

Curriculum Vitae

Melissa Grady Trainer

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EDUCATION

Ph.D., Department of Chemistry and Biochemistry, **University of Colorado** **2006**
Thesis: *Laboratory Studies of Organic Haze Aerosols in Simulated Planetary Atmospheres*

B.A. in Chemistry, **Franklin and Marshall College**, Lancaster, PA **2000**
Magna Cum Laude, with a minor in Mathematics

RESEARCH EXPERIENCE

NASA Post-doctoral Fellow, Astrobiology Institute at the University of Colorado **2006 –**
“The Evaluation of CO₂ Clathrate Hydrates as a Possible Sink for CH₄ in the Martian Atmosphere:
Fusing Laboratory Results with a Developing Mars General Circulation Model”
Advisor: Dr. Brian Toon

Graduate Research Assistant, University of Colorado at Boulder, Boulder, CO **2001 - 2006**
This research included the design and construction of a flow chamber for the production of these
haze particles. Analysis of the aerosols produced in these systems have involved several
techniques; specifically the use of an Aerosol Mass Spectrometer (AMS), a Scanning Mobility
Particle Sizer (SMPS), Transmission Electron Microscope (TEM), and Nuclear Magnetic
Resonance (NMR) Spectroscopy.
Advisor: Dr. Margaret Tolbert

Graduate Research Intern, Merck Research Laboratories, Rahway, NJ **2000**
Supervisor: Dr. Peter Yehl

Schappell Research Scholar, Franklin and Marshall College, Lancaster, PA **1999 - 2000**
Supervisor: Dr. Kenneth Hess

Research Assistant, University of Strathclyde, Glasgow, Scotland **1998**
Supervisor: Dr. John Reglinski
This work was supported by a Marshall Scholar Grant from Franklin and Marshall College.

Moore Mentorship Research Scholar, Franklin and Marshall College, Lancaster, PA **1996**
Supervisor: Dr. Claude Yoder

SERVICE, OUTREACH, AND EDUCATION EXPERIENCE

- Co-Investigator for Colorado Project Astro-Geo Mars Project** **2007 –**
Received funding for a NASA Education/Public Outreach project to adapt current laboratory study of Mars atmosphere-surface interactions into a curriculum-based program for local middle- and high-school science classrooms. Duties involve organization of scientist-teacher workshop, classroom visits, and development of a hands-on classroom activity exploring properties of Mars surface materials.
- Organizer for Astrobiology Graduate Conference** **2007**
Served as one of four organizers to plan conference schedule, seek funding, and design scientific program for a conference in Puerto Rico for graduate students and postdoctoral researchers interested in Astrobiology.
- Speaker for Fort Morgan Community Series** **2007**
Delivered a talk on scientific research to a general audience, as part of a community series featuring University of Colorado faculty.
- Methods in Chemistry Seminar Chairperson** **2004 – 2005**
Worked to coordinate student, post-doc, and alumni speakers for the MIC Seminar Series in the University of Colorado Chemistry Department.
- CIRES Earthworks Volunteer Scientist** **2002 – 2004**
Served as a scientist mentor for secondary science teachers from around the country. During the one-week workshop, guided teachers to design and conduct a field-based interdisciplinary study.
- Student Coordinator for the Carnegie Initiative on the Doctorate** **2003 – 2005**
Served as a liaison between the Chemistry Graduate Student Body and the faculty, served as representative of the Chemistry Department of the University of Colorado at national meetings of the CID departments, and enacted change within the educational and social structure of the Chemistry Department.
- Teaching Assistant, Chemistry 1131** **2001**
Same as Chemistry 1111 duties.
- Teaching Assistant, Chemistry 1111** **2000**
Ran laboratory and recitation sessions which ran concurrent with class, provided additional helproom hours for students, wrote quizzes and prepared problem sets, and graded all laboratory reports, including laboratory final.

HONORS AND AWARDS

- NASA Postdoctoral Program Fellowship **2006 - 2007**
NASA Graduate Student Researchers Fellowship **2002 - 2005**
Award for Excellence in Teaching, Chemistry Department at CU-Boulder **2001**

Richard C. Schiedt Trust for Graduate Study	2000
Phi Beta Kappa Honor Society	2000
ACS Analytical Chemistry Award	1999
CRC Freshman Chemistry Award	1997

PUBLICATIONS

- Trainer MG, Pavlov AA, DeWitt HL, Jimenez JL, McKay CP, Toon OB, Tolbert MA. "Organic Haze on Titan and the Early Earth". *Proceedings of the National Academy of the Sciences*, **103** (48): 18035-18042, 2006.
- Trainer MG, Pavlov AA, Curtis DB, McKay CP, Worsnop DR, Delia AE, Toohey DW, Toon OB, Tolbert MA. "Haze Aerosols in the Atmosphere of Early Earth: Manna from Heaven". *Astrobiology* **4** (4): 409-419, 2004.
- Trainer MG, Pavlov AA, Jimenez JL, McKay CP, Worsnop DR, Toon OB, Tolbert MA. "Chemical Composition of Titan's Haze: Are PAH's present?" *Geophysical Research Letters* **31**, L17S08, doi:10.1029/2004GL019859, 2004.
- Schaeffer RW, Chan BC, Marshall SR, Blasiolo B, Khan N, Yoder KL, **Trainer ME***, Yoder CH. "Preparation and analysis of multiple hydrates of simple salts". *Journal of Chemical Education* **77**(4): 509-510, 2000.

INVITED SEMINAR PRESENTATIONS

"Searching for Heterogeneous Sinks of CH₄ on Mars", University of Colorado Center for Astrobiology, March 21, 2007.

"Hazy Skies on the Early Earth: Lessons from Saturn's Moon Titan", Fort Morgan Community Enrichment Series, March 8, 2007.

"Organic Aerosols in Planetary Atmospheres: Titan and Early Earth", Ball Aerospace Engineering, October 29, 2004.

"Organic Aerosols in Planetary Atmospheres: Titan and Early Earth", Laboratory for Atmospheric and Space Physics, September 16, 2004.

CONFERENCE PRESENTATIONS

"Atmospheres, Bioindicators, and Organic Chemistry in Astrobiology"
 Astrobiology Graduate Conference San Juan, PR, July 2007
Invited Oral Presentation

* Misprint by publisher should have read Trainer, MG

“CO₂ Clathrates on Mars and the CH₄ Question: A Laboratory Investigation”

Trainer MG, Tolbert MA, Toon OB

Bioastronomy Meeting San Juan, PR, July 2007

Poster Presentation

“An Exploration of the Properties of CO₂ Clathrate Hydrates Formed under Martian Conditions and Measurement of Possible CH₄ Incorporation” Tolbert MA, **Trainer MG**, Toon OB

American Geophysical Union Fall Meeting San Francisco, CA, December 2006

Poster Presentation

“Laboratory Studies on the Production of Organic Haze on Titan and the Early Earth”

Trainer MG, Pavlov AA, DeWitt HL, Jimenez JL, McKay CP, Toon OB, Tolbert MA

American Geophysical Union Fall Meeting San Francisco, CA, December 2006

Poster Presentation

“Laboratory Insights into Organic Formation on the Early Earth: Photochemical Haze Production in the Atmosphere” **Trainer MG**, DeWitt HL, Pavlov AA, Jimenez JL, McKay CP, Toon OB, Tolbert MA

NASA Astrobiology Science Conference Washington, DC, March 2006

Oral Presentation

“Organic Synthesis From Above: Organic Haze Particles in Simulated Early Earth Atmospheres”

Trainer MG, DeWitt HL, Pavlov AA, Jimenez JL, McKay CP, Worsnop DR, Toon OB, Tolbert MA

Astrobiology Graduate Conference La Jolla, CA August 2005

Oral Presentation

“Properties of Organic Haze Particles Produced in Simulated Early Earth Atmospheres” **Trainer**

MG, DeWitt HL, Pavlov AA, Jimenez JL, McKay CP, Worsnop DR, Toon OB, Tolbert MA.

NASA Astrobiology Institute General Meeting Boulder, CO, April 2005 *Poster Presentation*

“Organic Haze Aerosols on the Early Earth: A Laboratory Investigation” **Trainer MG**, DeWitt HL, Pavlov AA, Jimenez JL, McKay CP, Worsnop DR, Toon OB, Tolbert MA.

American Geophysical Union Fall Meeting San Francisco, CA, December 2004

Poster Presentation

“Haze Aerosols in the Atmosphere of Early Earth: Manna from Heaven” **Trainer MG**, Pavlov AA, Curtis DB, McKay CP, Worsnop DR, Delia AE, Toohey DW, Toon OB, Tolbert MA

American Chemical Society Fall Meeting Philadelphia, PA August 2004

Oral Presentation

“Exploring the Production of Polycyclic Aromatic Hydrocarbons in Titan Hazes using an Aerosol Mass Spectrometer” **Trainer MG**, Pavlov AA, Jimenez JL, Toon OB, Tolbert MA, Worsnop DR, McKay CP

NASA Astrobiology Science Conference Moffet Field, CA, March 2004

Oral Presentation

“Laboratory Investigations into the Production of Organic Haze Aerosols: Focus on the Early Earth” **Trainer MG**, Curtis DB, Pavlov AA, Delia AE, Toon OB, Tolbert MA, McKay CP, Worsnop DR

NASA Astrobiology Institute General Meeting Tempe, AZ, February 2003

Oral Presentation

“Laboratory Studies of Organic Polymer Particles: Implications for Early Earth” Tolbert MA, **Trainer MG**, Curtis DB, Toon OB, Pavlov AA, McKay CP, Khare BN, Delia AE, Worsnop DR
American Geophysical Union Fall Meeting San Francisco, CA, December 2002
Oral Presentation

“Laboratory Studies of Early Earth Organic Hazes Using the Aerosol Mass Spectrometer” **Trainer MG**, Curtis DB, Delia AE, Tolbert MA, Toon OB, McKay CP, Worsnop DR
Third Annual Aerosol Mass Spectrometer Users’ Meeting Billerica, MA, October 2002
Oral Presentation

“Laboratory Studies of Early Earth Tholin Particles” **Trainer MG**, Curtis DB, Tolbert MA, Toon OB, McKay CP, Worsnop DR
NASA Laboratory Astrophysics Workshop Moffet Field, CA, May 2002 *Poster Presentation*

“Mass Spectrometric Laboratory Studies of Tholin Particles: Application to Early Earth and Titan” **Trainer MG**, Curtis DB, Toon OB, Tolbert MA, Worsnop DR, McKay CP
Astrobiology Science Conference Moffet Field, CA, April 2002 *Poster Presentation*

“Investigations of Reactive Plasma Gases in Glow Discharge Devices” **Trainer MG**, et al.
FACSS Meeting Vancouver, British Columbia, October 1999 *Oral Presentation*

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PROFESSIONAL MEMBERSHIPS

American Geophysical Union

American Chemical Society