

Andrew R. Metcalf, Ph.D.

CONTACT INFORMATION	Environmental Engineering and Earth Sciences Clemson University 342 Computer Court Anderson, SC 29625	Office: (864) 656-0464 Mobile: (626) 319-8040 Email: ametcal@clemson.edu Clemson Air Quality Lab
EDUCATION	California Institute of Technology , Pasadena, California Ph.D., Environmental Science and Engineering • Thesis: <i>Atmospheric Black Carbon: Measurements in the Los Angeles Atmosphere and Aging by Condensation of Organic Aerosol</i> • Advisor: John H. Seinfeld The Pennsylvania State University , University Park, Pennsylvania M.S. & B.S., with High Distinction and with Honors, Meteorology • Thesis: <i>A Chamber Study of Photochemical Oxidation Processes in the Atmosphere</i> • Advisor: William H. Brune	June, 2012 May, 2005
APPOINTMENTS	Clemson University , Clemson, South Carolina <i>Assistant Professor</i> , Department of Environmental Engineering and Earth Sciences University of Minnesota , Minneapolis, Minnesota <i>NSF-AGS Postdoctoral Fellow</i> , Department of Mechanical Engineering • Title: <i>Building a microfluidic platform to study atmospheric aerosol</i> Sandia National Laboratories , Livermore, California <i>Postdoctoral Appointee</i> , Combustion Research Facility • Topic: Building an apparatus to measure optical properties of soot aerosol	August, 2017–present September, 2013–July, 2017 June, 2012–August, 2013
TEACHING & MENTORSHIP	Instructor • EES 4300/6300 - Air Pollution Engineering • EES 8330 - Air Pollution Control Systems • EES 9610 - EES PhD Seminar Guest Lecturer • ME 4031W - Basic Mechanical Measurements Laboratory - Taught two lectures each semester on an introduction to programming with LabVIEW. • CHE 1435 - Fundamentals of Aerosol Physics and Chemistry - Taught two lectures on black carbon aerosol at the University of Toronto. Graduate Advisor • Current Advisees - Ali Mohammadi Nafchi, M.S., Biosystems Engineering - Nilima Sarwar, M.S., Environmental Engineering & Science - Katie Van Valkinburgh, M.S. Environmental Engineering & Science • Graduated Students - Isaac (Walt) Williams, III, M.S., Environmental Engineering & Science Undergraduate Research Advisor • Graduated Students - Kathryn Abbott, B.S., Environmental Engineering - Robert Basha, B.S., Environmental Engineering - McKenna Dove, B.S., Environmental Engineering - Shargene Nguyen, B.S., Environmental Engineering - Houston (Kaiser) Rich, B.S., Environmental Engineering - Camren Shea, B.S., Environmental Engineering - Thomas Timms, B.S., Environmental Engineering	Fall, 2017–Fall, 2019 Spring, 2019 Spring–Fall, 2019 Fall, 2014–Fall, 2015 Spring, 2015 Fall, 2017–present Spring, 2019–present Fall, 2019–present. Summer, 2019 Spring, 2019–present Spring, 2019 Spring, 2019 Spring, 2019 Spring, 2019 Spring, 2019 Spring, 2019

- PUBLICATIONS Schulze, B. C.; Charan, S. M.; Kenseth, C. M.; Kong, W.; Bates, K. H.; Williams, W.; **Metcalf, A. R.**; Jonsson, H. H.; Woods, R.; Sorooshian, A.; Flagan, R. C.; and Seinfeld, J. H. Characterization of aerosol hygroscopicity over the Northeast Pacific: Impacts on prediction of CCN and stratocumulus cloud droplet number concentrations. *Journal of Geophysical Research: Atmospheres*, under review.
- Italicized names are student advisees* Bhattacharya, A.; Mousavi, E. S.; **Metcalf, A. R.**, and Mohammadi Nafchi, A. Particle dispersion in cleanrooms: The effect of pressurization, door opening, and traffic flow. *Building and Environment*, under review.
- Abell, J. T.; Pullen, A.; Lebo, Z. J.; Kapp, P.; Gloege, L.; **Metcalf, A. R.**; Nie, J.; and Winckler, G. A wind-albedo-wind feedback driven by landscape evolution. *Nature Communications*, under review.
- Narayan, S.; Moravec, D. B.; **Metcalf, A. R.**; Quam, D.; Dallas, A. J.; and Dutcher, C. S. Microfluidic interfacial tensiometry: Effect of confinement and continuous phase properties on drop deformation in PDMS microfluidic channels. *Microfluidics and Nanofluidics*, under review.
- Sorooshian, A.; MacDonald, A. B.; Dadashazar, H.; Bates, K. H.; Coggon, M. M.; Craven, J. S.; Crosbie, E.; Hersey, S. P.; Hodas, N.; Lin, J. J.; Marty, A. N.; Maudlin, L. C.; **Metcalf, A. R.**; Murphy, S. M.; Prabhakar, G.; Rissman, T. A.; Shingler, T.; Varutbangkul, T.; Wang, Z.; Woods, R. K.; Chuang, P. Y.; Nenes, A.; Jonsson, H. H.; Flagan, R. C.; and Seinfeld, J. H. A multi-year data set on aerosol-cloud-precipitation-meteorology interactions for marine stratocumulus clouds. *Scientific Data*, 5, 180026, doi: 10.1038/sdata.2018.26, 2018.
- Metcalf, A. R.**; Narayan, S.; and Dutcher, C. S. A review of microfluidic concepts and applications for atmospheric aerosol science. *Aerosol Science & Technology*, 52(3), 310–329, doi: 10.1080/02786826.2017.1408952, 2017.
- Zhang, X.; Kim, H.; Parworth, C. L.; Young, D. E.; Zhang, Q.; **Metcalf, A. R.**; and Cappa, C. D. Optical properties of wintertime aerosols from residential wood burning in Fresno, CA: Results from DISCOVER-AQ 2013. *Environmental Science and Technology*, 50(4), 1681–1690, doi: 10.1021/acs.est.5b04134, 2016.
- Metcalf, A. R.**; Boyer, H. C.; and Dutcher, C. S. Interfacial tensions of aged organic aerosol particle mimics using a biphasic microfluidic platform. *Environmental Science and Technology*, 50(3), 1251–1259, doi: 10.1021/acs.est.5b04880, 2016.
- Jung, E.; Albrecht, B. A.; Jonsson, H. H.; Chen, Y.-C.; Seinfeld, J. H.; Sorooshian, A.; **Metcalf, A. R.**; Song, S.; Fang, M.; and Russell, L. M. Precipitation effects of giant cloud condensation nuclei artificially introduced into stratocumulus clouds. *Atmospheric Chemistry and Physics*, 15, 5645–5658, doi: 10.5194/acp-15-5645-2015, 2015.
- Coggon, M. M.; Sorooshian, A.; Wang, Z.; Craven, J. S.; **Metcalf, A. R.**; Lin, J. J.; Nenes, A.; Jonsson, H. H.; Flagan, R. C.; and Seinfeld, J. H. Observations of continental biogenic impacts on marine aerosol and clouds off the coast of California. *Journal of Geophysical Research: Atmospheres*, 119(11), 6724–6748, doi: 10.1002/2013JD021228, 2014.
- Fast, J. D.; Allan, J.; Bahreini, R.; Craven, J. S.; Emmons, L.; Ferrare, R. A.; Hayes, P. L.; Hodzic, A.; Holloway, J.; Hostetler, C. A.; Jimenez, J. L.; Jonsson, H.; Liu, S.; Liu, Y.; **Metcalf, A. R.**; Middlebrook, A.; Novak, J.; Pekour, M.; Perring, A.; Russell, L.; Sedlacek, A.; Seinfeld, J.; Setyan, A.; Shilling, J.; Shrivastava, M.; Springston, S.; Song, C.; Subramanian, R.; Taylor, J. W.; Vиноj, V.; Yang, Q.; Zaveri, R. A.; and Zhang, Q. Modeling regional aerosol and aerosol precursor variability over California and its sensitivity to emissions and long-range transport during the 2010 CalNex and CARES campaigns. *Atmospheric Chemistry and Physics*, 14, 10013–10060, doi: 10.5194/acp-14-10013-2014, 2014.
- Craven, J. S.; **Metcalf, A. R.**; Bahreini, R.; Middlebrook, A.; Hayes, P. L.; Duong, H. T.; Sorooshian, A.; Jimenez, J. L.; Flagan, R. C.; and Seinfeld, J. H. Los Angeles Basin airborne organic aerosol characterization during CalNex. *Journal of Geophysical Research: Atmospheres*, 118(19), 11,453–11,467, doi: 10.1002/jgrd.50853, 2013.

- PUBLICATIONS
CONTINUED
- Russell, L. M.; Sorooshian, A.; Seinfeld, J. H.; Albrecht, B. A.; Nenes, A.; Ahlm, L.; Chen, Y.-C.; Coggon, M.; Craven, J. S.; Flagan, R. C.; Frossard, A. A.; Jonsson, H.; Jung, E.; Lin, J. J.; **Metcalf, A. R.**; Modini, R.; Mülmenstädt, J.; Roberts, G. C.; Shingler, T.; Song, S.; Wang, Z.; and Wonaschütz, A. Eastern Pacific Emitted Aerosol Cloud Experiment (E-PEACE). *Bulletin of the American Meteorological Society*, 94, 709–729, doi: 10.1175/BAMS-D-12-00015.1, 2013.
- Hersey, S. P.; Craven, J. S.; **Metcalf, A. R.**; Lin, J.; Latham, T.; Suski, K. J.; Cahill, J. F.; Duong, H. T.; Sorooshian, A.; Jonsson, H. H.; Shiraiwa, M.; Zuend, A.; Nenes, A.; Prather, K. A.; Flagan, R. C.; and Seinfeld, J. H. Composition and hygroscopicity of the Los Angeles Aerosol: CalNex. *Journal of Geophysical Research*, 118(7), 3016–3036, doi: 10.1002/jgrd.50307, 2013.
- Ensberg, J. J.; Craven, J. S.; **Metcalf, A. R.**; Allan, J. D.; Angevine, W. M.; Bahreini, R.; Brioude, J.; Cai, C.; Coe, H.; de Gouw, J. A.; Ellis, R. A.; Flynn, J. H.; Haman, C. L.; Hayes, P. L.; Jimenez, J. L.; Lefer, B. L.; Middlebrook, A. M.; Murphy, J. G.; Neuman, J. A.; Nowak, J. B.; Roberts, J. M.; Stutz, J.; Taylor, J. W.; Veres, P. R.; Walker, J. M.; and Seinfeld, J. H. Inorganic and black carbon aerosols in the Los Angeles Basin during CalNex. *Journal of Geophysical Research*, 118(4), 1777–1803, doi: 10.1029/2012JD018136, 2013.
- Metcalf, A. R.**; Loza, C. L.; Coggon, M. M.; Craven, J. S.; Jonsson, H. H.; Flagan, R. C.; and Seinfeld, J. H. Secondary organic aerosol coating formation and evaporation: Chamber studies using black carbon seed aerosol and the single-particle soot photometer. *Aerosol Science and Technology*, 47, 326–347, doi: 10.1080/02786826.2012.750712, 2013.
- Coggon, M. M.; Sorooshian, A.; Wang, Z.; **Metcalf, A. R.**; Frossard, A. A.; Lin, J. J.; Craven, J. S.; Nenes, A.; Jonsson, H. H.; Russell, L. M.; Flagan, R. C.; and Seinfeld, J. H. Ship impacts on the marine atmosphere: insights into the contribution of shipping emissions to the properties of marine aerosol and clouds. *Atmospheric Chemistry and Physics*, 12, 8439–8458, doi: 10.5194/acp-12-8439-2012, 2012.
- Shingler, T.; Dey, S.; Sorooshian, A.; Brechtel, F. J.; Wang, Z.; **Metcalf, A.**; Coggon, M.; Mülmenstädt, J.; Russell, L. M.; Jonsson, H. H.; and Seinfeld, J. H. Characterization and airborne deployment of a new counterflow virtual impactor inlet. *Atmospheric Measurement Techniques*, 5, 1259–1269, doi: 10.5194/amt-5-1259-2012, 2012.
- Metcalf, A. R.**; Craven, J. S.; Ensberg, J. J.; Brioude, J.; Angevine, W.; Sorooshian, A.; Duong, H. T.; Jonsson, H. H.; Flagan, R. C.; and Seinfeld, J. H. Black carbon aerosol over the Los Angeles Basin during CalNex. *Journal of Geophysical Research*, 117(D21), D00V13, doi: 10.1029/2011JD017255, 2012.
- Duong, H. T.; Sorooshian, A.; Craven, J. S.; Hersey, S. P.; **Metcalf, A. R.**; Zhang, X.; Weber, R. J.; Jonsson, H.; Flagan, R. C.; and Seinfeld, J. H. Water-soluble organic aerosol in the Los Angeles Basin and outflow regions: airborne and ground measurements during the 2010 CalNex field campaign. *Journal of Geophysical Research*, 116(D21), D00V04, doi: 10.1029/2011JD016674, 2011.
- Wonaschütz, A.; Hersey, S. P.; Sorooshian, A.; Craven, J. S.; **Metcalf, A. R.**; Flagan, R. C.; and Seinfeld, J. H. Impact of a large wildfire on water-soluble organic aerosol in a major urban area: the 2009 Station Fire in Los Angeles County. *Atmospheric Chemistry and Physics*, 11, 8257–8270, doi: 10.5194/acp-11-8257-2011, 2011.
- Hersey, S. P.; Craven, J. S.; Schilling, K. A.; **Metcalf, A. R.**; Sorooshian, A.; Chan, M. N.; Flagan, R. C.; and Seinfeld, J. H. The Pasadena Aerosol Characterization Observatory (PACO): chemical and physical analysis of the Western Los Angeles basin aerosol. *Atmospheric Chemistry and Physics*, 11, 7417–7443, doi: 10.5194/acp-11-7417-2011, 2011.
- Ren, X.; Brune, W. H.; Mao, J.; Mitchell, M. J.; Leshner, R. L.; Simpas, J. B.; **Metcalf, A. R.**; Schwab, J. J.; Cai, C.; Li, Y.; Demerjian, K. L.; Felton, H. D.; Boynton, G.; Adams, A.; Perry, J.; He, Y.; Zhou, X.; and Hou, J. Behavior of OH and HO₂ in the winter atmosphere in New York City. *Atmospheric Environment*, 40, S252–S263, doi: 10.1016/j.atmosenv.2005.11.073, 2006.
- Ren, X.; Brune, W. H.; Oligier, A.; **Metcalf, A. R.**; Simpas, J. B.; Shirley T.; Schwab, J. J.; Bai, C.; Roychowdhury, U.; Li, Y.; Cai, C.; Demerjian, K. L.; He, Y.; Zhou, X.; Gao, H.; and Hou, J. OH, HO₂, and OH reactivity during the PMTACS-NY Whiteface Mountain 2002 campaign: observations and model comparison. *Journal of Geophysical Research*, 111(D10), D10S03, doi: 10.1029/2005JD006126, 2006.

- PUBLICATIONS CONTINUED Ren, X.; Brune, W. H.; Cantrell, C. A.; Edwards, G. D.; Shirley, T.; **Metcalf, A. R.**; and Leshner, R. L. Hydroxyl and peroxy radical chemistry in a rural area of Central Pennsylvania: observations and model comparisons. *Journal of Atmospheric Chemistry*, 52, 231–257, doi: 10.1007/s10874-005-3651-7, 2005.
- Ren, X.; Edwards, G. D.; Cantrell, C. A.; Leshner, R. L.; **Metcalf, A. R.**; Shirley, T.; and Brune, W. H. Intercomparison of peroxy radical measurements at a rural site using laser-induced fluorescence and Peroxy Radical Chemical Ionization Mass Spectrometer (PerCIMS) techniques. *Journal of Geophysical Research*, 108(D19), 4605, doi: 10.1029/2003JD003644, 2003.
- CONFERENCE PRESENTATIONS *Sarwar, N.*; *Williams, W.*; *Sorooshian, A.*; *Jonsson, H.*; *Flagan, R.*; *Seinfeld, J.*; and **Metcalf, A. R.**. *Airborne Characterization of Wildfire Influence on Local Air Quality in California*, Platform Presentation, American Association for Aerosol Research 37th Annual Conference, Portland, OR, October 2019.
- Italicized names are student advisees* **Metcalf, A. R.**; *Post, C.*; *Pearce, J.*; *Green, A.*; *Sarwar, N.*; *Mikhailova, E.*; and *Cope, M.* *Evaluation of a New Low-Cost Particle Sensor as an IoT Device for Outdoor Particulate Matter Monitoring*, Platform Presentation, American Association for Aerosol Research 37th Annual Conference, Portland, OR, October 2019.
- Metcalf, A. R.** *Airborne Characterization of Wildfire Influence on Local Air Quality in California*, Poster Presentation, Gordon Research Conference on Atmospheric Chemistry, Newry, ME, August 2019.
- Williams, W.*; *Sorooshian, A.*; *Jonsson, H.*; *Flagan, R.*; *Seinfeld, J.*; and **Metcalf, A. R.** *Characterization of Marine and Wildfire Environments with the Naval Postgraduate School's Twin Otter Aircraft*, Platform Presentation, American Geophysical Union Fall Meeting, Washington, DC, December 2018.
- Williams, W.*; *Sorooshian, A.*; *Jonsson, H.*; *Flagan, R.*; *Seinfeld, J.*; and **Metcalf, A. R.** *Black Carbon Aerosol in a Clean Marine Environment*, Platform Presentation, 10th International Aerosol Conference, St. Louis, MO, September 2018.
- Mohammadi Nafchi, A.*; *McMeeking, G. R.*; and **Metcalf, A. R.** *A Microfluidic Ice Nucleating Particle Counter for Continuous Measurements*, Poster Presentation, 10th International Aerosol Conference, St. Louis, MO, September 2018.
- Metcalf, A. R.**; *Hogan, C.*; *Dutcher, C.* *Freezing of aerosol liquid mimics in a microfluidic device*, Platform Presentation, American Association for Aerosol Research 36th Annual Conference, Raleigh, NC, October 2017.
- Metcalf, A. R.**; *Hogan, C.*; *Dutcher, C.* *Freezing of Aerosol Liquid Mimics in a Microfluidic Device*, Poster Presentation, Gordon Research Conference on Atmospheric Chemistry, Newry, ME, August 2017.
- Metcalf, A. R.**; *Hogan, C.*; *Dutcher, C.* *Using microfluidics for droplet and particle characterization of environmental fluids*, Platform Presentation, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, November 2016.
- Metcalf, A. R.**; *Dutcher, C. S.* *Surface activity in secondary organic aerosol liquid samples*, Platform Presentation, American Association for Aerosol Research 35th Annual Conference, Portland, OR, October 2016.
- Metcalf, A. R.**; *Boyer, H.*; *Dutcher, C. S.* *Using microfluidics to measure surface-bulk partitioning of aerosol constituents*, Platform Presentation, 18th Conference on Atmospheric Chemistry at American Meteorological Society 96th Annual Meeting, New Orleans, LA, January 2016.
- Metcalf, A. R.**; *Dutcher, C. S.* *Microfluidic measurements of atmospheric aerosol mimic rheology*, Platform Presentation, American Association for Aerosol Research 34th Annual Conference, Minneapolis, MN, October 2015.
- Metcalf, A. R.**; *Dutcher, C. S.* *Microfluidic measurements of atmospheric aerosol mimic mixing states*, Platform Presentation, 11th International Conference on Carbonaceous Particles in the Atmosphere, Berkeley, CA, August 2015.

- CONFERENCE PRESENTATIONS CONTINUED
- Metcalf, A. R.;** Dutcher, C. S. *Using microfluidics to assess surface activity of aerosol constituents*, Poster Presentation, Gordon Research Conference on Atmospheric Chemistry, Waterville Valley, NH, August 2015.
- Metcalf, A. R.;** Dutcher, C. S. *Probing aerosol particle interfaces with droplet microfluidics*, Poster Presentation, Gordon Research Conference on Microfluidics, Physics & Chemistry of, West Dover, VT, June 2015.
- Metcalf, A. R.;** Dutcher, C. S. *Novel measurements of aerosol particle interfaces using biphasic microfluidics*, Platform Presentation, American Geophysical Union Fall Meeting, San Francisco, CA, December 2014.
- Metcalf, A. R.;** Coggon, M.; Sorooshian, A.; Chen, Y.-C.; Craven, J. S.; Lin, J. J.; Russell, L. M.; Frossard, A. A.; Modini, R.; Muelmenstaedt, J.; Alhm, L.; Song, S.; Jung, E.; Albrecht, B. A.; Wonaschütz, A.; Wang, Z.; Shingler, T.; Jonsson, H. H.; Nenes, A.; Seinfeld, J. H. *In-situ measurements of aerosol-cloud-precipitation interactions during the 2011 E-PEACE campaign: case studies of clouds perturbed by ship emissions*, Poster Presentation, American Geophysical Union Fall Meeting, San Francisco, CA, December 2011.
- Metcalf, A. R.;** Craven, J. S.; Jonsson, H. H.; Flagan, R. C.; Seinfeld, J. H. *Black carbon measurements over the Los Angeles Basin during CalNex*, Platform Presentation, American Association for Aerosol Research 30th Annual Conference, Orlando, FL, October 2011.
- Metcalf, A. R.;** Craven, J. S.; Jonsson, H. H.; Flagan, R. C.; Seinfeld, J. H. *Black carbon measurements over the Los Angeles Basin during CalNex*, Poster Presentation, American Geophysical Union Fall Meeting, San Francisco, CA, December 2010.
- Co-author contributions to an additional 28 conference presentations.
- INVITED TALKS
- Using Microfluidics for the Detection of Water Impurities* September, 2018
Kanomax Aerosol Workshop 2018, 10th International Aerosol Conference
- The Clemson Air Quality Lab: Using Multiscale Measurements to Understand Air Pollution* March, 2018
Automotive Engineering Department Seminar, Clemson University
- Using Multiscale Measurements to Understand Air Pollution: From Laboratory to Field Studies* February, 2017
Environmental Engineering and Earth Sciences Department Seminar, Clemson University
- Understanding Atmospheric Aerosol Particle Morphology with Implications for Climate, Air Quality, and Human Health* February, 2016
Environmental & Water Resources Engineering Seminar, University at Buffalo
- Probing Aerosol Particle Interfaces with Droplet Microfluidics* May, 2015
Gordon Research Seminar on Microfluidics
- Probing Aerosol Particle Mimics with Droplet Microfluidics* March, 2015
SOCAAR Seminar Series, University of Toronto
- Field Measurements of Black Carbon Aerosol* December, 2013
Donaldson Company, Inc.
- Black Carbon Aerosol in the Los Angeles Basin* December, 2013
Particle Technology Laboratory, University of Minnesota
- Atmospheric Black Carbon: Measurements in the Los Angeles Atmosphere and Aging by Condensation of Organic Aerosol* March, 2013
Atmospheric, Earth, and Energy Division, Lawrence Livermore National Laboratory
- Black Carbon Aerosol in the Los Angeles Basin* December, 2011
Combustion Research Facility, Sandia National Laboratories
- Instrumentation in the Flagan Lab* February, 2011
Atmospheric Free Radical Chemistry Group, California Institute of Technology
- A Multi-angle Light-scattering Spectrometer for Detecting Scattering Phase Functions of Single Aerosol Particles* May, 2009
Chemical Kinetics and Photochemistry Group, Jet Propulsion Laboratory

PROFESSIONAL ACTIVITIES & SERVICE	Scientific Society Memberships	
	- American Meteorological Society (AMS)	2003–present
	- American Geophysical Union (AGU)	2003–present
	- American Association for Aerosol Research (AAAR)	2007–present
	- American Physical Society (APS) – Division of Fluid Dynamics (DFD)	2013–present
	- American Association for the Advancement of Science (AAAS)	2015–present
	- American Chemical Society (ACS)	2016–present
	- Air & Waste Management Association (A&WMA)	2018–present
	- Association of Environmental Engineering & Science Professors (AEESP)	2018–present
	Peer Reviewer	
	- <i>Micromachines</i>	2019–present
	- <i>Atmospheric Environment</i>	2017–present
	- <i>Aerosol Science & Technology</i>	2015–present
	- <i>Atmospheric Measurement Techniques</i>	2014–present
	- <i>Atmospheric Chemistry and Physics</i>	2014–present
- <i>Journal of Geophysical Research – Atmospheres</i>	2013–present	
Proposal Reviewer		
- NSF Graduate Research Fellowship Program	January, 2017	
- NASA Postdoctoral Program	2016–present	
- <i>National Oceanic and Atmospheric Administration</i> proposals	2015–present	
- <i>National Science Foundation</i> proposals	2015–present	
- US Dept. of Energy Atmospheric System Research Program	2015; 2018	
Student Competition Judge		
- Student Poster Competition, AAAR Annual Meeting	2015–present	
- Outstanding Student Paper Awards, AGU Fall Meeting	2014; 2018	
Session Co-chair, AAAR Annual Meeting	2014–present	
Panelist, Pre- & Post-Doctoral Fellowships Guide: A Grant Workshop	November, 2014	
NCAR Undergraduate Summer Leadership Workshop; Boulder, CO	June, 2003	
COMMUNITY SERVICE & OUTREACH	Tour Guide, MRSEC Research Experiences for Teachers	April, 2017
	Tour Guide, Microscopy and High-Speed Imaging Lab, Minnesota Nano Center Nano Day	April, 2015
	Judge, Twin Cities Regional Science Fair; Minneapolis, MN	2014–2016
	Judge, Anoka-Hennepin District K-12 STEM Fair; Coon Rapids, MN	2014–2016
	Volunteer, HandsOn Twin Cities Make A Difference Day	October, 2013
	Judge, Alameda County Science and Engineering Fair; Pleasanton, CA	March, 2013
AWARDS	National Science Foundation – Atmospheric and Geospace Sciences Postdoctoral Research Fellowship	2014–2016
	American Meteorological Society/National Oceanic and Atmospheric Administration Office of Global Programs Graduate Fellowship	2004–2005
	Environmental Protection Agency Research Experience for Undergraduates (REU) Grant	Summer, 2002