MARK SMALLEY

835 E Calaveras St, Altadena, CA 91101 | 563-880-4094 | mark.a.smalley@jpl.nasa.gov

EDUCATION

Ph.D. in Atmospheric and Oceanic Sciences **May 13 2016**
University of Wisconsin-Madison
Dissertation: "Precipitation aggregation and the local environment"
GPA: 3.837 (M.S. & Ph.D.)

M.S. in Atmospheric and Oceanic Sciences **2011**
University of Wisconsin-Madison
Thesis: "Effects of spectral response function differences on CO2 slicing with an application to cloud climatologies"

B.S. in Physics and Astronomy **2008**
University of Iowa

AWARDS

Best student poster presentation, 17th Conference on Satellite Meteorology and Oceanography, Annapolis, MD **2010**
Waldo Edward & Martha Althaus Smith Memorial Award, University of Iowa **2008**
I.C.R.U Student Research Grant, University of Iowa **2007**

RESEARCH EXPERIENCE

Caltech Post-Doctoral Scholar at NASA Jet Propulsion Laboratory NASA-JPL **Aug 2016-Present**
329J Aerosols and Clouds

- Improving a shallow and deep convective cloud parameterization
  - Specific parameter values are constrained by global observations from NASA A-train instruments
  - Parameterization is implemented in a single column model within a global circulation model

Post-Doctoral Research Scholar UW-Madison Dept. of Atmos. and Ocn. Sciences **May 2016 – Aug 2016**
Tristan L'Ecuyer Research Group

- Assessed precipitation retrievals from space-borne W-band CloudSat radar and surface based WSR-88D radars (NOAA/NSSL Multi-Radar Multi-System; MRMS)
  - Collaboration with the University of Oklahoma

Doctoral Research Assistant UW-Madison Dept. of Atmos. and Ocn. Sciences **Jan 2012 – May 2016**
Tristan L'Ecuyer Research Group

- Developed a new approach to describing the spatial characteristics of precipitation
- Established a new functional relationship of probability of precipitation and resolution
  - This led to connections between atmospheric states and precipitation spatial characteristics, namely the number of events and their relative spacing, yielding a possible route to general circulation model parameterizations
- Assessed precipitation retrievals from space-borne W-band CloudSat radar and surface based WSR-88D radars (NCEP Stage IV)
  - Currently expanding this study to another WSR-88D product, the NMQ/MRMS
- Collaborated on two publications with researchers outside the L'Ecuyer research group
- Mentored and assisted other group members with scripting and their research
- Produced co-located datasets of CloudSat and the NASA MERRA reanalysis, CloudSat and Stage IV, and CloudSat and NMQ/MRMS

Masters Research Assistant UW-Madison Dept. of Atmos. and Ocn. Sciences **Aug 2008 - Aug 2011**
Steve Ackerman / Bob Holz Research Group

- Conducted a controlled experiment to study how differences in infrared spectral response functions affect cloud height climotologies
  - Employed observations from a suite of space-born A-train instruments, including passive infrared (MODIS, HIRS), active visible (CALIOP), and passive hyper-spectral infrared (AIRS)
  - Scripted a CO2 Slicing algorithm to retrieve cloud heights from two infrared MODIS channels and MODIS-simulated channels from AIRS
- Utilized the Line-By-Line Radiative Transfer Model to simulate MODIS and HIRS clear-sky observations
- Exploited cluster computing techniques to run the controlled experiment in parallel

PUBLICATIONS

Mark Smalley and Tristan L'Ecuyer, 2015: A Global Assessment of the spatial distribution of precipitation occurrence. J. Appl. Meteor. Climatol*., **54**, 2179-2197.*

Lars Norin, A Devasthale, T. S. L'Ecuyer, N. B. Wood, and **M. Smalley**, 2015: Intercomparison of snowfall estimates derived from the CloudSat Cloud Profiling Radar and the ground-based weather radar network over Sweden. *Atmospheric Measurement Techniques*, **8**, 12.

Mark Smalley, T.S. L'Ecuyer, M. Lebsock, and J. Haynes, 2014: A comparison of precipitation occurrence from the NCEP Stage IV QPE product and the CloudSat Cloud Profiling Radar. J. Hydrometeor*., **15**, 444-458.*

PEER REVIEW

Served as a referee for the Journal of Geophysical Research

FIELD WORK

OLYMPEX-RADEX GPM validation campaign **Nov 10 - Nov 18 2015**
Operated the Doppler On Wheels at Lake Quinault

PROGRAMMING LANGUAGES

Fluent in Matlab
Have experience in Python
Have experience in Fortran

TEACHING EXPERIENCE

Academic Tutor **UW-Madison Athletic Department** **2015**
Assisted student physics, astronomy, and atmospheric science learning through weekly meetings

MEMBERSHIPS

American Meteorological Society

EXTRA CURRICULAR ACTIVITIES

Served on the UW-Madison Dept. of Atmos. and Ocn. Sciences Colloquium Committee **2012 – 2015**
Invited speakers and organized meetings and logistics for weekly department lecture series

ORAL PRESENTATIONS

Precipitation aggregation and local atmospheric state **2016**
Invited presentation at NASA Jet Propulsion Laboratory. Pasadena, CA

Precipitation aggregation and local atmospheric state **2016**
Oral Defense / Dept. of Atmos. and Ocn. Sciences Colloquium Series. Madison, WI

Precipitation aggregation and the local atmospheric state **2016**
Talk at CALIPSO/CloudSat Science Team Meeting. Newport News, VA

Impacts of instrument sensitivity and spatial resolution on precipitation retrievals from satellite radars
Talk at the AMS 37th Radar Conference. Norman, OK **2015**

The spatial distribution of precipitation and its connection to the local environment
Talk at AOSS Department Seminar. Madison, WI **2015**

The spatial distribution of precipitation and its connection to the local environment
Talk at CALIPSO/CloudSat Science Team Meeting. Alexandria, VA **2014**

Uncertainties in cloud climatologies due to inter-instrument differences in the spectral response function of HIRS and MODIS
Talk at AOSS Department Seminar. Madison, WI **2011**

POSTER PRESENTATIONS

A comparison of precipitation occurrence from the Multi-Radar Multi-Sensor System and the CloudSat Cloud Profiling Radar
Poster at the AMS 37th Radar Conference. Norman, OK **2015**

The relationships between precipitation spatial distributions and the environment
Poster at the 5th AOSS Poster Reception. Madison, WI **2015**

Spatial scaling relationships of precipitation: a perspective from CloudSat
Poster at the Reid Bryson Earth Day Conference. Madison, WI **2014**

A comparison of precipitation occurrence from NCEP's StageIV and CloudSat's Cloud Profiling Radar
Poster at the American Meteorological Society's Annual Meeting. Austin, TX **2013**

Investigating the relationship between CO2 slicing derived cloud top heights and instrument spectral differences
Poster at the 17th Conference on Satellite Meteorology and Oceanography. Annapolis, MD **2010**

Measurements of mineral dusts' scattering dependence on wavelengths in the visible and a comparison to Mie Theory
Poster at the I.C.R.U. Spring Undergraduate Research Festival. Iowa City, IA **2008**