TILL J.W. WAGNER

Curriculum Vitae

Atmospheric and Oceanic Sciences
University of Wisconsin–Madison
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My research focuses on the physical processes governing the Arctic, with an emphasis on ice–ocean interactions and links to global-scale ocean and climate variability. I investigate these processes using theory, numerical modeling, and observations. This work is aimed at building foundational understanding, as well as improving the predictive power and impact of climate and ice sheet models.

Education and Appointments

2026 -	**Associate Professor** (effective 17 August 2026), Department of Atmospheric and Oceanic Sciences, *University of Wisconsin–Madison*
2021 - 2026	**Assistant Professor,** Department of Atmospheric and Oceanic Sciences *University of Wisconsin–Madison*
2018 - 2021	**Assistant Professor,** Department of Physics and Physical Oceanography *University of North Carolina Wilmington*
2013 - 2017	**Postdoctoral Scholar,** Scripps Institution of Oceanography, *University of California San Diego* Advisors: Ian Eisenman (2013-2017), Fiamma Straneo (2017)
2009 - 2013	**Doctor of Philosophy (Ph.D.) in Mathematics** *University of Cambridge, UK* Advisors: Dominic Vella, Peter Wadhams
2008 - 2009	**Master of Advanced Studies (MASt) in Mathematics (Part III)** *University of Cambridge, UK*
2004 - 2008	**Master of Science (M.Sci.) in Physics & Philosophy,** *University of Bristol, UK*

Awards and Honors:

2024 – 2029	NSF CAREER Award
2025	Excellence in Teaching Award, *UW-AOS Department Graduate Student Association*
2025	Invited Participant, *Kavli Institute for Theoretical Physics - Polar25*
2017	Postdoctoral Fellowship, *Frontiers of Innovation Scholars Program UC San Diego*
2012	KAUST Visiting Student Fellowship, *University of Oxford*
2012	Research Fellowship, *Cambridge Philosophical Society*
2011	Smith-Knight Essay Prize in Mathematics, *University of Cambridge*
2009 – 2012	*UK Engineering and Physical Sciences Research Council Doctoral Training Award*
2008	*Cambridge European Trust Scholarship*

Funding (selected)

2024 - 2029	**NSF Polar - Antarctic Ocean and Atmospheric Science** ($784,598) *"CAREER: Constraining iceberg size distributions and their climate impacts in models"* Role: PI
2024 - 2027	**NSF Physical Oceanography** ($399,211) *"Collaborative Research: Prospects and limitations of predicting a potential collapse of the Atlantic meridional overturning circulation"* Role: PI (Co-PI E Maroon; Collaboration with D McNamara, UNC Wilmington; $683,657 total)
2026	**UW Madison - Reimagining Next Phase Research** ($99,956) Role: PI
2022 - 2026	**NSF Polar - Antarctic Ocean and Atmospheric Science** ($622,183) *"Wave Erosion at Ice Cliffs"* Role: PI (Co-PIs L Zoet, UW Geosciences; N Pujara, UW Engineering)
2023 - 2025	**UW Madison - Research Forward 3** ($476,632) *"A Fresh Look at Lake Biophysics: Wave-Driven Processes Across Scales and Seasons"* Role: Co-PI (PI: N Pujara; shared between 7 faculty at UW Madison)
2023 -2024	**UW Madison - WARF Fall Research Competition** ($51,312) *"Dynamics of a wind-ice-ocean feedback in the Arctic Ocean"* Role: PI
2018 - 2021	**NSF Polar - Antarctic Ocean and Atmospheric Science** ($289,502) *"Collaborative Research: Modeling Giant Icebergs and Their Decay"* Role: PI (Collaboration with A Adcroft, Princeton University; $578,170 total)
2017 - 2021	**NSF Polar - Antarctic Ocean and Atmospheric Science** ($399,570) *"The influence of sea ice motion on Antarctic sea ice expansion"* Role: Co-PI (PI: Eisenman)
2019	**Greenpeace International,** 3 weeks exclusive ship time on MY Arctic Sunrise *"Life on the edge: the marginal sea ice zone and the changing Arctic ecosystem"* Role: PI

Publications (* denotes member of my group/ where I am primary advisor)

[41] Wave erosion of ice cliffs: melt rate due to reflection of non-breaking surface waves,
A. Wolterman, **T.J.W. Wagner**, L.K. Zoet, and N. Pujara, (submitted to *Journal of Fluid Mechanics*)

[40] Effects of feedback between ice shelf geometry and basal melt on plume parameterizations,
N.B. Sartore*, M. Haseloff, and **T.J.W. Wagner**, (submitted to *Journal of Glaciology*)

[39] Light attenuation due to preferential orientation of particles in waves and shear flow: from bacteria to algae and microplastics,
S.T. Salemink-Harry, B.J. Smith*, H.A. Dugan, J.A. Franck, **T.J.W. Wagner**, G.M. Wilkinson, L.K. Zoet, N. Pujara, *Limnology and Oceanography*, 10.1002/lno.70227 (2025)

[38] How Ice Composition Controls Radiatively Driven Convection under Lake Ice,
B.J. Smith*, **T.J.W. Wagner,** H.A. Dugan, N. Pujara, G.M. Wilkinson, L.K. Zoet, and J.A. Franck
Geophysical Research Letters, 2025GL117454 (2025)

[37] Calving from horizontal forces in a revised crevasse-depth framework
D.A. Slater and **T.J.W. Wagner**, *The Cryosphere*, 19, 2475–2493 (2025)

[36] The role of surface water waves on driving cyanobacterial blooms in lakes
C.A.C. Gushulak, T.H. Bertram, … **T.J.W. Wagner**, L.K. Zoet, G.M. Wilkinson, *Limnology and Oceanography Letters*, 10.1002/lol2.70044 (2025)

[35] A frontal ablation dataset for 49 tidewater glaciers in Greenland
D. Fahrner, D. Slater, A. KC, C. Cenedese, D.A. Sutherland, E. Enderlin, F. de Jong, K.K. Kjeldsen, M. Wood, P. Nienow, S. Nowicki, **T.J.W. Wagner**, *Scientific Data, 12, 601* (2025)

[34] Slowed response of Atlantic meridional overturning circulation not a robust signal of collapse
C.C. Zimmerman*, **T.J.W. Wagner**, E.A. Maroon, D.E. McNamara, *Geophys Res Lett,* 52, e2024GL112415 (2025)

[33] Calving of Ross Ice Shelf from wave erosion and hydrostatic stresses
N.B. Sartore*, **T.J.W. Wagner**, M.R. Siegfried, N. Pujara, and L.K. Zoet, *The Cryosphere,* 19, 249–265 (2025)

[32] A model of near-sea ice phytoplankton blooms
C. Lester*, **T.J.W. Wagner**, D.E. McNamara, *Limnology and Oceanography Letters,* 10.1002/lol2.10449 (2024)

[31] Evaluating the importance of footloose-type failure in ice island deterioration modeling
A.J. Crawford, G. Crocker, J. Smith, D. Mueller, **T.J.W. Wagner**, *Cold Reg Sci & Tech,* 104325 (2024)

[30] Increased sea ice melt as a driver of enhanced Arctic phytoplankton blooming
A. Castagno*, **T.J.W. Wagner**, and 6 others, *Global Change Biology,* 29, 5087–5098 (2023)

[29] Asymmetry in the seasonal cycle of zonal-mean surface air temperature
L. Roach, I. Eisenman, **T.J.W. Wagner**, A. Donohoe, *Geophysical Research Letters,* 50, e2023GL103403 (2023)

[28] A possible hysteresis in the Arctic Ocean due to release of ocean heat during sea ice retreat
E. Beer, I. Eisenman, **T.J.W. Wagner**, E.C. Fine, *J Phys Oceanogr,* 53, 1323–1335 (2023)

[27] Spurious climate impacts in sea ice loss simulations
M.R. England*, I. Eisenman, **T.J.W. Wagner**, *Journal of Climate,* 35, 7401–7411 (2022)

[26] Asymmetry in the seasonal cycle of Antarctic sea ice due to insolation
L. Roach, I. Eisenman, **T.J.W. Wagner**, E. Blanchard, C. Bitz, *Nature Geoscience,* 15 (4) 277-281 (2022)

[25] How winds and currents determine the drift of floating objects
T.J.W. Wagner, I. Eisenman, A. Ceroli*, Navid Constantinou, *J Phys Oceanogr,* 52 (5) 907-916 (2022)

[24] How sea ice drift influences sea ice area and volume
T.J.W. Wagner, I. Eisenman, and H.C. Mason*, *Geophysical Research Letters*, e2021GL093069 (2021)

[23] The recent emergence of Arctic Amplification
M. R. England*, I. Eisenman, N. Lutsko, **T.J.W. Wagner**, *Geophysical Research Letters*, e2021GL094086 (2021)

[22] The Influence of Meltwater on Phytoplankton Blooms Near the Sea-Ice Edge
C.W. Lester*, **T.J.W. Wagner**, D.E. McNamara, M.R. Cape, *Geophysical Research Letters*, e2020GL091758 (2021)

[21] Modeling the breakup of tabular icebergs
M. R. England*, **T.J.W. Wagner**, I. Eisenman, *Science Advances,* 6 (51) eabd1273 (2020)

[20] Polar amplification due to enhanced heat flux across the halocline
E. Beer, I. Eisenman, **T.J.W. Wagner**, *Geophysical Research Letters,* 47, e2019GL086706 (2020)

[19] Viscous and elastic buoyancy stresses as drivers of ice-shelf calving
C. Mosbeux, **T.J.W. Wagner**, M. K. Becker, H. A. Fricker, *Journal of Glaciology,* 66.258, 643-657 (2020)

[18] Large spatial variations in the flux balance along the front of a Greenland tidewater glacier
T.J.W. Wagner, F. Straneo, […], H. Singh, *The Cryosphere,* 13, 911–925 (2019)

[17] Patterns of change in Antarctic sea ice extent from seasonal to longer timescales
C. Eayrs, D. Holland, D. Francis, **T.J.W. Wagner**, R. Kumar, X. Li, *Reviews of Geophysics,* 57, 631 (2019)

[16] Localized Plumes Drive Front-Wide Ocean Melting of A Greenlandic Tidewater Glacier
D. A. Slater, F. Straneo, S. B. Das, C. B. Richards, **T.J.W. Wagner**, P.W. Nienow, *GRL,* 45, 12350–12358 (2018)

[15] The influence of layering and barometric pumping on firn air transport in a 2-D model
Benjamin Birner, Christo Buizert, **T.J.W. Wagner**, J.P. Severinghaus, *The Cryosphere*, 12, 2021-2037 (2018)

[14] Wave inhibition by sea ice enables trans-Atlantic ice rafting of debris during Heinrich Events
T.J.W. Wagner, R.W. Dell, I. Eisenman, R.F. Keeling, L. Padman, J.P. Severinghaus, *EPSL,* 495, 157–163 (2018)

[13] On the Representation of Capsizing in Iceberg Models
T.J.W. Wagner, A.A. Stern, R.W. Dell, I. Eisenman, *Ocean Modelling,* 117, 88-96 (2017)

[12] An Analytical Model of Iceberg Drift
T.J.W. Wagner, R.W. Dell, I. Eisenman, *Journal of Physical Oceanography*, 47, 1605–1616 (2017)

[11] How Model Biases Skew the Distribution of Iceberg Meltwater
T.J.W. Wagner and I. Eisenman, *Geophysical Research Letters,* 44, 3691–3699 (2017)

[10] Journey of an Arctic Ice Island
A. Crawford, P. Wadhams, **T.J.W. Wagner**, […] K.W. Nicholls, *Oceanography*, 29, (2) 254-263 (2016)

[9] On the Role of Buoyant Flexure in Glacier Calving
T.J.W. Wagner, T.D. James, T. Murray, D. Vella, *Geophysical Research Letters,* 43, 1, 232-240 (2016)

[8] False Alarms: How Early Warning Signals Falsely Predict Abrupt Sea Ice Loss
T.J.W. Wagner and I. Eisenman, *Geophysical Research Letters,* 42, (23) 10333 (2015)

[7] Wind-Driven Upwelling around Grounded Tabular Icebergs
A.A. Stern, E. Johnson, D.M. Holland, **T.J.W. Wagner,** […] J.-E. Tremblay, *JGR-Oceans,* 120(8), 5820-5835 (2015)

[6] How Climate Model Complexity Influences Sea Ice Stability
T.J.W. Wagner and I. Eisenman, *Journal of Climate,* 28 (10) 3998-4014 (2015)

[5] The 'Footloose' Mechanism: Iceberg Decay from Hydrostatic Stresses
T.J.W. Wagner, […] K.W. Nicholls, *Geophysical Research Letters*, 41 (15) 5522 (2014)

[4] Switch on, Switch off: Stiction in Nanoelectromechanical Switches
T.J.W. Wagner and D. Vella, *Nanotechnology,* 24, 275501 (2013)

[3] The 'Sticky Elastica' – Delamination Blisters Beyond Small Deformations
T.J.W. Wagner and D. Vella, *Soft Matter*, 9, 1025-1030 (2013)

[2] The Sensitvity of Graphene 'Snap-Through' to Substrate Geometry
T.J.W. Wagner and D. Vella, *Applied Physics Letters*, 100, 233111 (2012)

[1] Floating Carpets and the Delamination of Thin Elastic Sheets
T.J.W. Wagner and D. Vella, *Physical Review Letters*, 107, 044301 (2011)

Invited Seminars & Talks (since 2018)

2026 Earth Science Colloquium, **Lamont–Doherty Earth Observatory and Columbia University**
Geoscience Colloquium, Department of Earth and Environmental Science, **University of Pennsylvania**
2025 ClimaTea, Department of Earth and Planetary Science, **Harvard University**
Invited Talk, **Midwest Glaciology Meeting**, Madison, WI
Geography, Earth and Atmospheric Sciences Seminar, **University of Melbourne**
2024 Icy Lunch, **University of Edinburgh**

	Oceanography Seminar, **Texas A&M University**
	Weeks Lecture, Geosciences, **UW–Madison**
2023	Program in Atmospheres, Oceans, & Climate (PAOC) Colloquium, **MIT**
	Ice and Climate Seminar, **Dartmouth College**
	Weston Round Table, Nelson Institute, **University of Wisconsin–Madison**
2022	Earth Day Presenter and Panelist, CPEP, **University of Wisconsin–Madison**
2021	Iceberg Mechanics Session, Invited Presentation, **AGU Fall Meeting**
	Nicholas School of the Environment, **Duke University**
	Climate People and Environment Program (CPEP), **University of Wisconsin–Madison**
2020	Geography 2050 Symposium, **American Geographical Society**
	Department of Physical Oceanography, **Woods Hole Oceanographic Institution**
	Department of Earth Sciences, **University of Oxford**
	Department of Atmospheric and Oceanic Sciences, **University of Wisconsin–Madison**
	Centre for Earth Observation Science Seminar, **University of Manitoba**
2019	Earth and Atmospheric Sciences Seminar, **Georgia Tech**
	Southeastern Section Meeting, **American Physical Society**
	Global Marine Science Summit, **UNC Wilmington**
2018	BiSEPPS Seminar Series, **Harvard University**
	Center for Coastal Physical Oceanography Seminar, **Old Dominion University**
	Applied Mathematics Colloquium, **University of North Carolina Chapel Hill**

Teaching

2026 –	*Survey of Oceanography, AOS/GEOSCI 105,* **UW–Madison**
2023 –	*Physical Oceanography, AOS 660,* **UW–Madison**
2022 –	*Global Warming Science and Impacts, AOS/GEOG 332,* **UW–Madison**
2021 –	*Ice and Climate Dynamics, AOS 801/762,* **UW–Madison**
2020	*Introduction to Climate Physics, PHY 292,* **UNCW**
2018 – 2021	*Fluid Mechanics, PHY 350,* **UNCW**
2018 – 2021	*Elementary College Physics, PHY 101,* **UNCW**
2016 – 2018	Developing course materials and training high school teachers to incorporate *Climate Science* in the **Next Generation Science Standards, State of California**

Advising

Postdocs	Ben Smith (2024 -)
	Mark England (2019-2021, then research fellow at U Exeter)
	Lettie Roach (visiting 2019, then research scientist NASA GISS/Columbia University)
PhD Students	Olivia Doty (2025 -)
	Sidi Liu (2025 -)
	Clark Zimmerman (2022 -)
	Nicolas Sartore (2022 -)
MS Student	Andrew Castagno (2019-2021, then Fulbright Scholar in Iceland)

Undergraduates	Abby Heiser (2024 - present)
	Jeremy Shodell (2023 - present)
	Joe Mahoney (2024)
	Elizabeth Bailey (2019-2021, then PhD student at Yale University)
	Conner Lester (2019-2021, then PhD student at Duke University)
	Hassan Mason (2018-2020, then PhD student at New York University)
	Amanda Ceroli (2018-2020, then Fulbright Scholar in the UK)

Seagoing Polar Expeditions

May 2019	**Fram Strait**, Sea ice–ecosystem interactions during spring blooms (PI)
Jul - Aug 2012	*"Operation Iceberg"*, **West Baffin Bay (West Greenland/Canada),** Iceberg decay processes
Jul 2012	**Fram Strait,** Sea ice deformation in the marginal ice zone
Sept 2011	*"Arctic Climate Impact Tour",* **Fram Strait (East Greenland/Svalbard)**
	Sea ice thickness & morphology in the marginal ice zone
Oct - Dec 2010	**Weddell & Bellingshausen Seas (Western Antarctica)**
	Sea ice & snow conditions in spring in Western Antarctica

Service and Memberships (selected)

Co-Organizer and Instructor: Greenland Ice Sheet Ocean Science Network (GRISO) **Summer School in Nuuk, Greenland**.

2026 Topic: *"A Collaborative Future: Strengthening Science & Connections in Greenland"*

2025 Topic: "From Ice to Impact–Understanding Greenland's Glaciers and Coastal Change"

Working Group Lead *of the NSF-funded* **Greenland Ice Sheet-Oceans Interactions Network** (GRISO) *working group on* "Ocean-Forcing-Ice" *(2021 - 2024)*

Committee Member of *the* **American Meteorological Society Polar Meteorology and Oceanography** *Committee (2016-2019) ;* **UNCW Coastal and Marine Science Council** *(2018 - 2020)*

UW-Madison Representative for the **University-National Oceanographic Laboratory System (UNOLS)**

Primary/Co-Convener *AGU Fall Meeting 2017, 2018, 2022, 2023, 2025*

Co-Convener *EGU General Assembly 2019 and 2020, AGU Fall Meeting 2023, 2025*

Journal Reviewer for *Nature; Nature Climate Change; Nature Communications; Science Advances; Journal of Climate; Journal of Fluid Mechanics; Geophysical Research Letters; The Cryosphere; Global Change Biology; JGR - Atmosphere; JGR - Oceans; JGR - Earth Surface; Journal of Glaciology; Physical D; Nonlinear Processes in Geophysics; Annals of Glaciology; Atmospheric Science Letters; Climate Dynamics; Earth Systems Science Data; npj Climate and Atmospheric Science; Cold Regions Science and Technology; Polar Research; Arctic; Arctic, Antarctic, and Alpine Research; Climate of the Past; Scientific Reports; Ecological Indicators; Frontiers of Marine Science; Progress in Oceanography; Earth System Dynamics*

Proposal Reviewer for *Natural Sciences and Engineering Research Council of Canada;* NSF *Polar Programs;* NSF *Ocean Sciences,* NSF *Mathematical Sciences,* NSF *Office of Integrative Activities, Antarctica New Zealand*

External Reviewer for Ocean Impact Navigator, *World Economic Forum;* IPCC Special Report on the Ocean and Cryosphere in a Changing Climate **Panel Reviewer for** NASA *Earth Science Division*; NSF *Polar Programs;* NSF *Oceanography*

Selected Outreach

Presentations and workshops for non-expert audiences:

2025	St Anna Elementary School, Munich, Germany; Kegonsa Elementary School
2024	Drumlin Reserve Assisted Living, Kegonsa Elementary, FIRST LEGO League Challenge
2023	Centers of Climatic Research & Sustainability and the Global Environment Lighting Talk
2022	Wednesday Night @ The Lab; CIMMS Weather Camp; Kegonsa Elementary (all UW-Madison)
2021	Climate Science Workshop for K-12 teachers, San Diego Unified School District (remote)
2017-2020	Scientific Advisor for California Science Teacher Association
2020	Planet Ocean Evening Seminar, Center for Marine Science, UNCW
2019	Osher Lifelong Learning Institute, Wilmington, NC; Marine Quest UNCW
2018	STEAM Team Summer Camp, UNCW; Summer Ventures in Science & Mathematics, UNCW
2014 - 2017	BE WiSE (Better Education for Women in Science & Engineering) Birch Aquarium, UCSD
2016	Ostercamp #1 Future Factory, Kammerspiele Theatre Munich, Germany

Advising **Henry Vilas Zoo** on re-envisaged "Arctic Passage" exhibit (with two new polar bears) in 2026

Youtube Channel with instructional animated videos (8-10 mins): "Intro to Climate Physics" and "Intro to Fluid Mechanics" ~100 videos total (>30,000 views)

Advised the **Washington Post's Visual Forensics Team** on reconstructing the drift of the migrant vessel Andriana prior to its capsizing in June 2023

Media interviews with news outlets covering studies and field work (incl. *CNN, BBC Science, TIME Magazine, The Sun, The Guardian, National Geographic, NPR, ARTE, Discovery News, Bloomberg, PRX The World, Vox*)

Communication workshop on Climate Change "*Revealing the New Arctic",* invited speaker, AGU, SF, 2015

Exhibition of frozen scaled sea ice floe replica at Architectural Association, London (collaboration with *ScanLAB Projects*, 2013)