

Knupp, Kevin R.

Kevin R. Knupp, Ph.D. (Professor, Department of Atmospheric Science, UAHuntsville)

Scientific Expertise: severe storms, mesoscale and boundary layer processes, cloud processes

Technological Expertise: ground-based remote sensing (radar, profiler, lidar, radiometer, *in situ*)

Dr. Knupp has developed diverse expertise in ground-based remote sensing, including analysis and interpretation of meteorological Doppler radar data; multiple Doppler processing; 915 MHz profiler measurements; lidar measurements; passive microwave remote sensing, and numerical modeling. Past and present research projects have included (1) instrument development, (2) dynamic and thermodynamic characteristics of deep precipitating convection; (3) precipitation growth within deep convection; (4) severe storms, tornadoes, lightning, and associated mesoscale phenomena; (5) mesoscale convective systems, including quasi-linear convective systems; (6) boundary layer and mesoscale processes, (7) landfalling hurricanes; and (8) wave phenomena. This diverse scientific background is demonstrated in the peer-reviewed publications.

Dr. Knupp has administered the development and operation of several major research platforms: (a) the Mobile Integrated Profiling System (MIPS) since its inception in 1998, (b) the Advanced (dual polarization, C-band) Radar for Meteorological and Operational Research (ARMOR) in 2005, (c) the Mobile Alabama X-band (MAX) dual polarization radar in 2007, (d) the Mobile Doppler Lidar and Sounding System (MoDLS, 2014), (e) the Rapidly Deployable Atmospheric Profiling System (RaDAPS, 2017), and (f) miscellaneous surface instrumentation (mobile and fixed). Dr. Knupp has extensive experience in the planning and execution of experimental field studies: Fourth Convection and Moisture Experiment (CAMEX-4, 2001, funded by NASA), International H₂O Project (IHOP, 2002, funded by NSF), Bow Echo and Mesoscale Convective Vortex Experiment (BAMEX, 2003, funded by NSF), Atmospheric Boundary Identification and Delineation Experiment (ABIDE, 2002-2013, funded by NSF), Hurricanes at Landfall (HaL, 1998-present), and Profiling of Winter Storms (PIOWS, 2009-2010, NSF), Ontario Winter Lake Effect Studies (OWLES, 2013, NSF), Plains Elevated Convection at Night (PECAN, 2015, NSF) and VORTEX-SE (2015-2018, NOAA). In addition, the MIPS has been used in other NSF funded studies, including the Hudson Valley Boundary Layer Program (near Albany, NY) and MIRAGE/MILAGRO (Mexico City).

The general theme of current research involves interactions between storms and the atmospheric boundary layer. Specific research areas include:

- *Severe storms:* tornadoes, hurricanes, lightning, bow echoes, microbursts, heat bursts, wake lows
- *Boundary layer processes:* structure and transition during hurricane landfall, nocturnal boundary layer processes, behavior of the CBL-NBL transition and the related impact on deep convection and severe storms.

- *Ground-based remote sensing*: radar meteorology, refinement of integrated measurements of precipitation; thermodynamics of the boundary layer to lower troposphere; integration of ground-based and space-based remote sensing measurements.
- *Cloud and precipitation processes*: precipitation and microphysical processes within mesoscale convective systems (tropical and midlatitude) and landfalling hurricanes

Education:

1977 - B.S. Meteorology, Iowa State University (graduated with distinction)
1980 - M.S. Atmospheric Science, Colorado State University
1985 - Ph.D. Atmospheric Science, Colorado State University

Professional experience:

1. Graduate Research Assistant, Colorado State University (7/77 to 2/85)
2. Research Associate, Colorado State University (3/85 to 10/85)
3. Research Scientist, University of Alabama in Huntsville (11/85 to 9/91)
4. Assistant Professor, University of Alabama in Huntsville (9/91 to 3/95)
5. Associate Professor, University of Alabama in Huntsville (3/95 to 3/2005)
6. Professor, University of Alabama in Huntsville (3/2005 to present)

Professional Memberships

American Meteorological Society (elected *Fellow* in 2011)
American Geophysical Union

Current editorships

Awards

1977 - Father James B. Macelwane Award, 2nd place
1998 - Editor's Award, Monthly Weather Review, American Meteorological Society
2011 – Fellow, American Meteorological Society
2012 – special award, Committee on Severe Local Storms, American Meteorological Society
2013 – Dean's Service Award
2013 – UAH Distinguished Research Award

Recent Significant Service Activities

Appointed voting member of the committee ASCE/SEI/AMS Standards Committee on Estimating Wind Speeds in Tornadoes and Other Windstorms (or Wind Speed Estimation, WSE), EF Scale Method Subcommittee, 2015-current.

Faculty Search Committee (assistant professor), Department of Civil and Environmental Engineering, Dec. 2017-Apr. 2018.

Reviewer for the following journal manuscripts and proposals: (a) J. Atmos. Sci., (b) Mon. Wea. Rev., (c) Bull. Amer. Meteor. Soc., (d) Quart. J. Royal Met. Soc., (e) NSF, (f) Geophys. Res. Lett., (g) J. Appl. Meteor. Clim.,

Promotion Reference Letter, Prof. Neil Fox, Univ. Missouri

Course Instructor, UAH Oster Lifelong Learning Institute (OLLI), Meteorology and Severe Weather (seven 90 min lectures, tour of SWIRLL, Feb-Mar. 2018)

Teaching Activities: Summary list of courses taught, theses advised

Courses Taught (underlined courses represent current regular courses):

- Severe and Hazardous Weather (ESS 112, undergraduate)
- Natural Hazards (ESS 402/502, undergraduate/graduate)
- Survey of Atmospheric Science (ATS 501, undergraduate/graduate)
- Atmospheric Thermodynamics and Cloud Physics (ATS 541, graduate)
- Forecasting Mesoscale Processes (ATS 554, graduate)
- Boundary Layer Meteorology (ATS 655, graduate)
- Ground-Based Remote Sensing (ATS 671, graduate)
- Cloud Processes (ATS 740)
- Selected Topics: Meteorological Instrumentation (ATS 690, Selected Topics)
- Selected Topics: Lightning and Storm Processes (ATS 690, Selected Topics)
- Selected Topics: Tornadoes and Tornadogenesis (ATS 690, Selected Topics)
- Selected Topics: Gravity Waves and Gravity Currents (ATS 790, Selected Topics)

Theses and Dissertations Advised and/or supported:

1. Stalker, James R., 1997: Deep convection in a low-shear subtropical environment: Cell interactions and merger processes. Ph.D. dissertation, University of Alabama in Huntsville, 184 pp.
2. Garinger, Linda Pickett, 1997: Climatology of Tornadoes and Severe Storms in the Southeast United States: Spatial/Temporal Patterns and Coastal Effects. M.S. Thesis, University of Alabama in Huntsville, 189 pp.
3. Paech, Simon J., 1997: Variations in Lightning Behavior and Storm Structure Among Adjacent Supercell Storms: The 18 May 1995 Case Study. M.S. Thesis, University of Alabama in Huntsville, 131 pp.

4. Coleman, T.A., 2000: The structure and dynamics of a mesoscale vortex pair within a mesoscale convective system in a low-shear environment. M.S. Thesis, University of Alabama in Huntsville, 71 pp.
5. Medlin, Jeffrey M., 2001: A Single-Doppler Radar Analysis of the Outer Rainband Mesocyclones Associated with Hurricane Opal of 4 October 1995. M.S. Thesis, University of Alabama in Huntsville, 83 pp.
6. Decker, Ryan K., 2001: Modification of the Stable Nocturnal Boundary Layer by Clouds Over Heterogeneous Terrain: An Observational Study. M.S. Thesis, University of Alabama in Huntsville, 79 pp.
7. Walters Justin, 2001: An Observational Study of the Temporal and Spatial Variability of the Stable Nocturnal Boundary Layer over Heterogeneous Terrain. M.S. Thesis, University of Alabama in Huntsville, 67 pp.
8. Altino, K., 2004: Total lightning as a proxy for downburst forecasting in low-shear environments. M.S. Thesis, 80 pp.
9. Roberts, B.C., 2005: Strong Updraft Feature Associated with Hurricane Earl During Landfall. M.S. Thesis. University of Alabama in Huntsville, 75 pp.
10. Phillips, D., 2006: A case study of the 24 June 2003 Bow Echo event in Iowa during BAMEX, M.S. Thesis, 115 pp.
11. Beard, K. S., 2006: Analysis of Methods to Solve the Lidar Ratio for Stratus Cloud Applications. M.S. Thesis, University of Alabama in Huntsville, 60 pp.
12. Karan, H., 2007: Thermodynamic and kinematic characteristics of low-level convergent zones observed by the Mobile Integrated Profiling System. Ph.D. Dissertation, University of Alabama in Huntsville, 185 pp.
13. Elkins, C.M., 2008: Kinematic structure and evolution of the 9 March 2006 Mississippi/Alabama bow echo. M.S. Thesis, University of Alabama in Huntsville, 167 pp.
14. Coleman, T., A., 2008: The Interactions Of Gravity Waves With Mesocyclones And Tornadoes. Ph.D. Dissertation, University of Alabama in Huntsville, 220 pp.
15. Williams, M., 2008: Investigating the kinematic and thermodynamic environment of a landfalling stratiform rainband using ground-based remote sensing and the WRF model. M.S. Thesis, University of Alabama in Huntsville, 106 pp.
16. Kim, D.K., 2008: Airflow and precipitation properties within the stratiform region of tropical storm Gabrielle during landfall. Ph.D. Dissertation, University of Alabama in Huntsville, 164 pp.
17. Asefi, S., 2009: Investigation and quantification of lake–breeze circulations induced by a small anthropogenic lake via radar observations and in-situ measurements. Ph.D. dissertation, University of Alabama in Huntsville, 246 pp.†
18. Busse, Jessica L., 2010: Observations of boundaries and convective initiation during the early evening transition time period. Ph.D. dissertation, University of Alabama in Huntsville, 210 pp.
19. Murphy, T., 2010: Super Tuesday Storm Variability. M.S. Thesis, University of Alabama in Huntsville, November 2010, 175 pp.
20. Mullins, Stephanie, 2011: Kinematic and microphysical analysis of mesovortices in Hurricane Ike (2008) using the Mobile Alabama X-band dual-polarization radar. M.S. Thesis, University of Alabama in Huntsville, June 2011, 153 pp.
21. Sherrer, A., 2014: Observational Analysis of the Interaction between a Baroclinic Boundary and Supercell Storms on 27 April 2011. M.S. Thesis, University of Alabama in Huntsville, June 2011, 123 pp.
22. Lyza, A. W., 2015: An Observational Analysis of Potential Influences of Terrain on Tornado Behavior. M.S. Thesis, University of Alabama in Huntsville, June 2011, 156 pp.

23. Murphy, T., 2015: Interactions of Wave-Like Reflectivity Segments with Deep Convection and Subsequent Mesocyclogenesis and Tornadogenesis. Ph.D. dissertation, University of Alabama in Huntsville, 193 pp.
24. Wingo, S. M., 2015: Characterization of the Afternoon to Evening Transition of the Planetary Boundary Layer over North Alabama and Implications for Convective Maintenance, Enhancement, and Initiation. Ph.D. dissertation, University of Alabama in Huntsville, 397 pp.
25. Hulsey, C., 2016: A Ground Based Remote Sensing Analysis of a Shallow Cold Front and Wave Features from the Plows Field Campaign. M.S. Thesis, University of Alabama in Huntsville, 90 pp.
26. Pennington, K., 2017: Radar and Profiling Observations of the Internal Structure and Propagation of a Lake Ontario Snow Band (IOP-4) during the Ontario Winter Lake-Effect Systems (OWLES) Field Project. M.S. Thesis, University of Alabama in Huntsville, 56 pp.
27. Leach, C.G.A., 2017: Implementing Active/Passive Atmospheric Profiling Observations to Enhance Dual Polarization Radar Hydrometeor Classification Algorithms for Winter Precipitation. M.S. Thesis, University of Alabama in Huntsville, 86 pp.
28. Conrad, D.M., 2017: Doppler Radar Observations Of Horizontal Shearing Instability In Quasi-Linear Convective Systems. M.S. Thesis, University Of Alabama In Huntsville, 68 pp.
29. Haliczzer, D., 2017: An observational and numerical modeling perspective of a nocturnal QLCS and its rapidly evolving environment during VORTEX-SE on 9-10 March 2017. M.S. Thesis, University of Alabama in Huntsville, 116 pp.
30. Lund, B., 2017: An Examination Of The 20 June 2015 Convective Initiation Event During PECAN. M.S. Thesis, University of Alabama in Huntsville, 82 pp.
31. Lisauckis, C.A., 2018: Cold-Season Severe QLCS Events over North AL: Climatology, Cloud, and Boundary Layer Characteristics. M.S. Thesis, University of Alabama in Huntsville, 51 pp.
32. Goudeau, B., 2018: A Case Study on the Usage and Efficacy of Infrasond Monitoring Arrays as a Means of Tornado Detection. M.S. Thesis, University of Alabama in Huntsville, 99 pp.

Research, Creative, and Scholarly Activity

Refereed Journal Articles:

1. Brown, J.M., and **K.R. Knupp**, 1980: The Iowa cyclonic/anticyclonic tornado pair and its parent thunderstorm. *Mon. Wea. Rev.*, **108**, 1626-1646.
2. Cotton, W.R., R.L. George, and **K.R. Knupp**, 1982: An intense, quasi-steady thunderstorm over mountainous terrain. Part I: Evolution of the storm-initiating mesoscale circulation. *J. Atmos. Sci.*, **39**, 328-342.
3. **Knupp, K.R.**, and W.R. Cotton, 1982: An intense, quasi-steady thunderstorm over mountainous terrain. Part II: Doppler radar observations of the storm morphological structure. *J. Atmos. Sci.*, **39**, 343-358.
4. **Knupp, K.R.**, and W.R. Cotton, 1982: An intense, quasi-steady thunderstorm over mountainous terrain. Part III: Doppler radar observations of the turbulent structure. *J. Atmos. Sci.*, **39**, 359-368.
5. **Knupp, K.R.**, and W.R. Cotton, 1985: Convective cloud downdrafts - An interpretive survey. *Rev. Geophys.*, **23**, 183-215.
6. Knight, C.A., and **K.R. Knupp**, 1986: Precipitation growth trajectories in a CCOPE storm. *J. Atmos. Sci.*, **43**, 1057-1073.
7. **Knupp, K.R.**, and W.R. Cotton, 1987: Internal structure of a small mesoscale convective system. *Mon. Wea. Rev.*, **115**, 629-645.

8. **Knupp, K.R.**, 1987: Downdrafts within High Plains cumulonimbi. Part I: General kinematic structure. *J. Atmos. Sci.*, 44, 987-1008.
9. **Knupp, K.R.**, 1988: Downdrafts within High Plains cumulonimbi. Part II: Dynamics and Thermodynamics. *J. Atmos. Sci.*, 45, 3965-3982.
10. **Knupp, K.R.**, 1989: Numerical simulation of downdraft initiation within precipitating cumulonimbi: Some preliminary results. *Mon. Wea. Rev.*, 117, 1517-1529.
11. Garinger, L.P, and **K.R. Knupp**, 1993: Seasonal tornado climatology for the Southeastern United States. In *The Tornado: Its Structure, Dynamics Prediction and Hazards*. Geophysical Monograph 79, Amer. Geophys. Union, 445-452.
12. Goodman, S. and **K.R. Knupp** 1993: Tornadogenesis via squall line and supercell interaction: The 15 November 1989 Huntsville tornado. In *The Tornado: Its Structure, Dynamics Prediction and Hazards*. Geophysical Monograph 79, Amer. Geophys. Union, 183-200.
13. Tatum, F.B., **K.R. Knupp**, and S.J. Vitton, 1995: Tornado detection based on seismic signal. *J. Appl. Meteor.*, **34**, 572-582.
14. **Knupp, K.R.**, 1996: Structure and Evolution of a Low-Buoyancy, Microburst-Producing Thunderstorm. *Mon. Wea. Rev.*, **124**, 2785-2806.
15. Gupta, S., R.T. McNider, M. Trainer, R.J. Zamora, **K. Knupp** and M.P.Singh, 1997: Nocturnal wind structure and plume growth rates due to inertial oscillations. *J. Appl. Meteor.*, **36**, 1050-1063.
16. Bringi, V.N., **K.R. Knupp**, A. Detwiler, L. Liu, I.J. Caylor and R.A. Black, 1997: Evolution of a Florida thunderstorm during the Convection and Precipitation/Electrification Experiment: The case of 9 August 1991. *Mon. Wea. Rev.*, **125**, 2131-2160.
17. **Knupp, K.R.**, B. Geerts, and S.J. Goodman, 1998: Structure of a Small, Vigorous Mesoscale Convective System. Part I: Formation, Radar Echo Morphology and Lightning Behavior. *Mon. Wea. Rev.*, **126**, 1812-1836.
18. **Knupp, K.R.**, B. Geerts, and J. Tuttle, 1998: Structure of a Small, Vigorous Mesoscale Convective System. Part II: Evolution of the Mesoscale Flows and Stratiform Precipitation. *Mon. Wea. Rev.*, **126**, 1837-1858
19. **Knupp, K.R.**, J. Stalker, and E.W. McCaul, 1998: A numerical and observational study of a marginal mini-supercell storm. *Atmos. Res.*, 49, 35-63.
20. Tong, H.V., V. Chandrasekar, **K. R. Knupp**, and J. Stalker, 1998: Multiparameter Radar Observations of Time Evolution of Convective Storms: Evaluation of Water Budgets and Latent Heating Rates. *J. Atmos. Oceanic Tech.*, 15, 1097-1109.
21. Goodman, S.J., D. E. Buechler, **K. Knupp**, K. Driscoll and E. W. McCaul, Jr., 2000: The 1997-98 El Nino Event and Related Wintertime Lightning Variations In the Southeastern United States. *Geophys. Res. Lett.*, 27, 541-544.
22. **Knupp, K.R.**, J. Walters and E.W. McCaul, Jr., 2000: Doppler profiler observations of Hurricanes Georges at landfall. *Geophys. Res. Lett.*, 27, 3361-3364
23. Stalker, J.R., **K.R. Knupp**, 2002: A Method to identify convective cells within multicell thunderstorms from multiple doppler radar data. *Mon. Wea. Rev.*, **130**, 188-195.
24. **Knupp, K.R.**, and S. Paech, 2003: Behavior of CG lightning among three adjacent tornadic supercell storms over the Tennessee Valley region. *Mon. Wea. Rev.*, **131**, 172-188.
25. Stalker, J.R., **K.R. Knupp**, 2003: On cell merger potential in multicell thunderstorms of weakly sheared environments: Cell separation distance vs. planetary boundary layer depth. *Mon. Wea. Rev.*, **131**, 1678-1695.
26. Davis, C., . . . **K. Knupp**, and co-authors, 2004: The Bow Echo and MCV Experiment: Observations and Opportunities. *Bull. Amer. Meteor. Soc.*, 85, 1075-1093.
27. **Knupp, K.R.**, J. Walters, and M. Biggerstaff, 2006: Doppler Profiler and Radar Observations of Boundary Layer Variability during the Landfall of Tropical Storm Gabrielle. *J. Atmos. Sci.*, **63**, 234-251.

28. Karan, H., and **K.R. Knupp**, 2006: Profiler observations of boundaries during IHOP. *Mon. Wea. Rev.*, **134**, 92-112.
29. **Knupp, K.R.**, 2006: Observational analysis of a gust front to bore to solitary wave transition within an evolving nocturnal boundary layer. *J. Atmos. Sci.*, **63**, 2016-2035.
30. Nielsen-Gammon, J. W., R. T. McNider, W. M. Angevine, A. B. White, **K. Knupp**, 2007. Mesoscale model performance with assimilation of wind profiler data: Sensitivity to assimilation parameters and network configuration, *J. Geophys. Res.*, **112**, D09119, doi:10.1029/2006JD007633.
31. Cronce, M., R.M. Rauber, **K.R. Knupp**, B.F. Jewett, J.T. Walters, and D. Phillips, 2007: Vertical Motions in Precipitation Bands in Three Winter Cyclones. *J. Appl. Meteor. Climatol.*, **46**, 1523–1543.
32. Nielsen-Gammon, J.W., C.L. Powell, M.J. Mahoney, W.M. Angevine, C. Senff, A. White, C. Berkowitz, C. Doran, and **K. Knupp**, 2008: Multisensor Estimation of Mixing Heights over a Coastal City. *J. Appl. Meteor. Climatol.*, **47**, 27–43.
33. Coleman, T.A., and **K.R. Knupp**, 2008: The Interactions of Gravity Waves with Mesocyclones: Preliminary Observations and Theory. *Mon. Wea. Rev.*, **136**, 4206–4219.
34. Coleman, T.A., and **K.R. Knupp**, and D Herzmann, 2009: The Spectacular Undular Bore in Iowa on 2 October 2007. *Mon. Wea. Rev.*, **137**, 495–503.
35. **Knupp, K.**, Ware, R., D. Cimini, F. Vandenbergh, J. Vivekanandan, E. Westwater, and T. Coleman, 2009: Ground-Based Passive Microwave Profiling during Dynamic Weather Conditions. *J. Atmos. Oceanic Tech.*, **26**, 1057–1073.
36. Kim, D.K., **K.R. Knupp**, and C.R. Williams, 2009: Airflow and Precipitation Properties within the Stratiform Region of Tropical Storm Gabrielle during Landfall. *Mon. Wea. Rev.*, **137**, 1954–1971.
37. Karan, H., and **K. Knupp**, 2009: Radar and Profiler Analysis of Colliding Boundaries: A Case Study. *Mon. Wea. Rev.*, **137**, 2203–2222.
38. Coleman, T.A., and **K.R. Knupp**, 2009b: Factors Affecting Surface Wind Speeds in Gravity Waves and Wake Lows, *Weather and Forecasting*, **24**, 1664–1679
39. Coleman, T.A., **K.R. Knupp**, and J.T. Tarvin, 2009: Review and Case Study of Sounds Associated with the Lightning Electromagnetic Pulse, *Mon. Wea. Rev.*, **137**, 3129-3136.
40. Walker, J. R., J. R. Mecikalski, **K. R. Knupp**, and W. M. MacKenzie, Jr. (2009), Development of a land surface heating index-based method to locate regions of potential mesoscale circulation formation, *J. Geophys. Res.*, **114**, D16112, doi:10.1029/2009JD011853.
41. Harrison, S.J., J.R. Mecikalski, and **K.R. Knupp**, 2009: Analysis of Outflow Boundary Collisions in North-Central Alabama, *Weather and Forecasting*, **24**, 1680-1690.
42. Coleman, T. A., and **K. R. Knupp**, 2010: A Non-Linear Impedance Relation for the Surface Winds in Pressure Disturbances. *J. Atmos. Sci.*, **67**, 3409-3422.
43. Coleman, T. A., **K. R. Knupp**, and D. E. Herzmann, 2010: An undular bore and gravity waves illustrated by dramatic time-lapse photography. *J. Atmos. Oceanic Tech.*, **27**, 1355-1361.
44. Coleman, T. A., and K. R. Knupp, 2010: Radiometer and Profiler Analysis of the Effects of a Bore and a Solitary Wave on the Stability of the NBL. *Mon. Wea. Rev.*, **139**, 211–223.
45. Asefi-Najafabady, S., K. Knupp, U. Nair, J. Mecikalski, R. Welch, 2010: Ground-based measurements and Dual-Doppler analysis of 3D wind fields and atmospheric circulations induced by a meso- γ scale inland lake. *J. Geophys. Res.*, **115**, D23117, doi:10.1029/2010JD014022.
46. Coleman, T. A., K. R. Knupp, J. Spann, J. B. Elliott, and J. B. DeBlock, 2010: The history and future of tornado warning dissemination in the United States, *Bull. Amer. Meteor. Soc.*, **92**, 567–582.
47. Anderson, M. E., L. D. Carey, W. A. Petersen, and K. R. Knupp, 2011: C-band dual-polarimetric radar signatures of hail. *Electronic J. Operational Meteor.*, **12** (2), 1–30.
48. Coleman, T. A., and K. R. Knupp, 2011: A review of three significant wake lows over Alabama and Georgia. *Wea. Forecasting*, **26**, 766–773.

49. Asefi-Najafabady, S., K. Knupp, J. Mecikalski, R.M. Welch, D. Philips, 2012: Mesoscale Circulations induced by a small lake under varying synoptic scale flows. *J. Geophys. Res.*, 117, D1, doi: 10.1029/2011JD016194.
50. Kuang, S., M. J. Newchurch, J. Burris, L. Wang, P. I. Buckley, S. Johnson, K. Knupp, G. Huang, D. Phillips, and W. Cantrell (2011), Nocturnal ozone enhancement in the lower troposphere observed by lidar, *Atmospheric Environment*, 45, 6078-6084.
51. Busse, J., and K. Knupp, 2012: Observed Characteristics of the Afternoon–Evening Boundary Layer Transition Based on Sodar and Surface Data. *J. Appl. Meteor. Clim.*, 51, 571-582.
52. Schultz, C.J., L.D. Carey, E.V. Schultz, B.C. Carcione, C.B. Darden, C.C. Crowe, P.N. Gatlin, D.J. Nadler, W.A. Petersen, and K.R. Knupp, 2012: Dual-Polarization Tornadoic Debris Signatures Part I: Examples and Utility in an Operational Setting. *Electronic J. Operational Meteor.*, 13 (9), 120–137.
53. Schultz, C.J., S.E. Nelson, L.D. Carey, L. Belanger, B.C. Carcione, C.B. Darden, T. Johnstone, A.L. Molthan, G.J. Jedlovec, E.V. Schultz, C.C. Crowe, and K.R. Knupp, 2012: Dual-polarization tornadoic debris signatures Part II: Comparisons and caveats. *Electronic J. Operational Meteor.*, 13 (10), 138–150.
54. Murphy, Todd A., Kevin R. Knupp, 2013: An Analysis of Cold Season Supercell Storms Using the Synthetic Dual-Doppler Technique. *Mon. Wea. Rev.*, 141, 602–624.
55. Rauber, R.M., J. Wegman, D. M. Plummer, A. A. Rosenow, M. Petersen, G.M. McFarquhar, B.F. Jewett, D. Leon, P. S. Market, K. R. Knupp, J. M. Keeler, and S. M. Battaglia, 2014: Stability and charging characteristics of the comma-head region of continental winter cyclones. *J. Atmos. Sci.*, in press.
56. Coleman, T. A., T. A. Murphy, K. R. Knupp, L. D. Carey, and M. E. Anderson, 2014: Extensive observations of the transition region of a winter storm. *J. Operational Meteor.*, 2 (1), 1–12.
57. Knupp, K. R., T. A. Murphy, T. A. Coleman, R. A. Wade, S. A. Mullins, C. J. Schultz, E. V. Schultz, L. Carey, A. Sherrer, E. W. McCaul Jr., B. Carcione, S. Latimer, A. Kula, K. Laws, P. T. Marsh, and K. Klockow, 2014: Meteorological Overview of the Devastating 27 April 2011 Tornado Outbreak. *Bull. Amer. Meteor. Soc.*, 95, 1041–1062.
58. Wingo, S.M., and K. R. Knupp, 2015: Multi-platform observations characterizing the afternoon-to-evening transition of the planetary boundary layer in Northern Alabama, USA. *Boundary-Layer Meteorology*, 155, 29-53.
59. Kristovich, D.A., R. D. Clark, J. Frame, B. Geerts, K. R. Knupp, K. A. Kosiba, N. F. Laird, N. D. Metz, J. Minder, T. D. Sikora, W. J. Steenburgh, S. M. Steiger, J. Wurman, and G. S. Young, 2016: The Ontario Winter Lake-effect Systems (OWLs) Field Project, *Bulletin of the American Meteorological Society*, 98, 315-332.
60. Finlon, J.A., G. M. McFarquhar, R. M. Rauber, D. M. Plummer, B. F. Jewett, D. Leon, and K. R. Knupp, 2016: A Comparison of X-band Polarization Parameters with In-Situ Microphysical Measurements in the Comma Head of Two Winter Cyclones. *J. Appl. Meteor. Clim.*, 55, 2549-2574.
61. Wingo, S., and K.R. Knupp, 2016: Structure of mesovortices in Hurricane Ike (2008) derived from ground-based dual-Doppler analyses. *Mon. Wea. Rev.*, 144, 4245-4263.
62. Coleman, T. A., and K. R. Knupp, 2016: Review and Case Studies of Non-Traditional Severe Local Windstorms. *J. Oper. Meteor.*, 4, 192-206.
63. Geerts, B., D. Parsons, C. L. Ziegler, T. M. Weckwerth, D. D. Turner, J. Wurman, K. Kosiba, R. M. Rauber, G. M. McFarquhar, M. D. Parker, R. S. Schumacher, M. C. Coniglio, K. Haghi, M. I. Biggerstaff, P. M. Klein, W. A. Gallus, B. B. Demoz, K. R. Knupp, R. A. Ferrare, A. R. Nehrir, R. D. Clark, X. Wang, J. M. Hanesiak, James O. Pinto, J. J. Moore, 2016: The 2015 Plains Elevated Convection At Night (PECAN) field project. *Bulletin of the American Meteorological Society*, 98, 767-786.
64. Lyza, A. W., A. W. Clayton, K. R. Knupp, E. Lenning, M. T. Friedlein, R. Castro, and E. S. Bentley, 2017: Analysis of mesovortex characteristics, behavior, and interactions during the second 30 June–1 July 2014 midwestern derecho event. *Electronic J. Severe Storms Meteor.*, 12 (2), 1–33.

65. Coleman, T. A., A. W. Lyza, K. R. Knupp, K. Laws, and W. Wyatt, 2018: A significant tornado in a heterogeneous environment during VORTEX-SE. *Electronic J. Severe Storms Meteor.*, **13** (2), 1–25.
66. Gatlin, P., W.A. Petersen, K. Knupp, and L. Carey, 2018: Observed Response of the Raindrop Size Distribution to Changes in the Melting Layer, *Atmosphere*, **9**, 319, [https://DOI: 10.3390/atmos9080319](https://doi.org/10.3390/atmos9080319)
67. Lyza, A.W., and K.R. Knupp, 2018: A Background Investigation of Tornado Activity across the Southern Cumberland Plateau Terrain System of Northeastern Alabama. *Mon. Wea. Rev.*, **146**, 4261-4278, <https://doi.org/10.1175/MWR-D-18-0300.1>
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Journal manuscripts submitted or conditionally accepted:

1. Weigel, A., R. Griffin, K. Knupp, A. Molthan, and T. Coleman, 2018: A Spatial Pattern Analysis of Land Surface Heterogeneity and its Relationship to Initiation of Weak Tornadoes. *Earth Interactions*, in review.
2. Hulsey, C., and Kevin. Knupp, 2018: A Ground Based Remote Sensing Analysis of a Shallow Cold Front with Density Current Attributes from the PLOWS Field Campaign. *Mon. Wea. Rev.*, submitted (Dec. 2018)

Commented [KK1]: Initiation of weak tornadoes
(weak tornadoes are defined as EF0 to EF1)

Manuscripts in preparation:

1. Knupp, K., D. Phillips, and B. Geerts, 2018: Observations of microbursts and microscale vortices associated with a strong heat burst event. *Mon. Wea. Rev.*, to be resubmitted.
2. Elkins, C.M., and K.R. Knupp, 2018: Kinematic structure and evolution of a severe cool season bow echo. *Mon Wea. Rev.*, to be resubmitted
3. Knupp, K., P. Ray², S. Kimball, J. Schroeder, M. Levitan, K. Hirai, and D. Phillips, 2018: Analysis of a concentrated heavy rain event during the landfall of Tropical Storm Ida (2009). *Mon. Wea. Rev.*, in preparation.
4. Knupp, K., and co-authors, 2018: Multi-sensor observations of heterogeneous boundary layer evolution in the wake of a decaying rainband. *Boundary Layer Meteorology*, in preparation.
5. Wingo, S. M. and K. R. Knupp, 2018: Measurements of vertical motion within gust fronts, solitary waves, and bores: A comparison among UHF Doppler wind profiler, X-band profiling radar, and vertically pointing Doppler lidar. In preparation, to submitted to JTECH.
6. Wingo, S. M. and K. R. Knupp, 2018: Case studies on the evolution of convergent boundaries propagating during the afternoon-to-evening transition period in north Alabama. In preparation, to submitted to MWR.
7. Knupp, K.R., S. M. Wingo, and T Coleman, 2018: Evolution and kinematic structure of a mature, shallow bore within a low-shear environment. *Mon. Wea. Rev.*, in preparation.
8. Kosiba, K.A., J. Wurman, K. Knupp, K. Pennington, and P. Robinson, 2018: Ontario Winter Lake-effect Systems (OWLeS): Misovortices in long-lake-axis-parallel snowbands Part 1: Bulk characteristics and kinematic evolution. *Mon Wea. Rev.*, in preparation.
9. Pennington, K., K. Knupp, and K. Kosiba, 2018: Ontario Winter Lake-effect Systems (OWLeS). Misovortices in long-lake-axis-parallel snowbands Part 2: MIPS profiler observations of the internal structure of a propagating vigorous lake-effect snow band at landfall. *Mon. Wea. Rev.*, in

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1. Knupp, Kevin R., and John M. Brown, 1977: Central Iowa tornado family, 13 June 1976. Preprints, 10th Conference on Severe Local Storms, AMS, 463-470.
2. Knupp, Kevin R., K.S. Danielson, and W.R. Cotton, 1978: A radar case study analysis of a heavily precipitating quasi-stationary convective storm system. Preprints, Conference on Cloud Physics and Atmospheric Electricity, AMS, 451-458.
3. Knupp, Kevin R., and W.R. Cotton, 1979: Characteristics of an intense, quasi-steady thunderstorm over mountainous terrain. Preprints, 11th Conference on Severe Local Storms, AMS, 530-537.
4. Knupp, K.R., and W.R. Cotton, 1980: Doppler radar observations of the three-dimensional turbulent structure of a quasi-steady thunderstorm. Preprints, 19th Conference on Radar Meteorology, AMS, 369-375.
5. Cotton, W.R., G. Tripoli, and K.R. Knupp, 1980: A three-dimensional simulation and observational analysis of an intense, quasi-steady thunderstorm over mountainous terrain. Preprints, VIIIth International Conference on Cloud Physics, Clermont-Ferrand, France.
6. Knupp, K.R., N. Motallebi and W.R. Cotton, 1981: Observations of heavily-precipitating mountainous thunderstorms. Preprints, Fourth Conference on Hydrometeorology, AMS, 204-211.
7. Brown, J.M., K.R. Knupp, and F. Caracena, 1982: Destructive winds from shallow, high-based cumulonimbi. 12th Conference on Severe Local Storms, AMS, 272-275.
8. Knupp, K.R., and W.R. Cotton, 1982: Doppler radar case study of downdraft initiation and structure within a moderately-intense thunderstorm. Preprints, 12th Conference on Severe Local Storms, AMS, 437-440.
9. Knupp, K.R., and W.R. Cotton, 1982: Characteristics of downdrafts and turbulence within thunderstorms. Preprints, Conference on Cloud Physics, AMS, 539-542.
10. Knupp, K.R., 1983: Doppler radar analysis of the structure of a highly-sheared multicell convective storm. Preprints, 21st Conference on Radar Meteorology, AMS, 64-69.
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13. Knupp, K.R., and D.P. Jorgensen, 1985: Case study analysis of a large-scale, long-lived downburst-producing storm. Preprints, 14th Conference on Severe Local Storms, AMS, 301-304.
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15. Knupp, K.R., and D.P. Jorgensen, 1986: Observations on the transformation from circular to linear convection. Preprints, 23rd Conference on Radar Meteorology and Conference on Cloud Physics, AMS, J14-J17.
16. Knupp, K.R., and S.F. Williams, 1988: Multiscale analysis of a sustained precipitation event. Preprints, 15th Conf. on Severe Local Storms, AMS, 452-455.
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18. Knupp, K.R., 1989: Observed structural variability of deep moist convection with a mesoscale convective system. Preprints, 24th Conference on Radar Meteorology, AMS, Tallahassee, 467-470.
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20. Knupp, K.R., 1990: Observations of steady, low-buoyancy, low-Ri thunderstorms. Preprints, 16th Conference of Severe Local Storms, Kananaskis Park, Canada, Amer. Meteor. Soc., 473-478.

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60. Walters, J.T., and K. R. Knupp, 2003: Doppler Profiler and Radar Observations of Tropical Storm Gabrielle During Landfall, 31st International Conference on Radar Meteorology.
61. Kim, D.-K., and K. R. Knupp, 2003: MIPS, Doppler Radar, and X-Band Polarimetric Observations of a Dissipating Squall Line Emanating from a Developing Tropical Storm, 31st International Conference on Radar Meteorology.
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119. Knupp, K.R., and D. Phillips, 2010: The landfall of Tropical Storm Ida: Frontal structures and boundary layer variability. 29th Conference on Hurricanes and Tropical Meteorology, 10-14 May 2010, Tucson, AZ. Amer. Meteor. Soc.
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- 124.
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127. Knupp, K.R., T. Coleman and E. W. McCaul, 2010: The 21 January Huntsville tornado: Storm and mesoscale characteristics inferred from combined high-resolution dual-polarization radar data and video images
128. Elise V. Schultz, E.V., C. Kirkpatrick, U. S. Nair, C. J. Schultz, K. Knupp, W. A. Petersen, and L. D. Carey, 2010: Intercomparison between the observed and modeled 21 January 2010 low topped tornado producing thunderstorm in Huntsville, AL. Abstract, accepted for oral presentation at the 25th Conference on Severe Local Storms, Denver, 11-15 October 2010.
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135. Peterson, M.K., R. M. Rauber, B. F. Jewett, G. M. McFarquhar, and K. R. Knupp, 2011: Analysis of the forcing responsible for banded precipitation within winter cyclones utilizing high resolution radar and sounding observations. 35th Conference on Radar Meteorology, Pittsburgh, AMS.
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140. Todd A. Murphy, R. A. Wade, T. A. Coleman, and K. R. Knupp, 2011: Observations of wave-like features interacting with a tornadic line-echo wave pattern. 35th Conference on Radar Meteorology, Pittsburgh, AMS.

141. Ryan A. Wade, and K. R. Knupp, 2011: Kinematic and microphysical analysis of the 10 January 2011 north Alabama thundersnow event during PLOWS. 35th Conference on Radar Meteorology, Pittsburgh, AMS
142. Mullins, S., E. V. Schultz and K. Knupp, 2012: Public Perception and Response to Severe Weather: Lessons From the 27 April 2011 Tornado Outbreak Across N Alabama. Special Symposium on the Tornado Disasters of 2011, 92nd Annual Meeting of the Amer. Meteor. Soc., New Orleans.
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144. Schultz, C.J., L. D. Carey, E. V. Schultz, W. A. Petersen, P. N. Gatlin, K. R. Knupp, A. L. Molthan, G. J. Jedlovec, B. Carcione, C. B. Darden, and C. C. Crowe, 2012: Dual-Polarimetric Radar-Based Tornado Debris Signatures and Paths Associated with Tornadoes Over Northern Alabama During the Historic Outbreak of 27 April 2011. Special Symposium on the Tornado Disasters of 2011, 92nd Annual Meeting of the Amer. Meteor. Soc., New Orleans.
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148. Carey, L.D., C. J. Schultz, A. L. Bain, A. Sherrer, K. R. Knupp, B. Carcione, C. C. Crowe, C. B. Darden, and M. E. Anderson, 2012: An Inter-comparison of S-band and C-band Polarimetric Radar Signatures of Large Hail and Tornado Debris on 2 March 2012 (poster presentation).
149. Mullins, S., K. R. Knupp, T. A. Coleman, T. A. Murphy, A. Sherrer, and R. A. Wade, 2012: Recent Afternoon-Evening Transition (AET) and Nocturnal Convective Initiation Events Studied as Part of the UAHuntsville ABIDE Field Project (poster presentation)
150. Knupp, K., T. Murphy, S. Mullins, R. Wade, and T. Coleman, 2012: The Devastating 27 April 2011 Tornado Outbreak: Initial Scientific Assessment (oral presentation).
151. Sherrer, A., R. A. Wade, T. A. Murphy, S. Mullins, T. Coleman, D. Phillips, and K. Knupp, 2012: Observations of a Thermal Boundary and its Interaction with the 27 April 2011 EF-5 Hackleburg Tornado (oral presentation).
152. Mullins, S., and K. R. Knupp, 2012: A Radar-based Analysis of the Mesoscale Convective Vortex that Crossed N AL on the Morning of 27 April 2011 (oral presentation)
153. Wade, R.A., T. A. Murphy and K. R. Knupp, 2012: A kinematic, multiple Doppler, and dual-pol radar analysis of the mid-day tornadic QLCS during the historic April 27th super outbreak (oral presentation).
154. Murphy, T.A., T. A. Coleman and K. R. Knupp, 2012: Observations and Analysis of Atmospheric Waves During the Historic April 27, 2011 Tornado Outbreak (poster presentation).
155. McCaul, E.W., Knupp, C. B. Darden, and K. B. Laws, 2012: Extreme damage incidents in the 27 April 2011 tornado superoutbreak (poster presentation).
156. Rauber, R., J. P. Wegman, D. M. Plummer, A. A. Rosenow, M. K. Peterson, G. M. McFarquhar, B. F. Jewett, D. Leon, P. S. Market, K. R. Knupp, S. Battaglia, and J. M. Keeler, 2013: Stability and Charging Characteristics of the Comma-head Region of Continental Winter Cyclones. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
157. Wade, R.A., and K. R. Knupp, 2013: Polarimetric and Atmospheric Profiling Measurements of Convective Snowbands and Atmospheric Waves during PLOWS36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.

158. Mullins, S., and K. Knupp, 2013: Multi-sensor observations integrated for transitional boundary layer convective initiation conference theme. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
159. Finlon, J.A., D. M. Plummer, R. M. Rauber, G. M. McFarquhar, B. F. Jewett, K. R. Knupp, and D. Leon, 2013: A Comparison of X-band Polarization Parameters with Aircraft Measurements of Two Comma Head Winter Cyclones. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
160. Mullins, S., and K. Knupp, 2013: Documenting the variability of the afternoon-evening transition (AET) in the planetary boundary layer conference theme. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
161. Mayhew, A.L., and K. R. Knupp, 2013: Multi-Sensor Analysis of MCS Maintenance and Boundary Layer Evolution During the 4-5 June 2012 ABIDE-III Field Deployment. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
162. Knupp, K.R., S. Mullins, R. Wade, T. Fehnel, E. Foshee, N. Feng, V. Franklin, B. Freitag, G. Heidelberger, E. Hipp, A. Kaulfus, T. Lyza, A. Mayhew, A. Sherrer, S. Stough, and A. White, 2014: High resolution, multi-sensor kinematic analysis of heterogeneous boundary layer evolution. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
163. Coleman, T.A., and K. Knupp, 2013: Analysis of the Effects Of Wind Channeling and Gradients in Roughness Length on Environmental Vorticity and Helicity. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
164. Todd A. Murphy, T., T. A. Coleman and K. R. Knupp, 2013: Observations and Analysis of Atmospheric Waves during the Historic April 27, 2011 Tornado Outbreak. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
165. Anthony W. Lyza, A., T. A. Murphy, R. A. Wade, T. A. Coleman, and K. R. Knupp, 2013: Multiple Doppler Radar Analysis of External Environmental and Topographical Influences on a QLCS Tornado Event. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
166. Adam Sherrer, A., K. R. Knupp, R. Wade, and T. A. Murphy, 2013: Observations of a Thermal Boundary and its interaction with the 27 April 2011 EF-5 Hackleburg Tornado. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
167. Kevin R. Knupp K.R., and S. Mullins, 2013: Multi-sensor comparison of airflow derived from polarimetric Doppler radars, a UHF wind profiler, and a Doppler wind lidar in the convective and nocturnal boundary layer. *36th Conference on Radar Meteorology, 16-20 September 2013, Breckenridge, CO.*
168. Kristovich, D.A.R., B. Geerts, W.J. Steenburgh, R.D. Clark, S.M. Steiger, J.M. Wurman, G.S. Young, K.R. Knupp, N.F. Laird, T.D. Sikora, K.A. Kosiba, N.D. Metz, and J.W. Frame, 2013: The OWLeS (Ontario Winter Lake-effect Systems) campaign, winter 2013-14. 15th Conf. on Mesoscale Processes, Portland, OR, Amer. Meteor. Soc.
169. Sherrer, A., K. Knupp, T. Murphy, and [R. A. Wade](#), 2014. Interactions Between a Thermal Boundary and Deep Convection During the 27 April 2011 Superoutbreak. Special Symposium on Severe Local Storms: The Current State of the Science and Understanding Impacts. 94th AMS Annual Meeting, Atlanta, GA.
170. Murphy, T., and K. Knupp, 2014: Prevalence and Characteristics of Atmospheric Waves in Severe Weather Environments. Special Symposium on Severe Local Storms: The Current State of the Science and Understanding Impacts. 94th AMS Annual Meeting, Atlanta, GA.
171. Mayhew, A.L., and K. R. Knupp, 2014: Multi-Sensor Analysis of MCS Maintenance and Boundary Layer Evolution During the 4–5 June 2012 ABIDE-III Field Deployment. Special Symposium on Severe

- Local Storms: The Current State of the Science and Understanding Impacts. 94th AMS Annual Meeting, Atlanta, GA.
172. Ryan Wade, T. Murphy and K. Knupp, 2014: Complex Supercell Mergers and Storm-Scale Interactions During Recent Significant Severe Weather Outbreaks. Special Symposium on Severe Local Storms: The Current State of the Science and Understanding Impacts. 94th AMS Annual Meeting, Atlanta, GA.
173. Lyza, A., and K. Knupp, 2014: High-Resolution Observations of a Tornado-Producing Quasi-Linear Convective System. Special Symposium on Severe Local Storms: The Current State of the Science and Understanding Impacts. 94th AMS Annual Meeting, Atlanta, GA
174. Lyza, A. W., J. Apke, K. S. Pennington, and K. **Knupp, 2014**: Integrated Observations of a Near-Surface Based Supercell Located Behind a Gust Front. 27th Conference on Severe Local Storms, AMS, Madison, WI
175. Anthony W. Lyza, A. W., and K. Knupp An Observational Analysis of Potential Terrain Influences on Tornado Behavior. 27th Conference on Severe Local Storms, AMS, Madison, WI
176. Anthony W. Lyza, A. W., T. A. Murphy and K. **Knupp, 2014**: Overview of the 28-29 April 2014 Tennessee Valley Tornado Outbreak. 27th Conference on Severe Local Storms, AMS, Madison, WI
177. **Lyza, A.W.**, and K. R. Knupp, 2015: MCS Propagation Mechanisms Observed during the PECAN Field Campaign. Preprints, 16th Conference on Mesoscale Processes, AMS, Boston, MA.
178. Wade, R., K. **Knupp**, D. Phillips, T. A. Murphy, A. Sherrer, A. Mayhew, A. Lyza, and B. Freitag, 2015: MIPS observations of the kinematic, thermodynamic, and microphysical characteristics of lake-effect snow bands during The Ontario Winter Lake-effect Systems (OWLeS) Field Project. 37th Conference on Radar Meteorology, Norman, OK, AMS.
179. Lisauckis, C. A., K. R. **Knupp**, T. A. Murphy, and A. W. Lyza, 2015: Storm Mode Variability over northern Alabama Within the Domain of the ARMOR Radar. 37th Conference on Radar Meteorology, Norman, OK, AMS.
180. Coleman, T., and K. **Knupp**, 2015: Mapping the Impact of Surface Roughness on the Kinematics of the 3D Wind Field. 37th Conference on Radar Meteorology, Norman, OK, AMS.
181. Wingo, S. M. and K. R. Knupp, 2015: Multi-Doppler and multi-platform analysis of convergent boundary zones during the planetary boundary layer's afternoon to evening transition (AET) period. 37th Conference on Radar Meteorology, Norman, OK, Amer. Meteor. Soc.
182. Knupp, K.R., and S. M. Wingo, 2015: Kinematic structure of a shallow bore in a low-shear environment. Oral presentation, 37th Conference on Radar Meteorology, Norman, OK, AMS.
183. Lyza, A.W., A. W. Clayton, K. R. Knupp, E. Lenning, R. Castro, M. Friedlein, and E. Bentley, 2015: Radar Observations of Mesovortices Associated with the Second A pair of intense, derecho-producing quasi-linear convective systems. Extended Abstract (21 pp.) and oral presentation, 37th Conference on Radar Meteorology, Norman, OK, AMS.
184. Lyza, A.W., and K. R. Knupp, 2015: Observations of an Unusual Nonsupercellular Tornado. Poster presentation, 37th Conference on Radar Meteorology, Norman, OK, AMS
185. Finlon, J., R. M. Rauber, G. M. McFarquhar, B. F. Jewett, D. M. Plummer, D. Leon, and K. **Knupp**, 2015. A Comparison of X-band Polarization Parameters with In-Situ Microphysical Measurements in the Comma Head of Two Winter Cyclones. 37th Conference on Radar Meteorology, Norman, OK (oral presentation)
186. Wade, R., T. Coleman and K. **Knupp, 2015**: Preliminary Profiling and Polarimetric Radar Analysis of Convective Snowbands and Atmospheric Waves during the 25 February 2015 Southeastern U.S. Heavy Snow Event. 37th Conference on Radar Meteorology, Norman, OK, oral presentation
187. Hulsey, C. B., and K. R. **Knupp, 2015**: An Analysis of a Shallow Cold Front and Wave Interactions from the PLOWS Field Campaign. 37th Conference on Radar Meteorology, Norman, OK, poster presentation and extended abstract.

188. Pennington, K. S., and K. R. **Knupp**, 2015: Radar and profiling observations of the interaction between a lake effect snow band and a shallow cold front during the Ontario Winter Lake-effect Systems (OWLeS) Experiment. 37th Conference on Radar Meteorology, Norman, OK, oral presentation.
189. Lyza, A.W., R. Wade, K. **Knupp**, B. C. Carcione, S. Latimer, and C. J. Stumpf, 2016: The 14 July 2015 Tennessee Valley Tornado Event: Challenges in QLCS Tornado Forecasting and Identification. IMPACTS: Major Weather Events and Impacts of 2015. AMS Annual Meeting, New Orleans, LA.
190. Lyza, A.W., K. R. **Knupp** and L. D. Carey, 2016: Supervised College Teaching from the Supervised College Teacher's Perspective. 25th Symposium on Education. AMS Annual Meeting, New Orleans, LA.
191. **Knupp**, K.R., R. Wade, A. W. Lyza, and S. M. Wingo, 2016: Comparison of Estimates of Vertical Motion from Vertically-Pointing Lidar and Radar Within Gust Fronts, Bores and Low-Level Gravity Waves. 18th Symposium on Meteorological Observation and Instrumentation. AMS Annual Meeting, New Orleans, LA.
192. Leach, C., and K. Knupp, 2016: An Analysis of Precipitation Transition and Hydrometeor Classification using Dual Polarization Radar and Active/Passive Atmospheric Profiling Observations. 18th Symposium on Meteorological Observations and Instrumentation, AMS Annual Meeting, New Orleans, LA.
193. Lyza, A.W., and K. R. **Knupp**, 2016: An Intercomparison of WSR-88D and ARMOR Radar Observations of the 14 July 2015 Tennessee Valley Tornadic Quasi-Linear Convective System. 18th Symposium on Meteorological Observation and Instrumentation. AMS Annual Meeting, New Orleans, LA.
194. Hulsey, C.B., and K. R. **Knupp**, 2016: Ground Based Remote Sensing Observations of a Wave and Cold Front Interaction during the PLOWS Field Campaign. 18th Symposium on Meteorological Observation and Instrumentation. AMS Annual Meeting, New Orleans, LA.
195. Lisauckis, C.A., K. R. **Knupp**, T. A. Murphy, T. A. Coleman, and A. W. Lyza, 2016: Investigating Tornado Genesis Events Within the ARMOR Domain. 15th Annual Student Conference, AMS Annual Meeting, New Orleans, LA.
196. Pennington, K. S., and K. R. Knupp, 2016: An Enhanced Look At Radar And Profiling Observations Of The Interaction Between A Lake-effect Snow Band And A Shallow Cold Front During The Ontario Winter Lake-effect Systems (OWLeS) Experiment. 15th Annual Student Conference, AMS Annual Meeting, New Orleans.
197. Lyza, A., C. L. Calamaio, A. L. Ravenscraft, A. Staarmann, D. M. Conrad, P. Tucker, R. Wade, K. R. Knupp, L. A. Schultz, T. P. Barron, B. C. Carcione, K. D. White, J. R. Walker, T. R. Lee, M. Buban, E. J. Dumas Jr., P. Owen, M. Warner, and K. Harvey, 2016: Utilization of Multiple Platforms in a High-Resolution Tornado Damage Survey: The 31 March 2016 Hartselle-Priceville, Alabama EF2 Tornado during VORTEX-SE. 28th Conference on Severe Local Storms, Portland, OR, AMS.
198. Coleman, T., A. W. Lyza, R. Wade, K. Knupp, and W. Wyatt, 2016: A Significant Tornado Near a Frontogenetical Boundary During VORTEX-SE. 28th Conference on Severe Local Storms, Portland, OR, AMS.
199. Knupp, K., T. A. Coleman and A. W. Lyza, 2016: External Controls on Tornadogenesis and Evolution: Potential Significance and Current State of Knowledge. 28th Conference on Severe Local Storms, Portland, OR, AMS.
200. Goudeau, B., and K. R. Knupp, 2016: An Observational Analysis of Mesovortex Genesis and Maintenance during the PECAN Field Campaign. 28th Conference on Severe Local Storms, Portland, OR, AMS.
201. Anthony W. Lyza, A. W., T. A. Murphy, D. M. Conrad, and K. R. Knupp, 2016: Environmental Evolution and Storm-Scale Observations of the 31 March 2016 Northern Alabama Tornado Event during VORTEX-SE. 28th Conference on Severe Local Storms, Portland, OR, AMS.

202. Clayton, A.W., A. W. Lyza, R. Wade, and K. R. Knupp, 2016: An Analysis of Tornado Debris Signatures in the 30 June - 1 July 2014 Quasi-Linear Convective System Tornado Outbreak
203. Conrad, D.M., A. W. Lyza, K. Knupp, and C. B. Hulse, 2016: Dual Doppler Radar Analysis of a Tornadoic Quasi-linear Convective System on 04 January 2015. 28th Conference on Severe Local Storms, Portland, OR, AMS.
204. Lund, B. M., and K. R. Knupp, 2016: An Examination of the 20 June 2015 Convective Initiation Event during PECAN. 28th Conference on Severe Local Storms, Portland, OR, AMS.
205. Lisauckis, C. A., and K. R. Knupp, 2016: Observed Low-level Cloud Morphology Associated with Tornadogenesis Events During the Southeastern United States Cool Season. 28th Conference on Severe Local Storms, Portland, OR, AMS.
206. Anthony W. Lyza, A.W., and K. R. Knupp, 2016: A Detailed Analysis of Tornado Events across Northeastern Alabama's Southern Cumberland System. 28th Conference on Severe Local Storms, Portland, OR, AMS.
207. Murphy, T.A., R. A. Wade, A. W. Lyza, and K. R. Knupp, 2017: An Examination of Convective Enhancement within Complex Terrain on 5 April 2017 during VORTEX-SE. Poster presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
208. Lyza, A. W., and K. Knupp, 2017: Radar Observations of a Small Tornado on 5 April 2017 during VORTEX-SE. Poster presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
209. Goudeau, B., K. Knupp, and H. Rinehart, 2017: A Preliminary Assessment of Infrasonic Tornado Detection via Comparison with Dual-Polarization Doppler Radar. Poster presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
210. Castro, R., A. Lyza, A. W. Clayton, B. Borchardt, E. Lenning, M. Friedlein, and K. R. Knupp, 2017: The Role of Polarimetric, Doppler Velocity, and Spectrum Width Signatures in the Reanalysis of a QLCS Tornado Cluster. Poster presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
211. Clayton, A.W., E. Lenning, M. Friedlein, A. W. Lyza, and K. Knupp, 2017: Utilizing Environmental and Radar Predictors to Anticipate Tornado Intensity. Poster presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
212. Conrad, D.M., and K. R. Knupp, 2017: The Role of Horizontal Shearing Instability in Mesovortexgenesis in the 04 January 2015 Quasi-Linear Convective System. Oral presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
213. Hulse, C.B., K. Knupp, A. W. Lyza, and R. A. Wade, 2017: The 29-30 November 2016 Northern Alabama Tornado Outbreak, Part 1: Radar and Vertical Profiling Observations of a Complex Supercell Mesocyclone. Oral presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
214. Lyza, A.W., C. B. Hulse, R. Wade, and K. Knupp, 2017: The 29-30 November 2016 Northern Alabama Tornado Outbreak, Part 2: Radar, Profiler, and In-Situ Observations of the Role of Topography in Supercell and Tornado Environmental Evolution. Oral presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
215. Timothy A. Coleman, T.A., K. Knupp, and P. N. Gatlin, 2017: High-Resolution Doppler Radar and Radiometer Analysis of a Cold Front Topped with Atmospheric Waves. Oral presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
216. Staarman, A., K.R. Knupp, D. M. Conrad, and A. W. Lyza: Mesoscale Environment and Internal Structure of Severe Cold Season QLCS's over the Southeast U.S. Poster presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
217. Wade, R., T. A. Murphy, D. D. Turner, T. R. Lee, M. Buban, P. Pangle, A. W. Lyza, and K. R. Knupp, 2017: A Comparison of Atmospheric Profilers and Environmental Soundings in Complex Terrain during the 2017 VORTEX-SE Field Campaign. Poster presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
218. Lund, B. M., and K. Knupp, 2017: An Examination of the 20 June 2015 Convective Initiation Event during PECAN. Oral presentation, 38th Conference on Radar Meteorology, 28 August – 1 September 2017, Chicago, AMS.
219. Ware, R., D. Berchoff, M. Beauharnois, L. Blanchette, K. Brewster, J. Brotzge, F.H. Carr, W. Conway, B. Demoz, Jeffrey M. Freedman, N. Gasperoni, I. Gultepe, K. Knupp, E. Lau, D. Holland, E. Joseph, M. Mahaffey, C. MacDonald, S. A. McLaughlin, R. Parmentier, K.A. Reed, P. Roller, N. Sette, C.

- Thorncroft, S. Vanderburg, D. Voytenko, Phillip Wiker, Tim Wilfong, 2018: Boundary Layer Profiling for High-Impact Weather Analysis and Nowcasting. Eighth Conference on Transition of Research to Operations, AMS Annual Meeting, Austin, TX.
220. Weigel, A., R. Griffin, K. Knupp, A. L. Molthan, and T. A. Coleman, 2018: Using GIS to Investigate Land–Atmosphere Interactions Involved in Tornadogenesis. 34th Conference on Environmental Information Processing Technologies, AMS Annual Meeting, Austin, TX.
221. Huang, G., M. J. Newchurch, S. Kuang, K. R. Knupp, H. G. Ouwersloot, and L. Wang, 2018: A Case Study of Ozone Diurnal Variation in the Planetary Boundary Layer in Southeast United States using Multiple Observations and Large-Eddy Simulation. 20th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA, AMS Annual Meeting, Austin, TX.
222. Knupp, K., R. Wade and B. Lund, 2018: Impact of Eclipse of 21 August 2017 on the Atmospheric Boundary Layer. 15th Conference on Space Weather, AMS Annual Meeting, Austin, TX.
223. Lyza, A.W., K. R. Knupp, D. D. Turner, R. Wade, and T. A. Murphy, 2018: Analyzing the Effects of Complex Terrain in Northeastern Alabama Severe Weather Events Using Multiple Profiling Systems, Doppler Radar, and In Situ Measurements during the VORTEX-SE 2017 Field Campaign. 19th Symposium on Meteorological Observation and Instrumentation, AMS Annual Meeting, Austin, TX.
224. Goudeau, B., K. R. Knupp, W. G. Frazier, R. Waxler, C. Talmadge, and C. Hetzer, 2018: An Analysis of Tornado-Emitted Infrasonics during the VORTEX-SE Field Campaign. 19th Symposium on Meteorological Observation and Instrumentation, AMS Annual Meeting, Austin, TX.
225. Lyza, A.W., E. Lenning, M. Friedlein, R. Castro, and K. R. Knupp, 2018: Utilizing Multiple Platforms to Assess the Role of Wave Features in the 30 June–1 July 2014 Midwestern QLCS Tornado Outbreak. 19th Symposium on Meteorological Observation and Instrumentation, AMS Annual Meeting, Austin, TX.
226. Coleman, T.A., A. W. Lyza, K. Knupp, K. B. Laws, and W. Wyatt, 2018: A significant tornado in a Heterogeneous environment during VORTEX-SE. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, oral presentation
227. Coleman, T.A., and A. Weigel, 2018: The Effects of Differential Friction on PBL Kinematics and Possible Influences on Tornadoes and CI. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, oral presentation
228. Coleman, T.A., and K. Knupp, 2018: Shear Available Potential Energy (SHAPE): A quantitative Measure of the Effect of Wind Shear on Convective Updraft Potential. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, oral presentation
229. Conrad, D.M., and K. R. Knupp, 2018: Doppler Radar Observations of a Tornadic Mesovortex in the 04 January 2015 Quasi-Linear Convective System. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, oral presentation
230. Haliczar, D., and K. Knupp, 2018: An observational and Numerical Modeling Study of Rapid Changes in the Pre-Storm Boundary Layer of a Severe Nocturnal QLCS during VORTEX-SE on 9-10 March 2017. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, oral presentation
231. Hulsey, C.B., K. R. Knupp and A. W. Lyza, 2018: 29-30 November Northern Alabama Tornado Outbreak: Radar and Vertical Profiling Observations of a Complex Supercell Mesocyclone. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, oral presentation
232. Lyza, A.W., and K. Knupp, 2018: Research and Operational Challenges Posed by the 18 November 2017 High-Shear/Low-CAPE QLCS Tornado Outbreak in North Alabama. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, poster presentation
233. Lyza, A.W., X. Li, K. Knupp, and J. R. Mecikalski, 2018: Using Observations and Numerical Simulations to Assess the Effects of Topography on the 29-30 November 2016 Tornado Outbreak in

- Northeastern Alabama. 29th Conference on Weather Analysis and Forecasting, Amer. Meteor. Soc., 3-8 June 2018, Denver, CO, oral presentation.
234. Lyza, A. W., X. Li, K. R. Knupp, and J. R. Mecikalski, 2018: Insights Gained into the Role of Topography in Modifying the Near-Storm Environments of Tornadic Storms through VORTEX-SE Observations and Numerical Simulations. 29th Conference on Severe Local Storms, 22 – 26 October 2018 Stowe, VT (oral presentation).
235. Anthony W. Lyza, A. W., K. R. Knupp, M. I. Biggerstaff, and A. A. Alford, 2018: Environment and Evolution of the 3 April 2018 Tornadic QLCS across North Alabama during VORTEX-SE. 29th Conference on Severe Local Storms, 22 – 26 October 2018 Stowe, VT (poster presentation).
236. Anthony W. Lyza, A. W., and K. R. Knupp, 2018: Preliminary Observations of Changes in Supercell RFD Buoyancy across Significant Topography in Northeastern Alabama during VORTEX-SE. 29th Conference on Severe Local Storms, 22 – 26 October 2018 Stowe, VT (poster presentation).
237. Kevin R. Knupp, K. R., B. Goudeau and A. W. Lyza, 2018: High-Resolution Observations of the Pre-Storm Boundary Layer and Internal Structure of a Prefrontal Tornadic Cool Season QLCS Using Multiple Atmospheric Profiling Systems and Dual Doppler Radar. 29th Conference on Severe Local Storms, 22 – 26 October 2018 Stowe, VT (oral presentation).

Research Funding (proposals funded)

1. Analysis and modeling of summertime convective cloud and precipitation structure over the Southeastern United States. Funded by NASA covering the time period 15 September 1987 to 31 December 1990, \$250,000. *Principal investigator.*
2. Observational and numerical modeling studies of downdrafts within precipitating convection. Funded by NSF for the period 1 May 1988 to 31 October 1991, \$177,000. *Principal investigator.*
3. Acquisition of a Sun-based RDSS and File Server System. An equipment proposal funded by NSF for the period 1 September 1989 to 28 February 1991, \$24,089. *Principal investigator.*
4. A Request for PC-McIDAS Equipment to Service Undergraduate Courses in Atmospheric Science. An equipment proposal funded by NSF for the period 15 April 1990 to 30 September 1992, \$17,946. *Co- Principal investigator.*
5. Climatology of Severe Weather Events for the Southeastern United States. Funded by the Southeast Regional Climate Center, 15 September 1990 to 14 September 1991, \$15,682. *Principal investigator*
6. Development of a Campus Meteorological Station for Research. UAH Mini Grant, 15 April 1992 to 15 April 1993, \$2.0k . *Principal investigator*
7. Radar Studies of Severe Storms over the Southeastern United States. Contract from North Carolina State University under the Southeast Consortium on Severe Storms and Tornadoes, July 1992 to 30 June 1993, \$35,440. *Principal investigator*
8. Kinematic and Bulk Microphysical Structure of Deep Convection during CaPE: Radar Analysis, Numerical Modeling and Accuracy Evaluation. Funded by the National Science Foundation, November 1992 to 30 April 1996, \$151,000. *Principal investigator*
9. Arizona (SWAMP) Field Program Profiler Support. Department of Commerce, 1 May to 31 December 1993, \$29,378. *Principal investigator*
10. Great Smoky Mountains Park Profiler Support. TVA, \$2100. *Principal investigator*
11. Tornadoic Storms Associated with Shear Lines within Mesoscale Convective Systems: A case study. Funded by the Cooperative Program for Operational Meteorology, Education and Training. 1 July 1995-30 June 1996, \$4500. *Principal investigator*
12. Radar Studies of Severe Storms over the Southeastern United States. Contract from North Carolina State University under the Southeast Consortium on Severe Storms and Tornadoes, 1 September 95 to 31 August 1996, \$54,000. *Principal investigator*
13. Seismic Detection of Tornadoes (UAH Proposal No. 95-511R). SBIR submitted by Engineering Analysis, Inc. to the Department of Commerce, \$2600, 1996. *Principal investigator*
14. Development Of A Multi-Sensor System For Measurement Of 4-D Atmospheric Boundary Layer Structures. Army Research Office. \$167,000 (1 January 1997 - 30 April 1998) *Principal investigator.*
15. Further investigations of cell interactions and merger within cumulonimbi and mesoscale convective systems. Continuation project, submitted to the National Science Foundation, 1 January 1997 to 31 December 1999, \$205,000. *Principal investigator.*
16. Analysis and Modeling of 4-D Stable Atmospheric Boundary Layer Structures over Heterogeneous terrain. Defense Experimental Program to Stimulate Competitive Research (DEPSCoR) via Army Research Office, 10/1/97-9/30/00, \$253.9k. *Principal investigator.*
17. Analysis and Modeling of 4-D Stable Atmospheric Boundary Layer Structures over Heterogeneous terrain. DoD Augmentation Awards for Science and Engineering Research Training (AASERT), 4/1/98-3/31/01, \$92.4k. *Principal investigator.*
18. Passive Microwave Radiometer System for Diverse Atmospheric Measurements, PI, Aug.1 2000 – July 31 2002, NSF Major Research Instrumentation Program, \$194.6k. *Principal investigator.*

19. Special Observing, Forecast, and Warning Tools in the Tennessee Valley and their Application to End-to-End Warning Decision Making Process, COMET/UCAR, June 2000 – May 2003, \$120k. Co-Principal investigator.
20. Atmospheric Boundary and Identification and Delineation Experiment (ABIDE) National Science Foundation, June 2000 – Dec 2003, \$277k. *Principal investigator.*
21. Identification, Measurement and Prediction of Hazardous Weather Conditions Affecting Aerostat Flight Operations (Principal Investigator) Clemson University (U.S. Army Space and Missile Command), September 2001 – August 2004, \$60k. *Principal investigator.*
22. Deployment of 915 MHz Profiler and Ceilometer to SEARCH site in Atlanta. Southern Company Services, 5/01-3/03, \$83.3k. *Principal investigator.*
23. Investigations of Precipitation and Microphysical Properties with Tropical Storms and Mesoscale Precipitation Systems during CAMEX-4, NASA Headquarters August 2001 – July 2004, \$321k. *Principal investigator.*
24. Utilization of the MIPS to Characterize Boundaries and Adjacent Boundary Layer Properties Associated with Convective Initiation during IHOP-2002, NSF, May 2002 – March 2005, \$255k. *Principal investigator.*
25. Deployment of the UAH MIPS at Bowen Power Plant. Southern Company Services, 10/1/02-1/31/03, \$18.5k, *Principal investigator.*
26. Wind profile measurements in support of the TVA Wind Energy Research Project. (Principal Investigator), Tennessee Valley Authority, 1/03 - 7/03, \$32.6k. *Principal investigator.*
27. Investigations of Interactions between the Boundary Layer and Squall Lines, NSF, March 2003-February 2006, \$402k. *Principal investigator.*
28. MIPS Operations in support of the Hudson Valley Boundary Layer Program (Principal Investigator), U. Albany / SUNY, via NSF, August 2003- June 2004, \$28.5k. *Principal investigator.*
29. MIPS Measurements of Boundary Layer Structure and Flows around West Memphis, Arkansas Department of Environmental Quality, July 2005-June 2006, \$73,400, PI
30. Profiler Measurements in Support of MIRAGE, National Science Foundation, October 2005-September 2006, \$130k, PI
31. Atmospheric Boundary and Delineation Experiment II, National Science Foundation, September 2005-October 2008, \$605k, PI
32. Radar Profiler Enhancements to the Mobile Integrated Profiling System (MIPS), National Science Foundation (Major Research Instrumentation Program), Principal Investigator, July 2006 – June 2007 (\$245k)
33. NOAA *Tornado and Hurricane Observations and Research (THOR)* Center Activities within the Huntsville Hazardous Weather Testbed, NOAA, Principal Investigator, August 2006-July 2008 (\$1,597k)
34. Rainfall Measurement Model Reducing Rain Gauge Requirements, Tennessee Valley Authority / NSSTC, Co - Principal Investigator, June 2007 -October 2008 (\$105k)
35. NOAA Hazardous Weather Testbed (HWT) Activities, NOAA, 1 October 2007-30 September 2009, \$900k
36. Tornado and Hurricane Observations and Research (THOR) Center Activities within the Huntsville Hazardous Weather Testbed (HWT–Huntsville), 1 August 2008-31 July 2010. \$750k
37. Collaborative Research: Investigations of Mesoscale and Processes in Extratropical Cyclones and Mesoscale Convective Systems. NSF, 1 November 2008 – 30 October 2012. \$510k.
38. Tornado and Hurricane Observations and Research (THOR) Center Activities: at the Huntsville Hazardous Weather Testbed (HWT–Huntsville) – 2009. NOAA, 1 August 2009-31 July 2011. \$779k

39. UAHuntsville Support for Navy STTR proposal to topic N11A-T036: Weather and Environmental Software Tool for System Requirements Investigation. DOD SBIR (Phase 1), subcontract from DMS Technology, Inc., 2905 Westcorp Blvd., Suite 220, Huntsville, AL 35805. co-PI (with Brain Landrum, MAE, PI), July 2011-Jan 202 (\$40 k)
40. Preliminary scientific and sociological assessment of the tornado outbreak of 27 April 2011. National Science Foundation, 1 June 2011-31 May 2012, \$150k.
41. Atmospheric Boundary Identification and Delineation Experiment III (ABIDE-3). National Science Foundation, 15 June 2011 - 15 May 2014, Knupp (PI), \$700k.
42. Lidar Ceilometer Upgrade to UAH Mobile Profiling System. UAHuntsville Research Infrastructure Investment (URII) Grant Program, 15 June – 15 October 2011, Knupp (PI), Newchurch and Christopher (co-I's). \$36.2k.
43. MRI: Acquisition of a Portable Compact Doppler Wind and Aerosol Lidar for Research Enhancements in Boundary Layer Meteorology, Air Quality, and Cloud Physics. Knupp (PI), Newchurch and Christopher (co-I's). National Science Foundation, 1 Oct. 2012 – 31 August 2013. \$339k
44. Collaborative Research: Ground-based remote sensing investigations of mesoscale and microscale processes in extratropical cyclones, Knupp (PI), National Science Foundation, 1/1/2013-12/31/2015. \$282k
45. Collaborative Research: The kinematics, microphysics, and dynamics of long-fetch lake-effect systems (OWLeS). Knupp (PI), National Science Foundation, 1/1/2013-12/31/2015. \$197k.
46. Preliminary investigations of topographic influences on boundary layer airflow and tornadoes 2014 UAH IIDR Program, \$38,851
47. Infrastructure Improvements for the UAH Mobile Profiling System, UAH Research Infrastructure Program, 5/1/2014 – 4/30/2015, \$27,821.
48. The origin and evolution of waves and bores within the Great Plains nocturnal boundary layer and their interaction with MCSs. National Science Foundation, 8/1/2014 – 7/31/2017, \$729,546.
49. REU Supplemental funding: The origin and evolution of waves and bores within the Great Plains. Knupp (PI), National Science Foundation, 5/15/2015-4/30/2015, \$24,848.
50. VORTEX-SE: Infrastructure development and field campaign activities (PI) 9/15/2015-9/30/2016, NOAA/OAR, \$690,592.
51. Northern Gulf Institute (NOAA Cooperative Institute) (co-PI). 10/1/2016 – 9/30/2021. NOAA, \$35M (proposed).
52. Pilot Study over Northern Alabama for Infra Sound Detection of Tornadoes (PI). 6/1/2016 – 5/31/2020. \$50,000, Madison County Commission.
53. Core infrastructure enhancements, operations, and preliminary research activities supporting VORTEX-SE 2017 field campaign activities. Part 1: Infrastructure enhancements (PI). 8/1/2016-7/31/2017 \$477,967, NOAA/OAR.
54. Core infrastructure enhancements, operations, and preliminary research activities supporting VORTEX-SE 2017 field campaign activities. Phase 2: Operations, field campaign activities, and research. 8/1/2016 – 7/31/2017 \$308,199, NOAA/OAR.
55. Direct Detection of Tornadoes using Infrasound Remote Sensing: Assessment of Capabilities through comparison with Dual Polarization Radar Measurements and Other Direct Detection Measurements. 10/1/2016-9/30/2017. \$95,159, NOAA/OAR.
56. Analysis and modeling of topographic influences on the atmospheric boundary layer: Potential impact on tornado evolution. 10/1/2016-9/30/2017. \$245,394, NOAA/OAR.
57. Evaluation and Improvements of Tornado Detection using Infrasound Remote Sensing: Comparative Analysis of Infrasound, Radar, Profiler, and Meteorological Data Sets, and Potential Impacts on NOAA/NWS Operations. 10/1/2017-9/30/2018, \$169,960, NOAA/OAR.

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58. VORTEX-SE 2018 Field Campaign Activities: High Shear, Low CAPE Emphasis. \$549,994, 8/1/2017-7/31/2018, NOAA/OAR.
59. VORTEX-SE Core Infrastructure Support and Activities Supporting Support Field Campaign Activities. \$442,892.00, 9/1/2018-8/30/2019, Northern Gulf Institute (via NOAA/OAR), Contract 191001.363513.04D.
60. Advancing Meteorological and Operational Detection of Mesoscale Kinematic and Thermodynamic Variability: An Improved Understanding of Its Sources Within the Boundary Layer During Tornado and Severe Weather Events in the Southeast and Potential Impacts on NOAA/NWS Operations \$480,941, 9/1/2018-8/30/2019, Northern Gulf Institute (via NOAA/OAR), Contract 191001.363513.04E.
61. Evaluation and Improvements of Tornado Detection Using Infrasound Remote Sensing: Comparative Analysis of Infrasound, Radar, Profiler, and Meteorological Data Sets, and Potential Impacts of NOAA/NWS. \$442,892, 9/1/2018-8/30/2019, Northern Gulf Institute (via NOAA/OAR), Contract 191001.363513.04F.