

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, Chemistry, **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

- 9/17 - Present: Arnold O. Beckman Postdoctoral Fellow - The University of Chicago.
- 7/15 - 8/17: 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 19th USA TODAY All-USA College Academic 3rd 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

- [18] 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: <http://dx.doi.org/10.1021/acsphotonics.6b00694>.
Note: Selected as an highlight in C&EN - <http://acsmeetings.cenmag.org/an-optical-analog-of-mri>

Nonlinear and 2D Ultrafast Spectroscopy

- [17] Rolczynski, B. S.; Yeh, S.-H.; Navotnaya, P.; Lloyd, L. T.; Ginzburg, A. R.; Zheng, H.; Allodi, M. A.; Otto, J. P.; Ashraf, K.; Gardiner, A. T.; Cogdell, R. J.; Kais, S.; Engel, G. S. "Measuring the Detailed Excitonic Peak Structure of the Fenna-Matthews-Olson Complex" **2017**, *submitted*.
- [16] Allodi, M. A.†; Otto, J. P.†; Sohail, S. H.; Saer, R. G.; Wood, R. E.; Rolczynski, B. S.; Massey, S. C.; Ting, P. C.; Blankenship, R. E.; Engel, G. S. "Reactive oxygen species affect ultrafast exciton transport in photosynthetic pigment-protein complexes" **2017**, *submitted*.
- [15] Sohail, S.H.; Dahlberg, P. D.; Allodi, M. A.; Ting, P.C.; Massey, S.C.; Martin, E.C.; Hunter, C.N.; Engel, G. S. "Communication: Broad Manifold of Excitonic States in Light-Harvesting Complex 1 Promotes Efficient Unidirectional Energy Transfer *in vivo*." *The Journal of Chemical Physics*, **2017**, 147, 131101. DOI: <http://dx.doi.org/10.1063/1.4999057>
- [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." *The Journal of Physical Chemistry Letters*, **2017**, 8, 4640-4644.
DOI: <http://dx.doi.org/10.1021/acs.jpcclett.7b02106>.
- [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**, 8, 988.
DOI: <http://dx.doi.org/10.1038/s41467-017-01124-z>

- [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: <http://dx.doi.org/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: <http://dx.doi.org/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 CO₂-CH₃OH Interstellar Ice Analogs.” *Physical Chemistry Chemical Physics*, **2016**, 18, 20199-20207. DOI: <http://dx.doi.org/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: <http://dx.doi.org/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: <http://dx.doi.org/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: <http://dx.doi.org/10.1088/0004-637X/781/1/16>.
- [6] Ioppolo, S.; McGuire, B. A.[†]; Allodi, M. A.[†]; Blake, G.A. “THz and Mid-IR Spectroscopy of Interstellar Ice Analogs: Methyl and Carboxylic Acid Groups.” *Faraday Discussions*, **2014**, 168, 461-484. DOI: <http://dx.doi.org/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: <http://dx.doi.org/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: <http://dx.doi.org/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: <http://dx.doi.org/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: <http://dx.doi.org/10.1021/jp801869c>.
- [1] Allodi, M. A.; Livada, J.; Dunn, M. E.; Kirschner, K. N.; Shields, G. C. “Do Hydroxyl Radical-Water Clusters, OH(H₂O)_n, n=1-5, Exist in the Atmosphere?” *Journal of Physical Chemistry A*, **2006**, 110, 13283-13289. DOI: <http://dx.doi.org/10.1021/jp064468l>.

Patent Applications

- [1] Engel, G.S. and Allodi, M.A. “Optical Resonance Imaging” **2017**, *Initial disclosure filed with UChicago Technology and Commercialization Licensing Office*.

Invited Talks

- 11/17 Carthage College, Kenosha, WI, USA.
- 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

- 8/17 “Optical Resonance Imaging: Sub-diffraction-limited Imaging of Exciton Dynamics at Interfaces”
13th Femtochemistry Conference, Cancun, Mexico.
- 4/17 “Optical resonance imaging: An optical analog to MRI with sub-diffraction-limited capabilities”
253rd 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.”
253rd 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”
42nd 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

- 8/17 Allodi, M. A., “Learning from the Master: Watching Biology Control Photochemistry in vivo”
Beckman Symposium, Irvine, CA, USA.
- 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 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 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 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 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

- SummerLink Presenter
University of Chicago, Summer 2017
 - Presented my research to a group of high school researchers and discussed STEM career paths.
- 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:
 - *Physical Chemistry Chemical Physics*
 - *The Journal of 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 - Excellent 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.