

Maïke Sonnewald, Ph.D.

Computer Science Department
University of California, Davis
One Shields Avenue, Davis, CA 95616

sonnewald@ucdavis.edu
Website: msonnewald.com
Group website: compclimate.com
+1 413-406-9121

Position and affiliations

2023–present	Assistant Professor at University of California, Davis
2023–present	Visiting Scholar at Princeton University
2022–present	Affiliate Assistant Professor at University of Washington
2020–present	Affiliate Researcher at NOAA Geophysical Fluid Dynamics Laboratory
2022–present	Associate Editor: American Meteorological Society (AMS) Journal of Artificial Intelligence for the Earth Systems

Education

2011–2016	University of Southampton, UK. Ph.D. Complex Systems Simulation at the National Oceanography Center Dissertation: <i>Ocean model utility dependence on horizontal resolution</i> Advisors: George Nurser, Joel J.-M. Hirschi, and James Dyke Fellowship: Engineering and Physical Sciences Research Council (EPSRC, UK)
2006–2011	University of Southampton, UK. M. Sci. <i>magna cum laude</i> , complex systems simulation, 2011 M. Sci. <i>magna cum laude</i> , physical oceanography, 2010

Professional history

Past positions

2020–2023	Associate Research Scholar at Princeton University
2016–2020	Postdoctoral Associate at Massachusetts Institute of Technology Advisors: C. Wunsch, P. Heimbach, and S. Dutkiewicz

Other positions

2023	Visiting Professor at Université catholique de Louvain, Belgium
2019–2022	Visiting Scientist at University of Washington
2017–2019	Visiting Scientist at Harvard University
2018–2019	Visiting Scientist at Université Grenoble Alpes, France
2016–2018	Visiting Scientist at University of Texas at Austin

Honours and spotlights

2023	Certificate of recognition from the California State Assembly
2023	UC Davis Faculty Scholar of the Center for the Advancement of Multicultural Perspectives on Science (CAMPOS)
2021	Spotlight paper at the International Conference on Machine Learning (ICML)
2021	Featured on the cover of the Journal of Advances in Modeling Earth Systems (JAMES)
2021	Invited core member for Kavli Institute for Theoretical Physics (KITP) program “ML in the Physics of Climate”.
2019	Winner at Simons Foundation visualization competition
2017	Kaufman Teaching Certificate Program (KTCP) awarded from MIT

Selected grants

2023	\$578,000 – Principle investigator for “Improving coastal sea level predictions with ocean process insight guided by machine learning”. NOAA Climate Program Office.
2023	£958,000 – Co-investigator for “Bridging theory to reality in projections of the Asian and West African monsoons (BRIDGE)”. National Environmental Research Council (UK).
2021	\$31,032 – Amazon Sustainability Data Initiative (ASDI)
2020	\$48,595 – ASDI

Policy impact

Committees and panels

2024	Expert committee member for the “Computational system and modeling framework for frontier Earth system science and climate simulation/projection international summit”. More information. Invitation by Prof. Droegenmeier, recently serving as Director of The White House Office of Science and Technology Policy.
2024	Panel member at the American Meteorological Society Washington Forum which examines public policy issues across the weather, water, and climate enterprise. More information.
2024	Panel member at the California Ocean Science Trust symposium on “Fishery Disasters under Climate Change”.

Invited talks and contributions

2024	Invited talk at the American Meteorological Society Washington Forum on “The Weather/Climate Data needed for Reliable AI”
2024	Invited talk on “Ocean predictability potential” at the California Ocean Science Trust symposium on “Fishery Disasters under Climate Change”
2024	Invited talk to UC Davis College of Engineering Executive Committee
2023	Invited talk on “Predictability, Predictions, and Applications Interface” for US CLIVAR by the World Climate Research Program under United Nations auspices. More information.
2022	Invited talk on “Physical Oceanography and AI” for US CLIVAR the World Climate Research Program under United Nations (UN) auspices. More information.
2022	Invited talk to NOAA GFDL HQ site review .
2021	Citation by the World Meteorological Organization (WMO) of the UN in a concept note on the status, opportunities and challenges of data handling and application of AI in the environmental modeling field, with recommendations for actions for WMO to support the community in its response. More information.
2021	Keynote at a Department of Energy AI workshop on “Ocean Grand Challenges”.
2021	Featured in NOAA’s artificial intelligence strategic plan 2021-2025 , a response to the President’s Executive Order on Maintaining American Leadership in AI. View document.
2020	Cited in a European Union policy recommendation: “Directorate-General for Internal Policies of the Union report on Artificial intelligence and the fisheries sector”. More information.
2020	Invited talk NOAA Senior Management Meeting , Oceanic and Atmospheric Research
2020	Contributed to the science basis for New Zealand’s Marine Protected Area legislation

Review articles (total: 4)

Notable impact in [blue](#)

[1] Lai C-Y, Hassanzadeh P, Sheshadri A, **Sonnwald M**, Ferrari R, Balaji V. “Machine learning for climate physics and simulations”, in press, *Annual Reviews of Condensed Matter Physics*.

- Impact factor: 23, DOI: <http://doi.org/10.48550/arXiv.2404.13227>

[2] Bronner, U., **Sonnevald, M.** and Wisbeck, M., “Marine modeling as the key to sustainable use and protection of the marine environment”, invited, 2023, The International Hydrographic Review.

- DOI: <https://doi.org/10.58440/ihr-29-a04>

[3] **Sonnevald, M.**, Brajard, J., Duben, P., Lguensat, R. and Balaji, V., “Bridging theory, simulation, and observations of the global ocean using Machine Learning”. Invited, 2021, *Environmental Research Letters*.

- Impact factor: 6.9, DOI: <https://doi.org/10.1088/1748-9326/ac0eb0>

- [Citation by World Meteorological Organization \(WMO\)](#). Available here.

[4] Irrgang, C., Boers, N., **Sonnevald, M.**, Elizabeth A. Barnes, Christopher Kadow, Staneva, J., and Saynisch-Wagner, J. “Towards neural Earth system modelling by integrating artificial intelligence in Earth system science”. 2021, *Nature Machine Intelligence*.

- Impact factor: 25.9, DOI: <https://doi.org/10.1038/s42256-021-00374-3>

- Coverage by five news outlets

Peer reviewed publications (total: 15)

* indicates student advised, notable impact in [blue](#)

[5] Khatri, H., Griffies, S.M., Storer, B.A., Buzzicotti, M., Aluie, H., **Sonnevald, M.**, Dussin, R. and Shao, A., “A scale-dependent analysis of the barotropic vorticity budget in a global ocean simulation”. *Journal of Advances in Modeling Earth Systems*.

- Impact factor: 8.5, DOI: <https://doi.org/10.1029/2023MS003813>

[6] Yik, W.*, **Sonnevald, M.**, Clare, M.*, Lguensat, R. “Southern Ocean Dynamics Under Climate Change: New Knowledge Through Physics-Guided Machine Learning”. 2023, *Conference on Neural Information Processing Systems (NeurIPS) Climate Change AI workshop*.

- Impact factor: 23.27, DOI: <https://doi.org/10.48550/arXiv.2310.13916>

[7] **Sonnevald, M.**, Reeve, K., Lguensat, R. “A supergyre modulates the global overturning through upwelling in the Southern Ocean”. 2023, *Nature Commun. Earth Environ.*

- Impact factor: 7.9, DOI: <https://doi.org/10.1038/s43247-023-00793-7>

[8] Jones, D., **Sonnevald, M.**, Rosso, I., Zhou, S., and Boehme, L., “Unsupervised classification identifies coherent thermohaline structures in the Weddell Gyre”. 2023, *Ocean Science*.

- Impact factor: 4.3, DOI: <https://doi.org/10.5194/egusphere-2022-1484>

[9] Clare, M.*, **Sonnewald, M.**, Lguensat, R., Deshayes, J. and Balaji, V., “Explainable Artificial Intelligence for Bayesian Neural Networks: Towards trustworthy predictions of ocean dynamics”. 2022, *Journal of Advances in Modeling Earth Systems*.

- Impact factor: 8.5, DOI: <https://doi.org/10.1029/2022MS003162>

[10] Kaiser, B., Saenz, J.A., **Sonnewald, M.** and Livescu, D., “Automated identification of dominant physical processes”. 2022, *Engineering Applications of Artificial Intelligence*.

- Impact factor: 7.8, DOI: <https://doi.org/10.1016/j.engappai.2022.105496>

[11] Krasting, J., De Palma, M., **Sonnewald, M.**, John, J. and Dunne, J. “Regional Sensitivity Patterns of Arctic Ocean Acidification Revealed With Machine Learning”. 2022, *Nature Commun. Earth Environ.*

- Impact factor: 7.9, DOI: <https://doi.org/10.1038/s43247-022-00419-4>

[12] **Sonnewald, M.**, and Lguensat, R. “Revealing the impact of global heating on North Atlantic circulation using transparent machine learning”. 2021, *Journal of Advances in Modeling Earth Systems*.

- Impact factor: 8.5, DOI: <https://doi.org/10.1029/2021MS002496>

- Cover Feature and in “Machine Learning Application to Earth System Modeling” edition.

[13] **Sonnewald, M.**, and Lguensat, R. , Radhakrishnan, A., Sayibou, Z.*, Wittenberg, A.T. and Balaji, V. “Revealing the impact of global warming on climate modes using transparent machine learning and a suite of climate models”. 2021, *International Conference on Machine Learning: Climate Change AI*.

- Impact factor: Available: <https://www.climatechange.ai/papers/icml2021/13>

- Workshop Spotlight.

[14] **Sonnewald, M.**, Dutkiewicz, S., Hill, C. and Forget, G. “Elucidating Ecological Complexity: Unsupervised Learning determines global marine eco-provinces”, 2020, *Science Advances*.

- Impact factor: 13.1, DOI: <https://doi.org/10.1126/sciadv.aay4740>

- [Data in science basis for New Zealand’s Marine Protected Area legislation](#)

- [Cited in European Union policy recommendation](#). Available here.

- Coverage by seven news outlets

[15] Le Bras, I., **Sonnevald, M.**, and Toole, J.M. “A Barotropic Vorticity Budget for the Sub-tropical North Atlantic Based on Observations”. 2019, *Journal of Physical Oceanography*.

- Impact factor: 3.5, DOI: <https://doi.org/10.1175/JP0-D-19-0111.1>

[16] **Sonnevald, M.**, Wunsch, C. and Heimbach, P. “Unsupervised Learning Reveals Geography of Global Ocean Dynamical Regions”. 2019, *Journal of Earth and Space Science*.

- Impact factor: 3.7, DOI: <https://doi.org/10.1029/2018EA000519>

- **Featured in NOAA’s AI strategic plan responding to the President’s Executive Order on Maintaining American Leadership in AI**. Available [here](#).

- In “Geoscience paper of the future” edition

- Coverage by four news outlets

[17] **Sonnevald, M.**, C. Wunsch, and P. Heimbach, “Linear Predictability: A Sea Surface Height Case Study”. 2018, *Journal of Climate*.

- Impact factor: 5.5, DOI: <https://doi.org/10.1175/JCLI-D-17-0142.1>

[18] Bulczak, A.I., Bacon, S., Naveira Garabato, A.C., Ridout, A., **Sonnevald, M.**, and Laxon, S.W. “Seasonal Variability of Sea Surface Height in the Coastal Waters and Deep Basins of the Nordic Seas”. 2014, *Geophysical Research Letters*.

- Impact factor: 5.2, DOI: <https://doi.org/10.1002/2014GL061796>

[19] **Sonnevald, M.**, Hirschi, J.J.-M., Marsh, R., McDonagh, E.L. and King, B.A. “Atlantic meridional ocean heat transport at 26N: impact on subtropical ocean heat content variability”. 2013, *Ocean Science*.

- Impact factor: 4.3, DOI: <https://doi.org/10.5194/os-9-1057-2013>

Preprints (total: 4)

[20] Rosenfeld K., **Sonnevald M.** et al., “Building Understandable Messaging for Policy and Evidence Review (BUMPER) with AI”.

- In review. DOI: <https://doi.org/10.48550/arXiv.2402.13979>.

[21] Kaiser, B., Wu, T., **Sonnevald, M.**, Thackray, C., Callis, T. “A Moonshot for AI Oracles in the Sciences”.

- In review. DOI: <https://doi.org/10.48550/arXiv.2406.17836>.

[22] Dräger S, **Sonnewald M.** “The Importance of Architecture Choice in Deep Learning for Climate Applications”.

- In revision. DOI: <https://doi.org/10.48550/arXiv.2402.13979>.

[23] **Sonnewald M.** “A hierarchical ensemble manifold methodology for new knowledge on spatial data: An application to ocean physics”.

- In revision. DOI: <https://doi.org/10.22541/essoar.168056792.25480169/v1>.

Other publications (total: 3)

[26] Gille, S., Abernathey, A., Chereskin, T., Cornuelle, B., Heimbach, P., Mazloff, M., Menemenlis, D., Rocha, C., Soares, S., **Maike Sonnewald**, Villas Boas, B., and Wang, J. “Open Code Policy for NASA Space Science: A perspective from ocean modeling and ocean data analysis”. 2018, *NASA White Paper*.

- Available: <https://tinyurl.com/NASA-WhitePaper>

[24] **The ECCO Consortium.** “A Twenty-Year Dynamical Oceanic Climatology: 1994-2013. Part 1: Active Scalar Fields”, 2017.

- MIT DSpace: <https://dspace.mit.edu/handle/1721.1/107613>.

[25] **The ECCO Consortium.** “A Twenty-Year Dynamical Oceanic Climatology: 1994-2013. Part 2: Velocities and Property Transports”, 2017.

- MIT DSpace: <https://dspace.mit.edu/handle/1721.1/109847>.

Academic keynotes and invited talks

Total: 82, including in Policy impact (8) & Service (2) sections

2024 total: 2

- **UC San Diego, Scripps Institute of Oceanography:** “Deciphering Southern Ocean Circulation: New Perspectives Through Machine Learning.
- **Dynamics Days:** “Equations as emergent phenomena determined using machine learning: An ocean case study.

2023 total: 11

- **UC Davis Atmospheric Science:** “Physics-Informed Machine Learning to Push the Ocean Frontier in Climate”
- **UC Davis Applied Mathematics:** “Physics-Informed Machine Learning to Push the Ocean Frontier in Climate”
- **CLIVAR Predictability, Predictions, and Applications Interface:** “Escaping ”black box” machine learning to increase trust and accelerate discovery”. 100 views

- **United Nations** International Telecommunication Union: “Physics-informed ML to push the ocean frontier in climate”. Over 500 views.
- **University of Toronto** Nobel Seminar Series: “Elucidating driving mechanisms in the North Atlantic and Southern Ocean dynamics: Physics-informed and trustworthy ML for ocean science”
- **University of Liege** 54th international Liege colloquium on ocean dynamics.
- **UCLouvain**: “Physics-informed machine learning to push the ocean frontier in climate: A Southern Ocean case study”
- **Institut Pierre-Simon Laplace - Sciences du climat (IPSL)**: “Physics-informed machine learning to push the ocean frontier in climate: A Southern Ocean case study.
- **University of Miami**: “Elucidating Driving Mechanisms in North Atlantic and Southern Ocean Dynamics: Physics-Informed and Trustworthy Machine Learning for Ocean Science”. Over 360 views
- **UC Davis** Computer Science: “Physics-informed and trustworthy computation for climate resilience.
- **Sorbonne University**: “Elucidating Driving Mechanisms in North Atlantic and Southern Ocean Dynamics: Physics-Informed and Trustworthy Machine Learning for Ocean Science.

2022 total: 13

- **CLIVAR** Physical Oceanography: “A supergyre in the Southern Ocean modulates the global overturning: insight guided by interpretable machine learning.
- **Climate Informatics**: “Asking how the Southern Ocean responds to global heating and understanding why the answer emerged.”
- **U. Cambridge**: “Intelligent solutions to monitor ocean health”.
- **SIAM Mathematics of Data Science**: “Developing and Learning from Trust in Machine Learning”.
- **SIAM Geosciences Webinar Series**: “Understanding the Ocean’s response in a Future Climate”. Over 200 views
- **Max Planck Institute for Meteorology**: “The response of the ocean’s overturning to global warming: A robust blueprint for trustworthy AI for climate analysis”.
- **Institute for Mathematical and Statistical Innovation (IMSI) at U. Chicago**: “Elucidating drivers of Southern Ocean circulation change: A blueprint for interpretable and explainable machine learning”
- **MIT** Earth Atmosphere and Planetary Science: “Intelligent solutions to monitor and predict ocean health”

- **MIT Mechanical Engineering:** “Intelligent solutions to monitor and predict ocean health”
- **UC Berkeley:** “Data driven understanding of ocean systems”
- **University of Liege:** “Intelligent solutions to monitor and predict ocean health”
- **U. Wisconsin-Madison:** “Revealing the impact of climate change on North Atlantic circulation using transparent machine learning”
- **U. Rhode Island:** “Revealing the impact of climate change on North Atlantic circulation using transparent machine learning”

2021 Talks total: 15

- **American Geophysical Union (AGU):** “Revealing the impact of climate change on North Atlantic circulation using transparent machine learning”.
- **Dept of Energy AI workshop:** “Ocean Grand Challenges.
- **Climate Change AI webinar:** “A robust blueprint for trustworthy AI for climate analysis”. Over 2500 views.
- **NOAA, AI workshop:** “Revealing the impact of climate change on North Atlantic circulation using transparent machine learning”.
- **US National Center for Atmospheric Research CGD Series:** “Revealing mechanisms of change in the Atlantic Meridional Overturning Circulation under global heating”. over 225 views.
- **KITP ML for Climate Physics:** “Revealing the Impact of Global Heating on the Meridional Overturning Circulation with transparent machine learning. Over 50 views
- **IMSI U. Chicago:** “Elucidating ecological complexity: Unsupervised learning determines global marine eco-provinces”. Available.
- **GEOMAR Helmholtz Centre for Ocean Research (Ger.):** “Solutions to understand and monitor the ocean and climate”.
- **Summit for Incorporating Data Science and Open Science in Aquatic Research:** “Understanding the ocean’s response in a future climate: A robust blueprint for trustworthy AI for climate analysis”.
- **International Conference on Machine Learning:** “Revealing the impact of global warming on climate modes using transparent machine learning”.
- **UC Santa Cruz:** “Revealing the impact of global warming on ocean circulation: A robust blueprint for trustworthy AI for climate analysis”.
- **Scripps Institute of Oceanography** “Revealing the Impact of Global Heating on the Meridional Overturning Circulation”.

- **Potsdam Institute for Climate Impact:** “Revealing the Impact of Global Heating on the Meridional Overturning Circulation”.
 - **Technical U. Munich:** “Revealing the Impact of Global Heating on the Meridional Overturning Circulation”.
 - **U. Washington:** “Revealing the Impact of Global Heating on the Meridional Overturning Circulation”.
- 2020 Talks total: 6
- **Second NOAA Workshop on Leveraging AI in the Environmental Sciences,** “Elucidating Ecological Complexity: Unsupervised Learning determines global marine eco-provinces”
 - **Los Alamos National Laboratory,** “Living on the Manifold: A geography of ocean dynamical regimes from eddy to global scale”. Los Alamos, USA.
 - **U. Washington** Department of Mechanical Engineering, “Living on the Manifold: A geography of ocean dynamical regimes from eddy to global scale”.
 - **U. Washington,** Department of Ocean Sciences, “Living on the Manifold: A geography of ocean dynamical regimes from eddy to global scale”.
 - **U. Washington,** “Elucidating Ecological Complexity: Unsupervised Learning determines global marine eco-provinces”.
 - **U. British Columbia,** “Ocean exploration with machine learning: An Antidote to Chaos?”
- 2019 Talks total: 7
- **AGU:** “Unsupervised Learning Reveals Geography of Global Ocean Dynamical Regions”
 - **U. Bergen,** “Ocean exploration with machine learning: An Antidote to Chaos?”
 - **Princeton University,** “Ocean exploration with machine learning: An Antidote to Chaos?”
 - **Norway-US bilateral AI workshop,** “Elucidating ocean ecological complexity”
 - **Norway-US bilateral AI workshop,** “Recognising ocean physical regimes”. Austin, USA.
 - **Woods Hole Oceanographic Institute:** “Ocean exploration with machine learning: An Antidote to Chaos?” Woods Hole, USA.
 - **U. Tromsø (Nor.):** “Ocean exploration with machine learning: An Antidote to Chaos?” Tromsø, Norway.

2012–2018	<u>Total talks: 18</u>
2018	MIT , “Machine learning for global biogeography?”
-	Columbia University , LDEO: , “Linear predictability: A sea surface height case study”
2017	Stony Brook University , “Linear predictability: A sea surface height case study”.
Others	Yale University , WHOI , MIT (2018 & 2015), U. Texas at Austin , U. Washington , Oregon State University , U. Oxford , MIT (Two invited student talks), U. Bristol , NOCS (2015, 2014 & 2013) and MONCACO meeting .

Teaching and advising

Postdoc advising

Upcoming	TBF, UC Davis, NOAA-CPO
2023–present	Arijeet Dutta, U. Birmingham, NERC-BRIDGE

Graduate advising

2024–present	Avery Wood, UC Davis
2024–present	Makayla Mcdevit, UC Davis
2024–present	Sanah Suri, Washington University in St. Louis
2023	Simon Draeger, UC Davis,
2023–present	Lily Walker, Okinawa Institute for Science and Technology (JP)
2021–present	Yvonne Jenniges, Alfred Wegener Institute (DE)
2021	Mariana Clare, Imperial College London, National Centre for Scientific Research (CNRS, Fr), subsequently researcher at European Center for Medium Range Weather Forecasting.
2021–2022	Giangiacomo Navarra, Georgia Tech. subsequently postdoc at Princeton.

Undergraduate advising

2024–present	Jasper Dong, UC Davis, Undergraduate.
2023–2024	William Yik, Harvey-Mudd, Holling Scholar (NOAA). Undergraduate. subsequently in Ph.D. program at University of Washington with Department of Energy Fellowship.
2021	Zouberou Sayibou, Bronx Community College, Undergraduate. subsequently transfer to Stanford.

Thesis and/or candidacy committee member

2024	Xuefeng Xu, UC Davis, Graduate. (QE)
2023	Lin Yao, UC Davis, Graduate. (QE)
2023	Mohamed Abuelanin Hussien, UC Davis, Graduate. (QE)
2023	Vishal Singh, UC Davis, Graduate. (QE)
2021–present	Jacob Cohen, University of Washington. Graduate.

Instructor of record

2024	ECS171: UC Davis. Lecturer on record, “Introduction to Machine Learning”, undergraduate. <i>Participants: 100, developed material, taught.</i>
2023	European Centre for Medium-Range Weather Forecasts (ECMWF) Massive Open Online Course: “Machine Learning in Weather and Climate”. Registered: over 9000, developed material, taught.
2021	AOS 551: Princeton University. Lecturer on record, “Deep learning in geophysical fluid dynamics”. Graduate level. Participants: 10, developed material, taught.

Courses and lectures

2023	Lecture: UCLovaine (Belgium). Machine Learning for oceanography Participants: 50, developed material, taught.
2023	Lecture: Ocean Data Science Summer School. Participants: 17, developed material, taught.
2023	ECS293: Guest lecture.
2022	Lecture: Ocean Data Science Summer School. Participants: 17, developed material, taught.
2022	Lecture: GEOMAR Helmholtz (Germany): “Rossby Wave theory”. Participants: over 30, developed material, taught.

2022	Lecture: University of Washington: “Uses and misuses of machine learning for geoscience”. Undergraduate level. Participants: 20, developed material, taught.
2020	Lecture: GFDL Holling, CIMES and Lapenta interns, undergraduate level: “Machine learning for the geosciences” <i>Class size 6, developed material, taught.</i>
2019	Lecture: Harvard University: “Machine Learning in Geoscience”, graduate. <i>Class size 10, developed material, taught</i>
2019	Lecture: Harvard University: “The good, the bad and the ugly of applied unsupervised learning”, graduate and undergraduate. <i>class size 60, developed material, taught.</i>
2013	Teaching Assistant: National Oceanography Centre (UK). “Physical Oceanography II & II”, undergraduate. Participants: 50.
2012	Teaching Assistant: National Oceanography Centre (UK). “MSc Fieldwork Boat Week”. Participants: set by ship capacity.

Tutorials and workshops

2021	Tutorial/workshop: Society for Industrial and Applied Mathematics (SIAM): Conference on Mathematical and Computational Issues in the Geosciences. Milan, Italy, graduate and undergraduate. Participants 60, developed material, taught.
2021	Tutorial: NOAA-GFDL: General. Participants: over 20, developed material, taught.
2019	Tutorial/workshop: (3 day), Princeton University & GFDL workshop at graduate level: “Machine learning and climate modeling”, graduate. <i>Class size 20-30, developed material, taught</i>
2018	Tutorial, AGU: “Vector Calculus in ECCO”, general. Over 100, developed material.
2014	Tutorial: SCCS, “Finite differences methods”, graduate. <i>Class size over 40, developed material, taught.</i>
2014	Tutorial: SCCS “Importance of model validation”, graduate. <i>Class size over 40, developed material, taught.</i>

Service

Invited talks

2024	UC Davis CoE Dean’s Executive Committee: “Building a resilient future under climate change”.
2024	UC Davis - Sandia National Lab Research Partnership Symposium on Climate Security: “Computational Climate and Ocean Group”.

Invited panels

2024	AMS Washington Forum on “The Weather/Climate Data Needed for Reliable AI”
2024	California Ocean Science Trust symposium on Fishery Disasters under Climate Change
2022	US CLIVAR Physical Oceanography review panel
2021	Incorporating Data Science and Open Science in Aquatic Research Summit with over 600 participants.
2020	AGU Fall Meeting on “Challenges and opportunities of applying AI, ML and DL to problems in the environmental and geosciences” with over 1200 participants.
2020	NOAA Workshop on “Leveraging AI in the Environmental Sciences” with over 60 participants.

Reviewing

Reviewing	Nature, Journal of Advances in Modeling Earth Systems, Geophysical Research Letters, Ocean Modelling, Journal of Geophysical Research, Journal of Physical Oceanography, Data Science and others.
2022	Times Higher Education: Reputation Survey for International Academics.
2018	Planning workshop: NSF US Software Sustainability Institute , which now improves the recognition , development, and use, of software for a more sustainable research enterprise. More information.
2017	NASA review panel Reviewer:6.

Conference, workshop, and seminar organization

2024	Organizer for UC Davis CAMPOS research colloquia
2024	Convener for “Interpretable Machine Learning for Marine Sciences” at AGU
2024	Program committee Platform for Advanced Scientific Computing (PASC)
2024	Convener for “New Knowledge Through Machine Learning Guided Exploration of Large-Scale Data Sets in Physical Oceanography” at OSM
2023	Convener for “Interpretable Machine Learning for Marine Sciences” at AGU
2023	Program committee for the 12th International Conf. on Climate Informatics
2023	Convener for Machine learning for Earth System modeling at European Geosciences Union (EGU)

2022	Convener for “Interpretable Machine Learning for Marine Sciences” at AGU
2022	Convener for “Machine learning for Earth system modelling” at EGU
2021	Program committee for Climate Change AI’s workshop “Tackling Climate Change with Machine Learning” at NeurIPS
2021	Convener for “Machine learning for Earth system modelling” at EGU
2021	Organizer and host for GFDL seminar series.
2020	Head convener for “Exploration in observed and model oceanographic data using interpretable ML”, oral and poster, at AGU
2020	Convener for “Machine Learning for Weather and Climate Modeling”, oral and poster, at AGU
2020	Session chair for “Exploiting Space- and Ground-Based Observations and Enhancing Earth System Prediction” at the 2nd NOAA Workshop on Leveraging AI in Environmental Sciences
2020	Co-convener for “Machine learning for Earth System modelling”, oral and poster, at EGU
2019	Co-convener for a breakout session, “Open Source Software Revolution” at OceanObs’19
2019	Head convener for “Innovation and Exploration of Observations and Earth System Models Using Machine Learning and Big Data Analysis”, oral and poster, AGU
2016	Organizer for “MIT Sack Lunch” seminar

Selected diversity, equity and inclusion activities

2024	Interaction: TechxNova, a 501(c)(3) non-profit organization focused on empowering youth in Space and Computer Sciences and advocating to bridge social gaps in STEM
2024	Interaction: “Bytes & Bites” event hosted by UC Davis’s Girls Who Code.
2024	Media feature: UC Davis international women’s day.
2023	Advising: Hollings NOAA internship at the time targeted at underserved minorities.
2021-2023	POD member:, Unlearning racism in Geoscience (URGE). Program to develop anti-racist policies and strategies at Princeton University.
2022	Talk: International Women’s Day NextGEOSS/GEO EDI.
2021	Advising: CIMES internship targeted at underserved minorities.
2020	<i>Taught “Climate change 101”, Virtual “Summer Climate Camp” by black led SynergyEd.</i> Class size 10, ages 11-13 years.

2020	Motivational speaker: Bronx Community College , NYC, USA. Effort by the Bronx Community College STEM Advisory Board to encourage students to consider STEM careers.
------	--

Selected recent public engagement and outreach

2024	Guardian interview: Interviewed for article “Atmospheric river storms are getting stronger, and deadlier”.
2024	UCDavis Engineering Progress Magazine: Front page article.
2024	UCDavis CoE feature: Climate change and AI.
2023	Podcast interview: AGU “Third pod from the sun” and “Carry the two” collaboration titled ‘Solving for climate: Coasts in the machine’.
2019	<i>Nautical day at the MIT museum:</i> MIT Museum , USA.
2016	<i>Copezilla team:</i> Red Bull Flugtag , (video: min 13), Boston, USA. MIT outreach activity , 3600 views.