

ALEX KINSELLA  
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## Academic Appointments

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

2021-2024 **Woods Hole Oceanographic Institution**  
*Postdoctoral Investigator, Mahadevan Group*

## Education

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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

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*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*.
- Submitted. A.O. Gonzalez, F. Fahrin, A. Kinsella, 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*.
- Submitted. 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." Submitted to *Nature Communications*.
- 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

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- 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

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- 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

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- 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 Pourquoi 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

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- 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

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- 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 interested 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

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- 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

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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