



Phillip M. Bitzer

## Professional Background

- Associate Professor* August 2017 - Present
- UAH Department of Atmospheric Science; Graduate Faculty
  - Specialities: Lightning Physics, Programming, Statistics
  - Graduate Faculty, University of Louisville
- Assistant Professor* August 2011 - July 2017
- UAH Department of Atmospheric Science; Graduate Faculty
- Research Associate* May 2010 - August 2011  
Earth System Science Center, University of Alabama in Huntsville, Huntsville, AL
- Teaching Assistant* August 2005 - December 2005  
Department of Physics, University of Alabama in Huntsville, Huntsville, AL
- Teacher, Coach* August 2003-July 2005  
Archbishop Hannan High School, Meraux, LA  
Taught Physics, Journalism, Earth Science, Louisiana History; Coached baseball, golf

## Degrees

- Bachelor of Science, Physics; Magma Cum Laude, August 2001  
Loyola University, New Orleans, LA;
- Master of Science, Physics; August 2007  
University of Alabama in Huntsville, Huntsville, AL
- Doctor of Philosophy, Physics; August 2011  
University of Alabama in Huntsville, Huntsville, AL  
Dissertation title: **New Revelations on Lightning Initiation and Evolution Using a Newly Developed Array of Wideband Electric Field Sensors**

## Teaching Activities

### *Courses Taught*

- ATS 673; Lightning
- ATS 606; Data Analysis in Atmospheric Science
- ATS 409/509; Application of Computers in Meteorology

### *Highlights*

- Developed new courses in Lightning and Data Analysis in Atmospheric Science; these were not previously offered by UAH Atmospheric Science
- Complete overhaul of Application of Computers in Meteorology; authored textbook for class
- Utilize aspects of *Peer Instruction* in all classes; wrote computer program for Application of Computers in Meteorology using these principles

## Research Grants and Contracts Received

- NOAA, Bayesian Merging of GLM data with Ground-Based Networks, \$319k, 08/2017-08/2020
- NOAA, Utilizing Sub-Flash Properties of GLM to Monitor Convective Intensity with Probabilistic Guidance, \$298k, 08/2017-08/2020 (co-I)
- United States Air Force 45th Weather Squadron, Performance Of GOES-16 Glm On Anvil Lightning And Merlin For Long Distance Lightning Aloft, \$31k, 07/2017-07/2018

NSF, Collaborative Research: Lightning as an agent of tropical tree mortality, \$349k, 01/2017-01/2020

UAH Honors Capstone, Arduino Electric Field Change Meter, 05/2017-08/2017

NSF, CAREER: Integrated instrumentation to investigate the electrical properties of lightning, \$748k, 06/2017-06/2022

NSF, Collaborative Research: Investigation of kinematic, microphysical and electrical processes leading to extreme lightning flash rates over Argentina using RELAMPAGO observations, \$580k, 08/2017-08/2021 (co-PI)

NASA, New Investigator Program: Detection and Applications of Continuing Current in Lightning Using LIS and GLM, \$270k, 08/2016-07/2019 (PI)

NASA, Use of Satellite-based Lightning Information To Understand Severe Thunderstorm Development and Tornadoic Potential, \$55k, 08/15-07/16 (co-I)

NASA, Evolution of Lightning Energetics and the Relationship to Severe Weather, \$298k, 08/15-06/18 (PI)

UAH-RCEU, Research and Creative Experiences for Undergraduates: The Physics of Lightning, 05-2015/08-2015 (PI)

DARPA, Research Proposal in Support of NIMBUS Activities, \$115k, 01/2015-03/2016 (co-PI)

NOAA, Toward an operation use of stroke level lightning data in severe weather forecasting, \$179k, 07/2014-07/2016 (PI)

NSF, Collaborative Research: The biology of lightning in tropical forests, \$105k, 06/2014-06/2016 (PI)

UAH-RIF, Research Infrastructure Fund: Investigations of High-Speed Lightning Processes using a High Speed Video Camera, \$99k, 08/2013-07/2014 (PI)

## Publications and Presentations

- Zhang, D., K. L. Cummins, P. Bitzer, and W. J. Koshak (2019), Evaluation of the performance characteristics of the lightning imaging sensor, *Journal of Atmospheric and Oceanic Technology*, doi: 10.1175/JTECH-D-18-0173.1
- Koshak, W. J., D. M. Mach, and P. M. Bitzer (2018), Mitigating vhf lightning source retrieval errors, *Journal of Atmospheric and Oceanic Technology*, 35(5), 1033–1052, doi: 10.1175/JTECH-D-17-0041.1
- Bitzer, P. M. (2017), Global distribution and properties of continuing current in lightning, *Journal of Geophysical Research: Atmospheres*, 122(2), 1033–1041, doi: 10.1002/2016JD025532
- Gjesteland, T., N. Østgaard, P. Bitzer, and H. J. Christian (2017), On the timing between terrestrial gamma ray flashes, radio atmospheric, and optical lightning emission, *Journal of Geophysical Research: Space Physics*, 122(7), 7734–7741, doi: 10.1002/2017JA024285
- Gora, E. M., P. M. Bitzer, J. C. Burchfield, S. A. Schnitzer, and S. P. Yanoviak (2017), Effects of lightning on trees: A predictive model based on in situ electrical resistivity, *Ecology and Evolution*, 7(20), 8523–8534, doi: 10.1002/ece3.3347
- Mecikalski, R. M., P. M. Bitzer, and L. D. Carey (2017), Why flash type matters: A statistical analysis, *Geophysical Research Letters*, 44(18), 9505–9512, doi: 10.1002/2017GL075003
- Stough, S. M., L. D. Carey, C. J. Schultz, and P. M. Bitzer (2017), Investigating the relationship between lightning and mesocyclonic rotation in supercell thunderstorms, *Weather and Forecasting*, 32(6), 2237–2259, doi: 10.1175/WAF-D-17-0025.1

- Yanoviak, S. P., E. M. Gora, J. M. Burchfield, P. M. Bitzer, and M. Detto (2017), Quantification and identification of lightning damage in tropical forests, *Ecology and Evolution*, 7(14), 5111–5122, doi: 10.1002/ece3.3095
- Bitzer, P. M., J. C. Burchfield, and H. J. Christian (2016), A Bayesian approach to assess the performance of lightning detection systems, *Journal of Atmospheric and Oceanic Technology*, 33(3), 563–578, doi: 10.1175/JTECH-D-15-0032.1
- Bitzer, P. M., and J. C. Burchfield (2016), Bayesian techniques to analyze and merge lightning locating system data, *Geophysical Research Letters*, 43(24), 12,605–12,613, doi: 10.1002/2016GL071951
- Yanoviak, S., E. Gora, J. Fredley, P. M. Bitzer, R.-M. Muzika, and W. P. Carson (2015), Direct effects of lightning in temperate forests: a review and preliminary survey in a hemlock-hardwood forest of the northern united states, *Canadian Journal of Forest Research*, 45(10), doi: 10.1139/cjfr-2015-0081
- Carlson, B. E., C. Liang, P. Bitzer, and H. Christian (2015), Time domain simulations of preliminary breakdown pulses in natural lightning, *Journal of Geophysical Research: Atmospheres*, 120(11), 5316–5333, doi: 10.1002/2014JD022765
- Matthee, R., J. R. Mecikalski, L. D. Carey, and P. M. Bitzer (2014), Quantitative differences between lightning and nonlightning convective rainfall events as observed with polarimetric radar and MSG satellite data, *Monthly Weather Review*, 142(10), 3651–3665, doi: 10.1175/MWR-D-14-00047.1
- Bitzer, P. M., and H. J. Christian (2014), Timing uncertainty of the Lightning Imaging Sensor, *Journal of Atmospheric and Oceanic Technology*, 32(3), 453–460, doi: 10.1175/JTECH-D-13-00177.1
- Bitzer, P. M., H. J. Christian, M. Stewart, J. Burchfield, S. Podgorny, D. Corredor, J. Hall, E. Kuznetsov, and V. Franklin (2013), Characterization and applications of VLF/LF source locations from lightning using the Huntsville Alabama Marx Meter Array, *Journal of Geophysical Research: Atmospheres*, 118(8), 3120–3138, doi: 10.1002/jgrd.50271

Selected Recent Conference Presentations (89 conference presentations since 2007)

- Bitzer, P. M., and S. I. Fairman (2019), GLM detection of continuing current and bolides, presented at 2019 GLM-Bolide Conference
- Zhu, Y., et al. (2019), Huntsville, Alabama, Marx Meter Array 2: Upgrade and capability, presented at 2019 Meeting of the American Meteorological Society
- Deierling, W., L. D. Carey, P. M. Bitzer, R. A. Marshall, A. Antunes de Sa, A. Sousa, J. C. Burchfield, B. L. Medina, and T. J. Lang (2019), Lightning observations during the RELAMPAGO field campaign, presented at 2019 Meeting of the American Meteorological Society
- Brunner, K., and P. M. Bitzer (2019), Applications of a lightning energy metric using satellite instrumentation and Monte Carlo simulations, presented at 2019 Meeting of the American Meteorological Society
- Carey, L. D., N. Curtis, S. M. Stough, C. J. Schultz, and P. M. Bitzer (2019), A radar investigation of storm morphology and precipitation processes during discrepancies between GOES-16 GLM and LMA observed lightning flash rates and jumps, presented at 2019 Meeting of the American Meteorological Society
- Tillier, C. E., S. F. Edgington, H. J. Christian, and P. M. Bitzer (2019), The first stereo views of lightning from space: Double the glms, double the fun, presented at 2019 Meeting of the American Meteorological Society
- Zhang, D., K. L. Cummins, and P. M. Bitzer (2019), Ground and space-based observations of horizontally extensive lightning flashes, presented at 2019 Meeting of the American Meteorological Society
- Ringhausen, J., and P. M. Bitzer (2019), Classification of glm flashes using random forest method, presented at 2019 Meeting of the American Meteorological Society

- Zhang, D., K. L. Cummins, P. M. Bitzer, and W. J. Koshak (2018), A Detailed Look at the Performance Characteristics of the Lightning Imaging Sensor, presented at 2018 International Conference on Atmospheric Electricity
- Koshak, W. J., D. M. Mach, and P. M. Bitzer (2018), Mitigating vhf lightning source retrieval errors, *Journal of Atmospheric and Oceanic Technology*, 35(5), 1033–1052, doi: 10.1175/JTECH-D-17-0041.1
- Edgington, S. F., C. E. Tillier, H. Demroff, R. VanBezooijen, H. J. Christian, and P. M. Bitzer (2018), Geostationary lightning mapper: Lessons learned from post launch test (invited), in *American Geophysical Union*
- Schultz, C. J., N. Curtis, L. D. Carey, P. M. Bitzer, and A. Leroy (2018), Understanding the implications of merging existing lightning datasets with glm for severe thunderstorm monitoring, in *American Meteorological Society Annual Meeting*
- Tillier, C. E., S. F. Edgington, H. Demroff, R. VanBezooijen, H. J. Christian, and P. M. Bitzer (2018), Geostationary lightning mapper: Post launch test results, in *American Meteorological Society Annual Meeting*
- Smith, D., C. Adams, M. Cherry, S. Al-Nussirat, S. Bai, Y. Banadaski, P. M. Bitzer, J. Hoffmann, et al. (2017), The TETRA-II experiment to observe terrestrial gamma flashes at ground level – analysis of nearby thunderstorm activity and comparison with lightning data, in *American Geophysical Union*
- Pleshinger, D., M. Cherry, C. Adams, S. Al-Nussirat, S. Bai, Y. Banadaski, P. M. Bitzer, J. Hoffmann, et al. (2017), Terrestrial gamma flashes at ground level – TETRA-II instrumentation, in *American Geophysical Union*
- Cherry, M., C. Adams, S. Al-Nussirat, S. Bai, Y. Banadaski, P. Bitzer, J. Hoffmann, E. Khosravi, et al. (2017), The TETRA-II experiment to observe terrestrial gamma flashes at ground level – preliminary results, presented at 2017 Meeting of the American Geophysical Union
- Zhang, D., K. L. Cummins, and P. M. Bitzer (2017), Ground and space-based observations of horizontally-extensive lightning flashes, presented at 2017 Meeting of the American Geophysical Union
- Grove, J. E., E. Wulf, R. S. Woolf, and P. M. Bitzer (2017), Airborne and ground-level searches for ionizing radiation from thunderstorms with istorm, presented at 2017 Meeting of the American Geophysical Union
- Edgington, S. F., T. C. E., P. M. Bitzer, H. J. Christian, M. D. Rafal, and S. J. Goodman (2017), GLM: Adventures in post-launch test, presented at 2017 Meeting of the American Meteorological Society
- Bitzer, P. M., and S. I. Fairman (2017), Characterization of continuing current on a global scale, presented at 2017 Meeting of the American Meteorological Society
- Bitzer, P. M., and J. C. Burchfield (2017), A first look at lightning energy determined from GLM, presented at 2017 Meeting of the American Geophysical Union
- Brunner, K. N., and P. M. Bitzer (2017), Investigations in thunderstorm energetics using satellite instrumentation and monte carlo simulations, presented at 2017 Meeting of the American Geophysical Union
- Cherry, M., C. Adams, S. Al-Nussirat, S. Bai, Y. Banadaski, P. Bitzer, J. Hoffmann, E. Khosravi, et al. (2017), The TETRA-II experiment to observe terrestrial gamma flashes at ground level – preliminary results, presented at 2017 Meeting of the American Geophysical Union
- Grove, J. E., E. Wulf, R. S. Woolf, and P. M. Bitzer (2017), Airborne and ground-level searches for ionizing radiation from thunderstorms with istorm, presented at 2017 Meeting of the American Geophysical Union
- Edgington, S. F., T. C. E., H. Demroff, R. VanBezooijen, H. J. Christian, and P. M. Bitzer (2017), Geostationary Lightning Mapper: Lessons learned from post

launch test (invited), presented at 2017 Meeting of the American Geophysical Union

- Zhang, D., K. L. Cummins, and P. M. Bitzer (2017), Ground and space-based observations of horizontally-extensive lightning flashes, presented at 2017 Meeting of the American Geophysical Union
- Schultz, C. J., P. M. Bitzer, L. D. Carey, T. Chronis, and S. M. Stough (2016), The temporal and probabilistic relationship between lightning jump occurrence and radar-derived thunderstorm intensification, presented at 2016 Meeting of the American Meteorological Society
- Ringhausen, J., and P. M. Bitzer (2016), A comparison of the VLF waveform and optical emissions using ground based and spaced based lightning detection methods, presented at 2016 Meeting of the American Meteorological Society
- Bitzer, P. M., J. C. Burchfield, and K. N. Brunner (2016), Multifrequency investigation into lightning initiation, presented at 2016 International Lightning Detection Conference

### Graduate Students Advised

- Veronica Franklin, Master's 2013  
Thesis Title: **An Evaluation of the Lightning Imaging Sensor with New Insights on the Discrimination of Lightning Flash and Stroke Detectability**
- Kelcy Brunner, Master's 2016  
Thesis Title: **Explorations in Intracloud Lightning and Leader Processes**
- Kelcy Brunner, PhD (expected graduation 2018)  
Thesis topic: Lightning energetics derived from optical emission detected from space
- Jacquelyn Ringhausen, Master's (Spring 2017)  
Thesis Topic: A Comparison Of The Vlf Waveform And Optical Emission Using Ground Based And Satellite Based Lightning Detection Methods
- Sarah Fairman, Master's (expected graduation 2019)  
Thesis Topic: Space detection of continuing current lightning and application to wildfires

### Professional Membership

- American Geophysical Union, 2007-present
- American Meteorological Society, 2012-present
- Lightning Imaging Sensor Science Team, 2011-present
- Geostationary Lightning Mapper Science Team, 2011-present

### Professional and University Service Activities

- Reviewer:

Journal of Geophysical Research  
Weather, Climate, and Society  
Sensors, MDPI  
Atmospheric Research

Cambridge University Press

NASA EPSCoR

NASA Earth and Space Science Fellowship Program

Journal of Operational Meteorology  
Radio Science

Advances in Space Research

Journal of Atmospheric and Solar-Terrestrial Physics

NSF Major Research Instrumentation Program

NASA Postdoctoral Program

- Session Chair, Oral. Lightning and Atmospheric Electricity in Thunderstorms, AGU Fall Meeting 2012; Session Chair, Poster I and II. Lightning and Atmospheric Electricity in Thunderstorms, AGU Fall Meeting 2012
- Session Chair, Oral. Lightning Safety and Warnings, International Lightning Detection Conference 2016
- Senator, Faculty Senate, University of Alabama in Huntsville (01/2012-08/2014); Member, Governance and Operations Committee, University of Alabama in Huntsville (01/2012-08/2014); Chair, Governance and Operations Committee, University of Alabama in Huntsville (01/2013-08/2014); Member, Executive Committee of Faculty Senate, University of Alabama in Huntsville (01/2013-08/2014)
- Member, Review Panel for UAH Research Infrastructure Fund (2014)
- Chair, ATS Graduate Curriculum Committee (09/2015-present)