

Curriculum Vitae

Gabriel J. Williams, Jr.

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Assistant Professor

The Citadel – The Military College of South Carolina

Department of Physics, Grimsley Hall

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Education

- **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

- **The Citadel: Military College of South Carolina**, Charleston, SC
Department of 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

My area of research expertise is in 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

Peer-Reviewed Publications

1. **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>.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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.

7. **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.
8. **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.
9. **G. Williams** et al. 2013: Shock-like Structures in the Tropical Cyclone Boundary Layer. *J. Adv. Model. Earth Syst.*, **5**, 338-353.
10. 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*.
11. 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

12. **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.
13. C. Slocum, **G. Williams**, R. Taft, and W. Schubert 2014: Tropical Cyclone Boundary Layer Shocks. arXiv:1405.7939 [physics.ao-ph].

Awards and Grants

1. 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
2. 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

Scientific and Conference Presentations

1. *Idealized Simulations of the Boundary Layer Structure for a Landfalling Tropical Cyclone*. 2nd Annual Southern Appalachian Weather and Climate Workshop, April 14th, 2023.

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

Local Presentations

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

Courses Taught

Introductory Undergraduate Level

- Introduction to Meteorology (F2012, S2017)
- Introduction to Oceanography (F2012, S2013)
- 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)
- 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)
- General Physics I Lab (Calculus Based) (F2007, F2019, F2020, F2021, F2023)
- General Physics II (Calculus Based) (S2008)
- General Physics II Lab (Calculus Based) (S2008)
- General Meteorology (Calculus Based) (F2010, S2011)

Intermediate/Advanced Undergraduate 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)
- Physical Meteorology (S2013)
- Boundary Layer Meteorology (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

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 16th, 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 McCloud: 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 Lavoie: Evolution of Quasi-Linear Convective Systems (QLCS) in the Lowcountry, 2022 – current.
19. Max Zollinger: The Influence of the Marine Boundary Layer on Squall Line Evolution in the Lowcountry, 2023 – current.

Professional Service

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*
- 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 – Present)
- Member of American Meteorological Society (2014 – 2023)

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 – 2023)

- 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

- Member of Faculty Award Committee (2023 – Present)