

# Curriculum Vitae

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## Education

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- **Doctor of Philosophy** (Atmospheric Science), August 2012  
Department of Atmospheric Science, Colorado State University, Fort Collins, CO  
Thesis Title: The Effects of Environmental Flow on the Internal Dynamics of Tropical Cyclones  
Thesis Advisor: Dr. Wayne H. Schubert
- **Master of Science** (Physics), May 2008  
Department of Physics and Astronomy, University of Texas – Rio Grande Valley, Brownsville, TX  
Thesis Title: A Statistical Analysis of Double White Dwarf Binaries in the LISA Gravitational  
Foreground  
Thesis Advisor: Dr. Matthew Benacquista
- **Bachelor of Science** (Mathematics & Physics), May 2006  
Morehouse College, Atlanta, GA

## Professional Employment

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- **The Citadel: Military College of South Carolina**, Charleston, SC  
Department of Applied Physics  
Assistant Professor of Physics, 2023 – present
- **College of Charleston**, Charleston, SC  
Department of Physics and Astronomy  
Associate Professor of Atmospheric Physics, 2019 – 2023  
Assistant Professor of Atmospheric Physics, 2013 – 2019
- **University of Louisiana at Monroe**, Monroe, LA  
Department of Atmospheric Science  
Assistant Professor of Atmospheric Science, 2012 – 2013

- **Front Range Community College**, Fort Collins, CO  
Mathematics and Science Program  
Adjunct Instructor of Physics and Meteorology, 2010 – 2011
- **University of Texas – Rio Grande Valley**, Brownsville, TX  
Department of Physics and Astronomy  
Physics Lecturer and Lab Instructor, 2006 – 2008

## Research Interests

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My area of research expertise is geophysical fluid dynamics. Current research projects include:

- Dynamics of rotating convection systems
- Boundary layer dynamics
- Tropical cyclone structure and dynamics
- Atmospheric radiation and convection
- Dynamics of mesoscale convective systems

## Research Publications

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### Peer-Reviewed Publications

1. **G. Williams**, 2024: The Adiabatic Evolution of 3D Annular Vortices with a Double-Eyewall Structure, *Dynamics*, <https://doi.org/10.3390/dynamics4030035>.
2. **G. Williams**, 2023: Idealized Simulations of the Boundary Layer Thermal Structure for a Landfalling Tropical Cyclone, *Meteorology and Atmospheric Physics*. <https://doi.org/10.1007/s00703-022-00943-0>.
3. **G. Williams**, 2022: Idealized Simulations of the Diurnal Variation within the Tropical Cyclone Boundary Layer, *Meteorology and Atmospheric Physics*. <https://doi.org/10.1007/s00703-022-00900-x>, pp. 1 – 26.
4. **G. Williams**, 2019: Idealized Simulations of the Inner Core Boundary Layer Structure in a Landfalling Tropical Cyclone. Part I: Kinematic Structure. *Tropical Cyclone Research and Review*. Volume 8, Issue 2, pp. 47 – 67.
5. **G. Williams**, 2019: The Generation and Maintenance of Hollow PV Towers in a Forced Primitive Equation Model. *Meteorology and Atmospheric Physics*. <https://doi.org/10.1007/s00703-019-00661-0>, pp. 1 – 25.

6. **G. Williams**, 2018: The Effects of Ice Microphysics on the Inner Core Thermal Structure of the Hurricane Boundary Layer. *Meteorology and Atmospheric Physics*, doi:10.1007/s00703-018-0616-3, pp. 1 – 17.
7. **G. Williams**, 2017: The Thermodynamic Evolution of the Hurricane Boundary Layer During Eyewall Replacement Cycles, *Meteorology and Atmospheric Physics*. 129:611 – 627 doi: 10.1007/s00703-016-0495-4, pp. 1 – 17.
8. **G. Williams**, 2016: Inner Core Thermodynamics of the Tropical Cyclone Boundary Layer, *Meteorology and Atmospheric Physics*, doi:10.1007/s00703-016-0441-5, pp.1 – 20.
9. **G. Williams**, 2015: The Effects of Vortex Structure and Vortex Translation on the Tropical Cyclone Boundary Layer Wind Field, *J. Adv. Model. Earth Syst.*, 07, doi:10.1002/2013MS000299.
10. **G. Williams** et al. 2013: Shock-like Structures in the Tropical Cyclone Boundary Layer. *J. Adv. Model. Earth Syst.*, 5, 338-353.
11. B. McNoldy, Z. Finch, D. Henderson, D. Lerach, R. Seigel, J. Steinweg-Woods, E. Stuckmeyer, D. Van Cleave, **G. Williams** et al. 2011: A High Wind Statistical Prediction Model for the Northern Front Range of Colorado. *Electronic Journal of Operational Meteorology*.
12. A. J. Ruiter, K. Belczynski, M. Benacquista, S. Larson, and **G. Williams**, 2010: The LISA Gravitational Wave Foreground: A Study of Double White Dwarfs. *The Astrophysical Journal*, 717:1006-1021.

## Non Peer-Reviewed Publications

13. **G. Williams**, 2017: The Generation and Maintenance of Hollow PV Towers in a Forced Primitive Equation Model. *Proceedings of the 2nd International Electronic Conference on Atmospheric Sciences*. Doi:10.3390/ecas2017-04149.
14. C. Slocum, **G. Williams**, R. Taft, and W. Schubert 2014: Tropical Cyclone Boundary Layer Shocks. arXiv:1405.7939 [physics.ao-ph].

## Awards and Grants

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1. 2023 Principal Investigator. “The Structure and Evolution of the Boundary Layer for Landfalling Tropical Cyclones.” Funded by The Swain Family School of Science and Mathematics along with the Lt. Col. James B. Near, Jr. Center for Climate Studies.
2. 2020 Co-Principal Investigator. “Acquisition of AWIPS II Edex Server and CAVE Client Computing Infrastructure at the College of Charleston.” Funded by UCAR Community Programs: UNIDATA Community Equipment Award. \$21,181.83

3. 2018 Principal Investigator. “The Structure and Evolution of the Hurricane Boundary Layer Near Landfall.” Funded by College of Charleston Faculty Research and Development Grant. \$2,680.00

## Presentations

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### Scientific and Conference Presentations

1. *Vortex Rossby Wave (VRW) Dynamics in Hurricane-Like Vortices*. Eleventh CMMAP Team Meeting Presentation, August 11, 2011.
2. *The Instability of Vortex Rings in Vertical Shear*. NCAR/NOAA/CSU TC Workshop. November 16, 2011.
3. *Shock-Like Structures in the Tropical Cyclone Boundary Layer*. National Weather Association, 38<sup>th</sup> Annual Meeting. October 17, 2013
4. *The Inner Core Thermal Structure of the Tropical Cyclone Boundary Layer*. 22<sup>nd</sup> Annual PAMS Allen Weber Mini-Technical Conference, March 4, 2016.
5. *The Thermodynamic Evolution of the Hurricane Boundary Layer During Eyewall Replacement Cycles*. 23<sup>rd</sup> Annual PAMS Allen Weber Mini-Technical Conference, March 2<sup>nd</sup>, 2017.
6. *The Generation and Maintenance of Hollow PV Towers in a Forced Primitive Equation Model*. The 2<sup>nd</sup> International Electronic Conference on Atmospheric Sciences, July 16<sup>th</sup> – 31<sup>st</sup>, 2017.
7. *The Thermodynamic Evolution of the Hurricane Boundary Layer During Eyewall Replacement Cycles*. 33<sup>rd</sup> Conference on Hurricanes and Tropical Meteorology, April 16<sup>th</sup> – 20<sup>th</sup>, 2018.
8. *The Thermodynamics of the Tropical Cyclone Boundary Layer*. Colorado State University Department of Atmospheric Science Colloquium, August 31<sup>st</sup>, 2018.
9. *The Inner-Core Thermodynamics of the Tropical Cyclone Boundary Layer*. The Wayne Schubert Symposium. 100<sup>th</sup> AMS Meeting, January 15<sup>th</sup>, 2020.
10. *Idealized Simulation of Diurnal Variation within the Tropical Cyclone Boundary Layer*. 1<sup>st</sup> Annual Southern Appalachian Weather and Climate Workshop, March 26<sup>th</sup>, 2022.
11. *Idealized Simulations of the Boundary Layer Structure for a Landfalling Tropical Cyclone*. 26<sup>th</sup> Annual Allen Weber Mini-Tech Meeting Agenda, March 23<sup>th</sup>, 2023.
12. *Idealized Simulations of the Boundary Layer Structure for a Landfalling Tropical Cyclone*. 2<sup>nd</sup> Annual Southern Appalachian Weather and Climate Workshop, April 14<sup>th</sup>, 2023.

13. *The Thermodynamic Evolution of the Boundary Layer for a Landfalling Hurricane*. 3<sup>rd</sup> Annual Southern Appalachian Weather and Climate Workshop, March 23<sup>rd</sup>, 2024.

## Local Presentations

14. *The Hazards and Impacts of Landfalling Hurricanes*. College of Charleston Faculty Lecture Series. September 16th, 2015.
15. *The Evolution of Hurricane Matthew Near Landfall*. South Carolina Alliance for Minority Participation (SCAMP) Meeting. October 24th, 2016.

## Courses Taught

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### Introductory Level

- Introduction to Meteorology (F2012, S2017)
- Introduction to Oceanography (F2012, S2013)
- Introduction to Solar System Astronomy (F2024)
- Introduction to Stars and Galaxies (S2024)
- Hurricanes and Their Impacts on Society (F2021, F2022)
- Introductory Physics I (Algebra-Based) (F2013, F2014, S2015, F2015, F2017, F2018, S2019, S2020, Su2023, F2023)
- Introductory Physics I Lab (Algebra-Based) (F2013, F2017, F2023, F2024)
- Introductory Physics II (Algebra-Based) (S2016, F2016)
- Introductory Physics II Lab (Algebra-Based) (S2014)
- General Physics I (Calculus Based) (F2007, F2019, F2020, S2021, S2022, S2023, F2023, F2024)
- General Physics I Lab (Calculus Based) (F2007, F2019, F2020, F2021, F2023, F2024)
- General Physics II (Calculus Based) (S2008)
- General Physics II Lab (Calculus Based) (S2008)
- General Meteorology (Calculus Based) (F2010, S2011)

### Intermediate/Advanced Level

- Broadcast Meteorology (F2018)
- Human and Atmosphere Interaction (Research Seminar) (F2012)
- Synoptic Meteorology (S2014, S2016, S2018, S2020, S2022, S2024)
- Climate (S2017)

- Numerical Weather Prediction (S2019)
- Atmospheric Physics (S2013)
- Fundamentals of Remote Sensing (S2024)
- Micrometeorology (S2013)
- Classical Mechanics (S2022, S2023)
- Electromagnetism I (F2014, F2015, F2016, F2017, F2018, F2020, F2021, F2022)
- Electromagnetism II (S2022)
- Mesoscale Meteorology (S2013, S2019, S2021, F2022)
- Thermal Physics (S2014, S2015, S2016, S2017, S2018, S2019, S2020, S2021, S2023, S2024)
- Tropical Meteorology (F2012)
- Fluid Mechanics (S2014, S2015)
- Statistical Mechanics (S2016, S2017)

## Student Research Projects

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1. Jared Marquis: Investigation of Strength, Intensity, and Integrated Kinetic Energy Associated with Hurricane Humberto (2008), 2013 – 2014.
2. Courtney Lawrence: Convection Associated with the Collision of Sea-Breeze Front and Gust Front on June 16<sup>th</sup>, 2014.
3. Isaac Gould: Analysis of Thermo-Mechanical Properties of Defected Graphene Using Molecular Dynamics Simulation., 2015 – 2016.
4. Danielle Masse: Computational Studies of Hemodynamical Flows in Idealized Abdominal Aortic Aneurysms with the Carreau-Yasuda Model, 2015 – 2016.
5. Linsey Passarella: Concurrent Observations of Eyewall Mesovortices and Concentric Eyewalls in Atlantic Hurricanes, 2015 – 2016.
6. Joseph Dibrigida: The Role of Warm Oceanic Eddies in the Rapid Intensification of Atlantic Hurricanes, 2016.
7. Joseph Dibrigida: Synoptic and Mesoscale Analysis of Folly Beach Waves, 2016 – 2017
8. O'Chun Jones: Synoptic Influences on the Tracks of Hurricane Harvey and Irma (2017), 2017 – 2018.
9. Trevor Gibbs: Coastal Marine Layer Influence on Incoming Zonal Severe Weather in the United States, 2018 – 2019.

10. William McLoud: Investigation of Barotropic Instability During the Eyewall Replacement Cycle of Mature Hurricanes, 2019
11. August Dale: The Effect of Urbanization on the Charleston Sea Breeze, 2019
12. Grant Farmer: An Assessment of the Influence of the El Nino/Southern Oscillation on the Frequency of Appalachian Cold Air Damming Events, 2019 – 2020
13. Tyniyah Goodlett: The Role of Convective Parameterization on Hurricane Track Forecasts of Major Atlantic Hurricanes for the 2017 Season, 2020
14. Max Zollinger: The Role of Oceanic Barrier Layers on Tropical Cyclone Intensity, 2021
15. Jon Leighton Gardner: The Effects of Tropical Cyclone Diurnal Cycle on the Tropical Cyclone Boundary Layer, 2021
16. Bruce Prince: Observational Analysis of Secondary Eyewall Formation and Inner Eyewall Dissipation, 2022.
17. Angela Nganga: Investigation of Barotropic Instability during Mature Hurricanes, 2022 – 2023.
18. MacDougall Lavoi: Evolution of Quasi-Linear Convective Systems (QLCS) in the Lowcountry, 2022 – 2023.
19. Max Zollinger: The Influence of the Marine Boundary Layer on Squall Line Evolution in the Lowcountry, 2023 – 2024.
20. Bruce Prince: Convective Parameters and Level of Risk Associated with Tornadic Activity in Chatham County, Georgia, 2023 – 2024.
21. Andy Gilles: Synoptic and Mesoscale Analysis of the April 12-13, 2020 South Carolina Lowcountry Tornado Outbreak. 2023 – 2024.
22. Mitchel Huott: A Model for Identifying Secondary Eyewalls in Hurricanes. 2023 – Current.
23. Tristan Eberbach: Transition of the Hurricane Boundary Layer during the Landfall of Hurricane Michael (2018). 2024 – Current.

## Professional Service

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## National and International Service

- Currently serves as peer-reviewer for the following journals and organizations:

- *Journal of Advances in Modeling Earth Systems*
- *Journal for Atmospheric Science*
- *Scientific Reports*
- *Atmosphere*
- *Energies*
- *Dynamics*
- Currently serves as ad-hoc grant review for *National Science Foundation Physics Meteorology Division*
- Served as Councilor for *Council on Undergraduate Research* from 2016 – 2019
- Member of American Geophysical Union (2015 – 2021)
- Member of American Meteorological Society (2014 – 2021)

## Service to the College of Charleston Department of Physics

- Air Quality Faculty Search Committee (2013 – 2014)
- Condensed Matter Physics Faculty Search Committee (2014 – 2015)
- Astronomy Faculty Search Committee (2016 – 2017)
- Astronomy Instructor Faculty Search Committee (2017 – 2018)
- Biophysics Faculty Search Committee (2021 – 2022)
- Chair of Physics Instructor Search Committee (2022)
- Atmospheric Physics Curriculum Committee (2013 – 2023)
- Resources and Awards Committee (2015 – Current)
  - Chair from 2015 – 2016 and 2019 – 2022
- Chair of the Assessment Committee (2015 – 2023)
- Physics Curriculum Committee (2019 – 2023)
  - Chair from 2022 – 2023
- Department Webmaster (2017 – 2023)

## Service to the College of Charleston Campus-Wide Committees

- Committee on Assessment of Institutional Effectiveness (2015 – 2018)
  - Secretary from 2017 - 2018
- School of Science and Mathematics Faculty Awards Selection Committee (2015 – 2022)
- Faculty Curriculum Committee (2018 – 2019)



- Faculty Hearing Committee Co-Chair (2020 – 2021)
- General Education Curriculum Committee (2021 – 2022)
- College Honor Board (2022 – 2023)

### Service to The Citadel Department of Applied Physics

- Physics Major Advisor (2023 – Current)

### Service to The Citadel Campus-Wide Committees

- Member of Faculty Award Committee (2023 – Present)
- Fellow of James Near Climate Center (2023 – Present)
- Member of Swain School Grants Committee (2023 – Present)
- Member of Enrollment Committee (2024 – Present)