George H. Bryan

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Curriculum Vitae
March 2024

Education

Ph.D., Meteorology, The Pennsylvania State University, December 2002
- Thesis: *An Investigation of the Convective Region of Numerically Simulated Squall Lines*
- Thesis Adviser: J. Michael Fritsch

M.S., Meteorology, The Pennsylvania State University, May 1998
- Thesis: *Discrete Frontal Propagation Induced by Convection*
- Thesis Adviser: J. Michael Fritsch

B.S., Meteorology, The Pennsylvania State University, May 1996
- With High Distinction and With Honors in Meteorology
- Minor in Geography
- Honors Thesis: *Meteorological Analysis of the 17 April 1995 Oklahoma Severe Storms*
- Honors Thesis Adviser: Gregory S. Forbes

Professional Experience

NSF National Center for Atmospheric Research
- Senior Scientist, 2017–present
- Scientist III, 2011–2017
- Scientist II, 2008–2011
- Scientist I, 2005–2008
- Postdoctoral Fellow, Advanced Study Program, 2003–2005

The Pennsylvania State University
- Graduate Research Assistant, 1996–2002
- Meteorological Observer, Department of Meteorology Weather Station, 1995–1996

University of Oklahoma and NOAA/National Severe Storms Laboratory
- Research Experience for Undergraduates Program, Summer 1995

Service

NSF National Center for Atmospheric Research
- Deputy Director, Mesoscale and Microscale Meteorology Laboratory, 2024–present
- Head, Dynamical & Physical Meteorology Section (MMM), 2020–present

- Deputy Head, Dynamical & Physical Meteorology Section (MMM), 2017–2020

Editorships
- Editor, *Monthly Weather Review* (American Meteorological Society), 2010–2015
- Associate Editor, *Atmospheric Science Letters* (Royal Meteorological Society), 2010–2014
- Associate Editor, *Monthly Weather Review* (American Meteorological Society), 2004–2010

American Meteorological Society
- Atmospheric Research Awards Committee: member, 2019–2022
- Conference on Hurricanes and Tropical Meteorology: member, Conference Committee: 2018, 2022
- STAC Committee on Mesoscale Processes: Member, 2005–2008
- 13th Conference on Mesoscale Processes (2009): member, Conference Committee
- 12th Conference on Mesoscale Processes (2007): member, Conference Committee

Field Projects
- VORTEX2, 2009–2010: Co-coordinator, mobile rawinsondes
- BAMEX, 2003: Co-coordinator, dropsonde aircraft
- VORTEX, 1995: REU participant (mobile mesonets, mobile rawinsondes, and ELDORA)

Pennsylvania State University
- Affiliate Professor of Meteorology and Atmospheric Science, 2022–present

Colorado State University
- Affiliate Faculty member, 2006–2009

Numerical model development and support
- Cloud Model 1 (CM1):
  - Primary developer and supporter of CM1, a numerical model for idealized research
  - CM1 has been used in more than 450 peer-reviewed journal articles
  - website: https://www2.mmm.ucar.edu/people/bryan/cm1/
- WRF:
  - Developed the tropical cyclone test case
  - Contributor to several schemes (subgrid turbulence parameterization, sixth-order diffusion scheme, Rayleigh damper)
  - Contributed to the WRF Technical Note

Honors and Awards

American Meteorological Society
- Clarence Leroy Meisinger Award, 2011
- Banner I. Miller Award, 2010
- Editor's Award, *Monthly Weather Review*, 2007
- Student Presentation Award, Conference on Severe Local Storms, 2000
- Graduate Fellowship, 1996–1998

Royal Meteorological Society
- Editor's Award, *Atmospheric Science Letters*, 2014

UCAR Outstanding Accomplishment Award
- Scientific and Technical Advancement, 2019

Mesoscale and Microscale Meteorology Laboratory, NCAR

- Outstanding Paper of the Year, 2015 (for Bryan and Morrison, 2012)
- Outstanding Paper of the Year, 2012 (for Bryan and Rotunno, 2009c)

The Pennsylvania State University

- College of Earth and Mineral Sciences 125th Anniversary Fellow, 2021
- Alumni Achievement Award, 2006
- Muan/Wilson Graduate Fellow Award, 2001
- Special Award for Teaching Support, 1999
- Robert O. Cole Award, 1996
- Outstanding Research Exhibit, Undergraduate Research Fair, 1996
- University Scholars Honors Degree, 1996

NOAA/National Weather Service

- Special Service Award, Eastern Region, 1999

Articles Submitted for Publication

1. Oguejiofor, C. N., **G. H. Bryan**, R. Rotunno, P. Sullivan, and D. H. Richter, 2023: The role of turbulence in an intense tropical cyclone: Momentum diffusion, eddy viscosities, and mixing lengths. Submitted to *J. Atmos. Sci.*

Peer-Reviewed Publications

83. Trier, S. B., D. A. Ahijevych, D. Carroll-Smith, **G. H. Bryan**, and R. D. Edwards, 2022: Composite mesoscale environmental conditions influencing tornado frequencies in landfalling tropical cyclones. *Wea. Forecasting*, **38,** 2481–2508,, doi:10.1175/WAF-D-22-0227.1.

82. Rozoff, C., D. S. Nolan, **G. H. Bryan,** E. A. Hendricks, and J. Knievel, 2023: Large-eddy simulations of the tropical cyclone boundary layer at landfall in an idealized urban environment. *J. Appl. Meteor. and Clim.,* **62,** 1457–1478, doi:10.1175/JAMC-D-23-0024.1.

81. Judt, F., R. Rios-Berrios, and **G. H. Bryan,** 2023: Marathon vs. sprint: Two modes of tropical cyclone rapid intensification in a global convection-permitting simulation. *Mon. Wea. Rev.,* 151, 2683–2699, doi:10.1175/MWR-D-23-0038.1.

80. Wang, A., Y. Pan, **G. H. Bryan**, and P. M. Markowski, 2022: Modeling near-surface turbulence in large-eddy simulations of a tornado: An application of thin-boundary-layer equations. *Mon. Wea. Rev.,* **151**, 1587–1607, doi:10.1175/MWR-D-22-0060.1

79. Rios-Berrios, R., F. Judt, **G. Bryan**, B. Madeiros, and W. Wang, 2022: Three-dimensional structure of convectively coupled equatorial waves in aquaplanet experiments with resolved or parameterized convection. *J. Clim.,* **36,** 2895–2915 doi:10.1175/JCLI-D-22-0422.1

78. Rios-Berrios, R., **G. H. Bryan**, B. Medeiros, and F. Judt, 2021: Differences in tropical rainfall in aquaplanet simulations with resolved or parameterized deep convection. *J. Adv. Model. Earth Syst.*, **14,** e2021MS002902, doi:10.1029/2021MS002902.

77. Chandrakar, K. K., H. Morrison, W. W. Grabowski, and **G. H. Bryan**, 2022: Comparison of Lagrangian "super-droplet" and Eulerian double-moment spectral microphysics schemes in large-eddy simulations of an isolated cumulus-congestus cloud. *J. Atmos. Sci.,* **79,** 1887–1910, doi:10.1175/JAS-D-21-0138.1.

76. Chen, X., **G. H. Bryan,** A. Hazelton, F. D. Marks, and P. Fitzpatrick, 2022: Evaluation and improvement of a TKE-based Eddy-Diffusivity Mass Flux (EDMF) planetary boundary layer scheme in hurricane conditions. *Wea. Forecasting,* **37,** 935–951, doi:10.1175/WAF-D-21-0168.1.

75. Nardi, K. M., C. M. Zarzycki, V. E. Larson, and **G. H. Bryan**, 2022: Assessing the sensitivity of the tropical cyclone boundary layer to the parameterization of momentum flux in the Community Earth System Model. *Mon. Wea. Rev.,* **150,** 883–906, doi:10.1175/MWR-D-21-0186.1.

74. Chandrakar, K. K., H. Morrison, W. W. Grabowski, and **G. H. Bryan**, 2022: Supersaturation variability from scalar mixing: Evaluation of a new subgrid-scale model using direct numerical simulations of turbulent Rayleigh-Bénard convection. *J. Atmos. Sci.,* **79,** 1191–1210, doi:10.1175/JAS-D-21-0250.1.

73. Stern, D. P., **G. H. Bryan**, C.-Y. Lee, and J. D. Doyle, 2021: Estimating the risk of extreme wind gusts in tropical cyclones using idealized large-eddy simulations and a statistical-dynamical model. *J. Atmos. Sci.,* **149,** 4183–4204, doi:10.1175/MWR-D-21-0059.1.

72. Chen, X., **G. H. Bryan**, J. A. Zhang, J. J. Cione, and F. D. Marks, 2020: A framework for simulating the tropical-cyclone boundary layer using large-eddy simulation and its use in evaluating PBL parameterizations. *J. Atmos. Sci.,* **78,** 3559–3574, doi:10.1175/JAS-D-20-0227.1.

71. Chen, X., and **G. H. Bryan**, 2021: Role of advection of parameterized turbulence kinetic energy in idealized tropical cyclone simulations. *J. Atmos. Sci.,* **78,** 3593–3611, doi:10.1175/JAS-D-21-0088.1.

70. Chandrakar, K. K., W. W. Grabowski, H. Morrison, and **G. H. Bryan**, 2020: Impact of entrainment-mixing and turbulent fluctuations on droplet size distributions in a cumulus cloud: An investigation using Lagrangian microphysics with a sub-grid-scale model. *J. Atmos. Sci.,* **78,** 2983–3005, doi:10.1175/JAS-D-20-0281.

69. Richter, D. H., C. Wainwright, D. P. Stern, **G. H. Bryan**, and D. Chavas, 2020: Potential low bias in high-wind drag coefficient inferred from dropsonde data in hurricanes. *J. Atmos. Sci.,* **78,** 2339–2352, doi:10.1175/JAS-D-20-0390.1.

68. Alland, J. J., B. H. Tang, K. L. Corbosiero, and **G. H. Bryan**, 2020: Combined effects of midlevel dry air and vertical wind shear on tropical cyclone development. Part I: Downdraft ventilation. *J. Atmos. Sci.*, **78,** 763–782, doi:10.1175/JAS-D-20-0054.1.

67. Alland, J. J., B. H. Tang, K. L. Corbosiero, and **G. H. Bryan**, 2020: Combined effects of midlevel dry air and vertical wind shear on tropical cyclone development. Part II: Radial ventilation. *J. Atmos. Sci.*, **78,** 783–796, doi:10.1175/JAS-D-20-0055.1.

66. Rousseau-Rizzi, R., R. Rotunno, and **G. H. Bryan**, 2020: A thermodynamic perspective on steady-state tropical cyclones. *J. Atmos. Sci.*, **78,** 583–593, doi:10.1175/JAS-D-20-0140.1.

65. Rios-Berrios, R., B. Medeiros, and **G. H. Bryan**, 2020: Mean climate and tropical rainfall variability in aquaplanet simulations using the Model for Prediction Across Scales – Atmosphere. *J. Adv. Model. Earth Syst.,* **12,** e2020MS002102, doi:10.1029/2020MS002102.

64. Wing, A. A., C. L. Stauffer, T. Becker, K. A. Reed, M.-S. Ahn, N. Arnold, S. Bony, M. Branson, **G. H. Bryan**, J.-P. Chaboureau, S. de Roode, K. Gayatri, C. Hohenegger, I.-K. Hu, F. Jansson, T. R. Jones, M. Khairoutdinov, D. Kim, S. Matsugishi, Z. Martin, B. Medeiros, H. Miura, Y. Moon, S. K. Muller, T. Ohno, M. Popp, T. Prabhakaran, D. Randall, R. Rios-Berrios, N. Rochetin, R. Roehrig, D. M. Romps, J. H. Ruppert, Jr., M. Satoh, L. G. Silvers, M. S. Singh, B. Stevens, L. Tomassini, C. C. van Heerwaarden, S. Wang, and M. Zhao, 2020: Clouds and convective self-aggregation in a multi-model ensemble of radiative-convective equilibrium simulations. *J. Adv. Model. Earth Syst.,* **12,** e2020MS002138, doi:10.1029/2020MS002138.

63. Stern, D. P., J. D. Kepert, **G. H. Bryan,** and J. D. Doyle, 2020: Understanding atypical mid-level wind speed maxima in hurricane eyewalls. *J. Atmos. Sci.,* **77,** 1531–1557, doi:10.1175/JAS-D-19-0191.1.

62. Rotunno, R., and **G. H. Bryan,** 2020: Numerical simulations of two-layer flow past topography. Part II: Lee vortices. *J. Atmos. Sci.,* **77,** 965–980, doi:10.1175/JAS-D-19-0142.1.

61. Kapoor, A., S. Ouakka, S. Arwade, J. Lundquist, M. Lackner, A. Myers, R. P. Worsnop, and **G. H. Bryan**, 2020. Hurricane eyewall winds and structural response of wind turbines. *Wind Energy Science,* **5,** 89–104, doi:10.5194/wes-5-89-2020.

60. Cione, J. J., **G. H. Bryan**, R. Dobosy, J. A. Zhang, G. de Boer, A. Aksoy, J. B. Wadler, E. A. Kalina, B. A. Dahl, K. Ryan, J. Neuhaus, E. Dumas, F. D. Marks, A. M. Farber, T. Hock, and X. Chen, 2020: Eye of the storm: Observing hurricanes with a small unmanned aircraft system. *Bull. Amer. Meteor. Soc.,* **101,** E186–E205, doi:10.1175/BAMS-D-19-0169.1.

59. Shi, X., R. M. Enriquez, R. L. Street, **G. H. Bryan**, and F. K. Chow, 2019: An implicit algebraic turbulence closure scheme for atmospheric boundary layer simulation. *J. Atmos. Sci.,* **76,** 3367–3386, doi:10.1175/JAS-D-18-0375.1.

58. Hutson, A., C. Weiss, and **G. Bryan,** 2019: Using mobile Doppler radar observations of gust fronts to infer buoyancy deficits within thunderstorm outflow. *Mon. Wea. Rev,* **147,** 3575–3594, doi:10.1175/MWR-D-18-0439.1.

57. Peng, K., R. Rotunno, **G. H. Bryan**, and J. Fang, 2019: Evolution of an axisymmetric tropical cyclone before reaching slantwise moist neutrality. *J. Atmos. Sci*, **76,** 1865–1884, doi:10.1175/JAS-D-18-0264.1.

56. Shi, X., F. K. Chow, R. L. Street, and **G. H. Bryan**, 2019: Key elements of turbulence closures for simulating deep convection at kilometer-scale resolution. *J. Adv. Model. Earth Syst.*, **11,** doi:10.1029/2018MS001446.

55. Morrison, H., M. Witte, **G. H. Bryan,** J. Y. Harrington, and Z. J. Lebo, 2018: Broadening of modeled cloud droplet spectra using bin microphysics in an Eulerian spatial domain. *J. Atmos. Sci.,* **75,** 4005–4030, doi:10.1175/JAS-D-18-0055.1.

54. Stern, D. P., and **G. H. Bryan**, 2018: Using simulated dropsondes to understand extreme updrafts and wind speeds in tropical cyclones. *Mon. Wea. Rev.,* **146,** 3901–3925, doi:10.1175/MWR-D-18-0041.1.

53. Peng, K., R. Rotunno, and **G. H. Bryan**, 2018: Evaluation of a time-dependent model for the intensification of tropical cyclones. *J. Atmos. Sci.,* **75,** 2125–2138, doi:10.1175/JAS-D-17-0382.1.

52. Shi, X., F. K. Chow, R. L. Street, and **G. H. Bryan**, 2018: An evaluation of LES turbulence models for scalar mixing in the stratocumulus-capped boundary layer. *J. Atmos. Sci.,* **75,** 1499–1507,10.1175/JAS-D-17-0392.1.

51. Rotunno, R., and **G. H. Bryan**, 2018: Numerical simulations of two-layer flow past topography. Part I. The lee-side hydraulic jump. *J. Atmos. Sci.,* **75,** 1231–1241, doi:10.1175/JAS-D-17-0306.1.

50. Shi, X., H. L. Hagen, F. K. Chow, **G. H. Bryan,** and R. L. Street, 2017: Large-eddy simulation of the stratocumulus-capped boundary layer with explicit filtering and reconstruction turbulence modeling. *J. Atmos. Sci.,* **75**, 611–637, doi:10.1175/JAS-D-17-0162.1.

49. Diao, M., **G. H. Bryan,** H. Morrison, and J. Jensen, 2017: Ice nucleation parameterization and relative humidity distribution in idealized squall line simulations. *J. Atmos. Sci.,* **74,** 2761–2787, doi:10.1175/JAS-D-16-0356.1.

48. Worsnop, R. P., J. K. Lundquist, **G. H. Bryan,** R. Damiani, and W. Musial, 2017: Gusts and shear within hurricane eyewalls can exceed offshore wind-turbine design standards. *Geophys. Res. Lett.,* **44,** 6413–6420, doi:10.1002/2017GL073537.

47. Worsnop, R. P., **G. H. Bryan,** J. K. Lundquist, and J. A. Zhang, 2017: Using large-eddy simulations to define spectral and coherence characteristics of the hurricane boundary layer for wind-energy applications. *Bound.-Layer Meteor.,* **165,** 55-86, doi:10.1007/s10546-017-0266-x.

46. Miyamoto, Y., **G. H. Bryan,** and R. Rotunno, 2017: An analytical model of maximum potential intensity for tropical cyclones incorporating the effect of ocean mixing. *Geophys. Res. Lett.,* **44**, 5826–5835, doi:10.1002/2017GL073670.

45. Rotunno, R., P. M. Markowski, and **G. H. Bryan,** 2017: "Near ground" vertical vorticity in supercell thunderstorm models. *J. Atmos. Sci.,* **74,** 1757-1766, doi:10.1175/JAS-D-16-0288.1.

44. **Bryan, G. H.,** N. A. Dahl, D. S. Nolan, and R. Rotunno, 2017: An eddy injection method for large-eddy simulations of tornado-like vortices. *Mon. Wea. Rev.,* **145,** 1937–1961, doi:10.1175/MWR-D-16-0339.1.

43. Nolan, D. S., N. A. Dahl, **G. H. Bryan,** and R. Rotunno, 2017: Tornado vortex structure, intensity, and surface wind gusts in large-eddy simulations with fully developed turbulence. *J. Atmos. Sci.,* **74,** 1573–1597, doi:10.1175/JAS-D-16-0258.1.

42. Dahl, N. A., D. S. Nolan, **G. H. Bryan,** and R. Rotunno, 2017: Using high-resolution simulations to quantify underestimates of tornado intensity from in situ observations. *Mon. Wea. Rev.,* **145,** 1963–1982, doi:10.1175/MWR-D-16-0346.1.

41. **Bryan, G. H.,** R. P. Worsnop, J. K. Lundquist, and J. A. Zhang, 2017: A simple method for simulating wind profiles in the boundary layer of tropical cyclones. *Bound.-Layer Meteor.,* **162,** 475–502, doi:10.1007/s10546-016-0207-0.

40. Rotunno, R., **G. H. Bryan**, D. S. Nolan, and N. A. Dahl, 2016: Axisymmetric tornado simulations at high Reynolds number. *J. Atmos. Sci.,* **73,** 3843–3854, doi:10.1175/JAS-D-16-0038.1.

39. Stern, D. P., **G. H. Bryan**, and S. D. Aberson, 2016: Extreme low-level updrafts and wind speeds measured by dropsondes in tropical cyclones. *Mon. Wea. Rev.,* **144,** 2177–2204, doi:10.1175/MWR-D-15-0313.1.

38. Markowski, P. M., and **G. H. Bryan**, 2016: LES of laminar flow in the PBL: A potential problem for convective storm simulations. *Mon. Wea. Rev.,* **144,** 1841–1850, doi:10.1175/MWR-D-15-0439.1.

37. Nowotarski, C. J., P. M. Markowski, Y. P. Richardson, and **G. H. Bryan**, 2015: Supercell low-level mesocyclones in simulations with a sheared convective boundary layer. *Mon. Wea. Rev.,* **143,** 272–297. doi:10.1175/MWR-D-14-00151.1.

36. Morrison, H., J. A. Milbrandt, **G. H. Bryan**, K. Ikeda, S. A. Tessendorf, and G. Thompson, 2015: Parameterization of cloud microphysics based on the prediction of bulk ice particle properties. Part 2: Case study comparisons with observations and other schemes. *J. Atmos. Sci.,* **72,** 312–339. doi:10.1175/JAS-D-14-0066.1.

35. Kalina, E. A., K. Friedrich, H. Morrison, and **G. H. Bryan**, 2014: Aerosol effects on idealized supercell thunderstorms in different environments. *J. Atmos. Sci.,* **71,** 4558–4580. doi:10.1175/JAS-D-14-0037.1.

34. Markowski, P., Y. Richardson, and **G. H. Bryan**, 2014: The origins of vortex sheets in a simulated supercell thunderstorm. *Mon. Wea. Rev.,* **142,** 3944–3954, doi:10.1175/MWR-D-14-00162.1.

33. Nowotarski, C. J., P. M. Markowski, Y. P. Richardson, and **G. H. Bryan**, 2014: Properties of a simulated convective boundary layer in an idealized supercell thunderstorm environment. *Mon. Wea. Rev.,* **142**, 3955–3976, doi:10.1175/MWR-D-13-00349.1.

32. **Bryan, G. H.,** and R. Rotunno, 2014: Gravity currents in confined channels with environmental shear. *J. Atmos. Sci.,* **71,** 1121–1142, doi:10.1175/JAS-D-13-0157.1.

31. **Bryan, G. H.,** and R. Rotunno, 2014: The optimal state for gravity currents in shear. *J. Atmos. Sci.,* **71,** 448–468, doi:10.1175/JAS-D-13-0156.1.

30. Muhlbauer, A., W. W. Grabowski, S. P. Malinowski, T. P. Ackerman, **G. H. Bryan**, Z. J. Lebo, J. A. Milbrandt, H. Morrison, M. Ovchinnikov, S. Tessendorf, J. M.. Theriault, and G. Thompson, 2013: Reexamination of the state of the art of cloud modeling shows real improvements *Bull. Amer. Meteor. Soc.,* **94,** ES45–ES48, doi:10.1175/BAMS-D-12-00188.1.

29. **Bryan, G. H.,** 2013: Comments on "Sensitivity of tropical-cyclone models to the surface drag coefficient." *Quart. J. Roy. Meteor. Soc.,* **139**, 1957–1960, doi:10.1002/qj.2066.

28. Rotunno, R., and **G. H. Bryan**, 2012: Effects of parameterized diffusion on simulated hurricanes. *J. Atmos. Sci.,* **69,** 2284–2299, doi:10.1175/JAS-D-11-0204.1.

27. **Bryan, G. H.,** 2012: Effects of surface exchange coefficients and turbulence length scales on the intensity and structure of numerically simulated hurricanes. *Mon. Wea. Rev.,* **140,** 1125–1143, doi:10.1175/MWR-D-11-00231.1.

26. **Bryan, G. H.**, and H. Morrison, 2012: Sensitivity of a simulated squall line to horizontal resolution and parameterization of microphysics. *Mon. Wea. Rev.,* **140,** 202–225, doi:10.1175/MWR-D-11-00046.1.

25. Kang, S.-L., and **G. H. Bryan**, 2011: A large eddy simulation study of moist convection initiation over heterogeneous surface fluxes. *Mon. Wea. Rev,* **139,** 2901–2917, doi:10.1175/MWR-D-10-05037.1.

24. Rotunno, R., J. B. Klemp, **G. H. Bryan**, and D. J. Muraki, 2011: Models of non-Boussinesq lock-exchange flow. *J. Fluid Mech.,* **675,** 1–26, doi:10.1017/jfm.2010.648.

23. **Bryan, G. H.**, and M. D. Parker, 2010: Observations of a squall line and its near environment using high-frequency rawinsonde launches during VORTEX2. *Mon. Wea. Rev.,* **138,** 4076–4097, doi:10.1175/2010MWR3359.1.

22. **Bryan, G. H.**, and R. Rotunno, 2009c: Evaluation of an analytical model for the maximum intensity of tropical cyclones. *J. Atmos. Sci.,* **66,** 3042–3060, doi:10.1175/2009JAS3038.1.

21. **Bryan, G. H.**, and R. Rotunno, 2009b: The maximum intensity of tropical cyclones in axisymmetric numerical model simulations. *Mon. Wea. Rev.,* **137,** 1770–1789, doi:10.1175/2008MWR2709.1.

20. **Bryan, G. H.**, and R. Rotunno, 2009a: The influence of near-surface, high-entropy air in hurricane eyes on maximum hurricane intensity. *J. Atmos. Sci.,* **66,** 148–158, doi:10.1175/2008JAS2707.1.

19. **Bryan, G. H.**, 2008: On the computation of pseudoadiabatic entropy and equivalent potential temperature. *Mon. Wea. Rev.,* **136,** 5239–5245, doi:10.1175/2008MWR2593.1.

18. **Bryan, G. H.**, and R. Rotunno, 2008: Gravity currents in a deep anelastic atmosphere. *J. Atmos. Sci.,* **65,** 536–556, doi:10.1175/2007JAS2443.1.

17. Kirshbaum, D. J., R. Rotunno, and **G. H. Bryan**, 2007: The spacing of orographic rainbands triggered by small-scale topography. *J. Atmos. Sci.,* **64,** 4222–4245, doi:10.1175/2007JAS2335.1.

16. Knievel, J. C., **G. H. Bryan**, and J. P. Hacker, 2007: Explicit numerical diffusion in the WRF Model. *Mon. Wea. Rev.,* **135,** 3808–3824, doi:10.1175/2007MWR2100.1.

15. Kirshbaum, D. J., **G. H. Bryan**, R. Rotunno, and D. R. Durran, 2007: The triggering of orographic rainbands by small-scale topography. *J. Atmos. Sci.,* **64,** 1530–1549, doi:10.1175/JAS3924.1.

14. **Bryan, G. H.**, R. Rotunno, and J. M. Fritsch, 2007: Roll circulations in the convective region of a simulated squall line. *J. Atmos. Sci.,* **64,** 1249–1266, doi:10.1175/JAS3899.1.

13. Trier, S. B., C. A. Davis, D. A. Ahijevych, M. L. Weisman, and **G. H. Bryan**, 2006: Mechanisms supporting long-lived episodes of propagating nocturnal convection within a 7-day WRF Model simulation. *J. Atmos. Sci.,* **63,** 2409–2435, doi:10.1175/JAS3768.1.

12. Schultz, D. M., K. M. Kanak, J. M. Straka, R. J. Trapp, B. A. Gordon, D. S. Zrnic, **G. H. Bryan**, A. J. Durant, T. J. Garratt, P. M. Klein, and D. K. Lilly, 2006: The mysteries of mammatus clouds: Observations and formation mechanisms. *J. Atmos. Sci.,* **63,** 2409–2435, doi:10.1175/JAS3758.1.

11. **Bryan, G. H.**, J. C. Knievel, and M. D. Parker, 2006: A multimodel assessment of RKW Theory's relevance to squall-line characteristics. *Mon. Wea. Rev.,* **134,** 2772–2792, doi:10.1175/MWR3226.1.

10. **Bryan, G. H.**, 2005: Spurious convective organization in simulated squall lines owing to moist absolutely unstable layers. *Mon. Wea. Rev.,* **133,** 1978–1997, doi:10.1175/MWR2952.1.

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Recent Presentations

Oral presentation, 2024 Tropical Cyclone Operations and Research Forum (TCORF) / Interdepartmental Hurricane Conference (IHC)

- Lakeland, FL: March 2024
- Title: Wind gusts in hurricanes according to large-eddy simulations

Oral presentation, 2023 HFIP Annual Meeting

- Miami, FL: November 2023
- Title: Model-observations synthesis using large-eddy simulations of hurricanes

Oral presentation, Symposium on tropical and extra-tropical cyclone impacts on future offshore wind energy

- Argonne National Laboratory, Lemont, IL: June 2023
- Title: Turbulence Kinetic Energy (TKE) in a large-eddy simulation of a tropical cyclone

Seminar, Stanford University, Department of Earth System Science

- Stanford, CA: May 2023
- Title: The budget of Turbulence Kinetic Energy (TKE) in a large-eddy simulation of a tropical cyclone

MMM Seminar, NCAR

- Boulder, CO: May 2023
- Title: The budget of Turbulence Kinetic Energy (TKE) in a large-eddy simulation of a tropical cyclone

Oral Presentation, 24th Symposium on Boundary Layers and Turbulence / 2023 AMS Annual Meeting

- Denver, CO: January 2023
- Title: On the importance of consistent numerical techniques for diagnosis and simulation of a convective boundary layer

Oral Presentation, AMS 35th Conference on Hurricanes and Tropical Meteorology

- New Orleans, LA: May 2022
- Title: Options for large-eddy simulations of hurricane boundary layers in CM1 (and other numerical models)

Colloquium, The Pennsylvania State University, Department of Meteorology and Atmospheric Science

- State College, PA: October 2021
- Title: Structure and dynamics of misovortices associated with near-surface wind gusts in large-eddy simulations of hurricanes

Oral Presentation, Joint WRF/MPAS Users' Workshop 2021

- Virtual meeting: June 2021
- Title: Evaluation of planetary boundary layer (PBL) parameterizations using large-eddy simulations (LES) in a broad range of conditions

Oral Presentation, 34rd Conference on Hurricanes and Tropical Meteorology

- Virtual meeting: April 2021
- Title: Coherent structures associated with extreme gust factors in large-eddy simulations of tropical cyclones

Seminar, MMM Dynamics Happy Hour

- Boulder, Colorado: April 2020

- Title: Using dropsondes and drones to understand the air-sea interface in hurricanes

Oral Presentation, 4th Convective Scale Modeling Workshop

- Boulder, Colorado: January 2020
- Title: Understanding and reducing biases in km-scale simulations of convection

Oral Presentation, 10th European Conference on Severe Storms

- Krakow, Poland: November 2019
- Title: An introduction to CM1

Seminar, Deutscher Wetterdienst (German Weather Service)

- Offenbach, Germany: October 2019
- Title: A mechanism for extraordinary wind gusts in tropical cyclones

Oral presentation, Mathematics of Weather Workshop

- Bad Orb, Germany: October 2019
- Title: Conservation of energy in numerical models accounting for hydrometeor friction and heat-content sedimentation

Oral presentation, 19th Cyclone Workshop

- Seeon, Germany: October 2019
- Title: A mechanism for extraordinary wind gusts in tropical cyclones

Colloquium, National Weather Center

- Norman, Oklahoma: September 2019
- Title: A mechanism for extraordinary wind gusts in tropical cyclones

Oral presentation, Richard Rotunno Symposium, 35th Conference on Alpine Meteorology

- Riva del Garda, Italy: September 2019
- Title: The anatomy of hydraulic jumps in the lee of topography

Oral presentation, 2019 NCAR/UCP Science & Discovery Day

- Boulder, CO: May 2019
- Title: Observing hurricanes with a small unmanned aircraft system