SONIA G. LASHER-TRAPP

Department of Earth, Atmospheric and Planetary Sciences
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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

- Associate Professor, Dept. of Earth, Atmospheric & Planetary Sciences, Purdue University, Aug 2009-present
- 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, Dec 2000- Dec 2002
- Postdoctoral Fellow, Advanced Study Program, NCAR/Texas A&M University, Aug 1998-Nov 2000

PROFESSIONAL ACTIVITIES

- Editor, Journal of Clouds, Aerosol and Radiation, 2014-2017
- Member, Program Committee for 16th International Conference 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

- Induction into 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 Earth and Atmospheric Sciences Outstanding Faculty Graduate Advisor, 2006
- Patricia Roberts Harris Fellow, The University of Oklahoma

FIELD PROGRAMS

- PI, COnvective 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) field campaign, Antigua and 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

- Principle Investigator: *The Convective Precipitation Experiment- Microphysical and Entrainment Dependencies (COPE-MED)*, 2013-2015, 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,* 2010-2013. 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, Ultragiant 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, Ultragiant 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 Ultragiant 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 Ultragiant Aerosols and Entrainment and Mixing in the Warm Rain Process*, 2000-2003, NSF, $193,139

PUBLICATIONS *(student authors underlined)*

Villanueva-Birriel, C. M., S. Lasher-Trapp, R. J. Trapp, and N. S. Diffenbaugh, 2013: Sensitivity of the Warm Rain Process in Convective Clouds to Regional Trends in Tropospheric Warming in the Contiguous U.S. *J. Clouds and Aerosol*, in review.

Johnson, A., S. Lasher-Trapp, A. Bansemer, Z. Ulanowski and A. J. Heymsfield, 2013: Detection and Quantification of Ice with the Small Ice Detector 2 HIAPER (SID-2H). *J. Atmos. Ocean. Tech*., in review.

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 Ultragiant 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 Ultragiant 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

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)*

Lasher-Trapp, S., D. C. Leon, C. H. Twohy, P. J. DeMott, G. R. McMeeking, A. V. Johnson, D. C. Rogers, D. W. Toohey, and A. J. Heymsfield, 2012: A Prolific Warm Rain Process and its Influence on Ice Nucleation in Tropical Maritime Cumuli. 16th Intl. Conf. on Clouds and Precip., Leipzig, Germany.

A. Johnson, S. Lasher-Trapp, A. Bansemer, D. C. Rogers, D. Leon, Z. Wang and A. Heymsfield, 2012: Detection of First Ice in Maritime Cumulus Clouds. 16th Intl. Conf. on Clouds and Precip., Leipzig, Germany.

C. Villanueva-Birriel, S. Lasher-Trapp and H. Morrison, 2012: Microphysical Differences Resulting from Regional Climate Change in Simulated Deep Convective Storms. 16th Intl. Conf. on Clouds and Precip., Leipzig, Germany.

Lasher-Trapp, S., D. C. Leon, C. H. Twohy, D. W. Toohey, P. J. DeMott, G. R. McMeeking, A. V. Johnson, D. C. Rogers, and A. J. Heymsfield, 2011: A Prolific Warm Rain Process and its Possible Influence on Ice Nucleation as Observed During ICE-T. AGU Fall Meeting, San Francisco, CA.

Johnson, A. V., S. Lasher-Trapp, D. C. Rogers, A. Heymsfield, R. L. Storer, D. Leon and Z. Wang, 2011: A Field Study of First Ice Formation in Maritime Cumulus Clouds. AGU Fall Meeting, San Francisco, CA.

Lasher-Trapp, S., 2011: The Influence of Warm Rain on Ice Initiation: *A Very Preliminary Look at ICE-T Data*. Midwestern Cloud Forum, Univ. of Illinois, Urbana-Champaign, IL.

Lasher-Trapp, S., and A. M. Blyth, 2010: *Entrainment in a High-Resolution Simulation of a Cumulus Cloud.* AGU Fall Meeting, San Francisco, CA.

Quardokus, K., S. Lasher-Trapp and E. M. Riggs, 2010: *Bringing Authentic Science Practice to the Undergraduate Classroom.* 19th Symposium on Education, 90th AMS Annual Meeting, Atlanta, GA.

Lasher-Trapp, S., 2010: *CCN vs GA: Strength in Numbers*. Meeting on Cloud-Aerosol Interactions, University of Leeds, Leeds, UK.

Villanueva-Birriel, C. M., and S. Lasher-Trapp, 2010: Changes in the Productivity of the Warm Rain Process in Deep Convective Clouds Resulting from Regional Climate Change over the Continental U.S. *Proceedings, AMS 13th Conf. on Cloud Physics*, available online through AMS.

Arthur, D. K., and S. Lasher-Trapp, 2010: *Effects of Environmental Temperature and Humidity in Future Climates on Ice Nucleation and Resulting Precipitation in Idealized Supercell Simulations.* AMS 13th Conf. on Cloud Physics.

Lasher-Trapp, S., 2010: ICE-T: *Warm Rain- Ice Interactions and Cloud Dynamics.* NSF ICE-T workshop, Boulder, CO.

Lasher-Trapp, S., 2009: The Relative Importance of CCN and Giant Aerosol Particles to Warm Rain Formation: Strength in Numbers. *Symposium on Aerosol, Clouds and Climate*, American Meteorological Society Annual Meeting, Phoenix, AZ.

Lasher-Trapp, S., W. A. Cooper and A. M. Blyth, 2008: Effects of entrainment and mixing on droplet coalescence in a simulated warm cumulus cloud. Preprints, *15th Int. Conf. on Clouds and Precipitation*, Cancun, Mexico, ICCP, CD-ROM.

Bewley, J. L., and S. Lasher-Trapp, 2008: The effects of entrainment and mixing on droplet populations: A comparison of numerical modeling and aircraft observations. Preprints, *15th Int. Conf. on Clouds and Precipitation*, Cancun, Mexico, ICCP, CD-ROM.

Arthur, D. K., S. Lasher-Trapp, A. Abdel-Haleem, N. Klosterman, and D. S. Ebert, 2008: A new three-dimensional visualization system for combining aircraft and radar data and its application to RICO observations. Preprints, *15th Int. Conf. on Clouds and Precipitation*, Cancun, Mexico, ICCP, CD-ROM.

NSF Workshop on Enabling Science Discoveries through Visual Exploration, Sept 2007, Washington D.C.: *"Visualization Needs for Multi-Scale Atmospheric Science Problems"*

Lasher-Trapp, S., Y. Song, N. Svakhine and D. Ebert, 2006: Turbulence and liquid water patterns in simulated small cumulus. 12th AMS Conf. on Cloud Physics, Madison, WI.

Bewley, J. and S. Lasher-Trapp, 2006: Can cloud droplet number increase with height? 12th AMS Conf. on Cloud Physics, Madison, WI.

Henry, C. and S. Lasher-Trapp, 2006: When can giant aerosol fail to produce rain? Preprints, *12th Conf. on Cloud Physics*, Madison, WI, Amer. Meteor. Soc. CD-ROM.

Stachnik, J. and S. Lasher-Trapp, 2006: Hailstorm simulations using the Weather Research and Forecasting (WRF) model: Microphysical parameterization sensitivities and preliminary verification. 12th AMS Conf. on Cloud Physics, Madison, WI.

Shackelford, A. and S. Lasher-Trapp, 2006: The significance of giant aerosol in stratiform clouds. 12th AMS Conf. on Cloud Physics, Madison, WI.

Lasher-Trapp, S., C. Henry and J. Bewley, 2006: Precipitation initiation studies. Second RICO Workshop, Boulder, CO.

Lasher-Trapp, S., C. Henry and J. Bewley, 2005: Warm rain initiation: Our interests at Purdue. First RICO Workshop, Boulder, CO.

Lasher-Trapp, S., 2004: Warm rain formation by ultragiant particles and cumulus entrainment. Pre-RICO Workshop, Boulder, CO.

Lasher-Trapp, S., S. Anderson-Bereznicki and C. Twohy, 2005: Giant Aerosol Particles as a Potential Source of Supercooled Large Drops in Wintertime Stratiform Clouds. *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract A33E-05.

Lasher-Trapp, S., S. Bereznicki and J. Stachnik, 2004: Giant and Ultragiant Aerosol Particles: Source of Large Supercooled Drops in Mixed-phase Clouds? *Proc. 14th Int. Conf. on Clouds and Precipitation*, Bologna, Italy, 831-835.