

David A. Randall

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Born September 8, 1948 in Columbus, Ohio

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Present position: Professor, Department of Atmospheric Science, Colorado State University

Research interests: General circulation modeling, cloud-climate studies, cloud parameterization

Education: **B.S.**, 1971, Aeronautical and Astronautical Engineering, The Ohio State University. **M.S.**, 1971, Aeronautical and Astronautical Engineering, The Ohio State University. **Ph.D.**, 1976, Atmospheric Sciences, University of California, Los Angeles (Professor A. Arakawa, advising).

Previous positions: 09/76 - 09/79: Assistant Professor, Department of Meteorology, Massachusetts Institute of Technology.

09/79 - 06/88: Meteorologist, Global Modeling and Simulation Branch, NASA/Goddard Space Flight Center.

Professional Society Memberships

American Meteorological Society, (Fellow) American Geophysical Union (Fellow), American Association for the Advancement of Science (Fellow)

Honors and Awards

Abell Faculty Research Award, CSU College of Engineering, 2007. NASA's Medal for Distinguished Public Service, 2006; Distinguished Lecturer, University of Utah Department of Meteorology, 2006; Scholarship Impact Award, Colorado State University, 2005; Robert D. Cess Distinguished TAOS Seminar Speaker, 2005; NASA Group Achievement Award, 2003; Fellow, American Geophysical Union, 2002; Fellow, American Association for the Advancement of Science, 2001; Bjerknes Lecturer, Fall AGU Meeting, 2001; Cermak Outstanding Graduate Advisor Award, 1999; Abell Faculty Research and Graduate Program Support Award for Excellence, 1996; Creativity Award from the National Science Foundation, 1995; NASA Group Achievement Award, 1995; Award for "Outstanding Contributions to the ARM Pro-

gram,” 1995; Meisinger Award of the American Meteorological Society, 1994; American Geophysical Union Editors' Citation for Excellence in Refereeing, JGR-Atmospheres, 1992; NASA Group Achievement Award, 1992; Dean's Council Award, College of Engineering, Colorado State University, 1991; NASA Medal for Exceptional Scientific Achievement, 1988; GLA Best Paper Award, 1987; Fellow, American Meteorological Society, 1986; GLAS Best Paper Award, 1983; Goddard Exceptional Performance Award, 1982; GLAS Special Achievement Award, 1982.

Selected Special Experience

Chair, Review Panel for NOAA's Climate Research and Modeling Program, 2008. Member, External Advisory Panel, Max Planck Institute for Meteorology, Hamburg, Germany, 2008-. **Chair**, External Advisory Panel, Center for Climate System Research, University of Tokyo, 2007. **Director**, Center for Multiscale Modeling of Atmospheric Processes, an NSF Science and Technology Center, 2006 - . Member, Biological and Environmental Research Advisory Committee, U.S. Department of Energy, 2004 - . **Coordinating Lead Author** (with Richard Wood) for Chapter 8 (Model Evaluation) of the IPCC Fourth Assessment Report. Member, Advisory Board for the Earth and Sun Systems Laboratory, National Center for Atmospheric Research, 2006-. **Chair**, Advisory Committee for the Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, 2003-. Member and former **Chair** (1993-1995), Scientific Computing Division Advisory Panel. **Chair**, U. S. Department of Energy Oversight Committee for CAPT. Member, External Review Panel for NOAA's Climate Diagnostics Center, 2001. Member, GEWEX Scientific Steering Group, 2001 - 2006. **Chief Editor**, *J. Climate* 1995 - 2004. **Chair**, Information Systems Committee, American Meteorological Society, 2001-2005. Member, GISS External Advisory Panel, 2000 - 2003. Member, Directorate Review Committee, Fundamental Science Directorate, Pacific Northwest National Laboratories. **Chair** ARM Science Team Executive Committee, 1993 - 1995. **Chair**, GEWEX Modeling and Prediction Panel, 1997 - 2002. Member, American Meteorological Society Awards Committee, 1997. **Chair**, Advisory Panel for Center for Clouds, Chemistry, and Climate (C⁴), 1997 - 1999 (Member since 1994). Member, Scientific Steering Committee for the Climate System Model, 1996 -2001. **Co-Chair**, Atmospheric Model Working Group, Climate System Model, 1996 - 2002. Member, Information Systems Committee, American Meteorological Society, 1997. **Chair**, GEWEX Cloud Systems Study Science Panel, 1996 - 2000. Member, Atmospheric Model Intercomparison Project Panel, 1995-1997. **Co-Chair**, Science Working Group for SHEBA (Surface Heat Balance of the Arctic) Project, 1994-1996. **Co-Chair**, FIRE Science Team, 1983 - 2000. For DOE's CHAMMP Project, Coordinator for Atmospheric GCM Research and Liaison with ARM Science Team. **Guest Editor**, *J. Atmos. Sci.*, 1994. Member, Working Group on Numerical Experimentation (WGNE) of the World Climate Research Program, 1994 - 1997. Member, AMS Committee on Tropical Meteorology and Tropical Cyclones, 1994. Participant, ASTEX Field Program, 1992. **Chair**, College of Engineering Computing Committee, 1989-1991. **Panel Chair**, DOE Carbon Dioxide Research Program Workshop. Member, LITE Science Steering Group, National Aeronautics and Space Administration. **Chair**, Modeling Sub-Panel, Eos Interdisciplinary Review Panel, National Aeronautics and Space Administration. Member, Eos Review Group, National Aeronautics and Space Administration. **Associate Editor**, *J. Atmos. Sci.* Member, Source Evaluation Board, Support Contract for Global Modeling and Simulation Branch, NASA/Goddard Space Flight Center. Participant, FIRE Marine Stratocumulus Field Program, 1987. **Chair**, Science Requirements Committee for Next Generation Computer, NASA Space and Earth Sciences Computer Users Committee. **Chair and Co-Program Chair**, AMS Committee on Cloud Physics. Participant in various Workshops and Seminars at the European Centre for Medium Range Weather Forecasts since 1980. Member, National Research Council Advisory Panel for the International Satellite Cloud Climatology Project. Acting Head, Climate Modeling Group, Goddard Laboratory for Atmospheric Science. Scientific Visitor (two months), University of Stockholm, Sweden. Participant, Mesoscale Air-Sea Interaction Experiment (MASEX). Scientific Visitor (three months), National Center for Atmospheric Research. Secretary, Computer Users' Committee, Goddard Modeling and Simulation Facility. Scientific Visitor (two con-

secutive summers, three months each), National Center for Atmospheric Research. Member, Technical Evaluation Panel for High-Speed Vector Processing Computer System, NASA/ Goddard Space Flight Center. Consultant, Goddard Institute for Space Studies and Goddard Laboratory for Atmospheric Sciences.

Refereed Journal Publications

(Last five years)

1. Khairoutdinov, M., and D. A. Randall, 2003: Cloud-resolving modeling of ARM Summer 1997 IOP: Model formulation, results, uncertainties and sensitivities. *J. Atmos. Sci.*, **60**, 607-625.
2. Randall, D. A., J. Curry, P. G. Duynkerke, S. Krueger, B. Ryan, D. Starr, M. Miller, W. B. Rossow, and B. A. Wielicki, 2003: Confronting models with data: The GEWEX Cloud Systems Study. *Bull. Amer. Meteor. Soc.*, **84**, 455-469.
3. Randall, D. A., and K. Emanuel, 2003: The Journal of the American Meteorological Society. *Bull. Amer. Meteor. Soc.*, 1093-1094.
4. Randall, D. A., M. Khairoutdinov, A. Arakawa, and W. Grabowski, 2003: Breaking the cloud-parameterization deadlock. *Bull. Amer. Meteor. Soc.*, **84**, 1547-1564.
5. DeMott, C., and D. A. Randall, 2004: Observed variations in tropical CAPE. *J. Geophys. Res.*, **109**, D02102, doi: 10.1029/2003JD003784.
6. Haertel, P. T., D. A. Randall, and T. G. Jensen, 2004: Toward a Lagrangian ocean model: Simulating upwelling in a large lake using slippery sacks. *Mon. Wea. Rev.*, **132**, 66-77.
7. Iorio, J. P., P. B. Duffy, B. Govindasamy, S. L. Thompson, M. Khairoutdinov, and D. A. Randall, 2004: Effects of model resolution and subgrid-scale physics on the simulation of daily precipitation in the continental United States. *Climate Dynamics*, **23**, 243-258.
8. Randall, D. A., and W. H. Schubert, 2004: Dreams of a stratocumulus sleeper. In *Atmospheric Turbulence and Mesoscale Meteorology*, Cambridge University Press.
9. Raisanen, P., H. W. Barker, M. F. Khairoutdinov, J. Li, and D. A. Randall, 2004: Stochastic generation of subgrid-scale cloudy columns for large-scale models. *Quart. J. Roy. Meteor. Soc.*, **130**, 2047-2068.
10. Xie, S., M. Zhang, M. Branson, R. T. Cederwall, A. D. Del Genio, Z. A. Eitzen, S. J. Ghan, S. F. Iacobellis, K. L. Johnson, M. Khairoutdinov, S. A. Klein, S. K. Krueger, W. Lin, U. Lohmann, M. A. Miller, D. A. Randall, R. C. J. Somerville, Y. C. Sud, G. K. Walker, A. Wolf, X. Wu, K.-M. Xu, J. J. Yio, G. Zhang, and J. Zhang, 2005: Simulations of midlatitude frontal clouds by SCMs and CRMs during the ARM March 2000 Cloud IOP. *J. Geophys. Res.* **110**, D15S03, doi:10.1029/2004JD005119.
11. Cole, J. N., H. W. Barker, D. A. Randall, M. F. Khairoutdinov, and E. Clothiaux, 2005: Interactions between Clouds and Radiation at Scales Unresolved by Global Climate Models. *Geophys. Res. Lett.*, **32**, L06703, doi:10.1029/2004GL020945.

12. Eitzen, Z., and D. A. Randall, 2005: Numerical simulations of the interactions between gravity waves and convection. *J. Atmos. Sci.*, **62**, 1480-1496.
13. Khairoutdinov, M., D. A. Randall, and C. DeMott, 2005: Simulation of the atmospheric general circulation using a cloud-resolving model as a super-parameterization of physical processes. *J. Atmos. Sci.*, **62**, 2136-2154.
14. Xu, K.-M., M. Zhang, Z. A. Eitzen, S. J. Ghan, S. A. Klein, X. Wu, S. Xie, M. Branson, A. D. Del Genio, S. F. Iacobellis, M. Khairoutdinov, W. Lin, U. Lohmann, D. A. Randall, R. C. J. Somerville, Y. C. Sud, G. K. Walker, A. Wolf, J. J. Yio, and J. Zhang, 2005: Modeling springtime shallow frontal clouds with cloud-resolving and single-column models. *J. Geophys. Res.*, **110**, D15S04, doi:10.1029/2004JD005153.
15. Lappen, C.-L., and D. A. Randall, 2005: Using idealized coherent structures to parameterize momentum fluxes in a PBL mass-flux model. *J. Atmos. Sci.*, **62**, 2829-2846.
16. Cole, J. N. S., H. W. Barker, W. O'Hirok, E. E. Clothiaux, M. F. Khairoutdinov, and D. A. Randall, 2005: Atmospheric radiative transfer through global arrays of 2D clouds. *Geophys. Res. Lett.*, **32**, L19817, doi:10.1029/2005GL023329.
17. Zupanski, M., S. J. Fletcher, I. M. Navon, B. Uzunoglu, R. P. Heikes, D. A. Randall, T. D. Ringler, and D. Daescu, 2006: Initiation of ensemble data assimilation. *Tellus*, **58A**, 159-170.
18. Ahlgrim, M., and D. A. Randall, 2006: Diagnosing monthly mean boundary-layer properties from re-analysis data using a bulk boundary-layer model. *J. Atmos. Sci.*, **63**, 998-1012.
19. Bony, S., R. Colman, V. M. Kattsov, R. P. Allen, C. S. Bretherton, J.-L. Dufresne, A. Hall, S. Hallegatte, M. M. Holland, W. Ingram, D. A. Randall, B. J. Soden, G. Tselioudis, and M. J. Webb, 2006: How well do we understand and evaluate climate change feedback processes? *J. Climate*, **19**, 3445-3482.
20. Lappen, C.-L., and D. A. Randall, 2006: Parameterization of pressure perturbations in a PBL mass flux model. *J. Atmos. Sci.*, **63**, 1726-1751.
21. Randall, D. A., M. E. Schlesinger, V. Galin, V. Meleshko, J.-J. Morcrette, and R. Wetherald, 2006: Cloud Feedbacks. In "*Frontiers in the Science of Climate Modeling*," J. T. Kiehl and V. Ramanathan, Eds., Cambridge University Press, pp. 217-250.
22. Khairoutdinov, M., and D. A. Randall, 2006: High-resolution simulations of shallow-to-deep convection transition over land. *J. Atmos. Sci.*, **63**, 3421-3436.
23. DeMott, C. A., D. A. Randall, and M. Khairoutdinov, 2007: Convective precipitation variability as a tool for general circulation model analysis. *J. Climate*, **20**, 91-112.
24. Stan, C., and D. A. Randall, 2007: Potential vorticity as a meridional coordinate. *J. Atmos. Sci.*, **64**, 621-633.
25. Toy, M., and D. A. Randall, 2007: Comment on the article "Vertical discretizations for compressible Euler equation atmospheric models giving optimal representation of normal modes" by Thuburn and Woolings. *J. Comp. Phys.*, **223**, 82-88.

26. Tulich, S. N., D. A. Randall, and B. E. Mapes, 2007: Vertical-mode and cloud decomposition of large-scale convectively coupled gravity waves in a two-dimensional cloud-resolving model. *J. Atmos. Sci.*, **64**, 1220-1229.
27. Benedict, J. J., and D. A. Randall, 2007: An analysis of the MJO based on TRMM rainfall data. *J. Atmos. Sci.*, **64**, 2332-2354.
28. Randall, D.A., R. A. Wood, S. Bony, R. Colman, T. Fichefet, J. Fyfe, V. Kattsov, A. Pitman, J. Shukla, J. Srinivasan, R. J. Stouffer, A. Sumi and K. E. Taylor, 2007: Climate Models and Their Evaluation. Chapter 8, pages 589-662, in: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. C. Marquis, K. B. Averyt, M. Tignor and H. L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.
29. Khairoutdinov, M., C. A. DeMott, and D. A. Randall, 2008: Evaluation of the simulated interannual and subseasonal variability in an AMIP-style simulation using the CSU Multiscale Modeling Framework. *J. Climate*, **21**, 413- 431.
30. Yamaguchi, T., and D. A. Randall, 2008: Large-eddy simulation of evaporatively driven entrainment in cloud-topped mixed layers. *J. Atmos. Sci.*, **65**, 1481–1504.
31. Teixeira, J., B. Stevens, C. S. Bretherton, R. Cederwall, J. D. Doyle, J. C. Golaz, A. Holtslag, S. Klein, J. Lundquist, D. A. Randall, A. P. Siebesma, and P. M. M. Soares, 2008: Parameterization of the atmospheric boundary layer: A view from just above the inversion. *Bull. Amer. Meteor. Soc.*, **89**, 453-458.
32. Tao, W.-K., J. Chern, R. Atlas, D. A. Randall, X. Lin, M. Khairoutdinov, J.-L. Li, D. E. Waliser, A. Hou, C. Peters-Lidard, W. Lau, and J. Simpson, 2008: A multi-scale modeling system: Developments, applications, and critical issues. *Bull Amer. Meteor. Soc.* (in press).
33. Toy, M. D., and D. A. Randall, 2009: Design of a non-hydrostatic atmospheric model based on a generalized vertical coordinate. Submitted to *Mon. Wea. Rev.*
34. Benedict, J., and D. A. Randall, 2009: MJO Structure in the Superparameterized CAM. In preparation.
35. Thayer-Calder, K., and D. A. Randall, 2009: The Role of Convective Moistening in the Formation and Progression of the MJO. In preparation.
36. DeMott, C., and D. A. Randall, 2009: Implied ocean heat transports in the standard and super-parameterized Community Atmosphere Models. In preparation.

Books

Randall, D. A., Ed., 2000: *General Circulation Model Development. Past, Present, and Future*. Academic Press, 807 pp.