

Curriculum Vitae  
**Marco A. Allodi**

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### Education

- 2015 Ph.D., Chemistry and Physics (minor), **California Institute of Technology**.  
– Advisor: Geoffrey A. Blake - Thesis Title: “On Ultrafast Time-Domain TeraHertz Spectroscopy in the Condensed Phase.”
- 2009 Fulbright Scholar, **Heinrich-Heine University**, Düsseldorf, Germany.
- 2008 A.B. *Summa Cum Laude*, Chemical Physics with Honors, **Hamilton College**.  
– Advisor: George C. Shields - Thesis Title: “An Investigation of Atmospherically Important Sulfuric Acid Aerosols.”

### Academic Appointments

- 7/15 - Present, Yung-Tsai & Ho-Tzu Yen Postdoctoral Fellow - The University of Chicago.

### Honors, Awards, and Fellowships

- 2017 Arnold O. Beckman Postdoctoral Fellowship, *Arnold and Mabel Beckman Foundation*.
- 2015 DARPA Riser Postdoctoral Scholar - Selected as a Promising Early Career Scientist.
- 2015 Herbert Newby McCoy Award (Caltech): Outstanding Doctoral Thesis in Chemistry.
- 2014 Yen Postdoctoral Fellowship, The Institute for Biophysical Dynamics, *The University of Chicago*.
- 2010 National Defense Science and Engineering Graduate (NDSEG) Fellowship.
- 2010 NSF Graduate Research Fellowship Program: Honorable Mention.
- 2008 Fulbright US Student Fellowship, *Heinrich-Heine University*, Düsseldorf, Germany.
- 2008 Underwood Prize in Chemistry (Hamilton College): Senior student who excels in chemistry.
- 2008 Norton Prize (Hamilton College): Undergraduate with greatest capacity for chemical research.
- 2008 James Soper Merrill Prize (Hamilton College): Awarded by the faculty at commencement to the student “who, in character and influence, has best typified the highest ideals of the College.”
- 2008 Named to the 19<sup>th</sup> USA TODAY All-USA College Academic 3<sup>rd</sup> Team.
- 2008 Induction into Sigma Xi and Phi Sigma Iota.
- 2007 Barry M. Goldwater Scholar.

- 2007 Induction into Phi Beta Kappa.
- 2007 Outstanding Undergraduate Poster Presentation: Sanibel Symposium, St. Simons Island, GA.
- 2004 Hans H. Schambach Scholar (Hamilton College): Merit Scholarship - top 5% of entering freshmen.
- 2004 Valedictorian, *Oriskany Central School*, Oriskany, NY.
- 2002 Eagle Scout - Boy Scouts of America.

## Peer-Reviewed Publications

† denotes equal contribution   \* denotes corresponding author

### Ultrafast Microscopy

- [15] Allodi, M. A.; Dahlberg, P. D.; Mazuski, R. J.; Davis, H. C.; Otto, J. P.; Engel, G. S. "Optical Resonance Imaging: An Optical Analog to MRI with Subdiffraction-Limited Capabilities." *ACS Photonics*, **2016**, 3, 2445-2452. DOI: 10.1021/acsp Photonics.6b00694. Note: Selected as an highlight in C&EN - <http://acsmeetings.cenmag.org/an-optical-analog-of-mri>

### Nonlinear and 2D Ultrafast Spectroscopy

- [14] Finneran, I. A.; Welsch, R.; Allodi, M. A.; Miller, T.F. III; Blake, G.A. "2D THz-THz-Raman photon-echo spectroscopy of molecular vibrations in liquids." *Physical Review Letters*, **2017**, *submitted*.
- [13] Dahlberg, P. D.; Ting, P.C.; Massey, S.C.; Allodi, M. A.; Martin, E. C.; Hunter, C.N.; Engel, G. S. "Mapping The Ultrafast Flow Of Harvested Solar Energy In Living Photosynthetic Cells." *Nature Communications*, **2017**, *in revision*.
- [12] Finneran, I. A.; Welsch, R.; Allodi, M. A.; Miller, T.F. III; Blake, G.A. "Coherent two-dimensional terahertz-terahertz-Raman spectroscopy of liquids." *Proceedings of the National Academy of Sciences USA.*, **2016**, 113, 6857-6861. DOI: 10.1073/pnas.1605631113.
- [11] Allodi, M. A.\*; Finneran, I. A.; Blake, G. A.\* "Nonlinear TeraHertz Coherent Excitation of Vibrational Modes of Liquids." *The Journal of Chemical Physics*, **2015**, 143, 234204. DOI: 10.1063/1.4938165.

### Laboratory Astrochemistry and Molecular Spectroscopy

- [10] McGuire, B. A.; Ioppolo, S.; Allodi, M. A.; Blake, G.A. "THz Time-Domain Spectroscopy of Mixed CO<sub>2</sub>-CH<sub>3</sub>OH Interstellar Ice Analogs." *Physical Chemistry Chemical Physics*, **2016**, 18, 20199-20207. DOI:10.1039/C6CP00632A.
- [9] Finneran, I. A.; Carroll, P. B.†; Allodi, M. A.†; Blake, G. A. "Hydrogen Bonding in the Ethanol-Water Dimer." *Physical Chemistry Chemical Physics*, **2015**, 17, 24210-24214. DOI: 10.1039/C5CP03589A.

- [8] Finneran, I. A.; Good, J. T.; Holland, D. B.; Carroll, P. B.; Allodi, M. A.; Blake, G. A. “Decade-Spanning, High-Precision Terahertz Frequency Comb.” *Physical Review Letters*, **2015**, 114, 163902. DOI: 10.1103/PhysRevLett.114.163902. Note: Selected as an Editors’ Suggestion and for a viewpoint in *Physics*.
- [7] Karssemeijer, L. J.; Ioppolo, S.; van Hemert, M. C.; van der Avoird, A.; Allodi, M. A.; Blake, G.A.; Cuppen, H. M. “Dynamics of CO in Amorphous Water Ice Environments.” *The Astrophysical Journal*, **2014**, 781, 16. DOI:10.1088/0004-637X/781/1/16.
- [6] Ioppolo, S.; McGuire, B. A.<sup>†</sup>; Allodi, M. A.<sup>†</sup>; Blake, G.A. “THz and Mid-IR Spectroscopy of Interstellar Ice Analogs: Methyl and Carboxylic Acid Groups.” *Faraday Discussions*, **2014**, 168, 461-484. DOI: 10.1039/C3FD00154G.
- [5] Allodi, M. A.\*; Ioppolo, S.; Kelley, M. J.; McGuire, B. A.; Blake, G.A.\* “The Structure and Dynamics of Carbon Dioxide and Water Containing Ices Investigated via THz and Mid-IR Spectroscopy.” *Physical Chemistry Chemical Physics*, **2014**, 16, 3442-3455. DOI:10.1039/C3CP53767F.
- [4] Allodi, M. A.; Baragiola, R. A.; Baratta, G. A.; Barucci, M. A.; Blake, G. A.; Boduch, Ph.; Brucato J. R.; Contreras, C.; Cuyllé, S. H.; Fulvio, D.; Gudipati, M. S.; Ioppolo, S.; Kanuchov, Z.; Lignell, A.; Linnartz, H.; Palumbo, M. E.; Raut, U.; Rothard, H.; Salama, F.; Savchenko, E. V.; Sciamma-O’Brien, E.; Strazzulla, G. “Complementary and Emerging Techniques for Astrophysical Ices Processed in the Laboratory.” *Space Science Reviews*, **2013**, 180, 101-175. DOI: 10.1007/s11214-013-0020-8.

### Computational Atmospheric Chemistry

- [3] Temelso, B.; Morrell, T. E.; Shields, R. M.; Allodi, M. A.; Wood, E. K.; Kirschner, K. N.; Castonguay, T. C.; Archer, K. A.; Shields, G. C. “Quantum Mechanical Study of Sulfuric Acid Hydration: Atmospheric Implications.” *Journal of Physical Chemistry A*, **2012**, 116, 2209-2224. DOI: 10.1021/jp2119026.
- [2] Allodi, M. A.; Kirschner, K.N.; Shields, G.C. “Thermodynamics of the Hydroxyl Radical Addition to Isoprene.” *Journal of Physical Chemistry A*, **2008**, 112, 7064-7071. DOI: 10.1021/jp801869c.
- [1] Allodi, M. A.; Livada, J.; Dunn, M. E.; Kirschner, K. N.; Shields, G. C. “Do Hydroxyl Radical-Water Clusters, OH(H<sub>2</sub>O)<sub>n</sub>, n=1-5, Exist in the Atmosphere?” *Journal of Physical Chemistry A*, **2006**, 110, 13283-13289. DOI: 10.1021/jp064468l.

### Invited Talks

- 9/16 “Opportunities at the Frontiers of Light-Matter Interactions.” *Departments of Chemistry and Physics* Hamilton College, Clinton, NY, USA.
- 7/16 “Opportunities at the Frontiers of Light-Matter Interactions.” *Department of Physical Sciences Seminar*, The Open University, Milton Keynes, UK.

- 9/15 “Frontiers of Light-Matter Interactions: Nonlinear TeraHertz Spectroscopy Towards Vibrational Coherent Control.” *AMO Group at the Advanced Photon Source Seminar*, Argonne National Laboratory, Lemont, IL, USA.
- 6/15 “Dancing to the Beat of a TeraHertz Drum: Molecular Dynamics and Vibrational Quantum Beats.” *Herbert Newby McCoy Award Symposium*, Caltech, Pasadena, CA, USA.
- 4/15 “Dancing at TeraHertz Frequencies: Molecular Motion from the Interstellar Medium to Neat Liquids.” *Engel Group Seminar*, The University of Chicago, Chicago, IL, USA.
- 3/15 “From the Atmosphere to the Interstellar Medium: Long-range Molecular Interactions.” *249th National Meeting of the American Chemical Society: George C. Shields Award Symposium*, Denver, CO, USA.
- 11/14 “Astrochemistry - from the Lab to the Stars” *Kliegel Lecture in Planetary Science*, Caltech, Pasadena, CA, USA.
- 6/14 “Chemistry from the Lab to the Stars: THz Time-Domain Spectroscopy and its applications in chemistry, biology, and astronomy.” *Gray-Hill Seminar*, Occidental College, Los Angeles, CA, USA.
- 10/13 “Chemistry from the Lab to the Stars: THz Spectroscopy of Molecular Ice Structure.” *Division of Chemistry and Chemical Engineering Seminar Day*, Caltech, Pasadena, CA, USA.
- 7/13 “Chemistry from the Lab to the Stars: THz Spectroscopy of Astrochemical Ices.” *Summer Chemical Physics Seminar*, Caltech, Pasadena, CA, USA.
- 3/13 “Time-Domain THz Spectroscopy - A Tool to Explore New Spectroscopy and Dynamics.” *Milliken Graduate Symposium*, Milliken Inc., Spartanburg, SC, USA.
- 2/13 “New Frontiers in Spectroscopy and Dynamics: Time-Domain THz Spectroscopy” *Okumura Group Seminar*, Caltech, Pasadena, CA, USA.

### Conference Talks

- 4/17 “Optical resonance imaging: An optical analog to MRI with sub-diffraction-limited capabilities” *253th National Meeting of the American Chemical Society*, San Francisco, CA, USA.
- 4/17 “Optical resonance imaging: An optical analog to MRI for sub-diffraction-limited exciton imaging.” *253th National Meeting of the American Chemical Society*, San Francisco, CA, USA.
- 11/16 “Ultrafast spectroscopic insight into cysteine-mediated exciton regulation in the Fenna-Matthews-Olson complex” *4<sup>th</sup> Midwest/Southeast Photosynthesis Conferences*, Turkey Run State Park, IN, USA.
- 8/15 “Watching molecules jump: Ultrafast Nonlinear TeraHertz Spectroscopy of Liquids and Binary Mixtures” *250th National Meeting of the American Chemical Society*, Boston, MA, USA.

- 3/15 “Time-Domain TeraHertz Spectroscopy of Polycyclic Aromatic Hydrocarbons.” *249th National Meeting of the American Chemical Society*, Denver, CO, USA.
- 7/14 “Understanding Complex Organic Molecules Through THz Spectroscopy: A Search for Glycine.” *Astrobiology Graduate Conference*; Rensselaer Polytechnic Institute, Troy, NY, USA.
- 9/13 “A THz Time-Domain Spectrometer to Study Astrochemical Ice Analogs: Investigations of Complex Organic Molecules.” *246th National Meeting of the American Chemical Society* ; Indianapolis, IN, USA.
- 6/13 “A new far-IR (THz) and IR spectrometer for the study of astrochemical ices.” *68th International Symposium on Molecular Spectroscopy*; The Ohio State University, Columbus, OH, USA.

### Poster Presentations

- 4/17 Allodi, M. A., “Exciton Imaging in Polycrystalline Semiconducting Organic Thin Films using Optical Resonance Imaging.” *253th National Meeting of the American Chemical Society*, San Francisco, CA, USA.
- 6/16 Allodi, M. A. “Coherent Two-dimensional Terahertz-Terahertz-Raman Spectroscopy of Liquids.” *8th International Conference on Coherent Multi-Dimensional Spectroscopy*; Groningen, The Netherlands.
- 9/15 Allodi, M. A. “Measuring and Engineering Exciton Dynamics at the Space-Time Limit: Optical Resonance Imaging ” *DARPA Wait What? Future Technology Forum*; St. Louis, MO, USA.
- 8/15 Allodi, M. A., Finneran, I. A., & Blake, G. A, “Watching Molecules Jump: Ultrafast Nonlinear TeraHertz Spectroscopy Toward Coherent Control of Liquids ” *Gordon Research Conference on Quantum Control of Light and Matter*; Mt. Holyoke College, South Hadley, MA, USA.
- 7/14 Allodi, M. A., Finneran, I. A., & Blake, G. A, “2D THz-THz spectroscopy in the solid phase.” *Gordon Research Conference on Atomic & Molecular Interactions*; Stonehill College, Easton, MA, USA.
- 3/14 Allodi, M. A., Ioppolo, S., McGuire, B. A., & Blake, G. A, “Time-domain THz spectroscopy of interstellar ice analogs: New instrumentation and optical constant extraction.” *247th National Meeting of the American Chemical Society* ; Dallas, TX, USA.
- 3/14 Allodi, M. A., Ioppolo, S., McGuire, B. A., Kelley, M. J., & Blake, G. A, “Laboratory Investigation of Pure and Mixed Ices of Astrochemical Relevance via THz and IR Spectroscopy.” *Caltech Rising Researchers Symposium*; California Institute of Technology, Pasadena, CA, USA.
- 9/13 Allodi, M. A., Ioppolo, S., McGuire, B. A., Kelley, M. J., & Blake, G. A, “Laboratory Investigation of Pure and Mixed Ices of Astrochemical Relevance via THz and

- IR Spectroscopy.”  
*Planetary Science at Caltech 50 Year Celebration*; California Institute of Technology, Pasadena, CA, USA.
- 9/13 Allodi, M. A., Ioppolo, S., McGuire, B. A., Kelley, M. J., & Blake, G. A., “Laboratory Investigation of Pure and Mixed Ices of Astrochemical Relevance via THz and IR Spectroscopy.”  
*246th National Meeting of the American Chemical Society* ; Indianapolis, IN, USA.
- 2/13 Allodi, M. A., Ioppolo, S., McGuire, B. A., Kelley, M. J., & Blake, G. A., “Laboratory Investigation of Pure and Mixed Ices of Astrochemical Relevance via THz and IR Spectroscopy.”  
*First Workshop on Experimental Laboratory Astrophysics*; Poipu, HI, USA.
- 10/12 Allodi, M. A., Ioppolo, S., McGuire, B. A., Kelley, M. J., & Blake, G. A., “Optical Pump - THz Probe Time Domain Spectroscopy to Elucidate Femtosecond Solvation Dynamics.”  
*Molecular Spectroscopy in the Era of Far-IR Astronomy*; Emory University, Atlanta, GA, USA.
- 2/07 Allodi, M. A.; Kirschner, K.N.; Shields, G.C. “The Effects of Prereactive Complexes on Gas-Phase Reactions. ”  
*Sanibel Symposium*; St. Simons Island, GA, USA.
- 8/06 Allodi, M. A.; Livada, J.; Dunn, M. E.; Kirschner, K. N.; Shields, G. C. “An Ab Initio Study of the Kinetics and Thermodynamics of Prereactive Complexes in Gas-Phase Reactions of the OH Radical and Hydrocarbons. ”  
*Mercury Conference*; Hamilton College, Clinton, NY, USA.
- 8/05 Allodi, M. A.; Kirschner, K.N.; Shields, G.C. “Computational Study of the OH Radical Addition to Isoprene.”  
*Mercury Conference*; Hamilton College, Clinton, NY, USA.

## Teaching Experience

- *The University of Chicago*
  - Guest Lecturer - Wave Mechanics/Spectroscopy - Chem 361 (graduate) - Fall 2015.
- *California Institute of Technology*
  - Head Teaching Assistant
    - \* General Chemistry - Chem 1b (undergraduate) - Winter 2010.
  - Teaching Assistant
    - \* Physical Chemistry and Spectroscopy - Chem 21b (undergraduate) - Winter 2015.
    - \* Physical Chemistry Lab - Chem 6 (undergraduate) - Spring 2010.
    - \* General Chemistry - Chem 1a (undergraduate) - Fall 2009.
- *Hamilton College*
  - Teaching Assistant
    - \* How Stuff Works - Phys 120 - Spring 2008

## Scientific and Teaching Outreach

- Volunteer Section Leader  
*Caltech Teaching Conference*, 2014.
  - Helped lead a section on teaching, assessment, and feedback.
- RISE Tutor  
*California Institute of Technology*, October 2013 - June 2014.
  - Tutor for Local High School Students Struggling with Math and Science. 2 hrs / week.

## Academic Service

- Grant Review Panelist, *Department of Defense - National Defense Science and Engineering Graduate (NDSEG) Fellowship*, January 2017.
- Grant Review Panelist, *National Science Foundation, MPS Division*, March 2016.
- Peer Referee for Academic Journals:
  - *The Journal of Chemical Physics*
  - *Physical Chemistry Chemical Physics*
  - *New Journal of Chemistry*
  - *RSC Advances*

*Verified Record Available at <https://publons.com/author/629778>*
- *California Institute of Technology*
  - Summer Chemical Physics Seminar, Series Founder and Organizer, 2011 - 2014.
  - Chemical Physics Seminar Organizing Committee, Group Representative, 2010 - 2015.
  - Summer Undergraduate Research Fellowship Program (SURF) Co-Mentor Advisory Committee, Member, 2011-2012.

## Professional Societies

- American Chemical Society, Member.
- Royal Society of Chemistry, Member.
- American Association for the Advancement of Science, Member.

## Languages

- English - Native Speaker.
- Spanish - Fluent in oral and written communication.
- German - Excellent oral comprehension; good written comprehension.
- Italian - Good oral and written comprehension.

## Grants Awarded

- 7/15-8/17: \$55,000 - Yen Postdoctoral Fellowship - The University of Chicago.
- 9/17-9/19: \$139,673 - Arnold O. Beckman Postdoctoral Fellowship - Arnold and Mabel Beckman Foundation.