

# Ryan D. Davis

---

Trinity University • Department of Chemistry  
1 Trinity Pl., San Antonio, TX 78212 • rdavis5@trinity.edu • 210.999.7827 • [sites.trinity.edu/davis-lab](http://sites.trinity.edu/davis-lab)

## Professional Appointments

- Trinity University** • San Antonio, Texas  
Assistant Professor, Department of Chemistry 2018-present
- Lawrence Berkeley National Laboratory** • Berkeley, California  
Postdoctoral Fellow, Chemical Sciences Division 2016-2018  
Host: Dr. Kevin R. Wilson

## Education

- University of Colorado - Boulder** • Boulder, Colorado  
Ph.D. in Analytical and Environmental Chemistry 2016  
[Thesis](#): Phase Transformations of Optically Levitated Microparticles of Atmospheric Relevance  
Research advisor: Prof. Margaret A. Tolbert
- University of California - San Diego** • La Jolla, California  
M.S. in Physical Chemistry 2010  
Project: Isotopic Fractionation Processes Relevant to the Atmosphere and Solar Nebula  
Research advisor: Prof. Mark H. Thiemens
- Colorado State University** • Ft. Collins, Colorado  
B.S. in Chemistry, ACS Certified 2008  
Honors thesis project: Design and Characterization of Polymer-Encapsulated Reverse Micelles  
Research advisor: Prof. Nancy E. Levinger

## Publications

External lists: [Google Scholar profile](#), [ORCID profile](#) (ID 0000-0002-4434-1320)

### *Peer-Reviewed Journal Articles: Trinity-Affiliated Work*

- [10] Jacobs MI, **Davis RD**, Rapf RJ, Wilson KR (2018) Studying Chemistry in Micro-Compartments by Separating Droplet Generation from Ionization. *Journal of the American Society of Mass Spectrometry*. DOI: [10.1007/s13361-018-2091-y](https://doi.org/10.1007/s13361-018-2091-y).

### *Peer-Reviewed Journal Articles: Pre-Trinity*

- [9] Ushijima SB, **Davis RD**, Tolbert MA (2018) Immersion and Contact Efflorescence Induced by Mineral Dust Particles. *The Journal of Physical Chemistry A*. DOI: [10.1021/acs.jpca.7b12075](https://doi.org/10.1021/acs.jpca.7b12075).
- [8] **Davis RD**, Jacobs MI, Houle FA, Wilson KR (2017) Colliding-droplet microreactor: rapid on-demand inertial mixing and metal-catalyzed aqueous-phase oxidation processes. *Analytical Chemistry* 89(22): 12494-12501. DOI: [10.1021/acs.analchem.7b03601](https://doi.org/10.1021/acs.analchem.7b03601).  
Highlighted in *Chemical and Engineering News*, 95(46): 16-18 (Nov. 20, 2017 issue).
- [7] Jacobs MI, Davies JF, Lee L, **Davis RD**, Houle FA, Wilson KR (2017) Exploring chemistry in microcompartments using guided droplet collisions in a branched quadrupole trap coupled to a single droplet, paper spray mass spectrometer. *Analytical Chemistry* 89(22): 12511-12519. DOI: [10.1021/acs.analchem.7b03704](https://doi.org/10.1021/acs.analchem.7b03704).  
Highlighted in *Chemical and Engineering News*, 95(46): 16-18 (Nov. 20, 2017 issue).

- [6] **Davis RD**, Tolbert MA (2017) Crystal nucleation initiated by transient ion-surface interactions at aerosol interfaces. *Science Advances* 3(7):e1700425, DOI: 10.1126/sciadv. 1700425, [advances.sciencemag.org/content/3/7/e1700425](https://advances.sciencemag.org/content/3/7/e1700425).
- [5] **Davis RD**, Lance S, Gordon JA, Ushijima SB, Tolbert MA (2015) Contact efflorescence as a pathway for crystallization of atmospherically relevant particles. *Proceedings of the National Academy of Science* 112(52):15815-15820, DOI: [10.1073/pnas.1522860113](https://doi.org/10.1073/pnas.1522860113).
- [4] **Davis RD**, Lance S, Gordon JA, Tolbert MA (2015) Long working-distance optical trap for in situ analysis of contact-induced phase transformations. *Analytical Chemistry* 87:6186-6194, DOI: [10.1021/acs.analchem.5b00809](https://doi.org/10.1021/acs.analchem.5b00809).
- [3] Nuding DL, **Davis RD**, Gough RV, Tolbert MA (2015) The aqueous stability of a Mars salt analog: Instant Mars. *Journal of Geophysical Research - Planets* 120:588-598, DOI: [10.1002/2014JE004722](https://doi.org/10.1002/2014JE004722).
- [2] Nuding DL, Rivera-Valentin EG, **Davis RD**, Gough RV, Chevrier VF, Tolbert MA (2014) Deliquescence and efflorescence of Ca(ClO<sub>4</sub>)<sub>2</sub>: An investigation of stable aqueous solutions relevant to Mars. *Icarus* 243:420-428, DOI: [10.1016/j.icarus.2014.08.036](https://doi.org/10.1016/j.icarus.2014.08.036).
- [1] Chakraborty S, **Davis RD**, Ahmed M, Jackson TL, Thiemens MH (2012) Oxygen isotope fractionation in the vacuum ultraviolet photodissociation of carbon monoxide: Wavelength, pressure and temperature dependency. *The Journal of Chemical Physics* 137:024309, DOI: [10.1063/1.4730911](https://doi.org/10.1063/1.4730911).

## Honors and Awards

NOAA Climate and Global Change Postdoctoral Fellowship alternate selection	2017
CIRES Graduate Student Fellowship (proposal based)	2016
Project title: "Laboratory studies of contact efflorescence"	
Best Paper Award, Analytical/Environmental Chemistry Division, University of Colorado	2016
Awarded for publication in <i>Proc. Natl. Acad. Sci.</i> ( <a href="https://doi.org/10.1073/pnas.1522860113">10.1073/pnas.1522860113</a> )	
NASA Earth and Space Science Fellowship (proposal based)	2013-2016
Project title: "Amorphous phase states of atmospheric particles studied in an optical trap: implications for global climate and air quality"	
Undergraduate Research Institute Award, Colorado State University	2007
Federal Science and Math Access to Retain Talent (SMART) Grant (merit/need based)	2006-2008
Hach Memorial Scholarship, Colorado State University	2005-2008
Western Undergraduate Exchange recipient	2004-2008

## Conference Presentations

### *As presenting author: Pre-Trinity*

- Davis RD**, Wilson KR. Metal-catalyzed aqueous oxidation processes in merged microdroplets (oral). American Geophysical Union Fall Meeting, New Orleans, LA, Dec 15, 2017.
- Davis RD**, Tolbert MA. Imaging the effects of transient aerosol interfaces (oral). Pacific Conference on Spectroscopy and Dynamics, Asilomar, CA, January 21, 2017.
- Davis RD**, Tolbert MA. The influence of interfacial composition of mixed organic-inorganic microparticles (oral). Toward a Molecular Level Understanding of Atmospheric Aerosols Conference, Santa Cruz, CA, August 31, 2016.
- Davis RD**, Tolbert MA. Contact efflorescence: early results and future directions (poster). Toward a Molecular Level Understanding of Atmospheric Aerosols Conference, Santa Cruz, CA, August 31, 2016.

- Davis RD**, Tolbert MA. Contact-induced efflorescence of amorphous inorganic microparticles (oral). American Chemical Society National Meeting, Denver, CO, March 22, 2015.
- Davis RD**, Lance S, Gordon JA, Tolbert MA. Contact efflorescence on-demand: a new approach to studying contact nucleation (poster). American Geophysical Union Fall Meeting, San Francisco, CA, Dec 15, 2014.
- Davis RD**, Kremer J, Elliot CM, Levinger NE. Nanopools in polymer films (poster). Gordon Research Conference, Chemistry and Physics of Liquids, Holderness, NH, July 31, 2007.

*As abstract coauthor*

- Jacobs MI, Davies JF, **Davis RD**, Lee L, Houle FA, Wilson KR. Understanding the Role of the Interface in Enhancing Reaction Rates in Microdroplets. 10<sup>th</sup> International Aerosol Conference, St. Louis, MO, Sep 2-7, 2018.
- Jacobs MI, Davies JF, **Davis RD**, Lee L, Houle FA, Wilson KR. Understanding the Role of the Interface in Enhancing Reaction Rates in Microdroplets. Gordon Research Seminar, Molecular Interactions and Dynamics, Stonehill College, Easton, MA, July 7, 2018.
- Ushijima S, **Davis RD**, Lance S, Gordon J, Tolbert MA. Heterogeneous efflorescence of atmospherically relevant salts by mineral dust particles. Abstracts of Papers of the American Chemical Society, 251, 2016.
- Chakraborty S, **Davis RD**, Ahmed M, Jackson TL, Thiemens MH. Anomalous Isotope Effect in VUV Photodissociation of Hydrogen Sulfide: Implications for Chondrite and Chondrule Isotopic Data. Lunar and Planetary Science Conference 42, 2011.
- Chakraborty S, **Davis RD**, Ahmed M, Jackson TL, Thiemens MH. Temperature and Wavelength Dependent Oxygen Isotopic Fractionation in the VUV Photodissociation of CO: Implications for the Solar Nebula. Lunar and Planetary Science Conference 42, 2011.
- Chakraborty S, **Davis RD**, Ahmed M, Jackson TL, Thiemens MH. Oxygen Isotope Effect Dominated by VUV Photodissociation Dynamics of CO: Implications for Nebular CO Photolysis. Meteoritics and Planetary Science Conference, 2011.
- Chakraborty S, **Davis RD**, Ahmed M, Jackson TL, Thiemens MH. Wavelength Dependent Oxygen Isotopic Fractionation in the VUV Photodissociation of CO: An Early Solar System Perspective. Lunar and Planetary Science Conference 41, 2010.
- Levinger NE, Swafford LA, Bullock GR, **Davis RD**. Exploring the water pool of reverse micelles using fluorescent optical probes. Abstracts of Papers of the American Chemical Society, 235, 2008.

**Workshops and Other Education/Training**

Cottrell Scholars Collaborative / American Chemical Society New Faculty Workshop, August 2-4, 2018, Washington DC.

**Teaching**

**Trinity University** (as assistant professor)

Fall 2018                      Analytical Chemistry Lecture and Lab CHEM-3432-1 (4 credits) – 10 students  
    Analytical Chemistry Lecture and Lab CHEM-3432-2 (4 credits) – 9 students

**University of Colorado – Boulder** (as teaching assistant)

Spring 2012                    Analytical Chemistry Laboratory  
 Fall 2011                        General Chemistry I  
    General Chemistry I Laboratory

**University of California - San Diego** (as teaching assistant)

Fall 2009            Environmental Chemistry  
Spring 2009        General Chemistry III  
Winter 2009        Analytical Chemistry Laboratory  
Fall 2008            General Chemistry I

**Colorado State University** (as teaching assistant)

Spring 2008        General Chemistry II Laboratory

**Student Research Mentoring as PI**

David Richards (2018 – present)

**Service**

*Service to the Profession*

**Manuscript reviewer for:** *Aerosol Science and Technology* (1), *Atmospheric Chemistry and Physics* (1), *Crystals* (1), *Environmental Science: Processes and Impacts* (1), *The Journal of Physical Chemistry A/B/C* (3), *Physical Chemistry Chemical Physics* (1), *Physical Review E* (1), *Physical Review X* (1).

- Reviewer profile (valid for reviews 2018 – present): [publons.com/a/1548085](https://publons.com/a/1548085)
- **Total manuscripts reviewed: 10**

*Service to the University*

**Placeholder. Service coming soon.**

*Service to the Public (Public Outreach and Broader Impact Activities)*

For additional details on some of my outreach activities, see [sites.trinity.edu/davis-lab/outreach](https://sites.trinity.edu/davis-lab/outreach).

- Visited local Colorado schools to present chemistry-related activities to local Colorado elementary and pre-kindergarten schools (2014 – 2016).
- Designed and presented a portable optical bench for hands-on optics activities for students at local Colorado schools (2014 – 2016).
- Designed and presented activities to demonstrate important weather-related phenomena to young students at Colorado schools (2014 – 2016).
- Coauthored proposals to obtain seed funding for developing safer treatments for pediatric epilepsy (2013).

**Professional Affiliations**

American Chemical Society (ACS) (member)	2014-present
American Geophysical Union (AGU) (member)	2014-present