Jinshi (Peter) Chen

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EDUCATION

Woods Hole Oceanographic Institution, Physical Oceanography Cambridge & Woods Hole, MA
Massachusetts Institute of Technology, Earth, Atmospheric, and Planetary Sciences Jun. 2019-Present
Ph.D. Candidate
Advisor: Dr. Britt Raubenheimer & Dr. Steve Elgar
Dissertation: *Cross surfzone transport dynamics driven by random breaking waves*
Overall GPA: 5.00/5.00

Cornell University, College of Arts & Sciences Ithaca, NY
Physics, Bachelor of Arts, Magna Cum Laude Aug. 2015-May 2019
Overall GPA: 4.08/4.00 • Major GPA: 4.14/4.00

RESEARCH AREAS & INTERESTS

• Nearshore processes & circulation • Wave breaking & turbulence • Nearshore air-sea interaction • Scientific modeling • Coastal resilience & climate mitigation

PUBLICATIONS

• Chen, J., Raubenheimer, B., & Elgar, S. (2024) Wave and Roller Transformation over Barred Bathymetry, *Journal of Geophysical Research: Oceans.*129, e2023JC020413
• Chen, J., Raubenheimer, B., & Elgar, S. Anisotropy of Surfzone Turbulence, *under review, Journal of Physical Oceanography*
• Chen, J., Raubenheimer, B., & Elgar, S. Vertical Structure of Undertow over Barred Bathymetry. *In prep.*

INVITED PRESENTATIONS

• *Cross Surfzone Transport Dynamics by Random Breaking Waves,* Presented at the Sack Lunch Seminar, Earth, Atmospheric, and Planetary Sciences, MIT, Dec. 2024
• *Cross Surfzone Transport Dynamics by Random Breaking Waves,* Presented at the Center for Coastal Studies seminar, Scripps Institution of Oceanography, Oct. 2024
• *Simulations and Observations of Surfzone Waves and Undertow*. Presented at Coastal Ocean Fluid Dynamics Laboratory (COFDL) seminar, WHOI, Aug. 2021

CONFERENCE PRESENTATIONS

• Chen, J., Raubenheimer, B., Elgar, S., & Tsai, B. (2024, December). *Simulations of Depth Resolved Cross-shore Momentum Transfer in the Surf Zone.* Poster presented at 2024 AGU Fall Meeting.
• Chen, J., Trowbridge, J., Raubenheimer, B., & Elgar, S. (2024, February). *Observation of Surfzone Turbulence Anisotropy*. Presented at 2024 Ocean Sciences Meeting.
• Chen, J., Raubenheimer, B., & Elgar, S. (2023, August). *Tidal Effect of Cross-shore Roller Transformation over Barred Bathymetries*. Presented at 2023 Young Coastal Scientists and Engineers Conference-Americas.
• Chen, J., Raubenheimer, B., & Elgar, S. (2022, December). *Cross-shore Roller Transformation over Barred Bathymetries*. Presented at 2022 AGU Fall Meeting.
• Chen, J., Raubenheimer, B., & Elgar, S. (2018, November). *Surfzone Setup and Alongshore Currents During Hurricane Matthew.* Poster presented at 71st Annual Meeting of the APS Division of Fluid Dynamics.

HONORS & AWARDS

• MathWorks Fellowship Aug. 2023-Jun. 2024

• Merrill Presidential Scholar May. 2019
• American Physical Society Division of Fluid Dynamics 2018 student travel grant Sept. 2018
• Woods Hole Oceanographic Institution Summer Student Fellowship Jun. 2018-Aug. 2018
• National Marine Figure of the Year 2013 by State Oceanic Administration (SOA), P.R.China Jun. 2014

RESEARCH GRANT AWARDED

• MathWorks Fellowship (~100k) Aug. 2023-Jun. 2024
• Ocean Ventures Fund (~10k) Jun. 2023
• PADI Foundation Grant (~8k) Apr. 2021

RESEARCH EXPERIENCE

MIT/WHOI Joint Program Cambridge, MA & Woods Hole, MA
Graduate Student Advisor: Prof. Glenn Flierl Dec. 2020-Apr. 2022
• Simulated random vortex generation and advection over a slope using *Dedalus* framework.
• Derived dimensionless relation between vortex properties (energy, size, etc) and slope & bathymetry properties.
• Explored possible critical transitions of vortex advection using simplified vortex dipole advection model.

MIT/WHOI Joint Program Cambridge, MA & Woods Hole, MA
Graduate Student Advisor: Dr. Britt Raubenheimer & Dr. Steve Elgar Jun. 2019-Present
• Numerically investigate the cross-shore wave roller transformation and vertical structure of undertow with random waves and field-based bathymetry using *OpenFOAM*.
• Investigate the surfzone turbulence structure and anisotropy with its relation to wave and mean current condition using field observation.

School of Civil & Environmental Engineering, Cornell University Ithaca, NY
Undergraduate Research Assistant Advisor: Prof. Peter J. Diamessis May 2017-May 2018
• Numerically investigated nonlinear harmonic formation during the refraction of a Mode-1 internal tide.
• Built linear and nonlinear partial differential equation solvers using spectral and collocation methods.

FIELD WORK

SINKEX, Field Research Facility, Duck, NC Sept. 2023-Oct. 2023
• Deployed vertically aligned ADVs to measure turbulence (Funded by WHOI OVF Award).
• Assisted mounting field cameras to collect surf zone foam images.

BIASEX, Field Research Facility, Duck, NC Sept. 2022
• Deployed ADV, ADCP in surf zone.
• Assisted mounting field cameras to collect surf zone foam images.
• Assisted flying drones for remote sensing on surface currents.

DUNEX, Field Research Facility, Duck, NC Aug. 2021-Oct. 2021
• Deployed ADV, ADCP and pressure sensors in surf zone (Funded by PADI Foundation Award).
• Assisted mounting field cameras to collect surf zone foam images.
• Assisted collecting sediment samples.
• Provided daily maintenance for in-situ sensors.

PROFESSIONAL ACTIVITIES

• **Chair & Convener,** Nearshore Processes, AGU24 Annual Meeting, Washington, D.C.

SPECIALIZED SKILLS

Software: MATLAB • Mathematica • OpenFOAM • Dedalus • FLUENT • LabVIEW
Programming language: Python • C/C++ • Julia
Laboratory: Particle Image Velocimetry (PIV) • Laser Induced Fluorescence (LIF) • Raman spectroscopy

Field Work: Acoustic Doppler Velocimetry (ADV) • Acoustic Doppler Current Profiler (ADCP) • CTD

MENTORING & TEACHING

Math Review Instructor, MIT-WHOI Joint Program — Woods Hole, MA
• Teach signal processing session for incoming MIT-WHOI Joint Program student. — Aug. 2024

Grad Teaching Development Tracks, MIT — Cambridge, MA
• Develop teaching skills through interactive learning modules and literature. — Nov. 2022-Feb. 2024

Peer Advisor, Cornell University — Ithaca, NY
• Mentored six freshmen on physics course selections and finding research projects. — Aug. 2017-Dec. 2017

Undergraduate Teaching Assistant, Cornell University — Ithaca, NY
• Held discussion sessions for PHYS 1112: Mechanics & Heat. — Feb. 2016-May. 2016

AFFILIATIONS

• American Geophysical Union — Dec. 2022-Present
• Phi Beta Kappa Honor Society — Mar. 2019-Present
• American Physical Society — Sept. 2018-Present

ADDITIONAL EXPERIENCE

• **Guest Student,** Woods Hole Oceanographic Institution, Woods Hole, MA — Jul. 2016-Aug.2016
• **Leading Student Researcher on Cyanobacteria,** TsingHua University, Beijing, China — Sept. 2013-Aug. 2014

CERTIFICATION

• **MIT Grant Writing Certificate** — Jun. 2024-Present
• **MIT Research Mentoring Certificate** — Apr. 2024-Present
• **MIT Graduate Teaching Certificate** — Apr. 2024-Present
• **Scientific Diver,** American Academy of Underwater Sciences — Jul. 2021-Present