

Young (Paul) Ro Yi

Guyot Hall M33
Princeton, NJ 08544

yryi@princeton.edu
609-258-8474

Education

Stanford University, Stanford, CA

PH.D., CIVIL AND ENVIRONMENTAL ENGINEERING, 2023

Dissertation: Underlying physics of mixing efficiency of stably stratified turbulence

Advisors: Profs. Jeffrey Koseff (principal advisor) and Ali Mani (co-advisor)

M.S., CIVIL AND ENVIRONMENTAL ENGINEERING, 2018

Princeton University, Princeton, NJ

B.A., GEOSCIENCES, SUMMA CUM LAUDE, 2017

Research

High Meadows Environmental Institute, Princeton University

Postdoctoral Environmental Fellow, 2023–present

Advisors: Profs. Elie Bou-Zeid, Luc Deike, Laure Resplandy, Daniel Sigman

Mani Group, Stanford University

Graduate researcher, 2019–2023

Advisor: Prof. Ali Mani

Environmental Fluid Mechanics Laboratory, Stanford University

Graduate researcher, 2017–2023

Advisor: Prof. Jeffrey Koseff

Ocean and Ice-Sheet Processes and Climate Group, GFDL

Undergraduate researcher, 2015–2017

Advisors: Dr. Sonya Legg and Prof. Robert Nazarian

Sarmiento Research Group, Princeton University

Undergraduate researcher, 2014–2015

Advisors: Drs. Keith Rodgers, Brendan Carter, and Katsuya Toyama

Publications

In prep

Yi, Y. R., J. R. Koseff, E. R. Bou-Zeid. Nonlinear and buoyancy pressure correlations in stably stratified turbulence.

Accepted

Yi, Y. R., J. R. Koseff. Underlying physics of mixing efficiency of shear-forced, stratified turbulence. *Phys. Rev. Fluids* 2023, 8, 084803.

Yi, Y. R., J. R. Koseff. Revised mixing coefficient scaling for sheared stably-stratified turbulence. *J. Fluid Mech.* 2022, 952, A18.

Yi, Y. R., J. R. Koseff. Dynamics and energetics underlying mixing efficiency in homogeneous stably stratified turbulence. *Phys. Rev. Fluids* 2022, 7, 084801. *Chosen as Editors' Suggestion.*

Yi, Y. R., S. Legg, and R. H. Nazarian. The Impact of Topographic Steepness on Tidal Dissipation at Bumpy Topography. *Fluids* 2017, 2, 55.

Proceedings

Sabet, F., Y. R. Yi, L. Thomas, M. Momen. "Characterizing mean and turbulent structures of hurricane winds via large-eddy simulations." *Center for Turbulence Research Proceedings of the Summer Program 2022*.

Yi, Y. R., S. Legg, R. Nazarian. "A process study of tidal mixing over rough topography." *Eighth International Symposium on Stratified Flows 2016*.

Invited talks

"Seaweed farming for carbon sequestration." High Meadows Environmental Institute, CEREAL (Conversation on Environment, Responsible Energy, And Life) seminar series, Princeton University, Princeton, November 28, 2023.

"Underlying physics of mixing efficiency of stably stratified turbulence." Department of Mechanical Engineering, Ocean Engineering Seminar series, University of California, Berkeley, March 10, 2023.

Conference presentations

Yi, Y. R., L. Deike, M. Chamecki, L. Resplandy, D. M. Sigman, B. von Herzen, E. Bou-Zeid. "Large-eddy simulations of shear-driven vertical mixing associated with depth-cycled macroalgae canopies". Ocean Sciences Meeting. February 20, 2024. (POSTER)

Yi, Y. R., J. R. Koseff, E. R. Bou-Zeid. "Analysis and modeling of slow and rapid pressure correlations in stably stratified turbulence". AGU Annual Meeting 2023. December 15, 2023. (TALK)

Yi, Y. R., J. R. Koseff, E. R. Bou-Zeid. "Analysis and modeling of slow and rapid pressure correlations in stably stratified turbulence". 76th Annual Meeting of the APS DIVISION OF FLUID DYNAMICS. November 20, 2023. (TALK)

Yi, Y. R., P. L. Johnson, J. R. Koseff. "Irreversible mixing in stably-stratified turbulence under momentum and scalar forcing: beyond the turbulent Froude number". 75th Annual Meeting of the APS DIVISION OF FLUID DYNAMICS. November 21, 2022. (TALK)

Y. R. Yi. "Uncovering the physics of the mixing efficiency of stably-stratified turbulence". Twelfth Physical Oceanography Dissertation Symposium. October 18, 2022. (TALK)

Koseff, J. R., Y. R. Yi. "Underlying physics of mixing efficiency of stratified turbulence". Ninth International Symposium on Stratified Flows. August 29, 2022. (TALK)

Yi, Y. R., J. R. Koseff. "What sets the maximum amplitude of the mixing coefficient of shear-forced, stably-stratified turbulence?". Ocean Mixing Gordon Research Seminar/Conference. June 5, 2022. (POSTER)

Yi, Y. R., A. Mani. "Characterization of Nonlocal Eddy Diffusivity in Homogeneous Shear Flow". 74th Annual Meeting of the APS DIVISION OF FLUID DYNAMICS. November 21, 2021. (TALK)

Yi, Y. R., J. R. Koseff, A. Mani. "Large-Scale Anisotropy Determines Mixing Regimes of Stably-Stratified Turbulence". 73rd Annual Meeting of the APS DIVISION OF FLUID DYNAMICS. November 23, 2020. (TALK)

- Yi, Y. R., J. R. Koseff. "Mixing Efficiency for Forced, Stationary, Stratified Turbulence: When is It Constant?". Ocean Sciences Meeting. February 18, 2020. (POSTER)
- Legg, S., R. Nazarian, Y. R. Yi, J. Klymak, M. Nikurashin, and M. Buijsman. "Internal Wave Driven Mixing: Numerical Process Studies of Breaking Internal Tides". CLIVAR. Open Science Conference: Charting the Course for Climate and Ocean Research. September 23, 2016. (POSTER)
- Yi, Y. R., S. Legg, and R. H. Nazarian. "A Process Study of Tidal Mixing Over Rough Topography". Eighth International Symposium on Stratified Flows. August 30, 2016. (TALK)
- Yi, Y. R., S. Legg, and R. H. Nazarian. "Tidal Mixing Over Rough Topography: Sensitivity to Topographic Length Scale and Steepness". Ocean Sciences Meeting, February 24, 2016. (POSTER)
- Rodgers, K., Y. R. Yi, T. Froelicher, J. Dunne, and H. Zanolowski. "Southern Ocean drivers of Equatorial Pacific O₂ changes over the 21st century in a large ensemble suite with GFDL's ESM2M earth system model". Ocean Sciences Meeting. February 22, 2016. (TALK)

Teaching

Stanford University, Stanford, CA
CEE363B, CHAOS & TURBULENCE, Spring 2022
Course assistant

ME361, TURBULENCE, Spring 2020, 2021
Course assistant (weekly tutorials, problem set and exam question preparation)

CEE262B, TRANSPORT & MIXING IN SURFACE WATER FLOWS, Winter 2021
Guest lecture on stratified turbulence

Selected awards and honors

High Meadows Environmental Institute Postdoctoral Environmental Fellowship, 2023
Physical Oceanography Dissertation Symposium XII, 2022
Charles H. Leavell Graduate Student Fellowship, 2018–2021
Edward Sampson, Class of 1914, Prize in Environmental Geosciences, 2017
Smith-Newton Scholarship, 2015–2017

Service activities

Stanford seeME, Stanford University
Leadership team and course instructor, 2022

Environmental Fluid Mechanics Laboratory, Stanford University
Seminar coordinator, 2020–2021

Rockefeller College, Princeton University
Peer Academic Adviser, 2016–2017

Manna Christian Fellowship, Princeton University

President, 2016–2017

Band leader, 2015–2016

A/V coordinator, 2013–2014

Reviewer

Journal of the Atmospheric Sciences, Journal of Fluid Mechanics, Physical Review
Fluids, Scientific Reports

Memberships

American Geophysical Union (AGU), 2023–present

American Physical Society (APS), 2020–present

The Oceanography Society (TOS), 2015–present