

## Eunji Yoo

National Renewable Energy Laboratory

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### Education

- **Ph.D. in Applied Mathematics**, University of California, Merced (UC Merced) [2017 - 2023]
  - Advisors: Dr. François Blanchette and Dr. Shilpa Khatri
  - Thesis title: Flows of settling marine aggregates and complex fluid rheology.
- **M.S. in Applied Mathematics**, San Diego State University (SDSU) [2014 - 2017]
- **B.S. in Mathematics**, Hankuk University of Foreign Studies, South Korea [2009 - 2013]

### Research Experiences

- Postdoctoral Researcher [Sep. 2023 - Current]
  - National Renewable Energy Laboratory (NREL)
  - Supervisors: Dr. Marc Day & Dr. Michael Martin
  - Developing AMReX codes for the embedded boundary with triangular mesh surface generation with an STL file.
  - Simulations of decarbonization in the steelmaking process in AMReX-incflo to analyze the interactions between the surrounding fluid and the pellet while melting.
    - Collaboration with researchers at Danieli & C. S.p.A.
- National Science Foundation Mathematical Sciences Graduate Internship [2022]
  - Hosted by Lawrence Berkeley National Laboratory (LBNL)
  - Mentor: Dr. Ishan Srivastava
  - Studying a second-order rheological model for a complex fluid flow with pressure-dependent viscosity.
  - Implementing the granular rheology in the AMReX framework using C++.
- National Science Foundation Mathematical Sciences Graduate Internship [2021]
  - Hosted by the National Renewable Energy Laboratory (NREL)
  - Mentor: Dr. Michael Martin
  - Creating a comprehensive solver package for a complex equation of state to obtain various properties for a wide temperature range of helium in Python.

### Technical Skills

Computational skills: C++, Matlab, Python, Linux-based system, LaTeX, Mathematica

Libraries: AMReX, Fast Multipole Method

Languages: English, Korean

### Publication

- E. Yoo, S. Khatri, and F. Blanchette, Hydrodynamic forces on randomly formed marine aggregates. Phys. Rev. Fluids, 5:044305, Apr 2020, DOI: <https://doi.org/10.1103/PhysRevFluids.5.044305>
- E. Yoo, Nonlinear Waves in Density Stratified Fluids over Underwater Topography, Master thesis, Dept. of Mathematics, San Diego State University

## Awards & Fellowships

Graduate Dean's Dissertation Fellowship (UC Merced) [2023]  
 National Sciences Foundation Mathematical Sciences Graduate Internship [2021, 2022]  
 Southern California Edison Fellowship [2021]  
 Applied Math Summer Research Fellowship (UC Merced) [2018, 2019]  
 Valedictorian Award at Hankuk University of Foreign Studies [2013]  
 Asan Foundation STEM undergraduate students Fellowship [2012]

## Presentations

- 2024 Society for Industrial and Applied Mathematics (SIAM) Annual Meeting [July. 2024]
  - Computational Methods for Multi-Physics Simulation of Melting in Steelmaking (poster)
- The American Physical Society's (APS) March Meeting 2023 [Mar. 2023]
  - Simulations of settling marine aggregates in a stratified fluid
- UC Merced Graduate program recruitment talk at San Diego State University [Oct. 2022]
  - University of California Merced Applied Mathematics Ph.D. program recruitment
- The Computational Science division summer poster session [Aug. 2022]
  - Continuum modeling of complex fluids with a second-order rheology (poster)
- Ocean Sciences Meeting (OSM) 2022 [Feb. 2022]
  - Simulations of settling marine aggregates in a stratified fluid
- APS 74th Annual Meeting of the Division of Fluid Dynamics [Nov. 2021]
  - Simulations of settling marine aggregates in a stratified fluid
- UC Merced, Energy and Environment seminar [Every semester in 2019 - 2023]
  - Simulations of flow around marine aggregates
  - Settling marine aggregate in a stratified fluid
  - Quick overview of) Fast multipole method for Stokes equations
- 7th Annual Rocky Mountain Fluid Mechanics Research Symposium [Aug. 2021]
  - One-dimensional flow of cryogenic Helium below 4K
- APS 72nd Annual Meeting of the Division of Fluid Dynamics [Nov. 2019]
  - Settling of randomly formed marine aggregates
- The Yosemite Fluid Meeting (FluMe) [Aug. 2018]
  - Flow around marine aggregates with boundary integral equations (poster)

## Teaching and Mentoring Experiences

- Teaching Assistant at UC Merced [2017-2023]
  - Calculus 2, Vector Calculus, Linear Algebra, Ordinary/Partial Differential Equations, and Numerical Methods.
- Mentor for Applied Math Challenge hosted by UC Merced SIAM Student chapter [2022]
  - Mentored a group of four undergraduate students to solve a challenging problem using numerical methods.
- Graduate Assistant for Research Experiences for Undergraduates at SDSU [2017]
  - Research topic: Study of Vortex Dynamics with Free Surface in a Shallow Water Regime
- Teaching Assistant at SDSU [Fall 2015 - Spring 2017]
  - Calculus 2 and Vector Calculus

## Extra Activities

- UC Merced SIAM student chapter, social media coordinator [2022 - 2023]

## References

- François Blanchette  
Professor, University of California, Merced, [fblanchette@ucmerced.edu](mailto:fblanchette@ucmerced.edu)
- Shilpa Khatri  
Associate Professor, University of California, Merced, [skhatri3@ucmerced.edu](mailto:skhatri3@ucmerced.edu)
- Micheal Martin  
Researcher IV-HPC, National Renewable Energy Laboratory, [Michael.Martin@nrel.gov](mailto:Michael.Martin@nrel.gov)
- Ishan Srivastava  
Research Scientist, Lawrence Berkeley National Laboratory, [isriva@lbl.gov](mailto:isriva@lbl.gov)