Kelly E. Miller
6220 Culebra Rd
San Antonio, TX 78238

Curriculum Vitae

E-mail: kmiller@swri.edu
Cell: (520)288-2599

Education

August 2016	Ph.D., University of Arizona, Tucson, AZ Planetary Science, minor in Geoscience Advisor: Dante Lauretta, Ph.D. Dissertation: The R chondrite record of volatile-rich environments in the early Solar System
	M.S., University of Arizona, Tucson, AZ Planetary Science *En route* to Ph.D.
May 2008	B. A., *cum laude*, Scripps College, Claremont, CA Honors Chemistry, minor in Asian studies Advisors: Katie Purvis-Roberts, Ph.D., Mary Hatcher-Skeers, Ph.D. Thesis topic: Effect of methylation on DNA backbone conformations

Awards and Honors

2017	Recipient of European Space Agency Group Achievement Award for Rosetta Mission
2016	Meteoritical Society Wiley Award for Student Presentation
2014 – 2016	NASA Earth and Space Sciences Fellow
2014	Galileo Circle Scholar

Publications

Miller, K. E., Glein, C., Waite, J. H. (accepted at ApJ) Contributions from accreted organics to Titan's atmosphere: New insights from cometary and chondritic data.

Waite*, Perryman*, Perry*, **Miller, K. E.***, et al. (2018) Chemical interactions between Saturn's atmosphere and rings. *Science,* **362**. *equally contributing authors

Perry, Waite, Mitchell, **Miller, K. E.**, et al. (2018) Material Flux From the Rings of Saturn Into Its Atmosphere. *Geophysical Research Letters,* **45**, 10093.

Howell, et al. (2018) Camilla: A centaur reconnaissance and impact mission concept. *Planetary and Space Science*.

Krot, Nagashima, Libourel, and **Miller, K. E.** (2018) Multiple mechanisms of transient heating events in the protoplanetary disk: Evidence from precursors of chondrules and igneous Ca,Al-rich inclusions. In *Chondrules*, eds. S. Russell, S. Krot, and H. Connolly.

Miller K. E., et al. (2017) Formation of unequilibrated R chondrite chondrules and opaque phases. *GCA*, 209, 24-50.

Waite, et al. (2017) Cassini finds molecular hydrogen in the Enceladus plume: Evidence for hydrothermal processes. *Science*, **356**, 155-159.

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Burton, McLain, Glavin, Elsila, Davidson, **Miller, K. E.**, et al. (2015) Amino acid analyses of R and CK chondrites. *Meteoritics and Planetary Science,* **50**, 470-482.

Manuscripts in Process (* denotes a mentored student or post-doc)

Miller, K. E., Waite, J. H. , Perryman, R. S., Perry, M. E., Bouquet, A., Magee, B. A., Bolton*, B., Brockwell, T., Glein, C. Cassini INMS Constraints on the Composition of Ring Rain Particles. For submission to *Icarus*.

Miller, K. E., Lauretta, D. S., Berger, E. L., Thompson, M. S., Zega, T. J., Jackson, K. M. Formation of copper sulfides in the R chondrites. For submission to *Meteoritics and Planetary Science*.

Bouquet, A., Miller, K. E., Glein, C., Waite, J. H. Limits on the contribution of early endogenic radiolysis in carbonaceous chondrites' parent bodies. For submission to *ApJ*.

Castillo-Rogez, J. C., et al. Ceres: Astrobiological Target and Possible Ocean World. Submitted to *Astrobiology*.

Selected Research and Professional Experience

2018	Group Leader for Origins and In Situ Analysis Group, SwRI Division 15, Planetary Science Section
2017 – present	Research Scientist at Southwest Research Institute, San Antonio, TX
2016 – 2017	Postdoctoral Researcher at Southwest Research Institute, San Antonio, TX Supervisor: Christopher R. Glein - Utilizing Cassini and Rosetta data to understand the role of comets in building planetary bodies in the outer Solar System - Studying the role of hydrothermal processes in the evolution of Enceladus, Titan, and other Ocean Worlds - Analysis of Cassini INMS data - Analysis of Rosetta ROSINA data
2011 – 2016	Research Assistant, LPL, University of Arizona, Tucson, AZ Advisor: Dante Lauretta, Ph.D. - Utilized EMPA, SIMS, and ICP-MS plus data from TEM for meteorite analyses - Developed thermodynamic models of meteorite formation
2008	Research Assistant, SETI, Mountain View, CA Supervisor: Richard Quinn, Ph.D. - Replicated electrochemical data from Phoenix Mars Lander in laboratory setting - Repaired and maintained laboratory equipment
2007 – 2008	Research Assistant, Joint Science Dept., Claremont Colleges, Claremont, CA Advisor: Mary Hatcher-Skeers, Ph.D. - Cleaned and prepared DNA samples - Collected and analyzed ^{31}P NMR data on DNA backbone conformations
2007 (summer)	REU Research Assistant, SETI, Mountain View, CA

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Supervisor: Richard Quinn, Ph.D.
- Determined detection limits for Phoenix Mars Lander chronopotentiometry probes

2006 (summer) REU Research Assistant, Chemistry Dept., California State University, Los Angeles, CA
Supervisor: Alison McCurdy, Ph.D.
- Tested synthesis pathway for photo-responsive Ca^{2+} chelator

Professional Development

2018	Member of the Ceres Science Definition Team
2017	Systems engineer for Planetary Science Summer Seminar Centaurs mission design
	"Getting Started with IDL Programming" course, June 28-30, SwRI, San Antonio, TX
2016	Establishing and Sustaining an Undergraduate Research Program, AGU Workshop, San Francisco, CA
2015	8th NAIC/NRAO School on Single Dish Radio Astronomy and 1st ALMA Interferometry School, Green Bank, WV
	Grad Slam public speaking contestant, Tucson, AZ
	ALMA Workshop, Star and Planet Formation Conference, Oracle, AZ
2014	Future Faculty Program, University of Tennessee, Knoxville, TN
	LPL Conference coordinator, Tucson, AZ
2012 – 2014	Journal club student coordinator, LPL, University of Arizona, Tucson, AZ
2013	MELTS workshop, Goldschmidt Conference, Florence, Italy
2012	NASA Astrobiology Institute Scholar, Santander, Spain
2007 – 2008	President of Women in Science Club, Scripps College, Claremont, CA
General	Panel member for multiple NASA ROSES proposal reviews
	Executive Secretary for multiple NASA ROSES proposal reviews
	Judge for multiple rounds of GPSC Travel Grants at University of Arizona, Tucson, AZ
	Judge for Stephen E. Dwornik Award at Lunar and Planetary Science Conference, The Woodlands, TX

Invited Talks

2018	Cassini Ion Neutral Mass Spectrometer Measurements of D Ring Influx to Saturn's Atmosphere. *American Geophysical Union Fall Meeting 2018.*
	Macromolecular Organics: From Primitive to Processed. *Carbon in the Solar System Panel Discussion*, *Division of Planetary Science 50th Meeting.*
	Ion Neutral Mass Spectrometer Plenary Talk, *Cassini PSG #75*
2017	Origins of Planetary Volatiles: Stories from the Inner and Outer Solar System. *Jet Propulsion Laboratory, Pasadena, CA.*
	Volatile Element Distribution During Planet Formation: Lessons from the Rumuruti Chondrites. *Purdue University, West Lafayette, IN.*

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2015 The Rumuruti Chondrites: Records of a Volatile-Rich Environment in the early solar system. *Department of Geoscience, University of Wisconsin, Madison, WI.*

Teaching Experience

2013 (spring)	Teaching Assistant, LPL, University of Arizona, Tucson, AZ PTYS 214 Astrobiology: A Planetary Perspective Supervisor: Ilaria Pascucci, Ph.D.
2012 (fall)	Teaching Assistant, LPL, University of Arizona, Tucson, AZ PTYS 206 Our Golden Age of Planetary Exploration Supervisor: Steve Kortenkamp, Ph.D.
2010 – 2011	Native English Teacher, GEPIK, Jungang Elementary School, Pyeongtaek, South Korea
2009 – 2010	Native English Teacher, GEPIK, Seongho Middle School, Osan, South Korea
2007 – 2008	Teaching Assistant, Joint Science Dept., Claremont Colleges, Claremont, CA 116L – 117L Organic Chemistry Laboratory Supervisors: Kersey Black, Ph.D., Thomas Poon, Ph.D.
2005 – 2007	Teaching Assistant, Joint Science Dept., Claremont Colleges, Claremont, CA 14L – 15L General Chemistry Laboratory Supervisors: Anthony Fucaloro, Ph.D., Thomas Davis

Outreach Experience

2018	Invited speaker for Lunar Cave Analog Test Sites 2018 kick-off event Panelist for San Antonio Comic Con panel "Asteroids: Defending the Earth and the Future of Planetary Mining"
2017-present	Founded monthly after-school STEM club for girls at Briscoe Middle School, San Antonio, TX John Jay High School STEM Fest Volunteer, May 20, San Antonio, TX Speaker for Powell Elementary School Summer STEM Program for Girls, June 21, San Antonio, TX Speaker for Young Engineers and Scientists Program, August 2, San Antonio, TX
2015	Tucson Hebrew Academy STEM Festival Volunteer, Tucson, AZ Speaker for Ms. Delgado's middle school class, Tucson, AZ Reviewer for undergraduate research conference talks, Tucson, AZ
2014	Art of Planetary Science volunteer, Tucson, AZ Summer Science Saturday volunteer, Tucson, AZ Updated descriptions for LPL impact and igneous samples outreach kit Meteorite Outreach training, Tucson, AZ Guest speaker at Tanque Verde High School, Tucson, AZ
2013	OSIRIS-REx Ambassador at Boys and Girls Club, Tucson, AZ Co-founded Starlight Science Cinema summer series, Tucson, AZ Science in the City volunteer, Tucson, AZ
2012	OSIRIS-REx Ambassador at Flandrau Science Center, Tucson, AZ OSIRIS-REx Ambassador training, Tucson, AZ Fun Fest volunteer, Tucson, AZ

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2006 Guest teacher for 5th grade class at Chaparral Elementary School on a biweekly basis, Claremont, CA

Selected Conference Abstracts (* denotes a mentored student or post-doc)

Miller, K. E., Waite, J. H. , Perryman, R. S., Perry, M. E., Bouquet, A., Magee, B. A., Bolton*, B., Brockwell, T., Glein, C. (2018) Cassini Ion Neutral Mass Spectrometer Measurements of D Ring Influx to Saturn's Atmosphere. *American Geophysical Union Fall Meeting 2018*.

Miller, K. E., Waite, J. H., Perryman, R., Perry, M., Glein, C. R. (2018) INMS compositional constraints on organics and other volatiles in Saturn ring rain. *Cassini Science Symposium.*

Miller, K. E., et al. (2018) Cassini Ion and Neutral Mass Spectrometer Observes Organic Molecules in the Upper Atmosphere of Saturn. *49th Lunar and Planetary Science Conference.*

Bolton*, **Miller, K. E.**, et al. (2018) Characterization of the Composition of Saturn Ring Material Measured by Cassini Ion and Neutral Mass Spectrometer. *Asia Oceania Geosciences Society 15th Annual Meeting*

Waite, Perry, Perryman, **Miller, K. E.**, et al. (2018) The Coupling of Saturn's Atmosphere and Ionosphere to the Rings. *Asia Oceania Geosciences Society 15th Annual Meeting.*

Waite, Perry, Perryman, **Miller, K. E.**, et al. (2018) The Coupling of Saturn's Atmosphere and Ionosphere to the Rings. *European Geosciences Union General Assembly 2018*.

Waite et al. (2018) The Coupling of Saturn's Atmosphere and Ionosphere to the Rings. *COSPAR 2018 42nd Assembly.*

Perry, M. E. et al. (2018) The Flow of Material Inward from Saturn's Rings. *European Geosciences Union General Assembly 2018*.

Perry, Waite, Perryman, Mitchell, Cravens, Moore, **Miller, K. E.**, et al. (2018) A New Understanding of the Interaction Between Saturn and its Rings. *49th Annual Division for Planetary Sciences Meeting.*

Bouchard, Howeel, Chou, Thompson, Cusson, Marcus, Brodsky Smith, Bhattaru, Blalock, Brueshaber, Eggl, Jawin, **Miller, K. E.**, et al (2018) Flyby and Impact of Chariklo: A New Fontiers Class Centaur Reconnaissance Mission Concept from the 2017 NASA-JPL Planetary Science Summer Seminar. *49th Annual Division for Planetary Sciences Meeting.*

Miller, K. E., et al. (2017) Origin of Titan's Nitrogen: Contributions from Organics in the Core. *49th Annual Division for Planetary Sciences Meeting*

Miller, K. E., et al. (2017) Contributions from cometary dust to Titan's N_2 atmosphere. *48th Lunar and Planetary Science Conference*

Miller, K. E., et al. (2016) Copper sulfides in the R chondrites: Evidence of hydrothermal alteration in low petrologic types. *The Meteoritical Society 79th Annual Meeting.*

Miller, K. E., et al. (2016) Chondrules and opaque phases in unequilibrated R chondrites: A comprehensive assessment of their formation. *47th Lunar and Planetary Science Conference*.

Miller, K. E., et al. (2015). The nature of primitive R chondrite material: Characterization of an R3.2 clast in Mount Prestrud 95404. *46th Lunar and Planetary Science Conference*.

Miller K. E., et al. (2014) Trace elements in the Rumuruti chondrites. *Goldschmidt Conference*.

Miller K. E., et al. (2014) Conditions for formation of chalcopyrite in the Rumuruti chondrites. *45th Lunar and Planetary Science Conference*.

Miller K. E., et al. (2013) Chalcopyrite in the R chondrite PRE 95411. *Goldschmidt Conference.*

Laboratory Techniques

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Electron microprobe analysis
SIMS
Solution and laser ablation ICP-MS
Optical microscopy

Chronopotentiometry
Cyclic voltammetry
NMR

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Software

IDL	Microsoft Excel
MATLAB	Microsoft Word
Mac OS	Microsoft Powerpoint
Windows OS	Endnote
Adobe Illustrator	HSC
Adobe Photoshop	MELTS (familiar)
Adobe Reader	

Competitive Scholarships

2016	Graduate and Professional Student Council Travel Grant recipient
	Small Bodies Assessment Group Early Career Travel Grant recipient
	MetSoc Student Travel Grant recipient
2015	Curson Travel Award recipient
2013	Goldschmidt Travel Grant recipient

Other Presentations

2016	Decoding the R chondrite record of a volatile-rich environment. *Solar System Symposium, Hokkaido, Japan.*
2015	The Rumuruti chondrites: Records of a volatile-rich environment in the early solar system. *Lecture seminar, Southwest Research Institute, San Antonio, TX.*
	Miller, K.E., et al. Sulfide chondrules in an R chondrite clast: A new chondrule-forming environment? *Gordon Research Conference: Origins of Solar Systems 2015, South Hadley, MA.* (poster)
	Miller, K.E., et al. The nature of primitive R chondrite material: Characterization of an R3.2 clast in Mount Prestrud 95404. *46th LPSC, Houston, TX.*
2014	Miller, K.E., et al. Copper sulfides and aqueous alteration in the Rumuruti chondrites. *LPL Conference 2014, Tucson, AZ.*
	Miller K.E., et al. Trace elements in the Rumuruti chondrites. *Goldschmidt 2014, Sacramento, CA.* (poster)
	Miller K.E., et al. Conditions for formation of chalcopyrite in the Rumuruti chondrites. *45th LPSC, Houston, TX.* (poster)
	Planetary geology field trips at LPL. *LPL Advisory Board meeting, Tucson, AZ.*
2013	Miller K.E., et al. Chalcopyrite in the R chondrite PRE 95411. *Goldschmidt 2013, Florence, Italy.* (poster)
	Miller, K.E., Lauretta, D.S. Trace element distribution in meteoritic sulfides via laser ablation ICP-MS. *Graduate Student Colloquium, Tucson, AZ.*
2012	A review of Ciesla and Sandford's "Organic synthesis via irradiation and warming of ice grains in the solar nebula." *Graduate Student Colloquium, Tucson, AZ.*
	A review of Herd et al.'s "Origin and evolution of prebiotic organic matter as inferred from the Tagish Lake meteorite." *Graduate Student Colloquium, Tucson, AZ.*
	Meteorites as a source of extraterrestial organic material. *Snyder Research Group meeting, Tucson, AZ.*

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Professional Memberships

Geological Society of America
Meteoritical Society
Sigma Xi
American Geophysical Union
American Astronomical Society

Field Experience

May 16-30, 2014 Volcano National Park, Hawai'i
- Compared radar and visual remote sensing data sets with ground observations
- Collected samples for geochemical analyses
- Conducted comparative study of lava morphologies in IR

Sept. 26-30, 2013 Northern New Mexico and Southern Colorado
- Studied lava flows in the El Malpais region and the K/T boundary

Mar. 28-31, 2013 Mojave Desert
- Studied dunes and volcanic processes
- Compared radar remote sensing data with ground observations

Oct. 26-28, 2012 Tucson local geology
- Studied formation and evolution of mountain ranges surrounding Tucson

Sept. 21-23, 2012 Surfaces class field trip, Northern Arizona
- Studied SP Crater, Grand Falls, Meteor Crater as examples of topics discussed in lectures

Sept. 23-25, 2011 Canyon de Chelly and Painted Desert
- Studied sedimentary and metamorphic processes in northern Arizona