ALEX KINSELLA Department of Physical Oceanography Woods Hole Oceanographic Institution MS 29, Clark Laboratory, Woods Hole, MA 02543 alex.kinsella@whoi.edu Webpage: kinsella.earth

Research Interests

I am a seagoing physical oceanographer interested in air-sea interaction across many scales. I have a particular interest in the coupling between the upper ocean and atmospheric convection in the tropics. I am committed to gathering high-quality measurements of the marine atmosphere and the upper ocean, as well as careful analysis of remote sensing datasets, reanalysis products, and simple models. I have experience using a variety of observational tools at sea (underway CTD, radiosonde, VMP, ADCP, wind lidar, ceilometer, waveglider, etc.) and I would like to develop particular expertise with marine cloud measurements (e.g. W-band radar, ceilometer, Doppler lidar).

Keywords: Air-sea interaction, tropical meteorology, upper-ocean dynamics, monsoons, cloud dynamics, cloud microphysics, seagoing observations

Academic Appointments

2021-PRESENT Woods Hole Oceanographic Institution

 $Post doctoral\ Investigator,\ Mahadevan\ Group$

Education

2015-21 UC Santa Barbara

Ph.D. Physics, June 2021 Advisor: David R. Morrison Dissertation Title: M-Theory and Heterotic String Theory on Special Holonomy Fibrations M.A. Physics, May 2018

2011-15 Stanford University

B.S. Mathematics and Physics (with distinction and physics departmental honors) Honors Thesis Advisor: Sean Hartnoll
Honors Thesis Title: No Negative Modes About the Axionic Wormhole Instanton
Six quarters of geophysics research in earthquake propagation modeling and observation, mentored by Professors Eric Dunham and Simon Klemperer

Peer-Reviewed Publications

Author ordering in high energy theoretical physics is alphabetical by last name

- Submitted A. Kinsella and A. Mahadevan. "Coupling and Climatology of Meridional SST Gradients and Monsoon Intraseasonal Oscillations in the Bay of Bengal." Submitted to Journal of Climate.
- 2021 B. Acharya, A. Kinsella, and D. Morrison. "Non-perturbative heterotic duals of M-theory on G_2 orbifolds." Journal of High Energy Physics. doi.org/10.1007/JHEP11(2021)065
- 2021 B. Acharya, A. Kinsella, and E. Eik Svanes. "T³-invariant heterotic Hull-Strominger solutions." Journal of High Energy Physics. doi.org/10.1007/JHEP01(2021)197

2018 S. B. Giddings and A. Kinsella. "Gauge-invariant observables, gravitational dressings, and holography in AdS." *Journal of High Energy Physics*. doi.org/10.1007/JHEP11(2018)074

Non Peer-Reviewed Publications

- 2022 A. Kinsella. "Finding Nature at Sea During NASA's S-MODE Field Campaign." Invited blog post for NASA Earth Expeditions. https://blogs.nasa.gov/earthexpeditions/2022/11/03/findingnature-at-sea-during-nasas-s-mode-field-campaign/
- 2023 A. Kinsella. "Ocean, Clouds, and Rainfall in the South Asian Summer Monsoon." Research news for WHOI Physical Oceanography Website. https://www.whoi.edu/south-asian-summer-monsoon/

Grants, Fellowships, and Awards

2023-24	ONR proposal funded as co-PI: "Ocean and atmosphere controls on air-sea interaction in the Arabian Sea" Two years of funding for participation in the ONR ASTRaL field campaign
2022-23	Francis E. Fowler IV Postdoctoral Investigator Award (\$196,798) To support research on freshwater feedbacks in the South Asian monsoon
2020-21	UC Santa Barbara National Science Foundation Extension Fellowship ($$24,000$)
2017-21	Simons Collaboration on Special Holonomy in Geometry, Analysis, and Physics Multi-year research stipend and travel funding for international conferences
2015-20	National Science Foundation Graduate Research Fellowship (\$102,000)
2015	Award for Excellence in Honors Thesis Presentation, Stanford Oral Communication Program $(\$350)$
2013	Stanford Vice Provost for Undergraduate Education Major Grant (\$6,000) To support research on the effect of fault roughness on radiation patterns of earthquakes
2012	Best Poster Presentation, Stanford Earth Science Undergraduate Research Program
2010	Manson Scholar, The Bay School of San Francisco Awarded by the faculty and administration for intellectual merit, commitment to the school's values, and leadership in the school community. Included a full four-year college scholarship.

Field Work Experience

- 2023 **ASTraL** (Arabian Sea Transition Layer): 17 day research cruise aboard R/V Roger Revelle on the Arabian Sea. Responsible for vertical microstructure profiler (VMP) operations and uCTD watchstanding.
- 2023 **Native Plant Trust Plant Conservation Volunteer** Five half-day field trips to monitor rare plant populations in New England. Responsible for off-trail wayfinding, plant identification, and ecosystem assessment.
- 2022 **S-MODE** (Submesoscale Ocean Dynamics Experiment): 25 day research cruise aboard R/V Bold Horizon in the eastern Pacific. Responsible for adaptive sampling navigation, uCTD operations, weather forecasting, and data flow.

- 2022 **CALYPSO** (Coherent Lagrangian Pathways from the Surface Ocean to Interior): 23 day research cruise aboard R/V Pourquois Pas? in the western Mediterranean. Responsible for uCTD operations, weather forecasting, and organization of daily seminar.
- 2012 **Broadband Salton Seismic Imaging Project**: Week-long field work in the Salton Trough with the Stanford Crustal Geophysics Group to retrieve data from a seismometer array. Responsible for off-road driving to seismometer locations, data retrieval, and data processing.

Selected Presentations

2023	Submesoscale Ocean Dynamics: Theory and Progress from Recent Observational Campaigns. Invited talk at International Center for Theoretical Sciences, March 2023
2023	Meridional SST Gradients and Intraseasonal Rainfall Variability in the Bay of Ben- gal. Invited talk at the Indian Institute for Tropical Meteorology, March 2023
2022	Monsoon Dynamics and the Ocean: The Relationship between SST Gradients and Rainfall in Monsoon Intraseasonal Oscillations. Invited talk at the SMAST Fisheries and Oceanography Seminar, November 2022
2022	CALYPSO 2022 Meteorology and Inertial Divergence Modeling . Talk at the CA-LYPSO DRI Meeting, September 2022
2022	The Effect of Bay of Bengal Freshwater Flux on Indian Summer Monsoon Rainfall in a Coupled Column Model. Poster Presentation at Atmospheric and Oceanic Fluid Dynamics Meeting, June 2022
2022	Monsoon Dynamics and the Ocean. Talk at the WHOI PO Seminar, June 2022
2022	Northern Indian Ocean SST Gradients and Monsoon Intraseasonal Oscillations. Poster presentation at the CLIVAR Pattern Effect Workshop, May 2022
2021	Freshwater Feedbacks on the Indian Monsoon . Talk at the WHOI Postdoc Symposium, November 2021
2021	Freshwater Feedbacks on the Indian Monsoon . Talk at the MISO-BoB Annual PI Meeting, October 2021
2021	A Journey from String Theory to Oceanography . Invited talk at Sonoma State University <i>What Physicists Do</i> Seminar, October 2021
2021	String Theory, the Biological Pump, and Modes of the Santa Barbara Channel. Invited talk at the Mahadevan Lab Group Meeting, January 2021
2019	Heterotic Duals of M-Theory on Joyce Orbifolds. Talk at the Simons Collaboration Meeting on <i>Physics and Special Holonomy</i> , Kavli Institute for Theoretical Physics, April 2019
2017	Diffeomorphism-Invariant Bulk Observables in AdS . Talk at Pacific Coast Gravity Meeting, UC Santa Barbara, March 2017
2013	Fully Coupled Models of (Idealized) Buildings and Seismic Waves from Earth- quakes. Poster at 2013 Southern California Earthquake Center Annual Meeting, Palm Springs, CA
2012	Rapid Lateral Variation of Seismic Anisotropy in the Salton Trough, Southern

California. Poster at 2012 American Geophysical Union Fall Meeting, San Francisco, CA

2016-20 UCSB Internal Seminars

Physics of the Ocean and Climate, May 2020 Seiberg-Witten Theory and 4-Manifolds, February 2019 The Supersymmetric Proof of the Index Theorem, May 2018 The Category of Topological B-Branes, February 2018 BRST, Gauge Theory, and Cohomological Field Theory, January 2018 The Kodaira Embedding Theorem, November 2017 Mirror Symmetry for G₂ Manifolds from Dual Tops, November 2017 D-Branes and Matrix Theory, October 2017 The A- and B-Model Topological Field Theories, May 2017 The Virasoro Algebra, January 2017 Lattice Gauge Theories, October 2016

Teaching and Mentorship Experience

2022-Present Public School Volunteering

-WHOI Broader Impacts Group: Guest class on oceans and climate change for 8th graders at Keith Middle School, New Bedford.
-Falmouth VIPS Program (Volunteers In Public Schools). Weekly volunteer physics tutoring. Five half-day field trips to local wetlands for 4th and 5th graders. Field trip to local pond for 1st graders.

- 2019-20 **Teaching assistant**, UC Santa Barbara Physics Department Physics 219: Statistical Mechanics (Winter 2020) Physics 210A: Electricity and Magnetism (Winter 2020) Physics 101: Complex Analysis (Spring 2019)
- 2015 **Residential counselor**, Stanford Pre-Collegiate Studies Ten week program in which I tutored high school students in special relativity, quantum mechanics, and number theory
- 2014-15 **Tutor**, Stanford University Mathematics Organization Linear algebra, multivariable calculus, and differential equations
- 2013 **Counselor**, Women in Physics Program, Stanford Society of Physics Students Events for freshman women interested in physics and physics demonstrations for local Girl Scouts

Service

2023-Present WHOI Postdoctoral Association At-Large Representative

2023-Present WHOI Sustainability Task Force Co-Leader

- 2023-Present WHOI Physical Oceanography Website Committee
- 2022-Present Peer reviewer for Journal of Climate, Journal of Geophysical Research: Oceans, Geophysical Research Letters, and Journal of Advances in Modeling Earth Systems
- 2021-Present Organizer of the WHOI Monthly Monsoon Meeting
- 2022 Co-Organizer of the CALYPSO DRI Meeting

2019-20 Organizer of the UC Santa Barbara High Energy Grad Seminar

2017-18 Co-Organizer of the UC Santa Barbara Mathematical Physics Seminar

Memberships

American Physical Society (APS)

American Geophysical Union (AGU)

American Meteorological Society (AMS)

Various conservation organizations: National Audubon Society, Mass Audubon, Native Plant Trust, Association to Preserve Cape Cod, Botanical Club of Cape Cod and the Islands, The 300 Committee Land Trust

2017-21 Simons Collaboration for Special Holonomy in Geometry, Analysis, and Physics