

# Michael I. Jacobs

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## EDUCATION

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- **Graduate Student, Physical Chemistry** (Fall 2014 to present)  
*University of California-Berkeley*
  - Research Advisor: Dr. Kevin Wilson and Prof. Rich Saykally
- **Bachelor of Arts, Chemistry and Biochemistry; Minor: Physics** (2011-2014, Highest Honors)  
*Oberlin College*
  - Undergraduate Thesis: Kinetics of the Reactions of Isoprene-Derived Hydroxynitrates: Gas Phase Epoxide Formation and Solution Phase Hydrolysis
  - Research Advisor: Prof. Matt Elrod

## RESEARCH EXPERIENCE

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- **Graduate Research Assistant: Kevin Wilson Laboratory** (Fall 2014 to present)  
*Chemical Sciences Division, Lawrence Berkeley National Laboratory*
  - Studying heterogeneous oxidation of solid and liquid aerosols with gas phase oxidants using X-ray photoelectron spectroscopy
  - Constructing a new experimental setup to measure chemical reactions in merging micron sized droplets
- **Undergraduate Research Assistant: Matt Elrod Laboratory** (Fall 2011 to Spring 2014)  
*Department of Chemistry, Oberlin College*
  - Learned about synthesis and purification of complex chemical compounds by refining and modifying procedures to create atmospherically relevant isoprene epoxide and hydroxy nitrate derivatives
  - Tested and helped develop various methods to measure the daytime gas phase OH radical rate constant for the synthesized isoprene epoxides and hydroxynitrates using a flow tube chemical ionization mass spectrometer
  - Used computer modeling to predict the atmospheric fate of the isoprene epoxides based on their measured OH rate constants
  - Used NMR spectroscopy to study hydrolysis kinetics of isoprene-derived hydroxynitrates
- **Undergraduate Research Program: Leemor Joshua-Tor Laboratory** (Summer 2013)  
*Cold Spring Harbor Laboratory*
  - Cloned, expressed and purified ssRNA-binding, piRNA pathway-linked protein truncations in both *E. coli* and eukaryotic cells for crystallographic screening and biochemical characterization
  - Helped develop and carry-out an experiment to test a protein truncation's RNA binding activity for inclusion in crystallographic screening

## TEACHING EXPERIENCE

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- **Graduate Student Instructor**, Department of Chemistry, University of California-Berkeley
  - CHEM 1A, General Chemistry for non-chemistry majors (Fall 2014, Spring 2016) – Taught weekly discussion and lab sections
  - CHEM 4B, General Chemistry for chemistry majors (Spring 2017) – Taught weekly lab section
- **Volunteer Instructor**, Prison University Project, San Quentin, CA
  - Gave lecture and organized classroom discussions once a week
  - Wrote and graded homework assignments and exams
  - Courses taught:
    - Math 50B, Pre-algebra (Summer 2015)
    - Math 221, Pre-Calculus II (Fall 2015)
    - Math 115, Intermediate Algebra (Summer 2016, Fall 2016, Summer 2017)
    - Math 135, Statistics (Fall 2017)
- **Undergraduate Teaching Assistant**, Department of Chemistry, Oberlin College
  - CHEM 339, Physical Chemistry I (Spring 2014)
  - CHEM 349, Physical Chemistry II (Fall 2013)
- **English summer camp volunteer**, Dayton-Deir al Assad (D-D) English Summer Experience
  - Taught English to middle school Arab-Israeli students (Summer 2008, 2009, 2014, 2016, 2017)

## AWARDS AND HONORS

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- National Science Foundation Graduate Research Fellowship (2016-present)
- Member of the Users' Executive Committee at the Advanced Light Source (ALS) – 2017-2019

## PUBLICATIONS

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- 1) Davis, R.D.; Jacobs, M.I.; Houle, F.A.; Wilson, K.R. Colliding-Droplet Microreactor: Rapid On-Demand Inertial Mixing and Metal Catalyzed Aqueous Phase Oxidation Processes (accepted).
- 2) Jacobs, M.I.; Davies, J.F.; Lee, L.; Davis, R.D.; Houle, F.A.; Wilson, K.R. Exploring Chemistry in Micro-Compartments using Guided Droplet Collisions in a Branched Quadrupole Trap Coupled to a Sing Droplet, Paper Spray Mass Spectrometer (accepted).
- 3) Jacobs, M.I.; Kostko, O.; Ahmed, M.; Wilson, K.R. Low Energy Electron Attenuation Lengths in Core-Shell Nanoparticles. *PCCP*, **2017**, 19 (20), 13372-13378.
- 4) Kostko, O.; Xu, B.; Jacobs, M.I.; Ahmed, M. Soft X-ray spectroscopy of nanoparticles by velocity map imagining. *J. Chem. Phys.*, **2017**, 147 (1), 013931.
- 5) Xu, B; Jacobs, M.I.; Kostko, O.; Ahmed, M. Guanidinium group is protonated in a strongly basic arginine solution. *ChemPhysChem* (accepted).
- 6) Jacobs, M.I.; Xu, B.; Kostko, O.; Heine, N.; Ahmed, M.; Wilson, K.R. Probing the Heterogeneous Ozonolysis of Squalene Nanoparticles by Photoemission. *J. Chem. Phys. A.*, **2016**, 120 (43), 8645-8656.
- 7) Mael, L.E.; Jacobs, M.I.; Elrod, M. J. Organosulfate and nitrate formation and reactivity from epoxides derived from methyl-3-buten-2-ol. *J. Chem. Phys. A.*, **2015**, 119 (19), 4464-4472.

- 8) Jacobs, M.I.; Burke, W.J.; Elrod, M.J. Kinetics of the reactions of isoprene-derived hydroxynitrates: gas phase epoxide formation and solution phase hydrolysis, *Atmos. Chem. Phys.*, **2014**, 14, 8933-8946
- 9) Jacobs, M.I.; Darer, A.I.; Elrod, M.J. Rate Constants and Products of the OH Reaction with Isoprene-Derived Epoxides, *Environ. Sci. Tech.*, **2013**, 47 (22), 12868-12876.

## **CONFERENCES ATTENDED**

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- **International Conference on Chemical Kinetics (2017)** **Chicago, IL**  
Jacobs, M.I.; Wilson, K.R.  
Podium Presentation: Studying Reactions in Confined Spaces Using a Linear Electrodynamic Balance
- **Advanced Light Source Users Meeting (2016)** **Berkeley, CA**  
Jacobs, M.I.; Xu, B.; Heine, N.; Kostko, O.; Ahmed, M.; Wilson, K.R.  
Poster Presentation: Probing Interfacial Chemical Reactions on Free Aerosol Particles Using Photoemission Spectroscopy
- **Toward a Molecular Understanding of Atmospheric Aerosol (2016)** **Santa Cruz, CA**  
Jacobs, M.I.; Xu, B.; Heine, N.; Kostko, O.; Ahmed, M.; Wilson, K.R.  
Podium and Poster Presentation: Probing Interfacial Chemical Reactions on Free Aerosol Particles Using Photoemission Spectroscopy
- **American Geophysical Union Fall Meeting (2015)** **San Francisco, CA**  
Jacobs, M.I.; Heine, N.; Xu, B.; Kostko, O.; Alayoglu, S.; Ahmed, M.; Wilson, K.R.  
Poster Presentation: Toward Probing Interfacial Chemical Reactions on Aerosol Particles Using X-ray Photoelectron Spectroscopy