



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

NOAA GEOPHYSICAL FLUID DYNAMICS LABORATORY (GFDL)

PRINCETON UNIVERSITY PROGRAM IN ATMOSPHERIC AND OCEANIC SCIENCES

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[RESEARCH AND TEACHING](#)

[ORCID](#)

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RESEARCH STATEMENT

I focus research on elements of geophysical fluid mechanics and the role of the physical ocean in the earth climate system. 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 dynamics; global and regional sea level variability and change; 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 foundations of ocean circulation models.

EDUCATION STATEMENT

As a lecturer, mentor, author, and editor, I aim to foster a fundamental 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 the ocean and climate, and for fostering an appreciation of geophysical fluid mechanics within the broader context of theoretical mechanics, thermodynamics, and mathematical physics. Teaching and mentoring are my passions, and they form central parts of my work as a research scientist and university faculty member. I strive to generate curiosity and passion in students while nurturing an honest and non-judgemental scientific pursuit of how nature works.

COLLABORATION STATEMENT

I nurture collaborations with scientists at all career stages who are passionate about developing a fundamental understanding of how the ocean works as part of the climate system.

BROADER INTERESTS AND ACTIVITIES

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

EDUCATION

1995-1996	Postdoctoral fellow in oceanography/climate (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	Biloxi High School, Mississippi

SPECIAL TOPIC SCHOOLS

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

2024–present	Chair of the GFDL-CIMES Visiting Scientist Committee
2024–present	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	Faculty member of 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
2011–present	Senior Scientist at GFDL (equivalent to university professor)
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–present	Staff Physical Scientist, NOAA/GFDL
1995–1996	Visiting Scientist, GFDL and Princeton University
1993–1995	NOAA Climate & Global Change 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

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

2024–present	Scientific advisory board for the C-Star program at [C]Worthy
2021–2022	NEMO Scientific Advisory Committee
2021–present	Editor-in-Chief for AGU's Journal of Advances in Modeling Earth Systems (JAMES)
2020–2022	Princeton University AOS Diversity, Equity, Inclusion, and Accessibility committee
2019–2023	Awards committee chair for the EGU Fridtjof Nansen Medal for Oceanographic Excellence
2018–2020	Ocean/Cryosphere Editor for AGU's Journal of Advances in Modeling the Earth System (JAMES)
2017–2021	Advisory board for the TICTOC Project, UK
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
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

MENTORING AND SABBATICAL HOSTING

2024	Claire Yung	visiting graduate student (from ANU, Canberra, AUS)
2023	Jan Zika	Princeton University visiting scholar (from UNSW, Sydney, AUS)
2022–present	Matthew Lobo	Princeton University graduate student (primary mentor)
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 (PhD committee)
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 (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 (PhD committee)
2014–2015	Ivy Frenger	Princeton University postdoc fellow (with Jorge Sarmiento)
2014	Magnus Hieronymus	Stockholm University graduate student (PhD thesis reader)
2013–2017	Robert Nazarian	Princeton University PhD student (PhD committee)
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

UNIVERSITY TEACHING

- Spring semester 2023, 2024, 2025 (planned): Princeton University Atmospheric and Oceanic Sciences 572: Waves and Instabilities in the Atmosphere and Ocean. 24 lectures covering the full course.
 - 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: Geophysical Fluid Mechanics. 24 (12) lectures covering the full (half) of course.
 - Spring semester 2020: Princeton University Atmospheric and Oceanic Sciences 521: Southern Ocean Seminar (5 lectures covering Southern Ocean dynamics)
 - Spring semester 2017, 2018, 2019, 2024: Princeton University Atmospheric and Oceanic Sciences 580: Special Topics on Great Papers in Atmospheric and Oceanic Sciences (led one discussion session on a chosen paper)
 - Spring semester 2016, 2019: Princeton University Geosciences 503: Responsible Conduct of Research in Geosciences (co-taught one three-hour discussion session)
 - Autumn semester 1993: Princeton University Atmospheric and Oceanic Sciences 580: Data Assimilation in Atmospheric and Oceanic Models (co-lecturer and coordinator of visiting lectures)
 - 1990–1993: Instructor, Undergraduate Physics Laboratory, University of Pennsylvania
 - 1990–1993: Teaching Assistant, General Relativity and Quantum Field Theory, University of Pennsylvania
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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: A. 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: J. Lazier.
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PARTICIPANT/COLLABORATOR ON RESEARCH GRANTS AND PROJECTS

- Partner Investigator for the Australian Research Council (2021-2025) Centre of Excellence in Antarctic Science (ACEAS), AU\$25M.
- 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

- 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 meeting of the Eddy Energy and Transport Climate Process Team, 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 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

DOCUMENTS UNDER REVIEW OR IN PREPARATION

9. [Geophysical Fluid Mechanics](#), 2024: S.M. Griffies, *in preparation*
8. Mathematics of fluid flow in property space, 2024: A. J. G. Nurser, S. M. Griffies, J. D. Zika, and G. J. Stanley, *in prep for Journal of Fluid Mechanics*
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