arXiv:1112.2763v1)
- [Pp1] "Role of power-law type long-term memory in the contact process",  
M. Ha, S. Kwon, H.S. Park, and H. Park (KIAS preprint)

## List of Presentations

(last updated: April 08, 2024)

### International: Invited & Contributed Talks (43 international talk only shown here)

43. STATPHYS28 at Tokyo, Japan  
[08/07-11, 2023]: “Quasi-long-range order and local faceting during interface growth”.
42. The 15<sup>th</sup> Asia Pacific Physics Conference (APPC15): Online Conference  
[08/21-26, 2022]: “Growing Interfaces coupled with Ising spin dynamics”.
41. International Workshop on Multiplex Brain Networks  
(Korea-Canada Cooperative Development Workshop 2022)  
at Univ. of Calgary and the BIRS, Banff, Canada  
[04/21-24, 2022]: “Scaling properties of activity-driven temporal networks with memory”.
40. Non-equilibrium Collective Phenomena (NCP 2021) Workshop  
at Gyeongju Hilton, Gyeongju, Korea  
[09/27-10/01, 2021]: “Role of Diffusion and Temporal Feedback in Epidemic Processes”.
39. Roles of heterogeneity in non-equilibrium collective dynamics (RHINO 2021)  
at Pohang Internation Center, Pohang, Korea  
[08/17-19, 2021]: “Epidemic Process with Temporal Feedbacks”.
38. Power-net 2021: Complex network approaches towards stable power grids:  
Online ZOOM Satellite Meeting on NETWORKS 2021 via WHOVA  
[07/01, 2021]: “Dynamic scaling of synchronization transitions in Kuramoto oscillators”.
37. APCTP Workshop: Roles of Heterogeneity in Non-equilibrium collective dynamics  
(RHINO 2019) at APCTP Headquarter, Pohang, Korea  
[07/15-17, 2019]: “Role of Heterogeneity in epidemic processes”.
36. XXVI Sitges Conference on Statistical Mechanics: New Trends in Statistical Physics  
(50th years of the Sitges Conference)  
at Hotel Calipolis, Sitges, Sweden  
[05/27-31, 2019]: “Mixed-Order Transitions in the GEP”.
35. The 7<sup>th</sup> International Conference on Complex Networks and Their Applications:  
COMPLEX NETWORKS 2018 at University of Cambridge, Cambridge, United Kingdom  
[12/11-13, 2018]: “Interplay of hubs and cooperation in social contagion”.
34. New Trends in Nonequilibrium Statistical Mechanics: Classical and Quantum Systems (nesmcq18)  
at Ettore Majorana Centre for Scientific Culture, Erice, Italy  
[07/23-21, 2018]: “Role of Localized Defect in 1D Driven Diffusive Flow”.
33. The 8<sup>th</sup> KIAS Conference on Statistical Physics (NSPCS 2018) at KIAS, Seoul, Korea  
[07/09-12, 2018]: “Universal Properties of Complex Contagions”.
32. BIFI International Conference 2018: Complexity, Networks, and Collective Behavior  
at Patio de la Infanta, Zaragoza, Spain  
[02/06-08, 2018]: “Role of Structural Heterogeneity in Generalized Epidemic Process”.
31. The 9<sup>th</sup> International Conference of Nonlinear Science: Dynamic Days Asia Pacific 9 (DDAP9)  
at Hong Kong Baptist University, Hong Kong, China  
[12/14-17, 2016]: “Relevance of columnar defect in KPZ growing interface”.
30. STATPHYS26 at Lyon, France [07/18-22, 2016]: “Cooperative Effects on Epidemic Dynamics”.
29. The 7<sup>th</sup> KIAS Conference on Statistical Physics (NSPCS 2016) at KIAS, Seoul, Korea  
[07/04-07, 2016]: “Role of Bias in Generalized Contact Process”.
28. International School and Conference on Networks Science (NetSci 2016) at K-Hotel, Seoul, Korea  
[05/30-06/03, 2016]: “Dynamic Scaling in Synchronization of Coupled Oscillators on Complex Networks”
27. DYCOSC15 - International Workshop on Dynamics of Coupled Oscillators:  
40 years of the Kuramoto Model at MPIPKS, Dresden, Germany  
[07/27-31, 2015]: “Dynamic scaling and universality class in synchronization”.
26. The 113<sup>th</sup> Statistical Mechanics Conference at Rutgers University, New Brunswick, NJ, U.S.A.  
[05/10-12, 2015]: “Universality Class of GEP on Modular Networks” (short talk).
25. STATPHYS25 at Seoul, Korea  
[07/22-26, 2013]: “Dynamic finite-size scaling and universality issues in synchronization”.

24. Patterns & waves in populations of cells and active particles:  
Satellite Meeting of STATPHYS25 at Korea University, Seoul  
[07/19-20, 2013]: "Time Evolution of Phase Synchronization in Coupled Oscillators".
23. The APS 2013 March Meeting, Baltimore, MD, U.S.A.  
[03/18-22, 2013]: "Dynamic Scaling of Synchronization in Kuramoto-type Globally Coupled Oscillators".
22. Workshop on the Open Problems of the Glass Transition and Related Topics,  
Kyushu University Nishi-Jin Plaza, Fukuoka, Japan  
[12/16-20, 2012]: "Glassy Behaviors in Random Constraint Satisfaction Problems".
21. The 7<sup>th</sup> International Conference of Nonlinear Science: Dynamic Days Asia Pacific 7 (DDAP7)  
and the 11<sup>th</sup> Taiwan International Symposium on Statistical Physics at Academia Sinica, Taipei, Taiwan  
[08/06-09, 2012]: "Applications of Absorbing Phase Transitions in Random Networks".
20. 2012 - 25<sup>th</sup> Annual Workshop of Center for Simulational Physics at University of Georgia:  
Recent Developments in Computer Simulational Studies in Condensed Matter Physics, Athens, GA, U.S.A.  
[02/20-24, 2012]: "Kinetic Roughening in Polymer Thin Film Growth".
19. Feza Gürsey Institute - Imperial College  
International Summer School and research workshop on Complexity, Istanbul, Turkey  
[09/05-10, 2011]: "Q-Coloring Problems in Complex Networks".
18. The 10<sup>th</sup> Statistical Mechanics Conference at Rutgers University, New Brunswick, NJ, U.S.A.  
[05/08-10, 2011]: "Contact Process with Long-term Memory and Branching Bias" (short talk).
17. APCTP Workshop on Current Progress of Simulations in Complex Systems  
at APCTP headquarters, Pohang, Korea  
[11/15-17, 2010 (invited)]: "Critical Behaviors of Stochastic-Local-Search Algorithms in Random CSPs".
16. The 4<sup>th</sup> KIAS Conference on Statistical Physics (NSPCS 2010):  
Satellite Meeting of STATPHYS24 at KIAS, Seoul, Korea  
[07/26-29, 2010]: "Finite-Size Effects on Critical Behaviors in Random K-SAT".
15. STATPHYS24 at Cairns, Australia  
[07/18-23, 2010]: "Universality Class of Polymer Thin Film Growth in (1+1) and (2+1) dimensions".
14. New Frontiers in Complex Networks (NFCN 2010):  
STATPHYS24 satellite meeting at SNU, Seoul, Korea  
[07/12-16, 2010 (invited)]: "Critical behaviors in random constraint satisfaction problems".
13. International Workshop on Statistical Physics and Computer Science (SPCS 2010):  
Satellite Meeting of STATPHYS24 at KITPC, Beijing, China  
[07/08-11, 2010]: "Phase transitions and critical behaviors in random k-satisfiability problems".
12. The APS 2010 March Meeting, Portland, OR, U.S.A.  
[03/15-19, 2010]: "Finite-Size Scaling (FSS) in Random K-Satisfiability Problems (K-SAT)".
11. APCTP Symposium on Fields of Special Interests in Theoretical Physics  
at APCTP Headquarters, Pohang  
[11/30-12/01, 2009 (invited)]: "Critical Phenomena in Critical Phenomena: Universality Perspective".
10. The 6<sup>th</sup> APCTP-KIAS Winter School on Statistical Physics at POSCO International Center, POSTECH, Pohang  
[02/04-06, 2009 (invited)]:  
"Why is Asymmetric Simple Exclusion Process still so popular? Not a just toy model?".
9. International Conference on Complex Networks: *The Past 10 Years and Future* at SNU, Seoul  
[12/19-22, 2008]: "Numerical Study of Statistical Models on Scale-Free Networks with Size-Dependent Cutoff".
8. The 5<sup>th</sup> International Conference of Nonlinear Science: Dynamic Days Asia Pacific 5 (DDAP5)  
at Nara Prefectural New Public Hall, Nara, Japan  
[09/09-12, 2008]: "Anomalous scaling behavior in polymer thin film growth".
7. SigmaPhi2008 at Orthodox Academy of Crete, Kolympari-Chania, Greece  
[07/14-18, 2008]: "Instability transition and ensemble equivalence in diffusive flow".
6. The "Physics in Distributed Information Systems" (PhysDIS) workshop  
at NORDITA, Stockholm, Sweden  
[05/15-17, 2008 (invited talk)]: "FSS in complex networks".
5. The 10<sup>th</sup> Asia Pacific Physics Conference (APPC10) at POSCO International Center, POSTECH, Pohang, Korea  
[08/21-24, 2007]: "Dynamic behavior of 1D driven diffusive flow with nonlocal hopping".
4. The 4<sup>th</sup> International Conference of Nonlinear Science: Dynamic Days Asia Pacific 4 (DDAP4)  
at POSTECH, Pohang, Korea  
[07/12-14, 2006]: "FSS in complex networks".

3. The 2<sup>nd</sup> KIAS Conference on Statistical Physics (NSPCS06) at KIAS, Seoul, Korea [07/03-06, 2006 (invited)]: “FSS in complex networks”.
2. The 89<sup>th</sup> Statistical Mechanics Conference at Rutgers University, New Brunswick, NJ, U.S.A. [05/18-20, 2003]: “Queuing transitions in 1D drive flow due to an obstruction” (short talk).
1. The APS 2001 March Meeting, Seattle, WA, U.S.A. [03/12-16, 2001]: “Dynamic analogue of Bose condensation in a traffic model with a parking garage”.

**Domestic: Invited & Contributed Talks** (42 domestic talk only shown here)

43. Gwangju-Chonnam KPS 2023 Annual Meeting at Chonnam National University, Gwangju, Korea [12/15, 2023]: “Universal Scaling in Temporal Synchronization”.
42. G-Fair Special Session at Gwangju, Chonnam National University, Korea [11/15, 2023]: “Scaling Analysis of Higher Education Disparity in Korea” (forthcoming).
41. The KPS 2021 Fall Virtual Meeting, Korea [10/20-22, 2021]: “Dynamic Scaling of Growing Interfaces coupled with Ising spin dynamics”
40. The KPS 2020 Fall Virtual Meeting, Korea [11/04-06, 2020]: “Universal scaling behaviors of epidemic models near the criticality”.
39. STATPHYS Monthly Meeting sponsored by APCTP Topical Program on "Statistical Physics of Disordered, Non-equilibrium and Complex Systems" at KIAS, Seoul, Korea [05/18, 2019]: “Phase Transitions and/or Crossover Scaling Behaviors”.
38. Gwangju-Chonnam KPS 2018 Annual Meeting at Chonnam National University, Gwangju, Korea [12/20, 2018 (invited)]: “Mixed-Order Transitions in Spread of Behavior”.
37. The KPS 2018 Fall Meeting at CECO, Changwon, Korea [10/24-26, 2018 (invited)]: “Effects of the threshold for cooperation on social contagions”
36. The KPS 2018 Spring Meeting at DCC, Daejeon, Korea [04/25-27, 2018]: “Cutoff-dependent finite-size scaling in scale-free networks”.
35. Gwangju-Chonnam KPS 2017 Annual Meeting at Chonnam National University, Gwangju, Korea [12/21, 2017]: “Dynamic Scaling in Activity-Driven Temporal Networks”.
34. STATPHYS Monthly Meeting sponsored by APCTP Topical Program on "Statistical Physics of Disordered, Non-equilibrium and Complex Systems" at KIAS, Seoul, Korea [12/09, 2017]: “Particle-jamming and hole-condensation in 1D driven flow”.
33. The KPS 2017 Spring Meeting at DCC, Daejeon, Korea [04/19-21, 2017]: “Finite-size scaling of the slow-bond problem of TASEP”.
32. Gwangju-Chonnam KPS 2015 Annual Meeting at Chosun University, Gwangju, Korea [12/22, 2015 (invited)]: “Extended Finite-Size Scaling in Epidemic Models”.
31. The KPS 2015 Fall Meeting at HICO, Gyeongju, Korea [10/21-23, 2015]: “Generalized Epidemic Process on Scale-Free Networks” (designated speaker).
30. Gwangju-Chonnam KPS 2014 Annual Meeting at Chonnam National University, Gwangju, Korea [12/23, 2014]: “Phase Transitions in Generalized Epidemic Process”.
29. The KPS 2014 Fall Meeting at KDJCC, Gwangju, Korea [10/22-24, 2014]: “Finite-Size Scaling in the KPZ-related Sign Phase Transition”.
28. STATPHYS Monthly Meeting sponsored by APCTP Topical Program on "Statistical Physics of Disordered, Non-equilibrium and Complex Systems" at KIAS, Seoul, Korea [06/21, 2014]: “Role of Disorder in Critical Behaviors of Nonequilibrium Processes”.
27. The 4<sup>th</sup> Workshop on Non-Equilibrium Fluctuation Theorem at SEACLOUD Hotel, Busan, Korea [01/12-14, 2014]: Review on “Entropy production and fluctuation relations for a KPZ interface”.
26. Gwangju-Chonnam KPS 2013 Annual Meeting at Chonnam National University, Gwangju, Korea [12/17, 2013]: “Dynamic Scaling in Polymer Thin Film Growth”.
25. The KPS 2013 Spring Meeting at DCC, Daejeon, Korea [04/24-26, 2013]: “Dynamic Scaling in Time Evolution of Phase Synchronized Oscillators”.
24. Gwangju-Chonnam KPS 2012 Annual Meeting at Chosun University, Gwangju, Korea [12/14, 2012 (invited)]: “How to Solve Random Constraint Satisfaction Problems using SLS Algorithms”.
23. The 2<sup>nd</sup> Workshop on Non-Equilibrium Fluctuation Theorems at SEACLOUD Hotel, Busan, Korea [05/18-19, 2012]: “Dynamic scaling of synchronized oscillation”.



22. The KPS 2012 Spring Meeting at DCC, Daejeon, Korea  
[04/25-27, 2012]: “Totally Asymmetric Simple Exclusion Process with a Quenched Slow Bond”
21. Gwangju-Chonnam KPS 2011 Annual Meeting  
at Chonnam National University, Gwangju, Korea  
[12/16, 2011 (invited)]: “Synchronization Phase Transitions in Globally Coupled Oscillators”.
20. The KPS 2011 Fall Meeting at BEXCO, Busan, Korea  
[10/19-21, 2011]: “Revisited Finite-Size Scaling in Complex Networks”.
19. The KPS 2011 Spring Meeting at DCC, Daejeon, Korea  
[04/13-15, 2011 (invited)]: “Role of Memory in Contact Process”.
18. The KPS 2010 Fall Meeting at Phoenix Park, Pyeongchang, Korea  
[10/20-22, 2010]: “Critical Behavior of Q-Coloring in Random Networks”.
17. The KPS 2010 Spring Meeting at DCC, Daejeon, Korea  
[04/21-23, 2010 (invited, Yong-Bong Prize)]:  
“Phase Transitions and Critical Behaviors in Random Constraint Satisfaction Problems”.
16. Winter School on Algorithms and Combinatorics 2010  
at Hongik International Center, Chochiwon, Korea  
[01/11-13, 2010]: “Finite-Size Scaling in Random k-Satisfiability Problems”.
15. The KPS 2009 Fall Meeting at CECO, Changwon, Korea  
[10/22-23, 2009]: “Finite-Size Scaling in Random k-Satisfiability Problems”.
14. The 15<sup>th</sup> Workshop of STATPHYS 2009 at Konjiam Resort, Gwangju, Korea  
[08/12-14, 2009]: “Intermittency studies and multifractality in (1+1)-d surface growth”.
13. The 24<sup>th</sup> MDRG Workshop at Mt. Jangtae Resort, Daejeon, Korea  
[06/25-26, 2009]: “Anomalous scaling behavior in polymer thin film growth by vapor deposition”.
12. The KPS 2009 Spring Meeting at DCC, Daejeon, Korea  
[04/23-24, 2009]: “Critical behavior of Ising model in annealed SFNs”.
11. The KPS 2008 Fall Meeting at KimDaeJung Convention Center, Gwangju, Korea  
[10/23-24, 2008]: “Driven contact process with a long-term memory”.
10. The KPS 2008 Spring Meeting at DCC, Daejeon, Korea  
[04/17-18, 2008]: “Boundary induced abrupt transitions in symmetric exclusion process”.
9. The KPS 2007 Fall Meeting at Jeju ICC, Jeju, Korea  
[10/18-19, 2007]: “Nonequilibrium phase transitions in the annealed version of SFNs”.
8. The 14<sup>th</sup> Workshop for STATPHYS 2007 at Naminara Hotel, Chunchon, Korea  
[08/16-18, 2007]: “Heterogeneous MF behaviors of the CP on the random neighbors version of SFNs”.
7. The KPS 2007 Spring Meeting at Phoenix Park, Pyeongchang, Korea  
[04/19-20, 2007]: “Spatial correlations and extended self-similarity in sandpiles”.
6. The KPS 2006 Fall Meeting at EXCO, Daegu, Korea  
[10/19-20, 2006 (invited)]: “Critical behavior of the contact process on complex networks”.
5. Fall Workshop of Research Institute of Physics & Chemistry at Chonbuk National University, Jeonju, Korea  
[09/08, 2006 (invited)]: “Mean-field behavior of the contact process on complex networks”.
4. APCTP Extended Monthly Meeting at Pukyong National University, Busan, Korea  
[08/19-20, 2004 (invited)]: “Instability threshold in a 1D driven diffusive system”.
3. The KPS 2004 Spring Meeting at Sungkyunkwan University, Suwon, Korea  
[04/23-24, 2004]: “Instability threshold in a 1D driven diffusive system: ASEP with nonlocal hopping”.
2. The 12<sup>th</sup> Workshop of Thermal and STATPHYS 2003 at Soohnbu, Korea  
[08/19-21, 2003]: “Queuing transitions in the ASEP”.
1. The Korean Physical Society (KPS) 1994 Spring Meeting at Inha University, Incheon, Korea  
[04/22-23, 1994]: “A restricted ballistic deposition model on a 1D staircase”.

**Colloquia/seminars** (22 invited only here)

22. Seminar for the Group of Grid Modernization Energy AI  
at Korea Institute of Energy Technology (KENTECH), Naju, Korea  
[09/11, 2023]: “Universality of Dynamic Phase Transition in Complex Systems”.
21. Physics Colloquium for Department of Physics at Inha University, Incheon, Korea  
[06/02, 2022]: “Phase Transitions and Critical Phenomena in Nonequilibrium Complex Systems”.

20. Physics Colloquium for Department of Physics and Photon Science at Gwangju Institute of Science and Technology (GIST), Gwangju, Korea  
[05/11, 2022] "Universality of Dynamic Phase Transitions in Complex Systems".
19. Physics Online Colloquium for Department of Applied Physics, Photonics and Nano-Electronics at Hanyang University - ERICA, Ansan, Korea  
[09/29, 2021]: "Biased Random Walk from Fun-d-a-mental to Applied Physics".
18. Advanced Physics and Career Lecture for High-School Students at Seogang High School, Gwangju, Korea  
[07/14, 2021]: "Useful Physics To Live Happily with Fun".
17. Physics Online Colloquium for Department of Physics at Ewha Womans University, Seoul, Korea  
[05/12, 2021]: "Universality and Diversity in Nonequilibrium Complex Systems".
16. Special Lecture for Professional Career and Job Expo at Daedeok Middle School, Daejeon, Korea  
[07/10, 2019]: "Why does Quantum Mechanics become popular in movies?".
15. Special Lecture for Professional Career and Job Expo at Daedeok Middle School, Daejeon, Korea  
[07/11, 2018]: "What is physics? Could being physicist is a job for living?".
14. Physics Colloquium for Department of Physics at Chonnam National University, Gwangju, Korea  
[11/20, 2014]: "More is either Different or the Same: Condensed-Matter Physics vs. Statistical Physics, Universality of Complex Systems".
13. Selected Program Seminar at Chosun Woman High School, Gwangju, Korea  
[12/12, 2012]: "False and True in Physics: Merits of Woman Physicists".
12. Physics Seminar at Seoul National University, Seoul, Korea  
[03/23, 2012]: "Dynamic Scaling in Globally-Coupled Kuramoto Oscillators".
11. Physics Seminar at University of Suwon, Suwon, Korea  
[05/20, 2010]: "How to Understand Critical Behavior in Complex Systems?".
10. HYKE Seminar at Seoul National University, Seoul, Korea  
[05/07, 2010]: "Phase Transitions and Universality Classes in Complex Systems".
9. Physics Colloquium at Inha University, Incheon, Korea  
[10/16, 2008]: "Simple physical model studies for complex systems and statistical physics".
8. The PhysDIS Program (05/05-31) Seminar at NORDITA, Stockholm, Sweden  
[05/28, 2008]: "Instability transitions and ensemble equivalence in diffusive flow".
7. Condensed-Matter Physics Seminar at Soongsil University, Seoul, Korea  
[12/18, 2007]: "Kinetic roughening and multifractality in vapor deposition polymerization growth".
6. Physics Colloquium at Chonbuk National University, Jeonju, Korea  
[09/28, 2006]: "Complexity and criticality in nonequilibrium systems"
5. The 2<sup>nd</sup> APCTP-KIAS Winter School on Statistical Physics at Phoenix Park, Pyeongchang, Korea  
[1/18-21, 2005 (lecture-type seminar)]: "ASEP: an overview & some recent developments".
4. ABRL Physics Seminar at Seoul National University, Seoul, Korea  
[12/03, 2004]: "Queueing transitions in 1D driven flow".
3. Condensed-Matter Physics Seminar at Soongsil University, Seoul, Korea  
[02/03, 2004]: "Nonequilibrium phase transitions in 1D driven diffusive systems".
2. Physics Colloquium at Inha University, Incheon, Korea  
[11/27, 2003]: "Phase transitions in 1D nonequilibrium driven systems".
1. Condensed-Matter Seminar at KIAS, Seoul, Korea  
[01/20, 2003]: "ASEP with a site defect".

**Contributed posters** (27 international poster presentations only shown here)

27. LesHouches2024 - Complex systems, statistical mechanics, and machine learning crossover:  
In Memory of Giovanni Paladine  
at Ecole de Physique des Houches, Les Houches, France  
[03/24-29, 2024]: "Generalized Wealth Dynamics with Talent, Luck, and Social interaction".
26. STATPHYS28 Satellite Meeting:  
New Frontiers in Complex Networks  
at Pukyong National University, Busan, Korea  
[08/02-06, 2023]: "Dynamics of Epidemic Models on Complex Networks".

25. Modeling on Ecology and Evolution Workshop (MEEW: hybrid workshop) at KIAS, Seoul, Korea [10/27-29, 2022]: "Revisited - Optimal evolutionary decision-making and control".
24. JSPS-APCTP Workshop: Roles of Heterogeneity in Non-equilibrium collective dynamics (RHINO 2022) at the University of Tokyo, Tokyo, Japan & Online [09/16-17, 2022]: "Dynamic Phase Ordering coupled with Surface Growth".
23. APCTP-KIAS Workshop on "Motors and Engines" at KIAS, Seoul, Korea [06/25-27, 2018]: "One-dimensional TASEP with a slow bond".
22. Dynamics Days 2018 - International conference on chaos and nonlinear dynamics at Hilton City Center, Denver, U.S.A. [01/04-06, 2018]: "Universal Scaling Properties of Cooperative Contagion with Structural Heterogeneity".
21. Yukawa International Seminar 2015 (YKIS2015)
  - New Frontiers in Non-equilibrium Statistical Physics 2015 at YITP, Kyoto, Japan [08/17-19, 2015]: "Dynamic Scaling Analysis in Random Constraint Satisfaction Problems".
20. Japan-France Joint Seminar
  - New Frontiers in Non-equilibrium Physics of Glassy Materials at YITP, Kyoto, Japan [08/11-14, 2015]: "Dynamic Scaling Analysis in Random Constraint Satisfaction Problems".
19. YITP workshop Interface fluctuations and KPZ universality class
  - unifying mathematical, theoretical, and experimental approaches at YITP, Kyoto, Japan [08/20-23, 2014]: "Dynamic phase transition by coupling Ising spins to KPZ-type surface growth".
18. The 6<sup>th</sup> KIAS Conference on Statistical Physics (NSPCS12) at KIAS, Seoul, Korea [07/08-10, 2014]: "Synchronization in Kuramoto Coupled Oscillators: From Dynamic Scaling to Transition Nature".
17. The 5<sup>th</sup> YSM-SPIP Frontier of Statistical Physics and Information Processing (FSPIP2013): Perspectives from Nonequilibrium Behaviors - Satellite Meeting of STATPHYS25 at YITP, Kyoto, Japan [07/11-14, 2013]: "Extended finite-size scaling in the Kuramoto model".
16. The 5<sup>th</sup> KIAS Conference on Statistical Physics (NSPCS12) at KIAS, Seoul, Korea [07/03-06, 2012]: "Dynamic Scaling in Synchronization Transition of Coupled Oscillators".
15. International Seminar on Large Fluctuations in Non-Equilibrium Systems (LAFNES11), at MPIPES, Dresden, Germany [07/04-15, 2011]: "Contact process with power-law type feedbacks".
14. International Seminar on Many-Body Systems Far From Equilibrium (MBSFFE09), *Fluctuations, Slow Dynamics, and Long-Range Interactions* at MPIPES, Dresden, Germany [02/16-27, 2009]: "Anomalous scaling behavior in polymer thin film growth by vapor deposition".
13. SigmaPhi2008 at Orthodox Academy of Crete, Kolympari - Chania, Greece [07/14-18, 2008]: "Anomalous scaling behavior in polymer thin film growth".
12. The 3<sup>rd</sup> KIAS Conference on Statistical Physics (NSPCS08) at KIAS, Seoul, Korea [07/01-04, 2008]: "Instability transition and ensemble equivalence in diffusive flow".
11. STATPHYS23 at Genova, Italy [07/09-13, 2007]: "Finite-size scaling in complex networks".
10. Satellite Meeting of before STATPHYS23: *STATICS AND DYNAMICS OF GRANULAR MEDIA AND COLLOIDAL SUSPENSIONS*, at Napoli, Italy [07/04-06, 2007]: "Dynamic instability transitions in 1D driven diffusive flow with nonlocal hopping".
9. International Conference on the Frontiers of Nonlinear and Complex Systems at Hong Kong Baptist University, Hong Kong, China [05/24-26, 2006]: "FSS in complex networks".
8. The Isaac Newton Institute School on *Non-Equilibrium Dynamics of Interacting Particle Systems* (PDSW02) at the INI, Cambridge, U.K. [03/27-04/07, 2006]: "Queuing transitions in the ASEP".
7. STATPHYS22 at Bangalore, India [07/03-11, 2004]: "ASEP with nonlocal hopping".
6. Satellite Meeting of before STATPHYS22: Nonequilibrium Statistical Physics of Complex Systems (NSPCS04) at KIAS, Seoul, Korea [06/29-07/02, 2004]: "Instability threshold in a 1D driven diffusive system".
5. NESTPHY03-MPIPES International Seminar at MPIPES, Dresden, Germany [09/20-10/10, 2003]: "Queuing transitions in the ASEP".
4. The 2<sup>nd</sup> Networking Day of Physics Career Development Organization at the University of Washington, Seattle, WA, U.S.A. [01/30, 2003]: "The effect of a columnar defect on slow combustion of papers".

3. The 6<sup>th</sup> APCTP Winter School on *Scaling and Phase Transitions in Complex Networks and Nonequilibrium Systems* at POSTECH, Pohang, Korea [02/18-21, 2002]: "Macroscopic car condensation in a parking garage".
2. Fundamental Problems of Statistical Physics X (FPSPX) at Altenberg, Germany [08/20-09/01, 2001]: "Dynamic analogue of Bose condensation in a traffic model with a parking garage"
1. The 4<sup>th</sup> CTP Workshop on Statistical Physics at Seoul National University, Seoul, Korea [01/27-31, 1997]: "Dynamic behaviors of 1D anchored interfaces".

### **Contributed Articles**

10. "Scaling Relations between Regional School-age Population Density and Densities of College Departments and Students by Majors"  
New Physics: Sae Mulli HIGHLIGHTS, PHYSICS & HIGH TECHNOLOGY  
Vol. 33, No. 11 November, 2023. (forthcoming)
9. "Spatial Correlations and Extended Self-Similarity Properties"  
New Physics: Sae Mulli HIGHLIGHTS, PHYSICS & HIGH TECHNOLOGY  
Vol. 24, No. 12 December, 2015.
8. "Fundamental Structural Constraint of Random Scale-Free Networks"  
Most Recent Research Review, PHYSICS & HIGH TECHNOLOGY  
Vol. 22, No. 1/2 January/February, 2013 (coauthor: Yongjoo Baek).
7. "Numerical Study of Synchronization in the Kuramoto Model with Finite Inertia"  
New Physics: Sae Mulli HIGHLIGHTS, PHYSICS & HIGH TECHNOLOGY  
Vol. 21, No. 11 November, 2012 (coauthor: Chulho Choi).
6. "Professor Column", Chosun University News, Vol. 198, January 2012.
5. "Relevance of Abelian Symmetry and Stochasticity in Directed Sandpiles"  
Most Recent Research Review, PHYSICS & HIGH TECHNOLOGY  
Vol. 18, No. 1/2 January/February, 2009 (coauthor: Hang-Hyun Jo).
4. "International Conference on the Frontiers on Nonlinear and Complex Systems"  
WE HERE THAT, APCTP Bulletin, Vol. 9, No. 1/2, Jan. - Dec. 2006.
3. "Farewell Essay", KIAS Newsletter, No. 33, Winter 2006.
2. "STATPHYS22: 22<sup>nd</sup> International Conference on Statistical Physics of IUPAP"  
Conference Participation Report, PHYSICS & HIGH TECHNOLOGY  
Vol. 13, No. 9, September, 2004.
1. "KIAS-APCTP Satellite Meeting and India Main Meeting of STATPHYS22"  
Conference Report, KIAS Newsletter, No. 25, Autumn 2004 (coauthor: Su-Chan Park).