Jaeyoung Yoon

Curriculum Vitae

jyoung-yoon.github.io/
wodud1516@gmail.com / jaeyoung.yoon@tum.de

ORCID:0000-0003-2173-5498

Appointment

Alexander von Humboldt fellowship
Post-doc at Technical University of Munich, Germany. *1 Sep. 2024 ∼*
Advisor: Prof. Christian Kuehn.

Education

Seoul National University
PhD in Mathematical Sciences *1 Sep. 2020 ∼ 29 Aug. 2024*
Thesis advisor: Prof. Seung-Yeal Ha.
Thesis: Some mathematical problems for the Winfree model with higher-order couplings.

Ewha Womans University
BSc in Department of Mathematics *2 Mar. 2016 ∼ 28 Aug. 2020*

Honors, Awards and Selected Membership

1. Selected member, Inverse Problems Young Academy (IPYA), Inverse Problems International Association, 2026–2029.
2. Excellence Award for Young Scientists, Republic of Korean Federation of Women in Science and Technology, November 2025.
3. Best Teaching Assistant, Faculty of Liberal Education, Seoul National University, February 2021.
4. International Research Training Group (IRTG) 2235 Program (March 2022 - August 2024).

Publications

1. * H.-O. Bae, S.-Y. Ha, C. Min, J. Yoo and J. Yoon, CBO algorithm with average drift and applications to portfolio optimization. ***Journal of Computational and Applied Mathematics*, 485** (2026) 117535.
2. * C. Kuehn and J. Yoon, Adaptive Cucker-Smale Networks: Limiting Laplacian Time-Varying Dynamics. To appear in ***Nonlinear Analysis: Real World Applications*, 90** (2026) 104563.
3. H. Ahn, J. Byeon, S.-Y. Ha and J.Yoon, Emergence of partial tracking in the set of active pursuer-evader pairs in Euclidean space. ***Automatica*, 179** (2025) 112445.
4. S.-Y. Ha, D. Ko, J. Yoon and W. Yoon, Continuum limit and emergent behaviors of continuum Kuramoto model on Euclidean spaces. ***Journal of Mathematical Physics*, 66** (2025) 042704.
5. * M. Kang, S.-Y. Ha, J. Yoon and M. Zanella, Measure-valued death state and local sensitivity analysis for Winfree models with uncertain high-order couplings. ***Communications in Mathematical Sciences*, 23** (2025) 1583-1629.
6. H. Ahn, J. Byeon, S.-Y. Ha and J. Yoon, Interplay of geometric constraint and bonding force in the emergent behaviors of relativistic Cucker-Smale flocks. ***Advances in Differential Equations***, 30, 5/6 (2025) 269-314.
7. J. Byeon, S.-Y. Ha, G. Hwang, D. Ko and J. Yoon, Consensus, error estimates and applications of first and second-order consensus-based optimization algorithms. ***Mathematical Models and Methods in Applied Sciences*, 22** (2025) 345-401.

8. * H. Ahn, J. Byeon, S.-Y. Ha and J. Yoon, Collective behaviors of second-order nonlinear consensus models with a bonding force. ***Journal of the Korean Mathematical Society***, **61** (2024) 565-602.
9. H. Ahn, J. Byeon, S.-Y. Ha and J. Yoon, Asymptotic tracking of a point cloud moving on Riemannian manifolds. ***SIAM Journal on Control and Optimization***, **61** (2023) 2379-2406.
10. * S.-Y. Ha, D. Ko and J. Yoon, Asymptotic dynamics of the Winfree oscillators with singular interaction functions. ***Acta Applicandae Mathematicae***, **185** (2023).
11. H. Ahn, J. Byeon, S.-Y. Ha and J. Yoon, On the relativistic flocks over the unit sphere and the hyperboloid in a bonding force field. ***Journal of Mathematical Physics***, **64** (2023).
12. N. Bellomo, S.-Y. Ha, N. Outada and J. Yoon, On the mathematical theory of behavioral swarms emerging collective dynamics. ***Mathematical Models and Methods in Applied Sciences***, **32** (2022) 2927-2959.
13. S.-Y. Ha, W. Shim and J. Yoon, An energy preserving discretization method for the thermodynamic Kuramoto model and collective behaviors. ***Communications in Mathematical Sciences***, **20** (2022) 495-521.

$*$: corresponding author

Preprints & Working Papers

1. * J. Yoon and C. Kuehn, Stability of Phase-Locked States in Signed Kuramoto Networks: Structure versus Adaptation. Under review. arXiv:2602.11981.
2. S.-Y. Ha, G. Hwang, P. Thieullen and J. Yoon, Existence of periodic measure-valued solutions to the nonlocal continuity equation via optimal transport. Under review. arXiv:2602.19692.
3. * C. Kuehn and J. Yoon, Spectral Selection in Symmetric Self-Attention Dynamics. Under review. arXiv:2604:26085.
4. * S. Cerrai, Q. Li, A. Nair and J. Yoon, Stochastic Modified Equations for Stochastic Gradient Descent in Infinite-Dimensional Hilbert Spaces. Under reivew. arXiv:2604.10860.
5. Z. Huang, Y. Wang and J. Yoon, Propagation in Random Space for Cucker–Smale Models: On the Role of Flocking and Random Batch Method.
6. * C. Kuehn and J. Yoon, Asymptotic Regimes of Self-Attention Dynamics.

Talk

1. 22nd December 2025, Hanyang Analysis Seminar, Seoul, Republic of Korea.
   Invited talk with the title: *Stochastic Modified Equations for SGD in Infinite-Dimensional Hilbert Spaces.*
2. 17th-19th September 2025, ECCOMAS 8th Young Investigators Conference 2025, Pescara, Italy
   Invited talk with the title: *Adaptive Cucker-Smale Networks: Limiting Laplacian Time-Varying Dynamics.*
3. 15th-18th July 2025, The 5th Republic of Korea-France Conference in Mathematics, Bordeaux, France.
   Invited talk with the title: *Adaptive Cucker-Smale Networks: Limiting Laplacian Time-Dynamics.*
4. 23rd-27th June 2025, Dynamics Days Europe 2025, Thessaloniki, Greece.
   Invited talk with the title: *Adaptive Cucker-Smale model and its asymptotic behavior in the singular limit.*
5. 14th April 2025, Hanyang Analysis Seminar, Seoul, Republic of Korea.
   Invited talk with the title: *Adaptive Cucker-Smale model and its asymptotic behavior in the singular limit.*
6. 16th-20th December 2024, The 14th AIMS Conference at NYU Abu Dhabi, Abu Dhabi, United Arab Emirates.
   Invited talk with the title: *Random Winfree dynamics with high-order couplings.*
7. 8th-10th April 2024, Eleventh Bielefeld-SNU Joint Workshop in Mathematics, Seoul, Republic of Korea.
   Poster presentation with the title: *Active Swarm model:Derivation of Active Swarm model and flocking estimate in micro/meso-scopic viewpoint.*
8. 19th February 2024, Italo-Republic of Korean Symposium on "Advances in Kinetic Equations for Collective Phenomena and Related Models", Pavia, Italy.
   Invited talk with the title: *Derivation of active swarm model and flocking estimate in micro/meso-scopic viewpoint.*

9. 7th-12th January 2024, East Asia Core Doctoral Forum in Mathematics, Shanghai, China.
   Invited talk with the title: *Active Swarm model:Derivation of Active Swarm model and flocking estimate in micro/meso-scopic viewpoint.*
10. 26th-28th October 2023, KMS Special Conference with 2022 Fields Medalists, Seoul, Republic of Korea.
    Contributed talk with the title: *Interplay of higher-order influence with uncertainty in Winfree model.*
11. 7th-9th August 2023, Workshop for Young Mathematicians in Republic of Korea 2023, Pohang, Republic of Korea.
    Invited talk with the title: *Winfree model with higher-order couplings and influences.*
12. 7th-9th November 2022, Kinetic and hydrodynamic descriptions in collective behavior, Granada, Spain.
    Short talk with the title: *Tracking the points cloud without collision in the Cucker-Smale type model.*
13. 18th-20th May 2022, Ninth Bielefeld-SNU Joint Workshop in Mathematics, online.
    Poster presentation with the title: *Pattern formation in the Cucker-Smale type model.*

Academic Visiting

1. 20th-29th October 2025, Simons Laufer Mathematical Sciences Institute (SLMath), Berkeley, United States of America (Host: Prof. Qin Li).
2. 14th-25th February 2024, University of Pavia, Pavia, Italy (Host: Prof. Mattia Zanella).
3. 11th April - 14th June 2023, Bielefeld University, Bielefeld, Germany (Host: Prof. Lubomir Banas).
4. 19th June – 27th August 2022, Bielefeld University, Bielefeld, Germany (Host: Prof. Lubomir Banas).

Attended Conferences and Workshops

1. 5th-9th January 2026, Global Young Scientists Summits, Singapore.
2. 20th-24th October 2025, Kinetic Theory: Novel Statistical, Stochastic and Analytical Methods, Simons Laufer Mathematical Sciences Institute (SLMath), Berkeley, CA, United States of America.
3. 17th-19th September 2025, ECCOMAS 8th Young Investigators Conference 2025, Pescara, Italy.
4. 15th-18th July 2025, The 5th Republic of Korea-France Conference in Mathematics, Bordeaux, France.
5. 23rd-27th June 2025, Dynamics Days Europe 2025, Thessaloniki, Greece.
6. 16th-20th December 2024, The 14th AIMS Conference at NYU Abu Dhabi, Abu Dhabi, United Arab Emirates.
7. 17th-28th June 2024, Particle interactive systems: Analysis and computational methods, Simons Laufer Mathematical Sciences Institute (SLMath), Berkeley, CA, United States of America.
8. 8th-10th April 2024, Eleventh Bielefeld-SNU Joint Workshop in Mathematics, Seoul, Republic of Korea.
9. 4th-5th April 2024, Shih-Hsien Fest on Hyperbolic Conservation Laws and Kinetic Theory, Seoul, Republic of Korea.
10. 19th February 2024, Italo-Republic of Korean Symposium on ”Advances in Kinetic Equations for Collective Phenomena and Related Models”, Pavia, Italy.
11. 7th-12th January 2024, East Asia Core Doctoral Forum in Mathematics, Shanghai, China.
12. 26th-28th October 2023, KMS Special Conference with 2022 Fields Medalists, Seoul, Republic of Korea.
13. 21st-25th August 2023, The 4th Republic of Korea-France Conference on Mathematics, Seoul, Republic of Korea.
14. 7th-9th August 2023, Workshop for Young Mathematicians in Republic of Korea 2023, Pohang, Republic of Korea.
15. 2nd-6th August 2023, PDE Summer School, Pohang, Republic of Korea.
16. 21st-24th February 2023, Tenth Bielefeld-SNU joint Workshop in Mathematics, Bielefeld, Germany.

17. 14th-17th February 2023, Kinetic Equations in Republic of Korea, Gangneung, Republic of Korea.
18. 3th-4th December 2022, Workshop for Young Mathematicians in Republic of Korea (WYMK) 2022, Daejeon, Republic of Korea.
19. 7th-9th November 2022, Kinetic and hydrodynamic descriptions in collective behavior, Granada, Spain.
20. 29th August 2022, Hyke meeting 2022, Seoul, Republic of Korea.
21. 22nd - 24th August 2022, BI.discrete22 "*Numerics and analysis of (stochastic) fluids*", Bielefeld, Germany.
22. 18th-20th May 2022, Ninth Bielefeld-SNU Joint workshop in Mathematics, Online.
23. 30th December 2021, One day workshop on collective dynamics: from particle to continuum models, Online workshop.
24. 23th-26th August 2021, Virtual Summer school on Kinetic and fluid equations for colletive dynamics France-Republic of Korea International Research Laboratory in Mathematics, Online school.
25. 26th-28th May 2021, HY-PDE Workshop 2021, Online workshop.

Teaching Experiences

1. March 2025 – Present: Co-supervision of a Master's student in collaboration with Prof. Christian Kuehn, Technical University of Munich.
   Topic: complex phenomena in dynamical systems.
2. September 2023 - December 2023: Chaos and Dynamical Systems , Teaching Assistant .
3. September 2022 - December 2022: Introduction to Mathemtatical Analysis 2 , Teaching Assistant.
4. March 2022 - June 2022: Chaos and Dynamical Systems , Teaching Assistant.
5. September 2021 - December 2021: Calculus 2, Introduction to Mathematical Analysis 2 , Teaching Assistant.
6. March 2021 - June 2021: Calculus 1 , Teaching Assistant.
7. September 2020 - December 2020: Calculus 2 , Teaching Assistant.

Peer Review (Journals)

1. SIAM Journal on Mathematical Analysis (SIMA).
2. SIAM Journal on Applied Mathematics (SIAP).
3. Proceedings A.
4. PDEA.

Research Interests

Mathematical analysis of collective dynamics, adaptive networks dynamics, ODE/PDE, mathematical modeling, optimization.

Skills

1. Programming Languages: Python and Matlab.

Last updated: June 4, 2026