ALEX KINSELLA

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Academic Appointments

2024-Present **Woods Hole Oceanographic Institution**
Research Associate III, Physical Oceanography Department

2021-2024 **Woods Hole Oceanographic Institution**
Postdoctoral 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

In prep. A. Kinsella and A. Mahadevan. "Air-Sea Interaction Regimes of the Northern Indian Ocean." In preparation for *Geophysical Research Letters*.

In review A.O. Gonzalez, F. Fahrin, G. Magnusdottir, A. Kinsella, and I. Ganguly. "We need to simulate more double ITCZs and less southern ITCZs in reanalyses and coupled climate models." Submitted to *JGR: Atmospheres*.

Accepted L. Middleton, W. Wu, T. Johnston, D. Tarry, J. Farrar, P. Poulain, T. Ozgokmen, A. Shcherbina, A. Pascual, C. McNeil, M. Belgacem, M. Berta, K. Abbott, A. Worden, F. Wittmers, A. Kinsella, L. Centurioni, V. Hormann, E. Cutolo, J. Tintoré, S. Ruiz, B. Casas, H. Cheslack, E. D'Asaro, and A. Mahadevan. "Cyclone splitting ventilates the upper ocean." Accepted at *Science Advances*.

2025 S. Kerhalkar, A. Kannad, A. Kinsella, A. Tandon, J. Sprintall, and C. Lee. "Monsoon-Frontal Interactions Drive Cyclone Biparjoy's Wake Recovery in the Arabian Sea." *Geophysical Research Letters*. doi.org/10.1029/2024GL112413

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. "T^3-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

2024-present A. Kinsella. "Cloudlooks." Ongoing educational Substack publication about clouds. https://cloudlooks.substack.com

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/

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/finding-nature-at-sea-during-nasas-s-mode-field-campaign/

Grants, Fellowships, and Awards

2024 NASA Group Achievement Award
For participation in the S-MODE IOP1 field campaign

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 Fellowship ($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

2025 **ASTraL IOP2** (Arabian Sea Transition Layer): 25 day research cruise aboard R/V Thomas G. Thompson on the Bay of Bengal. Responsible for real-time data processing, all-sky camera operation, and Waveglider recovery assistance and data retrieval.

2024 **WFIP3 Radiosonde Deployments** (Wind Forecast Improvement Project 3): 6-day research cruise aboard R/V Atlantic Explorer on the New England Shelf. Responsible for radiosonde launches, Doppler wind lidar maintenance, XBT survey design, and data processing.

2024 **WFIP3 Buoy Deployment** (Wind Forecast Improvement Project 3): 2 day research cruise aboard R/V Connecticut on the New England Shelf. Responsible for assisting in preparation, recovery, and deployment of Sentinel buoy.

2024 **ASTraL IOP1** (Arabian Sea Transition Layer): 50 day research cruise aboard R/V Thomas G. Thompson on the Bay of Bengal. Responsible for SUNA nitrate sensor, all-sky camera operation, Lagrangian float ballasting and deployment, Waveglider piloting, daily weather briefings and uCTD watchstanding.

2023 **ASTraL Pilot Cruise** (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.
Upcoming 45 day research cruise aboard R/V Thomas G. Thompson. Will be responsible for SUNA nitrate sensor operations, all-sky camera operation, and Lagrangian float ballasting and deployment.

2023-present **Native Plant Trust Plant Conservation Volunteer** Five half-day field trips per summer to monitor rare plant populations in New England. Responsible for off-trail wayfinding, plant identification, and ecosystem assessment.

2022 **S-MODE IOP1** (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 IOP2** (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

2025 **Clouds, Wind, and Rain: Shaping the Atmospheric Boundary Layer One Gust at a Time**. Invited seminar at SMAST, New Bedford, March 2025

2025 **Regimes of Air-Sea Interaction in the Northern Indian Ocean**. Talk at EKAMSAT Spring Workshop, Boulder, March 2025

2025 **Clouds, Climate, and the Ocean: A String Theorist Becomes an Oceanographer**. Invited seminar at University of Colorado, Colorado Springs, March 2025

2025 **Regimes of Air-Sea Interaction in the Northern Indian Ocean**. Talk at AMS Annual Meeting, New Orleans, January 2025

2025 **Clouds**, **Rain, and Wind during the Third Wind Forecast Improvement Project (WFIP3)**. Poster at AGU Annual Meeting, Washington, D.C., December 2024

2024 **Clouds, Rain, and Wind during the Third Wind Forecast Improvement Project (WFIP3)**. Poster at AGU Annual Meeting, Washington, D.C., December 2024

2024 **Clouds and Air-Sea Fluxes (and Nitrate) during EKAMSAT IOP1**. Talk at EKAMSAT Fall Workshop, Seattle, September 2024

2024 **Climate: It's All Light!**. Talk at People's Awards for Scientific Storytelling, Woods Hole, August 2024

2024 **Clouds, Climate, and the Ocean**. Talk at KidWind 2024, Woods Hole, July 2024

2024 **Clouds of the Upper Cape**. Talk at the Upper Cape Naturalist Club, April 2024

2024 **Regimes of Air-Sea Interaction in the Northern Indian Ocean**. Talk at the WHOI Physical Oceanography Seminar, March 2024

2024 **Regimes of Air-Sea Interaction in the Northern Indian Ocean**. Talk at Ocean Sciences Meeting, New Orleans, February 2024

2023 **Regimes of Air-Sea Interaction in the Northern Indian Ocean**. Talk at the WHOI Postdoc Symposium, December 2023

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 Bengal**. 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 CALYPSO 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 *What Physicists Do* 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 *Physics and Special Holonomy*, 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 Earthquakes**. 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 G_2 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

2024-Present **Naturalist Walk Leader**
Volunteer leadership of public walks with local land trusts and clubs focused on clouds and nature.

2023-Present **Geosciences Education & Mentorship Support**
Volunteer mentor matched with three college students interested in applying to graduate school in earth sciences.

2023-Present **Letters to a Pre-Scientist**
Volunteer mentor in a pen pal program where I am paired with a 7th grader intererested in a future career in science.

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 Sustainability Task Force Co-Leader
-Responsible for creating agendas and running monthly meetings, co-organizing lunch and learns, monthly beach cleanups, invasive plant removal on campus, event planning

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

2023-2024 WHOI Postdoctoral Association At-Large Representative
-Co-organized 2023 WHOI postdoc symposium; co-organized 2023 academic application workshop series; responsible for website upkeep

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, Upper Cape Naturalist Club

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