Hwi Lee

CONTACT INFORMATION

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Department of Mathematics
New York Institute of Technology
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https://hleemath.github.io/

RESEARCH INTERESTS

Numerical/applied analysis, scientific computing, nonlocal models, partial differential equations, mathematics of machine learning, optimal transport

ACADEMIC EXPERIENCE

New York Institute of Technology
Assistant Professor of Mathematics, September 2024 - current

Georgia Institute of Technology
Hale Visiting Assistant Professor, August 2021 - May 2024

EDUCATION

Columbia University Ph.D. in Applied Mathematics, May 2021
- Dissertation: Some applications of nonlocal models to smoothed particle hydrodynamics-like methods
- Advisor: Qiang Du

McGill University M.Sc. in Mathematics, May 2016
- Dissertation Topic: On Centroidal Voronoi Tessellations
- Advisor: Rustum Choksi

Simon Fraser University B.Sc. in Mathematics, Oct 2013
- First Class with Distinction

PAPERS

7. H. Lee and Y. Liu, *A level-set based finite difference method for the ground state Bose-Einstein condensates in smooth bounded domains*, https://arxiv.org/abs/2509.00668.
6. H. Lee, Z. Chao, H. Cobb, Y. Liu, and D. Xie, *PNP ion channel deep learning solver with local neural network and finite element input data*, Machine Learning: Science and Technology, (2024), pp. 045001.
5. H. Cobb, H. Lee and Y. Liu, *Solving Maxwell's Equation in 2D with Neural Networks with Local Converging Inputs*, https://arxiv.org/abs/2302.02860.
4. H. Lee and Y. Liu, *A ghost-point based second order accurate finite difference method on uniform orthogonal grids for electromagnetic scattering around curved perfect electric conductors with corners*, J. Computational Physics, (2023) **490**: 112314.
3. H. Lee and Q. Du, *Second-order accurate Dirichlet boundary conditions for linear nonlocal diffusion problems,* Comm. Math. Sci., (2022) **20**, 1815-1837.
2. H. Lee and Q. Du, *Nonlocal gradient operators with a nonspherical interaction neighborhood and their applications,* ESAIM: Mathematical Modelling and Numerical Analysis,(2020) **54** (1) 105-128.
1. H. Lee and Q. Du, *Asymptotically compatible SPH-like particle discretizations of one dimensional linear advection models,* SIAM J. Numer. Anal.,(2019) **57** (1) 127-147.

Teaching

Courses at New York Tech:

Fall 2025	Calculus I (MATH 170), Linear Algebra (MATH 310)
Spring 2025	Calculus II (MATH 180)
Fall 2024	Calculus III (MATH 260), Differential Equations (MATH 320)

Curriculum Development at New York Tech:

- Design a new course for Mathematics Major-Scientific Computation concentration MATH 4xx: Mathematical Foundations of Machine Learning

Courses at Georgia Tech:

Spring 2024	Calculus II (MATH 1552) x 2 (two sections)
Fall 2023	Calculus II
Spring 2023	Calculus II x 2
Fall 2022	Calculus II
Spring 2022	Calculus II
Fall 2021	Calculus II

Teaching Awards:

- Thank a Professor letter and certificate, New York Tech, 2024.
- Thank a Teacher letter and certificate, Georgia Tech, 2022.

Teaching Assistant at Columbia University:

Spring 2020	Multivariable Calculus for Engineers (APMA E2000)
Fall 2019	Multivariable Calculus for Engineers (APMA E2000)

Talks and Presentations

- *A PNP ion channel deep learning solver with NNLCI and finite element input data*, NSF CompMath Meeting 2025-Poster Presentation, University of Utah, May 2025.
- *A neural network approach for a Poisson–Nernst–Planck ion channel model*, 2025 Spring AMS Southeastern Sectional Meeting-Contributed Talk, Clemson University, March 2025.
- *A deep learning-based numerical method for a protein channel model*, Math-Physics Seminar, New York Institute of Technology, November 2024.
- *Application of NNLCIs to the scattering of electromagnetic waves around curved PECs*, Applied and Computational Mathematics Seminar, Georgia Institute of Technology, March 2023.
- *A second order accurate finite difference method on uniform orthogonal grids for solving Maxwell's equations around PEC*, 2023 SIAM Southeastern Atlantic Section Annual Meeting - Invited Talk, Virginia Tech, March 2023.
- *A second order accurate finite difference method on uniform rectangular grids for Maxwell's equations around curved PEC*, 2023 Georgia Scientific and Computing Symposium - Lightening Talk, Georgia State University, February 2023.
- *A second order accurate finite difference method on uniform rectangular grids for Maxwell's equations around curved PEC*, Analysis and Applied Math Seminar, Kennesaw University, November 2022.
- *One Nonlocal Worlds*, Poster Presentation, February 2021.
- *Nonsymmetric Nonlocal Gradient Operators and their Applications*, APAM Research Conference, Columbia University, February 2019.
- *Robust nonlocal particle method for linear advection problem*, NARC Seminar, Columbia University, November 2018.
- *Asymptotically compatible particle method for linear advection*, 2018 Applied Math Day-Talk, Rensselaer Polytechnic Institute, April 2018.

Service

- NYIT Mathematics Department Curriculum Committee
  - Responsible for the preparation of a proposal for a new course on mathematical foundations of machine learning for Scientific Computation Concentration
- NYIT SIAM Student Chapter
  - Preparation and submission of a petition to form the Chapter (approved)
- Organizing comittee for Annual NYIT Mathematics Day
- NYIT Admitted Student Day - Class of 2029
  - Faculty representation of Mathematics Department (Old Westbury Campus)
- π-Day Celebration, NYIT Department of Mathematics, March 14, 2025

Journal Referee for:

- SIAM Journal on Numerical Analysis.
- Physica Scripta.
- Numerical Methods for Partial Differential Equations.
- Mathematics and Computers in Simulation.
- Communications in Mathematical Sciences.

Conference and seminar organization

- Co-organizer, mini-symposium "Recent developments on nonlocal models in theory and applications", 1st Annual SIAM New York-New Jersey-Pennsylvania section meeting, Newark, New Jersey, October 21-22, 2023.

Other awards

2020	Korean Honor Scholarship, Government of the Republic of Korea
2015	Centre de Recherches Mathématiques Scholarship, McGill University
2013	Joe and Marry Merchant Scholarship, Simon Fraser University

References

Available upon request