Walter A. Robinson
Professor of Atmospheric Sciences
Department of Marine, Earth, and Atmospheric Sciences
North Carolina State University
warobin3@ncsu.edu

Degree	Institution	Date Conferred
B.A. – Physics	University of Pennsylvania	1977
M.S. – Physics	University of Pennsylvania	1977
M.Phil. – Geological Sciences	Columbia University	1982
Ph.D. – Geological Sciences	Columbia University	1985

Positions held:

Cosmic Radiation Observer, McMurdo Station, Antarctica, October 1977 – November 1978

Graduate Research Assistant, Department of Geological Sciences, Columbia University, New York, NY, September 1979 – February 1985

Summer Student Fellow, Summer Program in Geophysical Fluid Dynamics, Woods Hole Oceanographic Institution, Woods Hole, MA, June – August 1982

Postdoctoral Research Associate, Department of Atmospheric Sciences, University of Washington, Seattle, WA, March 1985 – December 1987

Assistant Professor, Department of Atmospheric Sciences, University of Illinois, Urbana, IL, January 1988 – August 1993

Associate Professor, Department of Atmospheric Sciences, University of Illinois, Urbana, IL, August 1993 – August 2001

Professor, Department of Atmospheric Sciences, University of Illinois, Urbana, IL, August 2001 – July 2009

Departmental Affiliate, Department of Electrical and Computer Engineering, University of Illinois, Urbana, IL, November 1995 – July 2009

Associate Program Director, NSF Climate and Large-scale Dynamics Program, under IPA assignment, July 2006 – January 2007

Program Director, NSF Climate and Large-scale Dynamics Program, under IPA assignment, January 2007 – July 2009

Professor, Department of Marine, Earth, and Atmospheric Sciences, North Carolina State University, Raleigh, NC, August 2009 – present

Head, Department of Marine, Earth, and Atmospheric Sciences, North Carolina State University, Raleigh, NC August 2011 – August 2016

Co-chief/chief Editor, *Journal of the Atmospheric Sciences*, January 2015 – December 2019

Visiting Scientist, Met Office Hadley Centre, Exeter, UK, September – December 2016 (on sabbatical from NC State)

Co-director, NC State Master's Degree Program in Climate Change and Society, January 2017 – present

Interim director, NC State Climate Office, August 2018 – June 2019

Honors & awards

Elected Fellow of the American Meteorological Society, January 2017

Publications

Journal articles

Rind, D., W. L. Donn, & W. A. Robinson, 1981: Stratospheric variability in summer. *J. Appl. Meteor.*, **20***,* 900-909.

Robinson, W. A., 1985: A model of the wave 1-wave 2 vacillation in the winter stratosphere. *J. Atmos. Sci.*, **42***,* 2289-2304.

Robinson, W. A., 1986: Interactions between stationary planetary waves in the stratosphere. *J. Atmos. Sci.*, **43***,* 1006-1016.

Robinson, W. A., 1986: The application of the quasi-geostrophic Eliassen-Palm flux to the analysis of stratospheric data. *J. Atmos. Sci.,* **43***,* 1017-1023.

Robinson, W. A., 1986: The behavior of planetary wave 2 in preconditioned zonal flows. *J. Atmos. Sci.*, **43***,* 3109-3121.

Robinson, W. A., 1987: Two applications of potential vorticity thinking. *J. Atmos. Sci.*, **44***,* 1554-1557.

Robinson, W. A., 1988: Analysis of LIMS data by potential vorticity inversion. *J. Atmos. Sci.*, **45***,* 2319-2342.

Robinson, W. A., 1988: Irreversible wave-mean flow interactions in a mechanistic model of the stratosphere. *J. Atmos. Sci.*, **45***,* 3413-3430.

Robinson, W. A., 1989: On the structure of potential vorticity in baroclinic instability. *Tellus*, **41A**, 275-284.

Robinson, W. A., 1991: The dynamics of low-frequency variability in a simple model of the global atmosphere. *J. Atmos. Sci.*, **48**, 429-441.

Chen, P., & W. A. Robinson, 1991: The effects of transience on the propagation of stratospheric planetary waves. *J. Atmos. Sci.,* **48**, 1078-1092.

Robinson, W. A., 1991: The dynamics of the zonal index in a simple model of the atmosphere. *Tellus,* **43A**, 295-305.

Qin, J., & W. A. Robinson, 1992: Barotropic dynamics of interactions between synoptic and low-frequency eddies. *J. Atmos. Sci.*, **49**, 71-79.

Robinson, W. A., & J. Qin, 1992: Predictability of the zonal index in a global model. *Tellus*, **44A**, 331-338.

Chen, P., & W. A. Robinson, 1992: Propagation of planetary waves between the troposphere and stratosphere. *J. Atmos. Sci.*, **49**, 2533-2545.

Robinson, W. A., 1993: The generation of ultralow-frequency variations in a simple global model. *J. Atmos. Sci.*, **50**, 137-143.

Robinson, W. A., 1993: Mechanisms of low-frequency variability in a simple model with orography. *J. Atmos. Sci.*, **50**, 878–888.

Qin, J., & W. A. Robinson, 1993: On the Rossby wave source and the steady linear response to tropical forcing. *J. Atmos. Sci.*, **50**, 1819–1823.

Feldstein, S. B., & W. A. Robinson, 1994: Comments on "Spatial structure of ultra-low-frequency variability of the flow in a simple atmospheric circulation model," by I. N. James and P. M. James. *Quart. J. Roy. Meteor. Soc.*, **120**, 739–745.

Robinson, W. A., 1994: Comments on "Horizontal divergence associated with zonally isolated jet streams." *J. Atmos. Sci.,* **51**, 1760–1761.

Robinson, W. A., 1994: Eddy feedbacks on the zonal index and eddy-zonal flow interactions induced by zonal flow transience. *J. Atmos. Sci.*, **51**, 2553–2562.

Huang, H.-P. & W. A. Robinson, 1995: Barotropic model simulations of the North Pacific retrograde disturbances. *J. Atmos. Sci.,* **52**, 1630–1641.

Qin, J., & W. A. Robinson, 1995: The impact of tropical forcing on extratropical predictability in a simple global model. *J. Atmos. Sci.,* **52**, 3895–3910.

Robinson, W. A., 1996: Does eddy feedback sustain variability in the zonal index? *J. Atmos. Sci.,* **53**, 3556–3569.

Robinson, W. A., 1997: Dissipation dependence of the jet latitude. *J. Climate,* **10**, 176–182.

Peng, S., W. A. Robinson, & M. P. Hoerling, 1997: The modeled atmospheric response to midlatitude SST anomalies and its dependence on background circulation states. *J. Climate,* **10**, 971–987.

Huang, H.-P., & W. A. Robinson, 1998: Two-dimensional turbulence and persistent zonal jets in a global barotropic model. *J. Atmos. Sci.,* **55**, 611–632.

Lieberman, R. S., W. A. Robinson, & 14 others, 1998: HRDI observations of mean meridional winds at solstice. *J. Atmos. Sci*., **55**, 1887-1896.

Herman, R. L., W. A. Robinson, & S. J. Franke, 1999: Observational evidence of two-day/gravity wave interaction using MF radar. *Geophys. Res. Lett.,* **26**, 1141-1144.

Franke, P. M., & W. A. Robinson, 1999: Nonlinear behavior in the propagation of atmospheric gravity waves. *J. Atmos. Sci.*, **56**, 3010-3027.

Robinson, W. A., 2000: A baroclinic mechanism for the eddy feedback on the zonal index. *J. Atmos. Sci.,* **57**, 415–422.

Robinson, W. A., 2000: Review of WETS: The Workshop on Extra-Tropical SST anomalies. *Bull. Amer. Meteor. Soc.,* **81**, 567–577.

Weickmann, K. M., W. A. Robinson, & M. C. Penland, 2000: Stochastic and oscillatory forcing of global atmospheric angular momentum. *J. Geophys. Res.*, **105**, 15,543-15,557.

Peng, S., & W. A. Robinson, 2001: Relationships between atmospheric internal variability and the responses to an extratropical SST anomaly. *J. Climate*, **14**, 2943-2959.

Peng, S., W. A. Robinson, & S. Li, 2002: North Atlantic SST forcing of the NAO and relationships with intrinsic hemispheric variability. *Geophys. Res. Lett.,* **29**, 10.1029/2001GL014043.

Robinson, W. A., 2002: On the midlatitude thermal response to tropical warmth. *Geophys. Res. Lett.,* **29**, 10.1029/2001GL014158.

Kushnir, Y., W. A. Robinson, I. Bladé, N. M. J. Hall, S. Peng, & R. Sutton, 2002: Atmospheric GCM response to extratropical SST anomalies: evaluation and synthesis. *J. Climate*, **15**, 2233-2256.

Robinson, W. A., R. Reudy, & J. E. Hansen, 2002: GCM simulations of recent cooling in the East-central United States. *J. Geophys. Res.*, **107**, 4748.

Peng, S., W. A. Robinson, & S. Li., 2003: Mechanisms for the linear and nonlinear NAO responses to the North Atlantic SST tripole. *J. Climate*, **16**, 1987-2004.

Seager, R., Y. Kushnir, N. Harnik, W. A. Robinson, & J. Miller, 2003: Mechanisms of hemispherically symmetric climate variability. *J. Climate*, **16**, 2960-2978.

Li, S., W. A. Robinson, & S. Peng, 2003: Influence of the North Atlantic SST tripole on northwest African rainfall. *J. Geophys. Res.*, **108**, 10.1029/2002JD003130.

Robinson, W. A., S. Li, & S. Peng, 2003: Dynamical nonlinearity in the atmospheric response to Atlantic sea surface temperature anomalies. *Geophys. Res. Lett.*, **30**, 10.1029/2003GL018416.

Robinson, W. A. 2004: Comments on "The structure and composition of the annular modes in an aquaplanet general circulation model". *J. Atmos. Sci.*, **61**, 949–953.

Song, Y., & W. A. Robinson, 2004: Dynamical mechanisms for stratospheric influences on the troposphere. *J. Atmos. Sci.*, **61**, 1711-1725.

Peng, S., W. A. Robinson, S. Li, & M. P. Hoerling, 2004: Tropical Atlantic SST forcing of coupled North Atlantic Seasonal Responses, *J. Climate*, **18**, 480-496.

Mitas, C., & W. A. Robinson, 2004: Atmospheric stability in a generalized barotropic model. *J. Atmos.*

Sci., **62**, 476-491.

Seager, R., N. Harnik, W. A. Robinson, Y. Kushnir, M. Ting, H.-P. Huang, & J. Velez, 2005: Mechanisms of ENSO forcing of hemispherically symmetric precipitation variability. *Quart. J. Royal. Meteor. Soc.*, **131**, 1501-1527.

Li, F., A. Z. Liu, G. R. Swenson, J. H. Hecht, & W. A. Robinson, 2005: Observations of gravity wave breakdown associated with dynamical instabilities. *J. Geophys. Res.*, **110**, D09S11, doi:10.1029/2004JD004849.

Kushnir, Y., W. A. Robinson, P. Chang, & A. W. Robertson, 2006: The physical basis for predicting Atlantic sector seasonal-to-interannual climate variability. *J. Climate*, **19**, 5949--5970.

Black, R. X., B. A. McDaniel, & W. A. Robinson, 2006: Stratosphere-troposphere coupling during spring onset. *J. Climate*, **19**, 4891-4901.

Peng, S., W. A. Robinson, S. Li, M. P. Hoerling, and M. A. Alexander, 2006: Effects of Ekman transport on the NAO response to a tropical Atlantic SST forcing. *J. Climate,* **19**, 4803-4818.

Robinson, W. A., 2006: On the self-maintenance of midlatitude jets. *J. Atmos. Sci.*, **63**, 2109-2122.

Li, S, W. A. Robinson, M. P. Hoerling, & K. M Weickmann, 2007: Dynamics of the extratropical response to a tropical Atlantic SST anomaly. *J. Climate*, **20**, 560-574.

Chen, G., I. M. Held, & W. A. Robinson, 2007: Sensitivity of the latitude of the surface westerlies to surface friction. *J. Atmos. Sci.*, **64**, 2899-2915.

Li, Z., W. Robinson, & A. Z. Liu, 2009: Sources of gravity waves in the lower stratosphere above South Pole. *J. Geophys. Res. Atmos.,* **114**, 10.1029/2008JD011478.

Sun, L., & W. A. Robinson, 2009: Downward influence of stratospheric final warming events in an idealized model. *Geophys. Res. Lett.* **36,** 10.1029/2008GL036624.

Sun, L., W. A. Robinson, & G. Chen, 2011: The role of planetary waves in the downward influence of stratospheric final warming events. *J. Atmos. Sci.*, **68**, 2826-2843.

Sun, L., W. A. Robinson, & G. Chen, 2012: The predictability of stratospheric warming events: more from the troposphere or the stratosphere? *J. Atmos. Sci.*, **69**, 768–783.

Willison, J., W. A. Robinson, & G. M. Lackmann, 2013: The importance of resolving mesoscale latent heating in the North Atlantic storm track. *J. Atmos. Sci.*, **70**, 2234–2250.

Sun, L., G. Chen, & W. A. Robinson, 2014: The role of stratospheric polar vortex breakdown in Southern Hemisphere climate trends. *J. Atmos. Sci.*, **71**, 2335-2353.

Marciano, C. G., G. M. Lackmann, & W. A. Robinson, 2015: Changes in U.S. East Coast cyclone dynamics with climate change. *J. Climate*, **28**, 468–484.

Willison, J., W. A. Robinson, & G. M. Lackmann, 2015: North Atlantic storm-track sensitivity to warming increases with model resolution. *J. Climate*, **28**, 4513–4524.

Michaelis, A. C., J. Willison, G. M. Lackmann, & W. A. Robinson, 2017: Changes in winter North Atlantic extratropical cyclones in high-resolution regional pseudo-global warming simulations. *J. Climate*, **30**, 6905-6925.

Long, X. & W.A. Robinson, 2017: Dynamical Heating of the Arctic Atmosphere during the Springtime Transition. *J. Climate*, **30**, 9539–9553.

Michaelis, A. C., Lackmann, G. M., and Robinson, W. A.: Evaluation of a unique approach to high-resolution climate modeling using the Model for Prediction Across Scales – Atmosphere (MPAS-A) version 5.1, *Geosci. Model Dev.*, **12**, 3725–3743.

Scaife, AA, Camp, J, Comer, R, *et al. Does increased atmospheric resolution improve seasonal climate predictions? Atmos Sci Lett. 2019*; 20:e922.

Miller, R.L., G. M. Lackmann, and W.A. Robinson, 2020: A New Variable-Threshold Persistent

Anomaly Index: Northern Hemisphere Anomalies in the ERA-Interim Reanalysis. *Mon. Wea. Rev*., **148**, 43–62.

Tierney, G., W. A. Robinson, G. M. Lackmann, G., & R. Miller, 2021: The Sensitivity of Persistent Geopotential Anomalies to the Climate of a Moist Channel Model, *Journal of Climate*, **34**, 5093-5108.

Lackmann, G. M., R. L. Miller, W. A. Robinson, W. A., & A. C. Michaelis, 2021: Persistent Anomaly Changes in High-Resolution Climate Simulations, *Journal of Climate*, **34**, 5425-5442.

W. A. Robinson, 2021: Climate Change and Extreme Weather: a Review Focusing on the Continental United States, *Journal of the Air & Waste Management Association,* **71**(10):1186-1209

Baek, S. H., Kushnir, Y., Robinson, W. A., Lora, J. M., Lee, D. E., & Ting, M., 2021: An Atmospheric bridge between the subpolar and tropical Atlantic regions: A perplexing asymmetric teleconnection. *Geophysical Research Letters,* **48***, e2021GL096602.*

Books & chapters

Robinson, W. A., 2001: *Modeling Dynamic Climate Systems.* Springer, 210 pp.

Robinson, W. A., 2007: Eddy-mediated interactions between low latitudes and the extratropics. Invited chapter in *Global Circulation of the Atmosphere*, T. Schneider and A. Sobel, *eds*., Princeton University Press.

Booth, J. F., & W. A. Robinson, 2018: How Will Storms and the Stormtracks Change? Extratropical Cyclones on a Warmer Earth. Invited chapter in *Our Warming Planet: Topics in Climate Dynamics***,** C. Rosenzweig *et al.,* eds., World Scientific.

Kunkel, K.E., D. R. Easterling, A. Ballinger, S. Bililign, S. M. Champion, D. R. Corbett, K. D. Dello, J. Dissen, G. M. Lackmann, R. A. Luettich, Jr., L. B. Perry, W. A. Robinson, L. E. Stevens, B. C. Stewart, & A. J. Terando, 2020: *North Carolina Climate Science Report*. North Carolina Institute for Climate Studies, 223 pp.

Other articles

Robinson, W. A., 1982: Second order constraints on the amplitudes of vertically propagating Rossby waves, in Woods Hole technical report, 1982 Summer Study Program in Geophysical Fluid Dynamics.

Robinson, W. A., 1991: "Tradition, Tradition," book review of *Physics: Principles and Problems.* In Bookwatch Reviews, Vol. 4, No. 6, published by the National Center for Science Education, Inc., P. O. Box 9477, Berkeley, CA 94709.

Robinson, W. A., 1992: Invited book review of *Physics of Climate,* by Oort and Peixoto. In *Bull. Amer. Meteor. Soc.*, **73**, 1856–1857.

Robinson, W. A., 1995: Invited book review of *Introduction to Geophysical Fluid Dynamics,* by Cushman-Roisin. In *J. of Geological Education*, **43**, 433–434.

Robinson, W. A., 1997: "Forecasting the Next Century's Weather." Invited book review of the IPCC Reports. *IEEE Spectrum*, Jan 1997, 10-14.

Robinson, W. A., 1999: "History of a young science." Invited book review of *Greenhouse* by Gale Christianson. *IEEE Spectrum*, Nov 1999, 16-17.

Robinson, W. A., 2003: "Stratospheric influences on weather and climate." Invited contribution to the McGraw-Hill 2003 *Yearbook of Science and Technology*.

Robinson, W. A., 2016: "A departmental approach to addressing the problem of sexual harassment and assault in field experiences," *In the Trenches*, **6**, 12-13.

Robinson, W., S. Speich, and E. Chassignet, 2018: Exploring the interplay between ocean eddies and the atmosphere, *Eos, 99,* https://doi.org/10.1029/2018EO100609

Theses Supervised

M.S.

Inna Shapiro (UIUC), "Momentum Budget of the Climatological Annual Cycle in the Tropical Upper Troposphere," October 1999

Luis Berjano (UIUC), "The Zonal Momentum Response to ENSO", May 2001

Jeff Willison (NC State), May 2012, "The Role of Diabatic Processes in the North Atlantic Stormtrack"

Michelle Cipullo (NC State), December 2013, "High-resolution Modeling Studies of the Changing Risks of Damage from Extratropical Cyclones

Katie Boaggio (NC State), December 2019, "Climate and Resolution Sensitivities of the Extratropical Storm Tracks in the UPSCALE Simulations"

Roger Turnau (NC State), May 2021,"Heat Waves in Current and Future Climates"

Ph.D. (co-supervisor in parentheses)

Ping Chen (UIUC), "Dynamics of Planetary Waves in the Atmosphere," January 1992

Jianchun Qin (UIUC), "Atmospheric Predictability in the Presence of Tropical Forcing," October 1993

Patricia Franke (Erhan Kudeki) (UIUC), "Breaking Gravity Waves in the Mesosphere," April 1996

Huei-Ping Huang (UIUC), "Barotropic Models of Low-frequency Variability," May 1997

David Werth (UIUC), "Low-frequency Variability in the Stratosphere," June 1997

Redina Herman (UIUC), "Mesospheric Interactions of Gravity Waves with the Large-scale Flow," August 2003

Christos Mitas (UIUC), "Generalized Barotropic Models of Atmospheric Low-frequency Variability," August 2003

Feng Li (Gary Swenson) (UIUC), "A Dynamical Study of Gravity Waves and Instabilities in the Mesopause Region at Maui, Hawaii," April 2005

Lantao Sun (UIUC), "Downward Influence of Stratospheric Final Warming Events in an Idealized Model," June 2010

Jeff Willison (NC State), "Changes in the Atlantic Stormtrack with Climate Change", December 2015

Xiaoyu Long (NC State), "The Dynamics of the Arctic Springtime Transition", August 2016

J. Michael Madden (NC State), "Severe Precipitation in the Southeast U.S.", in progress

Yuan Chen (NC State), "Minimal Dynamical Models of Persistent Anomalies," in progress

Roger Turnau (NC State), "Heat waves under climate change," in progress

Gabrielle Keaton (NC State), "Tropical Influence on Extratropical Persistent Anomalies," in progress

International, national or local professional committees or working group

American Meteorological Society, Committee on Waves and Stability, 1997 – 1999
Workshop on an Atlantic Climate Variability Experiment, January 1998
US CLIVAR
Scientific Steering Committee, 1998 –2001.

Atlantic Implementation Panel, 1999 – 2005 (Co-chair, 2004 – 2005)
Phenomena and Observations Synthesis Panel, 2005 – 2006
University Corporation for Atmospheric Research (UCAR) Membership Committee, 1999 - 2002
Editor, *Journal of the Atmospheric Sciences*, 2004 –2010
Organizer, US CLIVAR Atlantic Science Meeting, Miami, January 2005
Convenor, AGU Chapman Conference, "Jets and Annular Structures in Geophysical Fluids", January 2006
Member, Illinois State Representative Naomi Jakobsson's Environmental Concerns Task Force, 2003 –2006
Director, Illinois Project to Observe Nutrient Dynamics (IPOND), 2005 – 2006
Member, National Science Foundation (NSF) Advisory Committee for the Geosciences (AC-GEO), 2010 –2012
Member, NSF Advisory Committee on the Merit Review Process, 2011
Member, UCAR Nominating Committee, 2010 – 2012; 2016 – 2019
UCAR Member Representative for NC State, 2010 – present
Participant, advisory committee for the NC Museum of Natural Sciences exhibit on Weather and Climate Change, 2010 –2011
International CLIVAR Atlantic Implementation Panel, 2014 – 2019; 2018-19 co-chair
Member, American Meteorological Society Publications Commission, 2015 – 2019
Building Strong Geoscience Departments Traveling Workshop Facilitator for the National Association of Geoscience Teachers, 2015 – present
UCAR Members Nominating Committee, 2016-2018; 2018 chair
American Meteorology Society, Committee on Climate Change and Variability, 2017 – present; co-organizer of 2019 conference
UCAR President's Advisory Committee on University Relations, 2019 – present

North Carolina State service

Member, NC Climate Science Advisory Panel, 2019 – present

North Carolina State University service

Member, University Senate, 2010 – 2012; 2021-present
Member, Senate Resources and Environment Committee, 2010 – 2012
Member, University Standing Committee on the Physical Environment and Transportation Subcommittee, 2010 – 2012
Member, Bike and Pedestrian Master Plan Steering Committee, 2010 – 2012
Member, Faculty Committee on Honorary Degrees, 2010 – 2011
Member, Campus Sustainability Team, 2011 – 2016
Co-Chair, Academics Working Group of the Sustainability Council, 2016 – 2019
Member, Search Committee for Faculty Cluster – Leadership in Public Science, 2015 – 2017
Member, University Committee on Courses & Curriculum, 2017 – 2019
Member, Search committee for Faculty Excellence hire in Remote Sensing, 2018
Co-chair, College of Sciences diversity, equity, & inclusion committee, 2021–present

Department of Marine, Earth, and Atmospheric Sciences service

Chair, seminar committee, 2009 – 2011
Member, committee on peer evaluation of teaching, 2010 – 2011
Member, course and curriculum committee, 2009 – 2011; 2017 – present
Chair, committee on peer evaluation of teaching, 2017 – 2019
Member, committee for post-tenure review, 2017 – 2019

Chair, diversity committee, 2020 – 2021
Chair, search committee for faculty cluster hire

Presentations

"Numerical simulations of a wave-1 minor warming," 19th General Assembly of the IUGG, August 1987

"Potential vorticity thinking," NASA Goddard Institute for Space Studies, July 1988.

"The modification of the zonal mean flow during baroclinic life cycles," 7th AMS Conference on Atmospheric and Oceanic Waves and Stability, April 1989

"The dynamics of low-frequency variability in a simple model of the global atmosphere," Department of Meteorology, University of Wisconsin, Madison, April 1990

"The dynamics of low-frequency variability in a simple model," NCAR Workshop on Dynamical Extended Range Forecasting, June 1990

"Mechanisms of low-frequency variability in a simple global model with orography," 8th AMS Conference on Atmospheric and Oceanic Waves and Stability, October 1991

"Zonally symmetric variations in a model atmosphere," Lamont-Doherty Geological Observatory of Columbia University, January 1992

"Linear models of planetary waves: Results and implications," NASA Ames Research Center, March 1992

"Zonally symmetric variability in a simple global model," August 1992 at: Department of Environmental Sciences, University of East Anglia, Norwich, UK, Department of Applied Mathematics and Theoretical Physics, Cambridge Univ., Cambridge, UK, Department of Meteorology, University of Reading, Reading, UK

"Why long-range forecasting won't work," Department of Physics, Bradley University, Peoria, Illinois, November 1992

"Transient eddy feedback and low-frequency variability," 17th Stanstead Seminar, Lennoxville, Quebec, June 1993

"Low-frequency dynamics and long-range forecasting," University of Wisconsin, Madison, March 1994

"Linear and nonlinear barotropic governors in a simple model of the general circulation," 9th AMS Conference on Atmospheric and Oceanic Waves and Stability, Big Sky, Montana, June 1995

"Zonally symmetric low-frequency variability in middle latitudes," National Center for Atmospheric Research, Boulder, Colorado, and at NOAA/CDC, Boulder, Colorado, February 1996

"Climate variability driven by mid-latitude chaos," Weizmann Institute, Rehovot, Israel, March 1997

"'Modeling the Earth System': a new interdisciplinary STELLA-based course at the University of Illinois," Spring Meeting of the American Geophysical Union, Baltimore, Maryland, May 1997

"On the dynamics of the observed zonal index," AMS Conference on Atmospheric and Oceanic Fluid Dynamics, Tacoma, Washington, June 1997

"Climate variability in middle latitudes—the unpredictable continuum," Lamont-Doherty Earth

Observatory, Palisades, New York, March 1998

"The frequency dependence of transient eddy feedback," Climate Diagnostics Center and Colorado Research Associates, both in Boulder, Colorado, July 1998

"Self-maintenance of baroclinic jets by transient-eddy feedback and surface drag," AMS Conference on Atmospheric and Oceanic Waves and Stability, New York, New York, June 1999

"Where's the heat? Insights from GCM experiments into the lack of Eastern US warming," presented at the AMS 12th Symposium on Global Change and Climate Variations, Albuquerque, New Mexico, January 2001

"Does the troposphere care about the stratosphere?" invited – AMS Conference on Atmospheric and Oceanic Waves and Stability, Breckenridge, Colorado, June 2001

"Forced and free variability in the extratropics: the ocean, the stratosphere, and eddy feedback," McGill University, Montréal, November 2001

"How does the stratosphere influence the troposphere?" invited - AGU Fall meeting, San Francisco, December 2001

"How might the stratosphere influence the troposphere?" Climate Diagnostics Center, Boulder, Colorado, January 2002

"Dynamical influences of the winter stratosphere on the troposphere," NASA Goddard Institute of Space Studies, New York, New York, May 2002

"Why are there annular modes?" Georgia Institute of Technology, Atlanta, Georgia, October, 2002

"How does the stratosphere influence the troposphere?" invited – International Symposium on Stratospheric Variations and Climate, Fukuoka, Japan, November 2002

"Downward influence of the stratospheric polar vortex," California Institute of Technology, Pasadena, California, November 2002

"How does the stratosphere influence the troposphere in mechanistic GCMs?" invited – Workshop on the Role of the Stratosphere in Tropospheric Climate, Whistler, British Columbia, April 2003.

"Eddy-driven jets from a mean flow perspective," American Meteorological Society 14th Conference on Atmospheric and Oceanic Fluid Dynamics, San Antonio, June, 2003

"On the physical reality of annular modes," invited – IUGG2003, Sapporo, Japan, July 2003

"Negative viscosity redux: jets, annular variability, and eddy generation", Colorado State University, February 2004: Columbia University & State University of New York – Stony Brook, March 2004

"Dynamical mechanisms for stratospheric influences on the troposphere", invited – SPARC 3rd General Assembly, Victoria, B.C., August 2004

"Eddy mediated interactions between low latitudes and the extra-tropics", invited – Conference on the Global Circulation of the Atmosphere, Pasadena, November 2004

"Implications of eddy-zonal flow interactions in the troposphere for the mean climate and its variability," MIT, April 2005

"Atmospheric dynamics of the zonally symmetric extratropical response to ENSO," invited – 15th AMS Conference on Atmopsheric and Oceanic Fluid Dynamics, Boston June 2005

"Why do baroclinic eddies increase the temperature gradient?" 15th AMS Conference on Atmospheric and Oceanic Fluid Dynamics, Boston June 2005

"Self-maintaining eddy-driven jets" NOAA/CIRES Climate Diagnostics Center, Boulder, CO, June 2005

"Adventures of a stratospherean in the troposphere: Insights from wave-zonal flow dynamics into the circulation of the troposphere," Harvard University, Cambridge, MA, March, 2007

"Global greenhouse warming," Arlington Civic Federation, Arlington, VA, June 2007

"How does the weakening Hadley cell in global warming cause subtropical drying?" American Meteorological Society 16th Conference on Atmospheric and Oceanic Fluid Dynamics, Santa Fe, NM, July 2007

"Atmospheric jets: From fluid dynamics to Southwest drought," Geologic Society of Washington, September 2007

"Basic climate change science," South Dakota School of Mines, Rapid City, SD, October 2007

"Intraseasonal stratosphere-troposphere coupling and tropospheric prediction," Climate Diagnostics and Prediction Workshop, Tallahassee, FL, October 2007

"Self-maintaining jets and subtropical drying in the greenhouse," University of Maryland-College Park, MD, November 2007

"Downward influences from the stratosphere: implications for climate, forecasting, and the springtime transition," Naval Research Laboratory, Washington, D.C., November 2007

"Climate change for dummies: a systems thinking approach to global warming," Central North Carolina Chapter of the American Meteorological Society, Raleigh, NC, November 2009

"It's all connected: model biases, gravity waves, and the dynamics of the general circulation" University of Illinois, Urbana, Illinois, March, 2010; North Carolina State University, Raleigh, NC, April, 2010; University of Toronto, July 2010

"The predictability of stratospheric warming events: more from the troposphere or the stratosphere?" American Geophysical Union Fall Meeting, San Francisco, CA, December 2010

"Earth's greenhouse blanket: the basic science of global warming," North Carolina Museum of Natural Sciences, Raleigh, NC, January 2011

"Commitment, chaos, and noise: insights into global warming from the world's simplest climate models," University of Georgia, Athens, GA, April 2011

"Downward influence: how stratospheric dynamics informs our understanding of the troposphere," University of Georgia, Athens, GA, April 2011

"The role of diabatic processes in the North Atlantic storm track: A potential vorticity diagnosis," Johns Hopkins University, Baltimore, MD, May 2011

"Jet and storm track variability and change: adiabatic QG zonal averages and beyond," (invited), AGU Fall meeting, San Francisco, CA 2013

"How will the storm track change? High-resolution studies of the future of North Atlantic atmospheric circulation and weather," Duke University, Durham, NC, November 2013;

University of Texas, Austin, TX, January 2014; Texas A&M University, College Station, TX, March 2014; Penn State University, State College, PA, November 2015; University of Barcelona, November 2015; Oxford University, October 2016; United Kingdom Meteorological Office, November 2016; Cambridge University, December 2016

"The science of climate change," Fayetteville NC Public Library, April 2015

"Arctic Spring," United Kingdom Meteorological Office, December, 2016

"Why does climate change matter for North Carolina?" Center for Energy Education, Roanoke Rapids, NC, March 2020

"Climate Change: what to expect, what's happening, & why it matters to gardeners (& everybody else)", 5/7/2020, Wake County Master Gardener Volunteers

"Climate change in North Carolina," 5/14/2020, South Wake Conservationists

"Climate Change: Where Physics Meets Social Justice," 7/14/2020, Credit Suisse Sustainability Network

"Climate "13s": how climate change causes extreme weather & why it matters," 9/29/2020, Triangle EPA Retirees

"Climate change: what to expect, what's happening, & why it matters," 11/24/2020, Rotary International District 7710

"Climate change: what's happening & why it matters for NC nature", 12/9/2020, Carolina Backyard Naturalist

"Why are climate change impacts so much worse than expected so much sooner than expected? A review of how global warming is changing extreme weather", 1/26/2021, University of Illinois Urbana-Champaign

"Climate change: what's happening & why it matters for NC nature", 12/8/2021, Carolina Backyard Naturalist

Membership in professional societies

American Meteorological Society
American Geophysical Union
National Association of Geoscience Teachers
Geological Society of America
Sigma Xi

Research grants

Title: The Generation of Extra-Tropical Low-Frequency Variability (UIUC)
Sponsor: National Science Foundation
Period: January 1, 1989 – December 31, 1990
Amount: $107,185
Capacity: Principal Investigator

Title: Dynamics of Stratospheric Planetary Waves (UIUC)
Sponsor: NASA
Period: March 1, 1989 – February 28, 1992
Amount: $296,564
Capacity: Principal Investigator

Title: Internal Generation of Low and Ultra-low Frequency Variability in the Atmosphere (UIUC)
Sponsor: NSF
Period: March 1, 1991 – February 28, 1993
Amount: $120,000
Capacity: Principal Investigator

Title: Low-Frequency Variability in the Extratropical Atmosphere (UIUC)
Sponsor: NSF
Period: March 1, 1993 – August 31, 1996
Amount: $227,481
Capacity: Principal Investigator

Title: A Modeling and Diagnostic Study of Stationary Waves and Low-Frequency Anomalies (UIUC)
Sponsor: NOAA, Office of Global Programs
Period: March 1, 1995 – February 28, 1998
Amount: $307,832
Capacity: Co-principal Investigator with Mingfang Ting

Title: Cooperative University-based Program in Earth System Science Education (UIUC)
Sponsor: Universities Space Research Association
Period: September 1, 1995 – August 31, 1999
Amount: $84,000
Capacity: Principal Investigator

Title: Observational and Numerical Studies of the Momentum Budget of the Extratropical Summertime Mesosphere (UIUC)
Sponsor: NSF (subcontract with University of Michigan)
Period: January 1996 – December 1996
Amount: $12,700
Capacity: Principal investigator

Title: Low-frequency Variability in the Extratropical Atmosphere (UIUC)
Sponsor: NSF
Period: September 1996 – August 2000
Amount: $188,528
Capacity: Principal Investigator

Title: The Zonally Symmetric Response to ENSO (UIUC)
Sponsor: NOAA
Period: May 1997 – December 2000
Amount: $146,095
Capacity: Principal Investigator

Title: The Modeled Impact of Mid-latitude SST Anomalies on the Atmosphere and Its Dependence on GCM Climatology (UIUC)
Sponsor: NOAA

Period: May 1997 – April 2000
Amount: $155,297
Capacity: Co-investigator with Dr. Shiling Peng, at the University of Colorado

Title: Stochastic Linear Modeling of the Planetary Wave Climate of the Stratosphere (UIUC)
Sponsor: NSF
Period: September 1997 – August 2001
Amount: $117,334
Capacity: Principal Investigator

Title: Dynamics of Atmospheric Response to Midlatitude SST Anomalies (UIUC)
Sponsor: NSF
Period: June 1, 1999 – May 31, 2002
Amount: $42,105
Capacity: Principal Investigator

Title: Collaborative Research: A Diagnostic and Modeling Study of Stratosphere-Troposphere Coupling in the Arctic Oscillation (UIUC)
Sponsor: NSF
Period: June 1, 2000 – May 31, 2003
Amount: $272,917
Capacity: Principal Investigator

Title: Low-frequency Variability in the Extratropical Atmosphere (UIUC)
Sponsor: NSF
Period: September 1, 2000 – February 28, 2002
Amount: $63,166
Capacity: Principal Investigator

Title: Tropical and Extratropical SST Forcing of the NAO (UIUC)
Sponsor: NOAA
Period: March 1, 2003 – February 28, 2006
Amount: $60,000
Capacity: Principal Investigator

Title: Dynamics of Intraseasonal Extratropical Variability (UIUC)
Sponsor: NSF
Period: January 1, 2003 – December 31, 2005
Amount: $274,457
Capacity: Principal Investigator

Title: Collaborative Research: An Observational and Modeling Study of Spring Onset in the Northern Hemisphere Circulation (UIUC)
Sponsor: NSF
Period: May 1, 2005 – September 30, 2010
Amount: $214,011
Capacity: Principal Investigator

Title: How Will Global Warming Change the Storm Tracks? Investigating the Importance of Diabatic Processes Using High-resolution Simulations (NC State)
Sponsor: NSF
Period: September 15, 2010 – September 14, 2016
Amount: $575,753
Capacity: Co-principal Investigator with Prof. Gary Lackmann

Title: High-resolution Modeling Studies of the Changing Risks of Damage from Extratropical Cyclones (NC State)

Sponsor: Bermuda Institute for Ocean Sciences
Period: October 1, 2010 – September 30, 2012
Amount:$90,000
Capacity: Principal Investigator

Title: Collaborative Research: The Arctic Springtime Transition: Dynamics, Impacts, and Future Changes (NC State)
Sponsor: NSF
Period: September 1, 2011 – August 31, 2016
Amount:$267,274
Capacity: Principal Investigator

Title: Warming holes: Can climate models represent the variability and sources of regional temperature trends in the Continental United States? (NC State)
Sponsor: NSF
Period: March 1, 2011 – October 31, 2013
Amount: $30,000
Capacity: Principal Investigator

Title: Extratropical Persistent Anomalies on a Warmer Earth: Connections to extratropical storms and storm tracks (NC State)
Sponsor: NSF
Period: September 1, 2016 – August 31, 2023
Amount: $1,165,132
Capacity: Principal Investigator

Title: RAPID: Testing storm track sensitivity to resolution and climate change using UPSCALE global model output (NC State)
Sponsor: NSF
Period: February 15, 2017 – February 14, 2019
Amount: $101,648
Capacity: Principal Investigator

Title: Collaborative Research: North American Warm-season Extremes in a Changing Climate: Large-scale Drivers and Local Feedbacks
(NC State)
Sponsor: NSF
Period: May 16, 2022 – May 15, 2015
Amount: submitted
Capacity: Principal Investigator