

## Curriculum Vitae

Departamento de Matemática Aplicada  
Facultad de Ciencias, Universidad de Granada  
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18071 Granada  
SPAIN

Research Group on PDE's in Kinetic Theory, Quantum-Kinetics, Fluid Mechanics and Developmental Biology  
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## Appointments

- Postdoctoral Researcher (Mentor: Prof. Juan Soler), Departamento de Matemática Aplicada, Facultad de Ciencias, Universidad de Granada, Spain, November 2016 - Present.

## Education & Academic Degrees

- B.S. Mathematics, Seoul National University, August 2010.
- M.S. Mathematics, Seoul National University, August 2013.
  - Thesis Title: Asymptotic alignment of particle model with attractive-repulsive coupling.
  - Thesis Advisor : Prof. Seung-Yeal Ha.
- Ph.D. Mathematics, Seoul National University, August 2016.
  - Thesis Title: On the asymptotic dynamics of particle and kinetic Kuramoto synchronization models
  - Thesis Advisor : Prof. Seung-Yeal Ha.

## Publications

- Emergence of phase-locked states for the Winfree model in a large coupling regime (with S.-Y. Ha and S. W. Ryoo). [Discrete and Continuous Dynamical Systems - Series A](#), 35 (2015), no. 8, 3417-3436.

- Remarks on the complete synchronization of the Kuramoto oscillators (with S.-Y. Ha and H. K. Kim). [Nonlinearity](#), 28 (2015), no. 5, 1441-1462.
- Practical synchronization of generalized Kuramoto systems with an intrinsic dynamics (with S.-Y. Ha and S. E. Noh). [Networks and Heterogeneous Media](#), 10 (2015), no. 4, 787 - 807.
- Emergent dynamics of Winfree oscillators on locally coupled networks (with S.-Y. Ha, D. Ko, and S. W. Ryoo). [Journal of Differential Equations](#), 260 (2016), no. 5, 4203 - 4236.
- Synchronization of the Kuramoto oscillators with adaptive couplings (with S.-Y. Ha and S. E. Noh). [SIAM Journal on Applied Dynamical Systems](#), 15 (2016), no. 1, 162-194.
- Collective synchronization of classical and quantum oscillators (with S.-Y. Ha, D. Ko, and X. Zhang) [EMS Surveys in Mathematical Sciences](#), 3 (2016), no. 2, 209 - 267
- Emergence of partial locking states from the ensemble of Winfree oscillators (with S.-Y. Ha, D. Ko, and S. W. Ryoo). [Quarterly of Applied Mathematics](#), 75 (2017), 39 - 68.
- On the global well-posedness of BV weak solutions to the Kuramoto-Sakaguchi equation (with D. Amadori and S.-Y. Ha). [Journal of Differential Equations](#), 262 (2017), no. 2, 978 - 1022.
- Interplay of inertia and heterogeneous dynamics in an ensemble of Kuramoto oscillators (with S.-Y. Ha and S. E. Noh). [Analysis and Applications](#), 15 (2017), 837.
- Wave-front tracking analysis for the Kuramoto-Sakaguchi equation (with D. Amadori and S.-Y. Ha). [Springer INdAM Inovative Algorithms and Analysis](#).
- Remarks on the complete synchronization for the Kuramoto model with interaction frustrations (with S.-Y. Ha and H. K. Kim). [Analysis and Applications](#), published in online.
- Emergence of phase concentration for the Kuramoto-Sakaguchi equation (with S.-Y. Ha, Y. H. Kim, and J. Morales). Submitted to Archive for Rational Mechanics and Analysis.
- On the first-order reduction of the Cucker-Smale model and its clustering dynamics (with S.-Y. Ha and X. Zhang). Submitted to Communications in Mathematical Sciences.
- On the global existence of weak solutions for the Cucker-Smale-Navier-Stokes system with shear thickening (with S.-Y. Ha, H. K. Kim, and J.-M. Kim). Submitted to SCIENCE CHINA Mathematics.
- Uniform stability and mean-field limit for the augmented Kuramoto model (with S.-Y. Ha, J. Kim, and X. Zhang). Submitted to Networks and Heterogeneous Media.

- Emergent dynamics of Kuramoto oscillators with adaptive couplings II (with S.-Y. Ha, J. Lee, and Z. Li). Submitted to SIAM Journal on Applied Dynamical Systems.
- Complete cluster predictability of the Cucker-Smale flocking model on the line (with S.-Y. Ha, J. Kim and X. Zhang). Submitted to Journal of European Mathematical Society.
- Hebbian learning to the Kuramoto models with singular and regular weighted couplings (with D. Poyato and J. Soler). Preprint.
- Eulerian hydrodynamics for the Kuramoto model with Hebbian singular coupling (with D. Poyato and J. Soler). Preprint
- On the global well-posedness and asymptotic dynamics of the kinetic Winfree equation (with D. Amadori, S.-Y. Ha, and X. Zhang). Preprint.
- Emergent dynamics of Cucker-Smale dynamics with adaptive couplings (with S.-Y. Ha and D. Kim) Preprint.
- Asymptotic alignment of particle and kinetic models with attractive-repulsive couplings (with S.-Y. Ha, K.-K. Kang, and X. Zhang). Preprint.

## Talks

- Dec. 6, 2013, PARC Annual Research Performance Report, Seoul National University, Korea : *“Practical synchronization of Kuramoto system with an intrinsic dynamics”*
- Jan. 23, 2014, East Asian Core Doctorial Forum on Mathematics, Kyoto University, Japan : *“Practical synchronization of Kuramoto system with an intrinsic dynamics”*
- Oct. 28, 2014, Young Researchers Workshop: Multiscale phenomena: modeling, analysis and computation, CSCAMM, University of Maryland, USA: *“Practical synchronization of Kuramoto system with an intrinsic dynamics”*
- Jan. 27, 2015, Department of Information Engineering, Computer Science and Mathematics, University of L’Aquila, Italy : *“Practical synchronization of Kuramoto system with an intrinsic dynamics”*
- Feb. 25. 2015, PARC Monthly Colloquium, Seoul National University, Korea: *“Emergence of phase-locked states for the Winfree model in a large coupling regime”*
- Oct. 22. 2015, Séminaire Analyse à Lyon, École Normale Supérieure de Lyon, France: *“Emergent dynamics of Winfree oscillators on locally coupled networks”*
- Dec. 11. 2015, Departamento de Matemática Aplicada, Universidad de Granada, Spain: *“Emergent dynamics of Winfree oscillators on locally coupled networks”*

- Jan. 08. 2016, PARC Annual Research Performance Report, Seoul National University, Korea: “*Emergent dynamics of Winfree oscillators on locally coupled networks*”
- Apr. 27. 2016, Department of Mathematics and Computer Science, University of Ferrara, Italy: “*Synchronization of Kuramoto oscillators with adaptive couplings*”
- May. 21. 2016, KSIAM 2016 Spring Conference, National Institute for Mathematical Sciences, Korea: “*Synchronization of Kuramoto oscillators with adaptive couplings*”
- Aug. 4. 2016, XVI International Conference on Hyperbolic Problems: Theory, Numerics, Applications, RWTH Aachen University, Germany: “*Emergence of synchronization for the Kuramoto-Sakaguchi equation*”
- Dec. 1. 2016, Departamento de Matemática Aplicada, Universidad de Granada, Spain: “*Emergence of synchronization in the Kuramoto model*”
- Dec. 12. 2016, CMC Winter School on Applied Math and Math. Physics, KIAS and Seoul National University, Korea: “*Emergence of synchronization for the Kuramoto-Sakaguchi equation*”
- Dec. 28. 2016, Department of Mathematics, Sungkyunkwan University, Korea: “*Emergence of synchronization for the Kuramoto-Sakaguchi equation*”
- Jun. 26. 2017, XXV Conference on Differential Equations and Applications / XV Conference on Applied Mathematics, Technical University of Cartagena(UPCT), Spain: “*Uniform stability and mean-field limit for the augmented Kuramoto model*”
- Aug. 16. 2017, Department of Mathematics, Sungkyunkwan University, Korea: “*Multi-cluster flocking of the Cucker-Smale model in one spatial dimension*”
- Aug. 17. 2017, Department of Mathematics, Inha University, Korea: “*Uniform stability and mean-field limit for the augmented Kuramoto model*”
- Aug. 22. 2017, CMC Conference: Nonlinear dynamics of many-body systems and related topics, KIAS and Seoul National University, Korea: “*Hebbian learning in the Kuramoto model with regular and singular weighted couplings*”

## Posters

- Jun. 8 - 12, 2015, Summer school on Geometric methods for PDEs and dynamical systems, ANR Weak KAM beyond Hamilton-Jacobi, Porquerolles, France: “*Emergence of phase-locked states for the Winfree model in a large coupling regime*”
- Jul. 6 - 10, 2015, Equadiff 2015, Université Claude Bernard Lyon 1, Lyon, France: “*Emergence of phase-locked states for the Winfree model in a large coupling regime*”

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## Attended Conferences & Workshops

- NIMS-KU Financial Mathematics Summer School 2012, Korea University, Korea, August 14 - 17, 2012.
- NIMS-PARC Joint Workshop (Dynamical Systems in Network and its Application to Data Analysis), Korea, February 20 - 22, 2013.
- The Asian Mathematical Conference 2013, Busan, Korea, June 30 - July 3, 2013.
- IMA PI Summer Program (Flow, Geometric Motion, Deformation, and Mass Transport in Physiological Processes), IMA, University of Minnesota, MN, USA, July 15 - August 2, 2013.
- International Conference on Nonlinear Analysis : Fluid Dynamics and Kinetic Theory, Academia Sinica, Taipei, Taiwan, October 21 - 25, 2013.
- East Asian Core Doctorial Forum on Mathematics, Kyoto University, Japan, January 21 - 24, 2014.
- From Mechanics to Geometry, Seoul National University, Korea, May 26 - 29, 2014.
- Mathematical Theory of Gases and Fluids and Related Applications, Satellite Conference of ICM 2014, Chung-Ang University, Korea, August 10 - 12, 2014.
- International Congress of Mathematicians 2014, Coex, Korea, August 13 - 21, 2014.
- Young Researchers Workshop: Multiscale phenomena: modeling, analysis and computation, CSCAMM, University of Maryland, USA, October 27-31, 2014.
- Korea PDE Winter school, NIMS, Korea, February 9-13, 2015.
- Third Bielefeld-Seoul National University Joint Workshop in Mathematics, Seoul National University, Korea, February 26 - 27, 2015.
- Collective dynamics in gradient flows and entropy driven structures, Gran Sasso Science Institute, L'Aquila, Italy, June 1 - 5, 2015
- Summer school on Geometric methods for PDEs and dynamical systems, ANR Weak KAM beyond Hamilton-Jacobi, Porquerolles, France, June 8 - 12, 2015.
- Equadiff 2015, Université Claude Bernard Lyon 1, Lyon, France, July 6 - 10, 2015.
- Workshop Analysis in Lyon, École Normale Supérieure de Lyon, Lyon, France, October 26 - 30, 2015.
- KSIAM 2016 Spring Conference, NIMS, Daejeon, Korea, May 20 - 21, 2016.
- Preparation minischool for CMC conference: "Analysis, Geometry, and Optimal Transport", KIAS, Seoul, Korea, June 16 - 17, 2016.

- XVI International Conference on Hyperbolic Problems: Theory, Numerics, Applications, RWTH Aachen University, Aachen, Germany, August 1 - 5, 2016.
- CMC Intensive Lectures: On partial regularity results for the 3D incompressible Navier-Stokes equations, KIAS, Seoul, Korea, October 12 - 14, 2016.
- CMC Winter School on Applied Math and Math. Physics, KIAS and Seoul National University, Seoul, Korea, December 11 - 24, 2016.
- Workshop on PDEs: Modelling, Analysis and Numerical Simulation, IEMATH-GR, Granada, Spain, June 19 - 23, 2017.
- XXV Conference on Differential Equations and Applications / XV Conference on Applied Mathematics, Technical University of Cartagena(UPCT), Cartagena, Spain, June 26 - 30, 2017.
- CMC Conference: Nonlinear dynamics of many-body systems and related topics, KIAS and Seoul National University, Seoul, Korea, August 21 - 24, 2017.

## Long-term Visitings

- University of L'Aquila, Italy, June 1 - July 31, 2015.
- École Normale Supérieure de Lyon (Fall Semester 2015 in Analysis), France, August 20 - December 20, 2015.
- University of Ferrara, Italy, March 20 - April 30, 2016.

## Scholarship & Research Grant

- Foster Core Leaders of the Future Basic Science Program, National Research Foundation of Korea, 2014. 3 - 2016. 8

## Teaching Experiences

- Teaching Assistant, Department of Mathematical Sciences, Seoul National University, 2012. 9 - 2016. 8.
  - Subject: Calculus, Analysis, Engineering Mathematics, Chaos and Dynamical Systems, Ordinary Differential Equations, and Partial Differential Equations.

Last updated: September 1, 2017