

# TILL J.W. WAGNER

## Curriculum Vitae

Physics and Physical Oceanography  
University of North Carolina at Wilmington  
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### Research Interests:

high-latitude climate physics; in particular ice–ocean–atmosphere interactions; glacier, iceberg, and sea ice mechanics; ice–ecosystem interactions; nonlinear dynamics

### Research Methods:

formulation and analysis of mathematical models of physical processes using analytical and numerical methods; polar field experiments and analysis of observational in situ and remote sensing data; desktop laboratory experiments

### Preparation and Appointments

|             |                                                                                                                                                                                       |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2018 -      | <b>Assistant Professor</b><br>Department of Physics and Physical Oceanography,<br><i>University of North Carolina Wilmington</i>                                                      |
| 2013 - 2017 | <b>Postdoctoral Scholar</b><br>Scripps Institution of Oceanography, <i>University of California San Diego</i><br>Advisor: Ian Eisenman (2013-2017), Co-advisor: Fiamma Straneo (2017) |
| 2009 - 2013 | <b>Doctor of Philosophy (Ph.D.) in Mathematics</b><br><i>University of Cambridge and British Antarctic Survey</i><br>Advisors: Dominic Vella, Ted Maksym, Peter Wadhams               |
| 2008 - 2009 | <b>Master of Advanced Studies (MASt) in Mathematics (Part III)</b><br><i>University of Cambridge, UK</i>                                                                              |
| 2004 - 2008 | <b>Master of Science (M.Sci.) in Physics &amp; Philosophy</b><br><i>University of Bristol, UK</i>                                                                                     |

### External Funding and Fellowships

|             |                                                                                                                                                                                                                                                     |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2018 - 2020 | <b>NSF Polar - Antarctic Ocean and Atmospheric Science Grant</b> (\$289,502)<br><i>"Collaborative Research: Modeling Giant Icebergs and Their Decay"</i><br>Role: PI<br>Collaboration with Alistair Adcroft, Princeton University (\$578,170 total) |
| 2017 - 2020 | <b>NSF Polar - Antarctic Ocean and Atmospheric Science Grant</b> (\$399,570)<br><i>"The influence of sea ice motion on Antarctic sea ice expansion"</i><br>Role: Co-PI (PI: Eisenman)                                                               |
| 2019        | <b>Greenpeace International</b> , 3 weeks exclusive ship time on MY Arctic Sunrise<br><i>"Life on the edge: the marginal sea ice zone and the changing Arctic ecosystem"</i><br>Role: PI                                                            |

## External Funding and Fellowships (continued)

|             |                                                                                                                   |
|-------------|-------------------------------------------------------------------------------------------------------------------|
| 2016 - 2017 | <b>Frontiers of Innovation Scholars Program (FISP)</b> (\$25,000)<br>Project Fellowship for Postdoctoral Scholars |
| 2012        | <b>Cambridge Philosophical Society</b><br>Research Fellowship                                                     |
| 2012        | <b>Mathematical Institute, University of Oxford</b><br>KAUST Visiting Student Fellowship                          |
| 2011        | <b>Woods Hole Oceanographic Institution</b><br>Guest Program Fellowship                                           |
|             | <b>NASA, Goddard Space Flight Centre, Cryospheric Science Branch</b><br>Visiting Student                          |
| 2008 - 2009 | <b>Cambridge European Trust, University of Cambridge</b><br>Scholar of the Cambridge European Trust               |

## Publications

[20] Polar amplification due to enhanced heat flux across the halocline

E. Beer, I. Eisenman, **T. J. W. Wagner** (*submitted*)

[19] Viscous and elastic buoyancy stresses as drivers of ice-shelf calving

C. Mosbeux, **T. J. W. Wagner**, M. K. Becker, H. A. Fricker (*submitted*)

[18] Large spatial variations in the flux balance along the front of a Greenland tidewater glacier

**T. J. W. Wagner**, F. Straneo, C. G. Richards, D. A. Slater, L. A. Stevens, S. B. Das, 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, *Geophysical Research Letters*, 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, *Earth & Planetary Science Letters*, 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)

## Publications (continued)

**[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**, A.A. Stern, E.P. Abrahamsen, I. Church, R. Bates, 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**, P. Wadhams, R. Bates, E.P. Abrahamsen, K.W. Nicholls, A. Crawford, J. Gagnon, J.-E. Tremblay, *Journal of Geophysical Research - Oceans*, 10.1002/2015JC010805 (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**, P. Wadhams, R. Bates, P. Elosegui, A. Stern, D. Vella, E.P. Abrahamsen, A. Crawford, 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 Sensitivity 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

- 2019 Earth and Atmospheric Sciences Seminar, **Georgia Institute of Technology**  
Southeastern Section Meeting, **American Physical Society**, Wrightsville Beach, NC  
Global Marine Science Summit, **University of North Carolina 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**
- 2017 5th Postdoctoral Research Symposium, **UCSD** (Award for Best Presentation)  
Frontiers of Innovation Scholars Program (FISP) Symposium, **UCSD**

## Invited Seminars & Talks (continued)

- 2017 Sack Lunch Seminar, EAPS, **Massachusetts Institute of Technology**  
Physics & Physical Oceanography Seminar, **University of North Carolina Wilmington**
- 2016 Physical Geography Seminar, **University of Bristol**  
REAL 2016, Autodesk Conference, San Francisco
- 2015 Lunchtime Seminar, GFDL, **Princeton University**  
Seminar, **Max Planck Institute for Meteorology**, Hamburg, Germany
- 2014 Climate, Atmospheric Science and Physical Oceanography Seminar, **UCSD**
- 2013 Ocean & Climate Physics Seminar, LDEO, **Columbia University**  
Theory Seminar, Scripps Institution of Oceanography (SIO), **UCSD**
- 2012 Seminar, **IRPHE**, Marseille, France  
Lunchtime Seminar Series, DAMTP, **University of Cambridge**, UK

## Selected Contributed Presentations

- 2020 AGU Ocean Sciences Meeting, San Diego, CA
- 2019 AGU Fall Meeting, Washington D.C.  
AMS Polar Meteorology and Oceanography Meeting, Boulder, CO
- 2018 AGU Fall Meeting, Washington D.C.  
IGS Symposium, Buffalo, NY
- 2017 AGU Fall Meeting, New Orleans, LA  
AMS Annual Meeting, Seattle, WA
- 2016 Polar Seminar, SIO, UCSD  
International Glaciology Society (IGS) Symposium, San Diego, CA  
EGU General Assembly, Vienna, Austria
- 2015 AGU Fall Meeting, San Francisco, CA  
Polar Seminar, SIO, UCSD, CA  
SIAM Conference on Dynamical Systems, Snowbird, UT  
EGU General Assembly, Vienna, Austria  
CMOS-AMS Joint Conference, Whistler, BC
- 2014 American Geophysical Union (AGU) Fall Meeting, San Francisco, CA  
Latsis Symposium on Climate Dynamics, ETH Zurich, Switzerland  
Polar Seminar, SIO, UCSD, CA
- 2013 CASPO Seminar, SIO, UCSD, CA
- 2012 Seminar, Isaac Newton Institute, University of Cambridge, UK  
American Physical Society (APS) March Meeting, Boston, MA
- 2011 15<sup>th</sup> Biannual Cambridge/Oxford Mathematics Meeting "Wooly Owl", Oxford, UK  
2<sup>nd</sup> Year Ph.D. Student Talks, DAMTP, University of Cambridge, UK (Award for Best Presentation)

## Teaching

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|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2018 – present | <i>Fluid Mechanics, PHY 350</i> (Lectures) Department of Physics & Physical Oceanography, <b>UNCW</b>                                                                    |
| 2018 – present | <i>Elementary College Physics, PHY 101</i> (Lectures and Laboratory classes) Department of Physics & Physical Oceanography, <b>UNCW</b>                                  |
| 2016 – 2018    | Developing course materials and training high school teachers to incorporate <i>Climate Science</i> in the <b>Next Generation Science Standards, State of California</b> |
| 2014 – 2017    | Organizing and leading the weekly <i>Climate Journal Club Seminar Series</i> , Scripps Institution of Oceanography, <b>USCD</b>                                          |
| 2014           | Guest lecturer, graduate course " <i>Numerical Modeling of the Climate System</i> ", Scripps Institution of Oceanography, <b>USCD</b>                                    |
| 2012 - 2013    | Small group instructor, " <i>Mathematics for Natural Sciences</i> ", <b>University of Cambridge</b> , Natural Sciences Tripos                                            |

## Advising

|                |                                                                                  |
|----------------|----------------------------------------------------------------------------------|
| 2019 - present | Mark England (Postdoc)                                                           |
| 2019 - present | Andrew Castagno (Master of Marine Science)                                       |
| 2019 - present | Elizabeth Bailey, Conner Lester, Hassan Mason (all physics undergraduate majors) |
| 2018 - 2019    | Amanda Ceroli (physics undergraduate major, now Fulbright Fellow at NOC, UK)     |

## Seagoing Polar Expeditions

|                |                                                                                                                                       |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------|
| May 2019       | <i>"Life on the Ice Edge", Fram Strait</i><br>Topic: Sea ice–ecosystem interactions during spring blooms in Fram Strait (PI)          |
| Jul - Aug 2012 | <i>"Operation Iceberg", West Baffin Bay (West Greenland/Canada)</i><br>Iceberg decay processes                                        |
| Jul 2012       | <i>"Waves in Ice", Fram Strait</i><br>Sea ice deformation in the marginal ice zone                                                    |
| Sept 2011      | <i>"Arctic Climate Impact Tour", Fram Strait (East Greenland/Svalbard)</i><br>Sea ice thickness & morphology in the marginal ice zone |
| Oct - Dec 2010 | <i>"ICEBELL", Weddell &amp; Bellingshausen Seas (Western Antarctica)</i><br>Sea ice & snow conditions in spring in Western Antarctica |

## Service and Memberships

**Committee Member of** the American Meteorological Society Polar Meteorology and Oceanography Committee, UNCW Coastal and Marine Science Council, UNCW Marine Science Graduate Advisory Committee, UNCW Physics and Physical Oceanography Policies and Procedures Committee

**Primary Convener of** "Birth, Life, and Death of Icebergs" at AGU Fall Meeting 2017, "Glacier Front Dynamics and the Fate of Icebergs" at AGU Fall Meeting 2018; **Co-Convener of** "Polar meteorology and climatology" at EGU General Assembly 2019 and 2020

## Service and Memberships (continued)

**Reviewer for** *Nature Climate Change, Journal of Climate, Geophysical Research Letters, The Cryosphere, Journal of Geophysical Research - Atmosphere, Journal of Geophysical Research - Oceans, Journal of Glaciology, Arctic, npj Climate and Atmospheric Science, Polar Research, NSF Polar - Antarctic Oceans & Atmospheric Science, NSF Polar - Arctic Natural Sciences, NSF- Ocean Sciences Proposals, IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*

**Panel Reviewer for** NASA Cryospheric Science, Earth Science Division

**Member of** *the American Geophysical Union, European Geophysical Union, American Meteorological Society, Society Industrial and Applied Mathematics*

## Selected Outreach

**Presentations and workshops** for non-expert audiences:

|             |                                                                                                                                          |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 2020        | Planet Ocean Evening Seminar, Center for Marine Science, UNCW                                                                            |
| 2019        | Osher Lifelong Learning Institute, Wilmington, NC<br>Marine Quest (High School Summer Camp), UNCW                                        |
| 2018        | STEAM Team Summer Camp (Middle School Summer Camp), UNCW<br>Summer Ventures in Science & Mathematics (Middle School), UNCW               |
| 2014 - 2017 | BE WiSE (Better Education for Women in Science & Engineering) Birch Aquarium, UCSD                                                       |
| 2016        | Ostercamp #1 Future Factory, Kammerspiele Theatre Munich, Germany<br>S.E.A. Days: Polar Express Featured Scientist, Birch Aquarium, UCSD |
| 2012        | Society for the Preservation of Wild Culture, London                                                                                     |

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

**Development of K-12 Curriculum** for California Next Generation Science Standards as science advisor to *Math-Science Partnership, California Science Teachers Association* (2016 - 2018)

**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)