



✉ STEPHEN MATTHEW GRIFFIES (HE/HIM/HIS) *

PRINCETON UNIVERSITY PROGRAM IN ATMOSPHERIC AND OCEANIC SCIENCES
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[RESEARCH AND TEACHING](#)

[ORCID](#)

[GOOGLE SCHOLAR](#)

[WEB OF SCIENCE](#)

RESEARCH STATEMENT

I pursue research questions related to geophysical fluid mechanics and the role of the physical ocean in the earth system. In pursuit of this research, I make use of theoretical concepts, idealized process physics models, realistic numerical circulation models, and field measurements. Particular research topics include studies of Atlantic and Southern Ocean circulation dynamics; global and regional sea level; transport of matter and energy by mesoscale and submesoscale eddies; subgrid scale parameterizations of turbulent ocean stirring and mixing; analysis methods aimed at conceptually understanding ocean circulation and transport; physical and mathematical foundations of ocean circulation models; fundamental concepts and methods of geophysical fluid mechanics.

EDUCATION STATEMENT

As a teacher, mentor, author, and journal editor, I aim to foster an understanding of physical concepts and their creative and rigorous use in describing observed and simulated ocean and climate phenomena. I am particularly interested in revealing how concepts and methods from mathematical physics can be leveraged to deepen understanding of earth system mechanics, and for fostering an appreciation of geophysical fluid mechanics within the broader context of theoretical mechanics, thermodynamics, and mathematical physics. Teaching and mentoring are central to all of my work, and I strive to generate curiosity and passion in students while fostering an honest and non-judgmental scientific pursuit of how nature works.

COLLABORATION STATEMENT

I nurture collaborations with scientists at all career stages who are passionate about furthering a rigorous understanding of earth system mechanics.

BROADER INTERESTS AND ACTIVITIES

meditation, yoga, walking, writing, sustainability, cultures, surfing, skiing

EDUCATION

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|-----------|---|---------------------------------|
| 1995-1996 | Postdoctoral fellow in physical oceanography (mentor: Kirk Bryan) | Princeton University |
| 1993-1995 | NOAA Climate and Global Change Fellow (mentor: Kirk Bryan) | Princeton University |
| 1988-1993 | PhD in theoretical physics (advisor: Mirjam Cvetič) | University of Pennsylvania |
| 1987-1988 | pre-PhD studies in physics | University of Washington |
| 1986-1987 | Masters in engineering sciences & applied mathematics | Northwestern University |
| 1981-1986 | Bachelor of science in chemical engineering | Louisiana State University |
| 1978-1981 | High school (grades 10-12) | Biloxi High School, Mississippi |

SPECIAL TOPIC SCHOOLS

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| Jan 1998 | NATO Advanced Study Institute: OCEAN MODELING AND PARAMETERIZATION | Les Houches, France |
| Jan 1996 | NATO Advanced Study Institute: CLIMATE VARIABILITY AND PREDICTABILITY | Les Houches, France |
| Jul 1994 | Meeting of UCAR Global and Climate Change Fellows | Steamboat Springs, Colorado, USA |
| Jul 1992 | Theoretical Advanced Study Institute: FROM STRING THEORY TO BLACK HOLES | Boulder, Colorado, USA |
| Jul 1991 | High Energy Physics and Cosmology School, Center for Theoretical Physics | Trieste, Italy |
| Jun 1991 | Theoretical Physics Summer School: PARTICLE PHYSICS IN THE 1990's | Les Houches, France |

EMPLOYMENT AND APPOINTMENTS

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| 2024–2025 | Chair of the Visiting Scientist Committee for the Cooperative Institute for Modeling the Earth System |
| 2024–2025 | Director of Graduate Studies for Princeton University's Atmospheric and Oceanic Sciences Program |
| 2022–2024 | Graduate Work Committee for Princeton University's Atmospheric and Oceanic Sciences Program |
| 2020–2024 | Team lead for the GFDL Ocean/Cryosphere Division's high resolution climate model project CM4X |
| 2015–present | Lecturer in Princeton University's Atmospheric and Oceanic Sciences Program |
| 2013–2017 | Member, GFDL Model Development Team Steering Committee |
| Jun-Aug 2012 | Visiting Scientist, National Center for Atmospheric Research, Boulder, USA |
| Jan-Jun 2011 | Distinguished Visiting Scientist Fellow, CSIRO Marine and Atmospheric Research, Hobart, Australia |
| Mar 2009 | Visiting Professor, Universite catholique de Louvain, Belgium |
| Jan-Nov 2005 | Visiting Scientist, CSIRO Marine and Atmospheric Research, Hobart, Australia |
| 2001–2005 | Leader of the GFDL Oceans and Climate Group |
| 2000–2011 | Co-lead of the GFDL Ocean Model and Climate Model Development Teams |
| 1996–2025 | Staff Physical Scientist, NOAA/GFDL (senior scientist 2011–2025, retired 1 May 2025) |
| 1995–1996 | Visiting Scientist, GFDL and Princeton University |
| 1993–1995 | NOAA Climate & Global Change Postdoc Fellow at Princeton University |
| 1988–1993 | Physics Graduate Research Fellow, University of Pennsylvania Physics Department |
| 1986–1987 | Engineering Sciences and Applied Mathematics Fellow, Northwestern University |
| 1984–1986 | Chemical Engineering Research Laboratory Technician, Louisiana State University |

AWARDS AND HONORS

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| 2022 | NOAA Administrator's Award (with 26 others) "For advancing the understanding of the Earth System by developing and applying NOAA's state-of-the-art Coupled Carbon-Chemistry-Climate model" |
| 2021 | Reuters Hot List of Climate Scientists (#585) |
| 2019 | Department of Commerce Silver Medal Award (with Robert Hallberg and Matthew Harrison): "For developing the state-of-the-art Modular Ocean Model version 6 (MOM6) to strengthen the Nation's longer-range environmental prediction capabilities." |
| 2019 | Sigma Xi scientific honor society |
| various | Web of Sciences (Clarivate) Highly Cited Researcher (2018, 2020, 2021, 2022, 2023, 2024) |
| 2017 | Elected Fellow of the American Geophysical Union "For exceptional and sustained contributions to the understanding of large-scale ocean circulation and physics and seminal advances in ocean modeling" |
| 2017 | NOAA Administrator's Award (with Robert Hallberg) "For scientific leadership for the innovation of the versatile community-based Modular Ocean Model MOM6" |
| 2014 | European Geosciences Union Fridtjof Nansen Medal for Oceanographic Research "For outstanding contribution and leadership in ocean general circulation model development and critical insights in the physical nature and parameterization of ocean processes" |
| 2013 | Department of Commerce Silver Medal Award (with nine other GFDL staff scientists): "For development and application of NOAA's first comprehensive Earth System Model that couples the carbon cycle and climate for projection of changes" |
| 2012 | NOAA Administrator's Award "For scientific vision, leadership and development of the Modular Ocean Model (MOM4) for climate modeling, research and predictions" |
| 2011 | CSIRO Distinguished Visiting Scientist Fellow, Australia |
| 2009 | Visiting Professor, Universite catholique de Louvain, Belgium |
| 2001 | NOAA/Oceanic and Atmospheric Research Outstanding Scientific Review Paper |
| 1999 | NOAA/Oceanic and Atmospheric Research Outstanding Scientific Paper |
| 1998 | NOAA/Oceanic and Atmospheric Research Employee of the Year |
| 1997 | NOAA/Environmental Research Laboratories Outstanding Scientific Paper |
| 1993–1995 | NOAA Climate and Global Change Research Fellow |

PROFESSIONAL SERVICES AND MEMBERSHIPS

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| 2024–present | Scientific advisory board for the C-Star program at [C]Worthy |
| 2021–present | NEMO Scientific Advisory Committee |
| 2021–present | Editor-in-Chief for AGU's Journal of Advances in Modeling Earth Systems (JAMES) |
| 2018–2020 | Ocean/Cryosphere Editor for AGU's Journal of Advances in Modeling the Earth System (JAMES) |
| 2019–2023 | Awards committee for the EGU Fridtjof Nansen Medal for Oceanographic Excellence (chair) |
| 2017–2021 | Advisory board for the TICTOC Project, United Kingdom |
| 2016–2019 | Awards committee for the EGU Fridtjof Nansen Medal for Oceanographic Excellence |
| 2014–2018 | WCRP/CLIVAR Scientific Steering Group |
| 2014–2016 | Co-lead of the NCEP Climate Model Development Task Force |
| 2012–2014 | CLIVAR/CliC/SCAR Southern Ocean Region Implementation Panel |
| 2012–present | WCRP/CLIVAR Ocean Model Development Panel (ex officio) |
| 2010–present | European Geosciences Union (EGU) |
| 2009–2015 | Scientific Advisory Board for the Catalan Climate Institute <i>IC3</i> , Barcelona, Spain |
| 2007–2018 | Editor of the journal Ocean Modelling |
| 2006–2009 | WCRP/CLIVAR Scientific Steering Group (ex officio) |
| 2004–2009 | WCRP/CLIVAR Working Group on Coupled Modelling (ex officio) |
| 2004–2007 | Editorial Board of the journal Ocean Science |
| 1999–2012 | WCRP/CLIVAR Working Group on Ocean Model Development (co-chair 2004–2009) |
| 1993–present | American Geophysical Union and American Meteorological Society |

UNIVERSITY TEACHING

- Autumn semester 2025 (planned): Princeton University Atmospheric and Oceanic Sciences 580: Special topics: **Methods in the Analysis of Ocean Scalar Properties**. 24 lectures of 80 minutes duration covering the full course, presenting a suite of theoretical tools to support physical ocean analysis. Topics include material tracers, ocean thermodynamics, ocean energetics, tracer advection and diffusion, turbulent tracer transport, subgrid scale parameterizations, Green's function methods, watermass transformation analysis. Lecture material base on [Griffies \(2025\): Geophysical Fluid Mechanics](#).
- Spring semester 2023, 2024, 2025: Princeton University Atmospheric and Oceanic Sciences 572: **Theory of Geophysical Fluid Waves and Instabilities**. 24 lectures of 80 minutes duration covering the full course, presenting theoretical foundations for ocean and atmosphere linear wave mechanics and instability theory. Topics include wave kinematics, acoustics, capillary waves, surface gravity waves, inertial waves, Rossby waves, shallow water waves, internal inertia-gravity waves, shear instability, inertial instability, symmetric instability, baroclinic instability. Lecture material base on [Griffies \(2025\): Geophysical Fluid Mechanics](#).
- Autumn semester 2014 (0.5), 2015 (0.5), 2016 (0.5), 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024 (0.5): Princeton University Atmospheric and Oceanic Sciences 571: **Foundations of Geophysical Fluid Mechanics**. 24 (12) lectures of 80 minutes duration covering the full (half) of course, focusing on the theoretical foundations for geophysical fluid mechanics. Topics include mechanics of motion on a rotating planet, Eulerian and Lagrangian fluid kinematics, frictional stresses, pressure and form stress, buoyancy, Ekman mechanics, shallow water mechanics, vorticity and potential vorticity, quasi-geostrophy. Lecture material base on [Griffies \(2025\): Geophysical Fluid Mechanics](#).
- Spring semester 2020: Princeton University Atmospheric and Oceanic Sciences 521: **Southern Ocean Seminar**. I provided five 90-minute lectures covering Southern Ocean dynamics, while other lecturers presented allied material to cover Southern Ocean science. Lecture material base on [Griffies \(2025\): Geophysical Fluid Mechanics](#).
- Spring semester 2017, 2018, 2019, 2024: Princeton University Atmospheric and Oceanic Sciences 580: **Special Topics on Great Papers in Atmospheric and Oceanic Sciences**. I led on 90-minute discussion session on a chosen classic paper in ocean fluid mechanics.
- Spring semester 2016, 2019: Princeton University Geosciences 503: **Responsible Conduct of Research in Geosciences**. I co-taught one three-hour discussion session on ethical behavior in research.
- Autumn semester 1993: Princeton University Atmospheric and Oceanic Sciences Special Topics 580: **Data Assimilation in Atmospheric and Oceanic Models**. I was the co-lecturer and coordinator of visiting lectures throughout the semester.
- 1990–1993: Instructor, Undergraduate Physics Laboratory, University of Pennsylvania
- 1990–1993: Teaching Assistant, General Relativity and Quantum Field Theory, University of Pennsylvania

MENTORING AND SABBATICAL HOSTING

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| 2024 | Claire Yung | visiting graduate student (from ANU, Canberra, AUS) |
| 2024-present | Stefan Kildal-Brandt | Princeton University graduate student (geophysics) |
| 2023-present | Kiera Lowman | Princeton University graduate student (AOS) |
| 2023-present | Maxime Keutgen De Greef | Princeton University graduate student (AOS) |
| 2023-present | Kentaro Hanson | Princeton University graduate student (applied mathematics) |
| 2023 | Jan Zika | Princeton University visiting scholar (from UNSW, Sydney, AUS) |
| 2022-present | Matthew Lobo | Princeton University graduate student (AOS, primary mentor) |
| 2022-present | Winnie Chu | Princeton University graduate student (AOS) |
| 2022-present | Wenda Zhang | Princeton University postdoc fellow |
| 2021-2022 | Rachel Pang | Princeton University undergraduate student (junior paper mentor) |
| 2021 | Abigail Bodner | Brown University graduate student (PhD thesis reader) |
| 2020-present | Jan-Erik Tesdal | Princeton University postdoc fellow |
| 2020 | Ruth Moorman | Princeton University predoc intern |
| 2019-2020 | Benjamin Taylor | Princeton University predoc intern |
| 2019-2021 | Hemant Khatri | Princeton University postdoc fellow |
| 2019-2020 | Elizabeth Yankovsky | Princeton University graduate student (AOS) |
| 2019 | Hussein Aluie | Princeton University visiting scholar (from University of Rochester) |
| 2018-2022 | Graeme MacGilchrist | Princeton University postdoc fellow |
| 2017-2022 | Houssam Yassin | Princeton University graduate student (AOS, primary mentor) |
| 2017-2018 | Laure Zanna | Princeton University visiting scholar (from Oxford University) |
| 2017 | Jianjun Yin | Princeton University visiting scholar (from University of Arizona) |
| 2016-2019 | Brandon Reichl | Princeton University postdoc fellow |
| 2016-2018 | Nathaniel Tarshish | Princeton University predoc intern |
| 2015-2017 | Amanda O'Rourke | University of Michigan postdoc fellow (with Brian Arbic) |
| 2015-2016 | Henri Drake | Princeton University predoc intern (with Jorge Sarmiento) |
| 2014-2017 | Anna FitzMaurice | Princeton University PhD student (AOS) |
| 2014-2015 | Ivy Frenger | Princeton University postdoc fellow (with Jorge Sarmiento) |
| 2014 | Magnus Hieronymus | Stockholm University graduate student (PhD opponent) |
| 2013-2017 | Robert Nazarian | Princeton University PhD student (AOS) |
| 2013-2016 | Adele Morrison | Princeton University postdoc fellow (with Jorge Sarmiento) |
| 2013 | Terrence O'Kane | GFDL visiting scholar from CSIRO Marine Research, Hobart, Australia |
| 2012-2017 | Carolina Dufour | Princeton University postdoc fellow (with Jorge Sarmiento) |
| 2012-2013 | Yalin Fan | Princeton University postdoc fellow |
| 2011-2014 | Michael Bueti | University of Rhode Island PhD student (PhD committee) |
| 2008-2011 | Michael Bates | University of New South Wales PhD student (PhD committee) |
| 2005-2009 | Andreas Klocker | University of Tasmania PhD student (PhD committee) |
| 2003-2004 | Rüdiger Gerdes | GFDL visiting scholar (from AWI, Bremerhaven, Germany) |
| 2001-2002 | Harper Simmons | GFDL postdoc fellow |
| 1999-2002 | Shafer Smith | Princeton University postdoc fellow |

OCEANOGRAPHIC FIELD WORK

- Mar-May 2017: Eight week cruise on the *RRS JC Ross* to the Orkney Passage and Scotia Sea, as part of the Dynamics of the Orkney Passage Outflow (DynOPO) project. Principal Scientific Officer: Alberto Naveira Garabato.
- Jul 1993: Two week cruise on the *CCGS Hudson* to the Labrador Sea in support of the WOCE Line AR7W Atlantic Circulation Experiment. Chief Scientist: John Lazier.

PARTICIPANT/COLLABORATOR ON RESEARCH GRANTS AND PROJECTS

- Partner Investigator for the Australian Research Council Centre of Excellence in Our Future Oceans (under review)
- Partner Investigator for the Australian Research Council (2021-2025) Centre of Excellence in Antarctic Science (ACEAS), AU\$25M.
- PI for an NSF subcontract with New York University for NOAA's Climate Variability and Predictability Program Climate Process Team: *Ocean Transport and Eddy Energy* (2024-2025), \$150K.

Diagnostics and Performance Metrics for Evaluating Ventilation Pathways and Interior Water Mass Properties in Ocean Models (2020-2022), \$180K.

- Co-PI for NOAA's Climate Variability and Predictability Program Climate Process Team: *Ocean Transport and Eddy Energy* (2020-2024), \$770K.
- Co-PI for NOAA's Climate Variability and Predictability Program (CVP) *Decadal Climate Variability and Predictability* proposal *Drivers of coastal sea level change along the eastern US* (2020-2023), \$200K.
- PI for DOE subcontract with Princeton University for the *Diagnostics and Performance Metrics for Evaluating Ventilation Pathways and Interior Water Mass Properties in Ocean Models* (2020-2022), \$180K.
- Co-PI for Australian Research Council Discovery Project (2019-2022): *Risks of rapid ocean warming at the Antarctic continental margin*. AU\$582K.
- Co-PI for NOAA Modeling, Analysis, Predictions, and Projections Program (01Aug2018–31Jul2020): *Addressing Key Issues in CMIP6-era Earth System Models*. \$434K.
- Program advisory board for the UK NERC funded project: *Transient tracer-based Investigation of Circulation and Thermal Ocean Change (TICTOC)* (2017-2021).
- Partner Investigator for the Australian Research Council (2017-2023) Centre of Excellence for Climate Extremes, AU\$30M.
- Co-PI for the Ocean Model Intercomparison Project (OMIP), which is part of the Coupled Model Intercomparison Project (CMIP6) (2016-2022).
- Co-PI for the Flux Anomaly Forcing Model Intercomparison Project (FAFMIP), which is part of the Coupled Model Intercomparison Project (CMIP6) (2016-2022).
- Co-PI for NOAA Modeling, Analysis, Predictions, and Projections Program (01Jul2016–30Jun2018): *Development toward NCEP's fully-coupled global forecast and data assimilation system: A coupled wave-ocean system*. \$316K.
- Partner Investigator for the Australian Research Council (2016-2020) funded project: *An Australian Consortium for Eddy-Resolving Ocean-Sea Ice Modelling*, AU\$599K.
- US Department of Energy (15Aug2014–14Aug2017): *Three-dimensional structure of the Southern Ocean overturning circulation*, \$624K.
- US National Science Foundation (01Sep2014–31Aug2020): *Southern Ocean Carbon and Climate Observations and Modeling (SOCCOM)*, \$20.9M
- NASA (26Jun2014–25 Jun2017): *The role of mesoscale eddies in cross-frontal transport and subduction of nutrients and carbon in the Southern Ocean*, \$715K.
- NOAA (01Sept2013–31Aug2016): *Signature of the Atlantic meridional overturning circulation in the North Atlantic dynamic sea level*, \$393K.
- US Department of Energy (15Sep2011–14Sep2015): *Mode and intermediate waters in Earth System Models*, \$519K.
- Partner Investigator for the Australian Research Council (2011-2018) Centre of Excellence for Climate System Science, AU\$21.4M.
- NOAA Climate Program Office and US National Science Foundation (2010–2015): *Climate Processes Team on representing internal-wave driven mixing in global ocean models*.
- NOAA Climate Program Office and US National Science Foundation (2003–2008): *Climate Processes Team on ocean eddy mixed layer interactions*.
- NOAA Climate Program Office and US National Science Foundation (2003–2008): *Climate Processes Team on gravity current entrainment*.

CONVENER/ORGANIZER OF WORKSHOPS & MEETINGS

- Oct 2021: Scientific advisory committee for the WCRP/CLIVAR workshop: Future Directions in Basin and Global High-resolution Ocean Modelling, GEOMAR, Kiel, Germany (virtual).
- Mar 2019: Scientific advisory committee for the WCRP/CLIVAR workshop: Sources and sinks of ocean mesoscale eddy energy, Florida State University, Tallahassee, Florida, USA.
- Feb 2018: Co-convener for the Town Hall: Process understanding and standardized assessment towards the eddying realm. AMERICAN GEOPHYSICAL UNION OCEAN SCIENCES CONFERENCE, Portland, Oregon, USA.
- Feb 2018: Co-convener for the session: Modeling the Climate System at High Resolution, AMERICAN GEOPHYSICAL UNION OCEAN SCIENCES CONFERENCE, Portland, Oregon, USA.
- Sep 2016: Science Organizing Committee and Executive Planning Team for CLIVAR OPEN SCIENCE CONFERENCE, Qingdao, China.
- Apr 2014: PHYSICAL AND BIOGEOCHEMICAL OCEAN MODELLING: DEVELOPMENT, ASSESSMENT, AND APPLICATIONS, Session at the European Geosciences Union General Assembly, Vienna, Austria.
- Feb 2014: PHYSICAL AND BIOGEOCHEMICAL OCEAN MODELING: DEVELOPMENT, ASSESSMENT AND APPLICATIONS, Session at the Ocean Sciences meeting, Honolulu, Hawaii.
- Apr 2013: PHYSICAL AND BIOGEOCHEMICAL OCEAN MODELLING: DEVELOPMENT, ASSESSMENT, AND APPLICATIONS, Session at the European Geosciences Union General Assembly, Vienna, Austria.
- Feb 2013: CLIVAR WGOMD/SOP WORKSHOP ON SEA-LEVEL RISE, OCEAN/ICE-SHELF INTERACTIONS, AND ICE SHEETS, Hobart, Australia.
- Apr 2012: PHYSICAL AND BIOGEOCHEMICAL OCEAN MODELLING: DEVELOPMENT, ASSESSMENT, AND APPLICATIONS, Session at the European Geosciences Union General Assembly, Vienna, Austria.
- Oct 2011: OCEAN CIRCULATION AND VENTILATION, Session at the WCRP Open Science Conference, Denver, USA.
- Apr 2011: PHYSICAL AND BIOGEOCHEMICAL OCEAN MODELLING: DEVELOPMENT, ASSESSMENT, AND APPLICATIONS, Session at the European Geosciences Union General Assembly, Vienna, Austria.
- Oct 2009: WORKSHOP ON OCEAN CLIMATE MODELING, GFDL/Princeton, USA.
- Apr 2009: CLIVAR WORKSHOP ON OCEAN MESOSCALE EDDIES: OBSERVATIONS, SIMULATIONS, AND PARAMETERIZATIONS, Exeter, UK.
- Aug 2007: CLIVAR WORKSHOP ON NUMERICAL METHODS IN OCEAN MODELLING, Bergen, Norway.
- Nov 2005: CLIVAR WORKSHOP ON MODELLING THE SOUTHERN OCEAN, Hobart, Australia.
- Jun 2004: CLIVAR WORKSHOP ON EVALUATING THE OCEAN COMPONENT OF IPCC MODELS, Princeton, USA.
- Aug 2002: WORKSHOP ON Z-COORDINATE OCEAN MODELING, Massachusetts Institute of Technology, USA.
- Nov 1999: MEETING OF Z-COORDINATE OCEAN MODELING AT GFDL, LANL, MIT, AND NCAR, Princeton, USA.
- Jul 1999: OCEAN/ATMOSPHERE VARIABILITY AND PREDICTABILITY, Session at the International Union of Geodesy and Geophysics, Birmingham, UK.

INVITED PEDAGOGICAL LECTURES AND SPECIAL TOPICS COURSES

- Oct 2022: FUNDAMENTAL EQUATIONS AND DIAGNOSTICS FOR MOM6. Lecture given as part of a 2-day tutorial on the Modular Ocean Model (MOM6), Princeton, USA.
- April/May 2019: FUNDAMENTALS OF OCEAN MODELS AND THE ANALYSIS OF OCEAN SIMULATIONS. 15 lectures (45 minutes each) on ocean model fundamentals and analysis methods given as part of the Advanced Ocean Modelling Summer School, Tasmania, Australia.
- Jan 2019: OCEAN CIRCULATION AS A PROBLEM IN MATHEMATICAL & COMPUTATIONAL PHYSICS: A HISTORICAL AND CONTEMPORARY PERSPECTIVE. Public lecture given as part of the Australian Mathematics Science Institute (AMSI) Summer School at the University of New South Wales, Sydney, Australia.

- Jul 2016: OCEAN MODELLING AND SEA LEVEL ANALYSIS: three lectures (two hours each) at the International Centre for Theoretical Physics / Indian Institute for Tropical Meteorology: ADVANCED SCHOOL ON EARTH SYSTEM MODELLING, Pune, India
- Aug 2013: OCEAN MODELS AND OCEAN MODELING: LECTURES ON THE FUNDAMENTALS AND PRACTICES: Five lectures (two hours each) at the International Centre for Theoretical Physics School: FUNDAMENTALS OF OCEAN CLIMATE MODELING AT GLOBAL AND REGIONAL SCALES, Hyderabad, India
- Mar 2009: PHYSICAL PROCESSES SETTING THE OCEAN'S WATER MASSES: four lectures (two hours each) at the Université Catholique de Louvain, Belgium
- Nov 2007: OCEAN MODEL FUNDAMENTALS: 10 lectures (two hours each) at the University of Tasmania, Australia
- Aug 2006: OCEAN MODEL FUNDAMENTALS: two lectures (one hour each) at the NSF summer school, MODERN MATHEMATICAL METHODS IN PHYSICAL OCEANOGRAPHY, Breckenridge, USA
- Oct 2004: OCEAN MODEL FUNDAMENTALS: 10 lectures (two hours each) at the INDIAN INTENSIVE SCHOOL ON LARGE-SCALE OCEAN MODELLING, Bangalore, India
- Sep 2004: OCEAN MODEL FUNDAMENTALS: three lectures (two hours each) at the GLOBAL OCEAN DATA ASSIMILATION EXPERIMENT SUMMER SCHOOL, La Londe Les Maures, France
- May 2003: OCEAN CLIMATE MODELING AT NOAA-GFDL: two lectures (one hour each) for a workshop on ocean modeling, Hobart, Australia
- May 2002: OCEAN CLIMATE MODELING WITH MOM4: three lectures (one hour each) for a workshop on ocean modeling, Kiel, Germany
- Jan 2001: OCEAN DYNAMICS AND MODELING: three lectures (two hours each) at La Escuela de Verano de Universidad de Concepción, Chile
- Mar 1999: OCEAN AND CLIMATE MODELING: two lectures (90 minutes each) at CONFERENCE ON GLOBAL CLIMATE, Barcelona, Spain

PRESENTATIONS SINCE 2010

- Mar 2025: CLIMATE MODEL THERMAL EQUILIBRATION IN AN OCEAN MESOSCALE DOMINANT REGIME, virtual talk to the Harvard University Earth and Planetary Sciences Department.
- Dec 2024: MOM6 AND THE CM4X CLIMATE MODEL HIERARCHY, talk given at the annual meeting of the American Geophysical Union, Washington, DC, USA.
- Oct 2024: MOM6 AND THE CM4X CLIMATE MODEL HIERARCHY, talk given at the Center for Ocean/Atmosphere Science, Courant Institute of Mathematical Sciences, New York University, USA.
- Sep 2024: THE LONG AND WINDING ROAD TO OMIP, talk given at the 50th anniversary of the Ocean Section of NCAR, National Center of Atmospheric Research, Boulder, USA.
- Sep 2024: MOM6 AND THE CM4X CLIMATE MODEL HIERARCHY, talk given at the COMMODORE workshop on numerical methods in ocean modeling, National Center of Atmospheric Research, Boulder, USA.
- Aug 2024: MOM6 AND THE CM4X CLIMATE MODEL HIERARCHY, talk given at the annual Eddy Energy and Transport Climate Process Team meeting, Brown University, USA.
- June 2024: MODELING THE OCEAN WITH MOM6: A PRIMER ON VERTICAL LAGRANGIAN REMAPPING AND THE ANALYSIS OF FINITE VOLUME OCEAN MODELS, virtual seminar given at Alfred Wegener Institute, Germany, in honor of the retirement of Rüdiger Gerdes.
- April 2024: MODELING THE OCEAN WITH MOM6: A PRIMER ON VERTICAL LAGRANGIAN REMAPPING AND THE ANALYSIS OF FINITE VOLUME OCEAN MODELS, virtual seminar given at University of Rhode Island Graduate School of Oceanography.
- Feb 2022: A MATHEMATICAL FORMALISM FOR CIRCULATION IN WATER MASS CONFIGURATION SPACE, virtual presentation at AGU Ocean Sciences Meeting.
- Feb 2022: MEDITATION FOR SCIENTISTS (with Jonathan Lilly): AMERICAN GEOPHYSICAL UNION OCEAN SCIENCES CONFERENCE, Honolulu, Hawaii (virtual).

- May 2020: THE IMPORTANCE OF REFINED MODEL RESOLUTION FOR UNDERSTANDING AND PROJECTING GLOBAL, REGIONAL, AND COASTAL SEA LEVEL, NASA GISS virtual Sea Level Seminar Series.
- Feb 2020: MEDITATION FOR SCIENTISTS (with Jonathan Lilly): AMERICAN GEOPHYSICAL UNION OCEAN SCIENCES CONFERENCE, San Diego, CA.
- Jan-April 2020: VERTICAL LAGRANGIAN-REMAPPING, GENERALIZED VERTICAL COORDINATES, AND SPURIOUS DIAPYCNAL MIXING IN OCEAN MODELS: COMMODORE meeting, Hamburg, Germany; DRAKKAR meeting, Grenoble, France; AGU Ocean Sciences, San Diego, USA; CESM Ocean Model Working Group.
- Oct 2019: WATER MASS TRANSFORMATION (WMT) ANALYSIS AND TRACER BUDGETS WITH GENERALIZED VERTICAL COORDINATES AND VERTICAL LAGRANGIAN-REMAPPING, annual meeting of the Transient tracer-based Investigation of Circulation and Thermal Ocean Change (TICTOC) Project, Exeter, UK.
- Feb 2019: WATER MASS TRANSFORMATION ANALYSIS IN OCEAN MODELS: SOME THOUGHTS AND QUESTIONS, workshop on Water mass transformation for ocean physics and biogeochemistry, University of New South Wales, Sydney, Australia.
- Jan 2019: A HISTORICAL SURVEY OF NEUTRAL DIFFUSION METHODS AND COMMENTS ON CURRENT RESEARCH, presented during the celebration of Peter Gent's career, NCAR, Colorado, USA.
- May 2018: UNDERSTANDING AND PROJECTING GLOBAL, REGIONAL, AND COASTAL SEA LEVEL: REASONS TO INCLUDE COASTAL OCEAN PROCESSES IN GLOBAL MODELS: Consortium for Ocean-Sea Ice Modelling in Australia (COSIMA) Annual Meeting, Australian National University, Canberra, Australia & University of New South Wales, Sydney, Australia; ISSI workshop on understanding the relationship between coastal sea level and large-scale ocean circulation, Bern, Switzerland.
- Feb 2018: SUBSURFACE WARMING OF ANTARCTIC COASTAL WATERS: A ROLE FOR BOTH WINDS AND FRESHENING: AMERICAN GEOPHYSICAL UNION OCEAN SCIENCES CONFERENCE, Portland, Oregon, USA.
- Dec 2017: LOCALIZED RAPID WARMING OF WEST ANTARCTIC SUBSURFACE WATERS BY REMOTE WINDS: American Geophysical Union Fall Meeting, New Orleans, Louisiana, USA.
- Nov 2017: PHYSICAL MECHANISMS OF SEA LEVEL VARIATIONS IN A CHANGING CLIMATE: International CLIVAR Scientific Steering Group meeting, Indian Institute of Tropical Meteorology, Pune, India.
- Jul 2017: LOCALIZED RAPID WARMING OF WEST ANTARCTIC SUBSURFACE WATERS BY REMOTE WINDS: WCRP Conference on Regional Sea-level Changes and Coastal Impacts, Columbia University, New York City, USA.
- May 2017: LOCALIZED RAPID WARMING OF WEST ANTARCTIC SUBSURFACE WATERS BY REMOTE WINDS: RRS JC Ross research cruise JR16005 to Orkney Passage, Southern Ocean.
- Jan 2017: THE OCEAN MESOSCALE: OBSERVATIONS, THEORY, AND MODELING: Banff International Research Station (BIRS) workshop: *Transport in unsteady flows: From deterministic structures to stochastic models and back again*, Banff, Canada.
- July 2016: ELEMENTS OF SEA LEVEL IN A CHANGING CLIMATE: Indian Institute of Tropical Meteorology, Pune, India.
- July 2016: OCEAN MODELLING: AN INTRODUCTION FOR MATHEMATICAL PHYSICISTS: Department of Mathematics, Savitribai Phule Pune University, Pune, India.
- May 2016: ELEMENTS OF SEA LEVEL IN A CHANGING CLIMATE: University of New South Wales, Sydney, Australia & Australian National University, Canberra, Australia.
- Jan 2016: ELEMENTS OF SEA LEVEL IN A CHANGING CLIMATE: Louisiana State University Chemical Engineering Department, Baton Rouge, Louisiana, USA.
- Oct 2015: IMPACTS ON OCEAN HEAT FROM THE MESOSCALE: Lamont-Doherty Earth Observatory / Columbia University, USA.
- Oct 2015: IMPACTS ON OCEAN HEAT FROM THE MESOSCALE: Stony Brook Marine Sciences, Stony Brook, USA.
- Oct 2014: IMPACTS ON OCEAN HEAT FROM THE MESOSCALE: Meeting on ocean heat uptake at the National Oceanography Centre, Southampton, UK.
- Jun 2014: IMPACTS ON OCEAN HEAT FROM THE MESOSCALE: University of Stockholm, Sweden.
- Apr 2014: PROBLEMS AND PROSPECTS WITH OCEAN MESOSCALE EDDYING CLIMATE MODELS: Nansen Medal lecture at the European Geosciences Union annual meeting, Vienna, Austria.

- Apr 2014: PROBLEMS AND PROSPECTS WITH OCEAN MESOSCALE EDDYING CLIMATE MODELS: lecture given at a CLIVAR workshop on eddying ocean climate models, Kiel, Germany.
- Sep 2013: PROBLEMS AND PROSPECTS OF MODEL COMPARISONS: AN OCEAN PROCESS PERSPECTIVE: lecture given at a symposium celebrating the 80th birthday of Gerold Siedler, Kiel, Germany.
- Feb 2013: SEA LEVEL IN A SUITE OF FORCED GLOBAL OCEAN-ICE SIMULATIONS: CLIVAR workshop on Sea-Level Rise, Ocean/Ice-Shelf Interactions, and Ice Sheets, Hobart, Australia
- Jan 2013: OCEAN MODEL NUMERICS AND PHYSICS: CHALLENGES FOR MESOSCALE EDDYING GLOBAL CLIMATE SIMULATIONS: 10th annual meeting of the Drakkar Ocean Modelling Consortia, Grenoble, France
- Sep 2012: SEA LEVEL IN OCEAN CLIMATE MODELS: FUNDAMENTALS AND PRACTICES: University of Tasmania, Hobart, Australia
- Sep 2012: OCEAN MODELLING WITH MOM AND ITS RELATION TO AUSTRALIAN OCEAN CLIMATE SCIENCE: Second meeting of Consortia for Ocean Modelling in Australia, Hobart, Australia
- Feb 2012: OCEAN MODELLING WITH MOM AND ITS RELATION TO AUSTRALIAN OCEAN CLIMATE SCIENCE: First meeting of Consortia for Ocean Modelling in Australia, Hobart, Australia
- Mar 2011: DYNAMIC SEA LEVEL, STATIC SEA LEVEL, AND THE NON-BOUSSINESQ STERIC EFFECT: Australia National University, Canberra, Australia
- Nov 2010: OCEAN CLIMATE MODELING AT GFDL: Scientific Workshop for the Centre for Australian Weather and Climate Research, Hobart, Australia
- Sep 2010: SENSITIVITY OF ATLANTIC OCEAN VARIABILITY TO OCEAN PHYSICS AND VERTICAL COORDINATE: CLIVAR WGOMD/GSOP Workshop on Decadal Variability, Predictability, and Predictions: Understanding the Role of the Ocean. Boulder USA

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13. [Geophysical Fluid Mechanics](#), 2025: S.M. Griffies, *in preparation*
12. Ocean energy pathways: a multi-scale perspective, 2025: H. Aluie, R. Barkan, S.M. Griffies, D. Marshall, B. Storer, *in prep for Annual Reviews of Fluid Mechanics*
11. Mathematics of fluid flow in property space, 2025: A. J. G. Nurser, S. M. Griffies, J. D. Zika, and G. J. Stanley, *in prep*
10. A theoretical framework to decompose causes of regional ocean temperature change, 2025: E. McDonagh, J. Gregory, S. M. Griffies, T. W. N. Haine, A. J. G. Nurser, J. Zika, and the TICTOC consortium, *in prep*
9. The hat average: improved time-averaging for budget analyses in climate models, 2025: C. Bladwell, R.M. Holmes, J.D. Zika, A. Kiss, and S.M. Griffies, *in preparation for Geoscientific Model Development*
8. Energy pathways in two-layer quasi-geostrophic turbulence over a meridionally sloping bottom with moderate-to-strong linear bottom drag, 2025: M. Lobo and S. M. Griffies, *in prep for Journal of Physical Oceanography*
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3. The defining role of sterodynamic sea level in 21st century climate projections, 2025: J.-E. Tesdal, J. P. Krasting, S. M. Griffies, R. E. Kopp, P. Kumar, W. V. Sweet, T. H. J. Hermans, *submitted to AGU Advances*

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