

SONIA G. LASHER-TRAPP

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University of Illinois at Urbana-Champaign
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EDUCATION

- The University of Oklahoma, Ph.D. in Meteorology, 1998
- The University of Oklahoma, M.S. in Meteorology, 1993
- Saint Louis University, B.S. in Meteorology *Summa cum Laude*, 1990

EMPLOYMENT & APPOINTMENTS

Blue Waters Professor, Dept. of Atmospheric Sciences, Univ. of Illinois, Aug 2014- present
Associate Professor, Dept. of Earth, Atmos. & Planet. Sci., Purdue University, 2009-2014
Sabbatical Visitor, School of Environment, University of Leeds, Jan 2010- Aug 2010
Assistant Professor, Dept. of Earth & Atmos. Sci., Purdue University, Jan 2003-Jul 2009
Research Scientist, New Mexico Institute of Mines and Technology, in residence at the
National Center for Atmospheric Research (NCAR), Dec 2000- Dec 2002
Postdoctoral Fellow, Advanced Study Program, NCAR, Aug 1998-Nov 2000

PROFESSIONAL ACTIVITIES

Session Chair: 17th International Conference on Clouds and Precipitation, 2016
Member, Program Committee, 17th Int. Conf. on Clouds and Precipitation, 2015-2016
Session Chair: European Conference on Severe Storms, 2015
Editor, Journal of the Atmospheric Sciences, 2015- 2017
Session Chair: AMS 14th Conference on Cloud Physics, 2014
Member, COPE Steering Committee, 2012-2013
Member, Program Committee, 16th Int. Conf. on Clouds and Precipitation, 2011-2012
Member, ICE-T Steering Committee, 2010-2011
Associate Editor, Journal of the Atmospheric Sciences, 2008 - 2009
Elected Member, International Commission on Clouds and Precipitation, 2008-2016
Member, NSF Observing Facilities Assessment Panel (OFAP), 2006-2009
Chair, program committee, AMS 12th Conference on Cloud Physics, 2005-2006
Member, AGU Cloud and Precipitation Committee, 2005-2007
Member, AMS Cloud Physics committee, 2001-2007
Session chair: AMS 11th Conference on Cloud Physics, 2002

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Meteorological Society
- American Geophysical Union

HONORS & AWARDS

Purdue University Teaching Academy, 2013
Purdue University College of Science Undergraduate Advising Award, 2013
Purdue University College of Science Graduate Mentoring Award, 2010
Purdue University College of Science Outstanding Contributions to Undergraduate Teaching by an Assist. Professor, 2007
Purdue University Dept. of EAS Outstanding Faculty Graduate Advisor, 2006
Patricia Roberts Harris Fellow, The University of Oklahoma

FIELD PROGRAMS

- Southern Ocean Clouds Radiation Aerosol Transport Experimental Study (SOCRATES), Tasmania, Jan-Feb 2018
- PI, COncvective Precipitation Experiment (COPE), SW England, July-Aug 2013
- PI, Ice in Cumulus Experiment- Tropical (ICE-T), St. Croix, July 2011
- Rain in Cumulus over the Ocean (RICO), Antigua/Barbuda, Dec 2004-Jan 2005
- Aircraft Icing Research Study II (AIRSII), Cleveland, OH, Nov-Dec 2003
- Small Cumulus Microphysics Study (SCMS), Cape Kennedy, FL, July & Aug 1995
- Verification of the Origin of Rotation in Thunderstorms Experiment (VORTEX), Summer 1990 and 1991

FUNDING

- (in review) Principle Investigator: *Quantifying Entrainment and its Effects in Isolated, Sheared Cumuli and Thunderstorms*, 2017-2020, NSF, \$549,738
- Co- Investigator: *Microphysical Processes within Southern Ocean Clouds*, 2017-2020, NSF, \$821,614
- Co- Investigator: *A Bottom-up Approach to Improve the Representation of Deep Convective Clouds in Weather and Climate Models*, 2015-2018, DOE-ASR, \$551,150
- Principle Investigator: *A System for Characterizing And Measuring Precipitation (SCAMP)*, 2015, University of Illinois Vice Chancellor for Research Equipment Funding, \$58,640
- Co- Investigator: *Development of a Geographic Winter-weather Severity Index for the Assessment of Maintenance Performance*, 2014, INDOT, \$174,231

- Principle Investigator: *The Convective Precipitation Experiment- Microphysical and Entrainment Dependencies (COPE-MED)*, 2013-2016, NSF, \$524,815
- Principle Investigator: *Changes in Precipitation Processes and Efficiency within Convective Clouds over the Continental U.S. in a Warmer Climate.*, 2011-2012, Purdue Research Foundation, \$15,750
- Principle Investigator: *Ice Nucleation in Maritime Cumuli: Considering Dynamical and Microphysical Interactions*, 2010-2014. NSF, \$423,253
- Principle Investigator: *Numerical Modeling of Precipitation Changes Resulting from Regional Climate Change Across the U.S.*, Summer 2010, Purdue Climate Change Research Center, \$6,000
- Principle Investigator: *The Application of a Successful Research-Based Laboratory Model to Atmospheric Science*, 2009-2011, NSF, \$150,000
- Principle Investigator: *Entrainment, Ultragrantic Particles, and Warm Rain Formation in Trade Wind Cumulus* (supplement), 2008-2009, NSF, \$20,807
- Principle Investigator: *The Effects of Entrainment and Mixing on Droplet Populations in Trade Wind Cumuli*, 2008-2009, Purdue Research Foundation, \$16,300
- Co-principal Investigator: *Sub-Daily Scale Extreme Precipitation in Future Climate-Change Scenarios: A Pilot Study*, 2006-2008, NSF, \$275,075
- Co-principal Investigator: *Collaborative Research: An Advanced Interactive Multifield, Multisource Atmospheric Visual Analysis Environment*, 2005-2009, NSF, \$686,163
- Principal Investigator: *Entrainment, Ultragrantic Particles, and Warm Rain Formation in Trade Wind Cumulus*, 2004-2008, NSF, \$352,761
- Co-principal Investigator: *Interdisciplinary Earth and Atmospheric Science Research: A Unique Challenge for Graduate Student Recruitment*, 2004-2005, Purdue Graduate College, \$10,000
- Principal Investigator: *Supercooled Large Drop Formation by Ultragrantic Particles in Wintertime Stratiform Clouds during the Second Alliance Icing Research Study (AIRS II)*, 2003-2006, NSF, \$201,089
- Co-principal Investigator: *Interdisciplinary Earth and Atmospheric Science Research: A Unique Challenge for Graduate Student Recruitment*, 2003-2004, Purdue Graduate College, \$5,000
- Co-principal Investigator: *The Roles of Ultragrantic Aerosols and Entrainment and Mixing in the Warm Rain Process*, 2000-2003, NSF, \$193,139

PUBLICATIONS (student authors underlined)

Plummer, D. M., J. R. French, D. C. Leon, A. M. Blyth, S. Lasher-Trapp, L. J. Bennett, D. R. L. Dufton, R. C. Jackson, and R. R. Neely, 2017: Radar-derived Structural and Precipitation Characteristics of Warm-based Convection Developing Z_{DR} Columns. Submitted to *J. Appl. Meteor. Clim.*

Field, P., and 28 other coauthors, 2017: Secondary Ice Production: Current State of the Science and Recommendations for the Future. *AMS Monographs*, Chapter 7, 1-20.

Moser, D. H. and S. Lasher-Trapp, 2017: The Influence of Successive Thermals on Entrainment and Dilution in a Simulated Cumulus Congestus. *J. Atmos. Sci.*, 74, 375-392.

Lasher-Trapp, S., D. C. Leon, P. J. DeMott, C. M. Villanueva-Birriel, A. V. Johnson, D. H. Moser, C. S. Tully, and W. Wu, 2016: A Multi-Sensor Investigation of Rime-Splintering In Tropical Maritime Cumuli. *J. Atmos. Sci.*, 73, 2547-2564.

Leon, D. C., J. R. French, S. Lasher-Trapp, A. M. Blyth, and 41 co-authors, 2016: The Convective Precipitation Experiment (COPE): Investigating the Origins of Heavy Precipitation in the Southwestern United Kingdom. *Bull. Amer. Meteor. Soc.*, 97, 1003-1020.

Villanueva-Birriel, C. M., S. Lasher-Trapp, R. J. Trapp, and N. S. Diffenbaugh, 2014: Sensitivity of the Warm Rain Process in Convective Clouds to Regional Trends in Tropospheric Warming in the Contiguous U.S. *J. Clouds, Aerosol and Radiation*, 1, 1-17.

Johnson, A., S. Lasher-Trapp, A. Bansemmer, Z. Ulanowski and A. J. Heymsfield, 2014: Detection and Quantification of Ice with the Small Ice Detector 2 HIAPER (SID-2H). *J. Atmos. Ocean. Tech.*, 31, 1263-1275.

Cooper, W. A., S. G. Lasher-Trapp, and A. M. Blyth, 2013: The influence of entrainment and mixing on the initial formation of rain in a warm cumulus cloud. *J. Atmos. Sci.*, 70, 1727-1743.

Quardokus, K., S. Lasher-Trapp and E. M. Riggs, 2012: Can students perform authentic research early in their undergraduate program? *Bull. Amer. Meteor. Soc.*, 93, 1641-1649.

Bewley, J.L., and S. Lasher-Trapp, 2011: Progress on Predicting the Breadth of Droplet Size Distributions Observed in Small Cumuli. *J. Atmos. Sci.*, 68, 2921-2929.

Cooper, W.A., S. G. Lasher-Trapp, and A. M. Blyth, 2011: Initiation of Coalescence in a Cumulus Cloud: A Beneficial Influence of Entrainment and Mixing. *Atmos. Chem. Phys. Disc.*, 11, 10557-10613.

Arthur, D. K., S. Lasher-Trapp, A. Abdel-Haleem, N. Klosterman, and D. S. Ebert, 2010: A New Three-Dimensional Visualization System for Combining Aircraft and Radar Data and Its Application to RICO Observations. *J. Atmos. Oceanic Tech.*, 27, 811-828.

Reiche, C. H., and S. Lasher-Trapp, 2010: The minor importance of giant aerosol to precipitation development within small trade wind cumuli observed during RICO. *Atmospheric Research*, 95, 386-399.

Parker, L. C., G. H. Krockover, S. Lasher-Trapp and D. C. Eichinger, 2008: Ideas about the nature of science held by undergraduate atmospheric science students. *Bull. Amer. Meteor. Soc.*, 89, 1681-1688.

Lasher-Trapp, S., S. Anderson-Bereznicki, A. Shackelford, C. H. Twohy and J. G. Hudson, 2008: An investigation of the influence of droplet number concentration and giant aerosol particles upon supercooled large drop formation in wintertime stratiform clouds. *J. Appl. Meteor. Climatol.*, 47, 2659-2678.

Lasher-Trapp, S., 2007: Clouds in a warmer climate: Friend or foe? *Forum on Public Policy*, 3, 353-368.

Rauber, R. M., and coauthors, 2007: Rain in shallow cumulus over the ocean—the RICO campaign. *Bull. Amer. Meteor. Soc.*, 88, 1912-1928.

Rauber, R. M., and coauthors, 2007: Supplement to Rain in shallow cumulus over the ocean. *Bull. Amer. Meteor. Soc.*, 88, S12-S18.

Lasher-Trapp, S., and J. P. Stachnik, 2007: Giant and Ultragiant Aerosol Particle Variability over the Eastern Great Lakes Region. *J. Appl. Meteor.*, 46, 651-659.

Song, Y., J. Ye, N. Svakhine, S. Lasher-Trapp, M. Baldwin and D. S. Ebert, 2006: An Atmospheric Visual Analysis and Exploration System. *IEEE Transactions on Visualization and Computer Graphics*, 12, 1157-1164.

Barth, M., and coauthors, 2006: Coupling Between Land Ecosystems and the Atmospheric Hydrologic Cycle through Biogenic Aerosol Pathways. *Bull. Amer. Meteor. Soc.*, 86, 1738-1742.

Blyth, A. M., S. G. Lasher-Trapp and W. A. Cooper, 2005: A Study of Thermals in Cumulus Clouds. *Quart. J. Roy. Meteor. Soc.*, 131, 1171-1190.

Lasher-Trapp, S. G., W. A. Cooper and A. M. Blyth, 2005: Broadening of Droplet Size Distributions from Entrainment and Mixing in a Cumulus Cloud. *Quart. J. Roy. Meteor. Soc.*, 131, 195-220.

Blyth, A. M., S. G. Lasher-Trapp, W. A. Cooper, C. A. Knight and J. Latham, 2002: The Role of Giant and Ultra-giant Aerosols in the Initiation of Rain in Warm Cumulus Clouds. *J. Atmos. Sci.*, 60, 2557-2572.

Knight, C. A., J. Vivekanandan and S. Lasher-Trapp, 2002: First Radar Echoes and Early ZDR History of Florida Cumulus. *J. Atmos. Sci.*, 59, 1454-1472.

Lasher-Trapp, S. G., W. A. Cooper and A. M. Blyth, 2002: Measurements of Ultragraining Aerosol Particles in the Atmosphere from the Small Cumulus Microphysics Study. *J. Atmos. Ocean. Tech.*, 19, 402-408.

Lasher-Trapp, S., C. A. Knight and J. M. Straka, 2001: Early Radar Echoes from Ultragraining Aerosol in a Cumulus Congestus: Modeling and Observations. *J. Atmos. Sci.*, 58, 3545-3562.

Doswell, C. A. III, and S. G. Lasher-Trapp, 1997: Measuring the Degree of Irregularity in Observation Networks. *J. Atmos. Ocean. Tech.*, 14, 120-132.

INVITED PRESENTATIONS

Secondary Ice Multiplication Symposium, Manchester, England 2015: Invited co-Lead for group presentation on “*Modeling/Theory*”.

Pennsylvania State University, 2015: “*The Enhanced Production of Ice in Tropical Cumuli: Observations and Numerical Modeling*”

Northern Illinois University, DeKalb, IL, 2015: “*Extreme Precipitation in Future Climates: A Microphysical Emphasis*”

Northern Illinois University, DeKalb, IL, 2015: “*The Enhanced Production of Ice in Tropical Cumuli*”

Illinois State Water Survey, Champaign, IL, 2015: “*The Enhanced Production of Ice in Tropical Cumuli*”

Dept. of Atmospheric Science, University of Illinois Urbana-Champaign, 2014: “*Extreme Precipitation in Future Climates: A Microphysical Emphasis*”

National Science Teachers Association National Conference on Science Education, Indianapolis, IN, 2012: “*Clouds and Precipitation in a Future Climate: Why Isn't There an App for This Yet?*”

UK National Centre for Atmospheric Science, Summer School on Atmospheric Measurement, Arran, Scotland, 2011: “*Cloud Physics: Precipitation Processes*”

National Center for Atmospheric Research, Boulder, CO, 2011: “*Progress on Entrainment and its Effects in Small Cumuli*”

University of Illinois, Urbana-Champaign, IL, 2011: “*Vignettes on Entrainment and its Effects in Small Cumuli*”

University of Leeds, Leeds, England, 2010: “*Initiation of Coalescence in a Cumulus Cloud: Influence of Variability in Drop Growth Histories Produced by Entrainment?*”

University of Manchester, Manchester, England, 2010: “*Initiation of Coalescence in a Cumulus Cloud: Influence of Variability in Drop Growth Histories Produced by Entrainment*”

UK Met. Office, Exeter, England, 2010: “*CCN vs GA: Strength in Numbers*”

Oxford Round Table (Invited speaker), Oxford, England, 2007: “*Clouds in a Warmer Climate: Friend or Foe?*”

Dept. of Geosciences, University of Nebraska (Stout lecture), 2007: “*Aerosol Effects Upon Supercooled Clouds and Aircraft Icing*”

National Severe Storms Laboratory, 2005: “*When Do the Microphysics Matter?*”

Department of Physics, Michigan Technical University, 2005: “*Evidence for Giant Aerosol Particles as a Source of Large Supercooled Drops, and a Possible Forecasting Technique*”

National Center for Atmospheric Research, 2005: “*More Evidence for Giant Aerosol Particles as a Source of Large Supercooled Drops in Stratiform Mixed-Phase Clouds*”

Department of Physics, DePauw University, 2004: “*Giant Aerosol Particles and Aircraft Icing: A New Connection*”

National Center for Atmospheric Research, 2004: “*Giant Aerosol Particles: Source of Large Supercooled Drops in Mixed-Phase Clouds?*”

Department of Atmospheric Science, U. of Illinois Urbana-Champaign, 2003: “*Broadening of Droplet Size Distributions from Entrainment and Mixing in a Cumulus Cloud*”

Department of Geological and Atmospheric Sciences, Iowa State University, 2002: “*Observational Analysis of Microphysical Processes within Cores of Small Warm Cumuli*”

Department of Atmospheric Science, Texas A&M University, 2000: “*Modeling and Observations of Warm Rain Processes in Small Cumuli*”

Department of Atmospheric Science, University of Wyoming, 1999: “*The Importance of Ultragiant Aerosol Particles to Warm Rain Formation*”

RECENT CONFERENCE, SYMPOSIA & WORKSHOP PRESENTATIONS (student presenters underlined)

Moser, D., S. Lasher-Trapp and B. Engelsen, 2017: *Cumulus Entrainment in Convective Clouds and Storms*. Blue Waters Symposium, Sun River, OR.

R. Trapp, S. Lasher-Trapp, S. Nesbitt, P. Borque, G. Marion, H. Mallinson, B. Engelsen, 2016: Controls and Inter-relationships Between the Convective Components of Simulated and Observed Midlatitude Convection. DOE Spring 2017 Meeting, Leesburg, VA.

Lasher-Trapp, S., D. Moser, D. C. Leon, J. French, and A. Blyth, 2016: High Resolution Simulations of Cumulus Entrainment. International Conference on Clouds and Precipitation, Manchester, England.

Moser, D., and S. Lasher-Trapp, 2016: Entrainment and Dilution Rates of Successive Thermals in a Simulated Cumulus Congestus. International Conference on Clouds and Precipitation, Manchester, England.

Kumar, S., S. Lasher-Trapp, D. Moser, J. French, A. Blyth and D. C. Leon, 2016: An investigation of Relationship between Wind Shear and Microphysical Pathways Leading to Convective Rainfall. International Conference on Clouds and Precipitation, Manchester, England.

Trapp, R. J., G. R. Marion, S. Lasher-Trapp, and S. Nesbitt, 2016: Controls on the Widths of Intense Convective Updrafts. DOE Spring 2016 Meeting, Leesburg, VA.

Lasher-Trapp, S., A. Blyth, J. French, and D. C. Leon, 2015: Microphysical Pathways to Heavy Convective Rainfall. European Conference on Severe Storms, Wiener Neustadt, Austria.

Lasher-Trapp, S., D. C. Leon and P. J. DeMott, January 2015: On the Production of Large Ice Number Concentrations in Maritime Cumuli. Joint session for 17th Conference on Atmospheric Chemistry & 7th Symposium on Aerosol-Cloud-Climate Interactions, Phoenix, AZ.

Lasher-Trapp, S., D. C. Leon and P. J. DeMott, July 2014: A Quicker Start to the Hallett-Mossop Process in Maritime Clouds. AMS 14th Conference on Cloud Physics, Boston, MA.

Lasher-Trapp, S., A. M. Blyth and D. Moser, July 2014: Entraining Eddies Associated with the Thermal Circulation in Cumulus Clouds. AMS 14th Conference on Cloud Physics, Boston, MA.

Moser, D., and S. Lasher-Trapp, July 2014: Modification of Cumulus Entrainment Due to Neighboring Clouds. AMS 14th Conference on Cloud Physics, Boston, MA.

Johnson, A. V., and S. Lasher-Trapp, July 2014: Modeling of Early Ice Formation in Maritime Cumulus Clouds. AMS 14th Conference on Cloud Physics, Boston, MA.

Villanueva-Birriel, C. M., and S. Lasher-Trapp, July 2014: Impacts Of Regional Climate Change Upon The Warm Rain Process And Surface Precipitation From Deep Convective Storms: A Numerical Modeling Study. AMS 14th Conference on Cloud Physics, Boston, MA.

EAS 431 Students and S. Lasher-Trapp, Feb 2014: The Variability in Atmospheric Thermodynamics Study (VATS): The Drought of Summer 2012, revisited. AMS Student Conference, Atlanta, GA.

Lasher-Trapp, S., D. C. Leon and J. French, Aug 2013: The Convective Precipitation Experiment: Preliminary Analysis. COPE Workshop, Exeter, England.