Curriculum Vita

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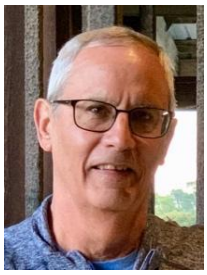

Education:

Belknap College	Meteorology	B.S.	1973
Massachusetts Institute of Technology	Meteorology	M.S.	1975
Massachusetts Institute of Technology	Meteorology	Sc.D.	1981

Professional Experience:

Meteorologist — July 1975 to July 1976
Center for Experiment Design and Data Analysis
NOAA/Environmental Data Service, Washington, DC

Research Meteorologist — July 1980 to present
Director — February 2003 to present
Hurricane Research Division
NOAA/Atlantic Oceanographic Meteorological Laboratory, Miami, FL

Adjunct Professor — September 1993 to present
Department of Meteorology and Physical Oceanography
Rosenstiel School for Marine and Atmospheric Sciences, University of Miami, Miami, FL

Fellow — January 1997 to present
Cooperative Institute for Marine and Atmospheric Studies
Rosenstiel School for Marine and Atmospheric Sciences, University of Miami, Miami, FL

Senior Fellow — July 1997 to 2012
Joint Institute for Marine and Atmospheric Research
University of Hawaii at Manoa, Honolulu, HI

Accomplishments:

Specialized in radar remote sensing (ground-based, airborne, and spaceborne) of tropical cyclones and mesoscale convective systems to understand the storm kinematic and precipitation structure.

Field Program Experience:

1980-present	NOAA Hurricane Field Program (>390 research missions in tropical cyclones) - director 1993-2001
1992-93	TOGA COARE (Solomon Islands)
1991	Convection and Precipitation Experiment (Florida)
1991	Tropical Experiment in Mexico (Acapulco, Mexico)
1987	Equatorial Mesoscale Experiment (Australia)
1986	Genesis of Atlantic Lows Experiment (North Carolina)
1985	Preliminary Regional Experiment for STORM-Central (Kansas)
1978-79	Winter Monsoon Experiment (Malaysia)
1974	GATE (Africa)

Honors and Awards:

2021	AMS Joanne Simpson Tropical Meteorology Research Award
2018	NOAA/OAR Dr. Daniel L. Albritton Outstanding Science Communicator Award
2015	U.S. Department of Commerce Gold Medal for developing and implementing the high-resolution HWRF model (group award)
2014	AMS Banner I. Miller Award (with Fuqing Zhang, Yonghui Weng, and John Gamache)

2012 NOAA Administrators Award for outstanding management of the G-IV Tail Doppler Radar project (group award)
2011 2010 NOAA/OAR Outstanding Scientific Paper Award for Weather and Water
2011 AMS Verner E. Suomi Award
2010 NOAA Distinguished Career Award
2008 NOAA Research Employee of the Year
2007 NOAA Bronze Medal for Hurricane Research Division Performance during Hurricanes Rita and Katrina (group award)
2005 NOAA Administrator's Award for establishing and administering the Joint Hurricane Testbed (group award)
2005 OFCM Richard H. Hagemeyer Award at the 59th Interdepartmental Hurricane Conference
2005 USWRP Joint Hurricane Testbed Outstanding Contributor Award
2003 NOAA Diversity Council Spectrum Achievement Award for Managers
2001 NOAA TECH 2002 award for best wireless application for development of satellite-cell based WLAN for NOAA WP-3D aircraft (group award)
1997 US Department of Commerce Silver Medal for performance as the Research Mission Manager for the NOAA High Altitude Jet procurement
1992 US Department of Commerce Gold Medal for Hurricane Research Division's Performance in Hurricane Andrew (group award)
1989 Distinguished Authorship Award, NOAA, Environmental Research Laboratories

AMS Activities:

2020-present Member, AMS Atmospheric Research Awards Committee (chair 2022)
2013-2016 Councilor, American Meteorological Society
2000-present Fellow, American Meteorological Society
1984-1991 Committee on Radar Meteorology, American Meteorological Society (Chairman 1987-1991)
1980-present member, Greater Miami Chapter of the American Meteorological Society (secretary 1981, chairman 1982)
1973-present member, American Meteorological Society
1971-1973 student member, American Meteorological Society

Professional Activities:

2020-present Editorial Committee, MAUSAM, Quarterly Journal of Meteorology, Hydrology, and Geophysics
2015-present Editorial Board, Tropical Cyclone Research and Review
2015-present NCAR EOL Airborne Phased Array Radar (APAR) Advisory Committee
2011-2012 NOAA Service Assessment Team for Hurricane Irene 2011, (Co-lead)
2010-2012 Review Team for NASA Earth Venture–1 Investigation: Hurricane and Severe Storm Sentinel (HS3)
2008-2017 Working Group for Tropical Cyclone Research (WG/TCR) for the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM), (Co-chairman)
2007-present NOAA Hurricane Forecast Improvement Program, (Research Lead)
2006 Guest Associate Editor, Special Issue on CAMEX, Journal of Atmospheric Science
2005-2007 Tropical Cyclone Joint Action Group (TC/JAG) for the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM), (Co-chairman)
2005-2014 NCAR EOL External Advisory Committee
2004 NOAA/National Weather Service Executive Leadership Seminar
2003-2012 NOAA G-IV tail Doppler radar procurement, (Research Mission Manager)
2001-2005 USWRP Joint Hurricane Testbed Steering Committee
1999-2008 NASA TRMM (Precipitation) Science Team
1999 Review Committee for NASA/GSFC Mesoscale Atmospheric Processes Branch
1998 UCAR Advanced Study Program (ASP) Summer Colloquium on Hurricanes at Landfall (co-organizer)
1997 USWRP Landfalling Hurricanes Workshop Organizing Team (Co-Chairman)
1996 USWRP Prospectus Development Team #5: Landfalling tropical cyclones, (Co-Chairman)
1996-2001 North American Atmospheric Observing System (NAOS), Test and Evaluation Working Group
1996 NSF Review panel for NCAR's Atmospheric Technology Division, (Chairman)

1995	Committee of Visitors, Review of the NSF Division of Atmospheric Sciences' Lower Atmospheric Research Section
1993-1997	NOAA mid-size jet procurement, (Research Mission Manager)
1992-1994	Observing Facility Advisory Panel, NCAR/ATD (Chairman 1994)

Publications (Books and Refereed Journals)

1. Marks, F. D., J. A. Zhang, and P. Dodge, 2021: The atmospheric boundary wind layer structure at the landfall of Hurricane Fran (1996) from WSR-88D radar observations. *Mon. Wea. Rev.*, (revised).
2. Fitzpatrick, P., Y. Lau, G. Alaka, and F. Marks, 2021: A multi-metric ranking technique for comparing forecast products applied to 2017 Atlantic tropical cyclone guidance. *Wea. Forecasting*. (revised)
3. Mohanty, S., G. Halliwell, S. Gopalakrishnan, J. Dong, H. S. Kim, F. Marks, U.C. Mohanty, and S. Sil, 2021: Impact of different Bay of Bengal ocean conditions on tropical cyclone intensity and the foreced ocean response using coupled HWRF-HYCOM prediction system. *J. Atmos. Res.*, (submitted)
4. Chen, X., G. H. Bryan, J. A. Zhang, J. J. Cione, and F. D. Marks, 2021: Evaluation of planetary boundary layer schemes in hurricane conditions using observations and large-eddy simulations. *J. Atmos. Sci.,* (revised).
5. Zhu, P., A. Hazelton, Z. Zhang, F. Marks, and V. Tallapragada, 2021:The Role of Eyewall Turbulent Transport in the Pathway to Intensification of Tropical Cyclones. *J. Geophys. Res.*, **126**, e2021JD034983. doi: https://doi.org/10.1029/2021JD034983
6. Chen, X., M. Xue, B. Zhou, J. Fang, J. A. Zhang, and F. D. Marks, 2021: Effect of Scale-Aware Planetary Boundary Layer Schemes on Tropical Cyclone Intensification and Structural Changes in the Gray Zone. *Mon. Wea. Rev.*, **149**, 2079–2095. doi:https://doi.org/10.1175/MWR-D-20-0297.1
7. Christophersen, H. W., B. A.Dahl, J. P. Dunion, R. F. Rogers, F. D. Marks, R. Atlas, and W. J. Blackwell, 2021: Impact of TROPICS Radiances on Tropical Cyclone Prediction in an OSSE, *Mon. Wea. Rev.*, **149**, 2279–2298, doi: https://doi.org/10.1175/MWR-D-20-0339.1.
8. Chen, X., J.-F. Gu, J. A. Zhang, F. D. Marks, R. F. Rogers, and J. J. Cione, 2021: Boundary Layer Recovery and Precipitation Symmetrization Preceding Rapid Intensification of Tropical Cyclones under Shear, *J. Atmos. Sci.,***78**, 1523-1544, doi: https://doi.org/10.1175/JAS-D-20-0252.1.
9. Bhalachandran, S., R. Nadimpalli, K. K. Osuri, S. Subramanian, S. Gopalakrishnan, F. D. Marks, U. C. Mohanty, and D. Niyogi, 2020: Author Correction: On the processes influencing rapid intensity changes of tropical cyclones over the Bay of Bengal, *Nature Scientific Reports*, Article 3382. doi: https://doi.org/10.1038/s41598-020-77009-x.
10. Zhang, J.A., E. A. Kalina, M. K. Biswas, R. F. Rogers, P. Zhu, F. D. Marks, 2020: A Review and Evaluation of Planetary Boundary Layer Parameterizations in Hurricane Weather Research and Forecasting Model Using Idealized Simulations and Observations. *Atmos.,* **11**, 1091. doi: https://doi.org/10.3390/atmos11101091.
11. Hazelton, A., Z. Zhang, B. Liu, J. Dong, G. Alaka, W. Wang, T. Marchok, A. Mehra, S. Gopalakrishnan, X. Zhang, M. Bender, V. Tallapragada, and F. Marks, 2021: Atlantic hurricane forecasts from the Global-Nested Hurricane Analysis and Forecast System (HAFS): Composite statistics and key events. *Wea. Forecasting*, **36**, 519-538. doi: https://doi.org/10.1175/WAF-D-20-0044.1.
12. Leighton, H., R. Black, X. Zhang, F. D. Marks, and S. G. Gopalakrishnan, 2020: Ice Particle Size Distributions from Composites of Microphysics Observations Collected in Tropical Cyclones. *Geophys. Res. Lett*., 47, e2020GL088762. https://doi.org/10.1029/2020GL088762.
13. Ko, M.-C., F. D. Marks, G. J. Alaka, Jr., and S.G. Gopalakrishnan, 2020: Evaluation of Hurricane Harvey (2017) Rainfall in Deterministic and Probabilistic HWRF Forecasts. *Atmos.,* **11**, 666; doi: https://doi.org/10.3390/atmos11060666.
14. Dong, J., B. Liu, Z. Zhang, W. Wang, A. Mehra, A. Hazelton, H. Winterbottom, L. Zhu, K. Wu, C. Zhang, V. Tallapragada, X. Zhang, S. Gopalakrishnan, F. Marks, 2020: The Evaluation of Real-time Hurricane Analysis and Forecast System (HAFS) Stand-Alone Regional (SAR) model performance in 2019 Atlantic Hurricane Season. *Atmos.*, **11**, 617, doi: https://doi.org/10.3390/atmos11060617.
15. Alford, A. A., J. A. Zhang, M. I. Biggerstaff, P. P. Dodge, F. D. Marks, and D. J. Bodine, 2020: Transition of the Hurricane Boundary Layer During the Landfall of Hurricane Irene (2011). *Mon. Wea. Rev.*, **148**, 3509–3531, doi: https://doi.org/10.1175/JAS-D-19-0290.1.

16. Hristova-Veleva, S. M. P. Peggy Li, B. Knosp, Q. A. Vu, F. J. Turk, W. L. Poulsen, Z. S. Haddad, B. H. Lambrigtsen, B. W. Stiles, T.-P. J. Shen, N. Niamsuwan, S. Tanelli, O. O. Sy, H. Su, D. G. Vane, Y. Chao, P. S. Callahan, R. S. Dunbar, M. Montgomery, M. Boothe, V. Tallapragada, S. Trahan, A. J. Wimmers, R. Holz, J. Reid, F. Marks, T. Vukicevic, S. Bhalachandran, H. Leighton, S. G. Gopalakrishnan, A. Navarro, F. J. Tapiador, 2020: An Eye on the Storm: Integrating a Wealth of Data for Quickly Advancing the Physical Understanding and Forecasting of Hurricanes. *Bull. Amer. Meteor. Soc*., **101**, E1718–E1742. doi: https://doi.org/10.1175/BAMS-D-19-0020.1.
17. Vigh, J. L., N. M. Dorst, C. L. Williams, D. P. Stern, E. W. Uhlhorn, B. W. Klotz, J. Martinez, H. E. Willoughby, F. D. Marks, Jr., D. R. Chavas, 2020: FLIGHT+: The Extended Flight Level Dataset for Tropical Cyclones (Version v1.3). Tropical Cyclone Data Project, National Center for Atmospheric Research, Research Applications Laboratory, Boulder, Colorado. [Available online at: http://dx.doi.org/10.5065/D6WS8R93.]
18. Hazelton, A., X. Zhang, S. Gopalakrishnan, F. Marks, W. Ramstrom, and J. Zhang, 2020: High-resolution ensemble HFV3 forecasts of Hurricane Michael (2018): Rapid intensification in moderate to strong shear, *Mon. Wea. Rev.*, **148**, 2009–2032. doi: https://doi.org/10.1175/MWR-D-19-0275.1.
19. Balachandran, S., D. R. Chavas, F. D. Marks, S. Dubey, A. Shreevastava, and T. N. Krishnamurti, 2020: Characterizing the energetics of multi-scale asymmetries during tropical cyclone rapid intensity changes, *J. Atmos. Sci*., **77**, 315-336. doi: https://doi.org/10.1175/JAS-D-19-0067.1.
20. 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: https://doi.org/10.1175/BAMS-D-19-0169.1.
21. Gopalakrishnan, S. G., K. K. Osuri, F. D. Marks, and U. C. Mohanty, 2019: An inner-core analysis of the axisymmetric and asymmetric intensification of tropical cyclones: Influence of shear. *Mausam: Quarterly Journal of Meteorology, Hydrology and Geophysics,* **70**, 667-690. https://metnet.imd.gov.in/imdmausam/.
22. Alaka, G. J., X. Zhang, S. G. Gopalakrishnan, Z. Zhang, F. D. Marks, and R. Atlas, 2019: Hurricane Joaquin track forecasts in an experimental HWRF ensemble prediction system. *Wea. Forecasting*, **34**, 1889-1908. doi: https://doi.org/10.1175/WAF-D-19-0028.1.
23. Zhu, P., B. Tyner, J.A. Zhang, E. Aligo, S. Gopalakrishnan, F.D. Marks, A. Mehra, and V. Tallapragada, 2019: Role of eyewall and rainband eddy forcing in tropical cyclone intensification. *Atmos. Chem. Phys.,* **19**, 14289–14310, doi: https://doi.org/10.5194/acp-19-14289-2019.
24. Balachandran, S., P. S. C. Rao, and F. D. Marks, 2019: Conceptual framework for the scale-specific stochastic modeling of transitions in tropical cyclone intensities. *Earth and Space Science*, **6**, 972-981. doi: https://doi.org/10.1029/2019EA000585.
25. Chen, X., J. A. Zhang, and F. D. Marks, 2019: A thermodynamic pathway leading to rapid intensification of tropical cyclones in shear. *Geophys. Res. Lett.,* **46**, 9241-9251. doi: https://doi.org/10.1029/2019GL083667.
26. Bhalachandran, S., R. Nadimpalli, K. K. Osuri, S. Subramanian, S. Gopalakrishnan, F. D. Marks, U. C. Mohanty, and D. Niyogi, 2019: On the processes influencing rapid intensity changes of tropical cyclones over the Bay of Bengal. *Nature Scientific Reports*, Article 3382. doi: https://doi.org/10.1038/s41598-019-40332-z.
27. Bhalachandran, S., Z. Haddad, S. Hristova-Veleva, and F. Marks, 2018: The relative importance of factors influencing tropical cyclone rapid intensity changes. *Geophys. Res. Lett*., 2282-2292 doi: https://doi.org/10.1029/2018GL079997.
28. Tang, J., J. A. Zhang, C. Kieu, and F. D. Marks, 2018: Sensitivity of Hurricane Intensity and Structure to Two Types of Planetary Boundary Layer Parameterization Schemes in Idealized HWRF Simulations. *Trop. Cyclone Res. and Rev*., **7**, 201-211., doi: https://doi.org/10.6057/2018TCRR04.01 or https://www.sciencedirect.com/science/article/pii/S2225603219300037
29. Bhalachandran, S., Z. S. Haddad, S. Hristova-Veleva, F. D. Marks, 2018: A low-wavenumber analysis of the environmental and vortex-scale variables responsible for rapid intensity changes in landfalling tropical cyclones", *Proc. SPIE 10782, Remote Sensing and Modeling of the Atmosphere, Oceans, and Interactions VII*, 3382. doi: https://doi.org/10.1117/12.2500290.
30. Tang, J., J. A. Zhang, S. D. Aberson, F. D. Marks, and X. lei, 2018: Multi-layer tower observations of vertical eddy diffusivity and mixing length in the tropical cyclone boundary layer during landfalls. *J. Atmos. Sci.*, **75**, 3159–3168. doi: https://doi.org/10.1175/JAS-D-17-0353.1.
31. Bowers, G. S., D. M. Smith, N. A. Kelley, G. F. Martinez-McKinney, S. A. Cummer, J. R. Dwyer, S. Heckman, R. H. Holzworth, F. Marks, P. Reasor, J. Gamache, J. Dunion, T. Richards, and H. K. Rassoul, 2018: A downward beam

of energetic positrons from the eyewall of Hurricane Patricia. *J. Geophys. Res.,* **123**, 4977-4987. doi: https://dx.doi.org/10.1029/2017JD027771.

32. Tyner, B., P. Zhu, J. A. Zhang, S. Gopalakrishnan, F. D. Marks, and V. Tallapragada, 2018: A Top-Down Pathway to Secondary Eyewall Formation in Simulated Tropical Cyclones. *J. Geophys. Res.,* **123**, 174-197. https://dx.doi.org/10.1002/2017JD027410.
33. Tratt, D. M., J. A. Hackwell, B. L. Valant-Spaight, R. L. Walterscheid, L. J. Gelinas, J. H. Hecht, C. M. Swenson, C. P. Lampen, M. J. Alexander, L. Hoffmann, D. S. Nolan, S. D. Miller, J. L. Hall, R. Atlas, F. D. Marks, and P. T. Partain, 2018: GHOST: A Satellite Mission Concept for Persistent Monitoring of Stratospheric Gravity Waves Induced by Severe Storms. *Bull. Amer. Meteor. Soc*., **99**, 1813-1828. doi: https://dx.doi.org/10.1175/BAMS-D-17-0064.1.
34. Blackwell, W. J., S. Braun, R. Bennartz, C. Velden, M. DeMaria, R. Atlas, J. Dunion, F. Marks, R. Rogers, and B. Annane, 2018: An overview of the TROPICS NASA Earth Venture mission. *Quart. J. Roy. Met. Soc.*, 1–11. doi: https://doi.org/10.1002/qj.3290.
35. Tyner, B., P. Zhu, J. A. Zhang, S. Gopalakrishnan, F. D. Marks, and V. Tallapragada, 2018: Sensitivity of tropical cyclone secondary eyewall formation in the HWRF system to snow fall speed. *J. Geophys. Res.*, **123**, 174-197. doi: https://dx.doi.org/10.1002/2017JD027410.
36. W. J. Blackwell, S. Braun, B. Zavodsky, C. Velden, T. Greenwald, D. Herndon, R. Bennartz, M. DeMaria, G. Chirokova, R. Atlas, J. Dunion, F. Marks, R. Rogers, H. Christophersen, B. Annane, 2018: Overview of the NASA TROPICS CubeSat constellation mission. *Proc. SPIE 10769, CubeSats and NanoSats for Remote Sensing II,* 1076908. doi: https://doi.org/10.1117/12.2320333.
37. Zhang, J. A., F. D. Marks, J. A. Sippel, X. Zhang, G. S. Gopalakrishnan, R. F. Rogers, and Z. Zhang, 2018: Improving hurricane model physics using aircraft observations: horizontal diffusion parameterization in HWRF. *Wea. Forecasting*, **33**, 317-329. doi: https://doi.org/10.1175/WAF-D-17-0097.1.
38. Soukup, G. A., and F. D. Marks, 2017: Evaluation of hurricane wind speed analyses in a simulation of Hurricane Earl (2010) using low order wavenumbers. *Mon. Wea. Rev*., **145**, 3223-3245 doi: https://dx.doi.org/10.1175/MWR-D-14-00281.1.
39. Alaka, G. J., X. Zhang, S. G. Gopalakrishnan, S. B. Goldenberg, and F. D. Marks, 2017: Performance of Atlantic basin track forecasts from the 2013 basin-scale HWRF. *Wea. Forecasting*, **32**, 1253-1271 doi: https://dx.doi.org/10.1175/WAF-D-16-0150.1.
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41. Marks, F. D., 2016: Advancing the understanding and prediction of tropical cyclones using aircraft observations, *Advanced Numerical Modeling and Data Assimilation Techniques for Tropical Cyclone Prediction*. Ed: S. Gopalakrishnan and U. C. Mohanty, Springer Netherlands**,** ISBN: 978-94-024-0896-6
42. Kellner, O., D. Niyogi, and F. D. Marks, 2016: Land-falling Tropical System Rainfall Contribution to the Hydroclimate of the Eastern U.S. Corn Belt 1981-2012, *Wea. Clim. Extremes*, 54-67. doi: https://dx.doi.org/10.1016/j.wace.2016.06.001.
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44. Zhu, P., Z. Zhu, S. Gopalakrishnan, R. Black, F. D. Marks, V. Tallapragada, J. A. Zhang, X. Zhang, and C. Gao, 2016: Impact of subgrid-scale processes on eyewall replacement cycle of tropical cyclones in HWRF system, *Geophys. Res. Lett*., **42**, 10,027–10,036, doi: https://dx.doi.org/10.1002/2015GL066436.
45. Zhang, J. A., and F. D. Marks, 2015: Sensitivity of tropical cyclone intensity change and structure to horizontal diffusion in idealized three-dimensional numerical simulations. *Mon. Wea. Rev*., **143**, 3981-3995. doi: https://dx.doi.org/10.1175/MWR-D-14-00341.1.
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