

Michael T. Ruggiero

Academic Appointments

2018–Present **Assistant Professor of Chemistry**, *University of Vermont*, Burlington, Vermont, USA.

Education

2014–2016 **Doctor of Philosophy – Physical Chemistry**, *Syracuse University*, Syracuse, New York, USA.

2012–2014 **Master of Philosophy – Physical Chemistry**, *Syracuse University*, Syracuse, New York, USA.

2008–2012 **Bachelor of Science – Chemistry (ACS Certified), Mathematics Minor**, *State University of New York, College at Geneseo*, Geneseo, New York, USA.

Research Experience

2016–2018 **Postdoctoral Research Associate**, UNIVERSITY OF CAMBRIDGE, Cambridge, UK.

*Department of Chemical Engineering and Biotechnology
Terahertz Applications Group, PI: Prof. J. Axel Zeitler*

2016–Present **Guest Researcher**, MEDIMMUNE LTD., Cambridge, UK.

Contact: Dr. Chris van der Walle

2012–2016 **Research Assistant**, SYRACUSE UNIVERSITY, Syracuse, New York, USA.

*Supervisor: Prof. Timothy M. Korter
Thesis Title: Elucidating the Electronic Origins of Intermolecular Forces in Crystalline Solids*

2015 **Invited Researcher**, UNIVERSITY OF TORINO, Turin, IT.

Host: Prof. Roberto Orlando

2011–2012 **Undergraduate Research Assistant**, SUNY GENESEO, Geneseo, New York, USA.

Supervisor: Prof. Jeffrey J. Peterson

Teaching Experience

2018–Present **Physical Chemistry Professor**, *University of Vermont*, Burlington, Vermont.

Taught advanced physical chemistry and related topics to upper level undergraduates and graduate students

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- 2016–2018 **Master's Students Supervisor**, UNIVERSITY OF CAMBRIDGE, Cambridge, UK.
Supervised chemistry master's students. Responsible for generating a research project and proposal for master's students to perform within two terms. Prepared the students to use a variety of experimental and computational techniques, and supervised their day-to-day laboratory activities.
- 2016–2018 **Chemical Engineering Research Supervisor**, UNIVERSITY OF CAMBRIDGE, Cambridge, UK.
Supervised chemical engineering undergraduate and master's research students. Responsible for generating a suitable research project and proposal for final-year students to perform within two terms. Prepared the students to use a variety of experimental and computational techniques, and supervised their day-to-day laboratory activities.
- 2016–2018 **Chemistry Supervisions**, CHURCHILL COLLEGE, UNIVERSITY OF CAMBRIDGE, Cambridge, UK.
Taught chemistry IA (general chemistry) and IB part A (physical chemistry/quantum mechanics) undergraduate students. Supervisions were small group teaching (2-4 students per session) that were in addition to the student's lecture courses. Was responsible for writing and assigning homework problems, and designing lessons around the lecture courses based on individual needs from week-to-week.
- 2016–2018 **Postgraduate Mentor**, CHURCHILL COLLEGE, UNIVERSITY OF CAMBRIDGE, Cambridge, UK.
Mentored and advised postgraduate students who were studying in Churchill College. Responsible for keeping up to date on the student's progress, their wellbeing, and offering advice for a successful career. Meetings with students were held both formally and informally throughout the year.
- 2012–2014 **Teaching Assistant**, SYRACUSE UNIVERSITY, Syracuse, New York, USA.
Taught physical chemistry I (thermodynamics) and II (quantum mechanics) lecture and laboratory. Assisted in designing and teaching laboratory experiments to advanced undergraduate students. Responsibilities included pre-laboratory instruction, experimental set-up and break-down, post-laboratory assistance (office hours), and grading scientific reports.

External Grant Support

- 2019–2022 NSF Grant DMR-1919610
"MRI: Acquisition of a Tip-Enhanced Nano Raman Spectroscopy (TERS) Microscope for Soft Matter Research and Education"
Award Amount: \$400,000, Role: Co-PI

Awards

- 2018 Forbes 30 Under 30
Annual list chronicling the brashiest entrepreneurs across the United States and Canada. One of 30 in the Science category. Featured in numerous print and web news outlets.

- 2018 The International Society of Infrared, Millimeter, and Terahertz Waves (IRMMW-THz) 2019 Young Scientist Award Winner
Awarded for "spreading and expanding the translation of terahertz spectroscopy from its core community into the chemical sciences" The IRMMW-THz Young Scientist Award recognizes interdisciplinary, outstanding scientific work by a young scientist who has made innovative contributions and discoveries in the field of infrared, millimeter, and terahertz waves.
- 2018 UVM OVPR Express Grant
Awarded funds to build a boutique experimental terahertz spectrometer for additional characterization potential.
- 2017 ARCHER HPC 500,000 Core Hours
Co-Investigator on a resource grant for the UK National Supercomputer, was awarded 500,000 CPU hours for a four-month period (September-December 2017).
- 2017 UK Best Use of ARCHER Competition Winner
Was selected as one of the leading users of the UK ARCHER National Supercomputer for work related to the study of dynamics of amorphous solids using *ab initio* molecular dynamics and solid-state density functional theory methods.
- 2017 Diamond Light source Beam Time
Three days of X-ray beam time for the study of radial distribution function in amorphous pharmaceuticals
- 2017 ISIS (TOSCA) Beam Time
Five days of Tosca beam time for the study of the low-frequency dynamics in organic semiconducting crystals
- 2017 ISIS (SANDALS) Beam Time
Five days of Sandals beam time for the study of amorphous sorbitol-water mixtures
- 2016 Churchill College Postdoctoral Fellowship Recipient
Received a fellowship from Churchill College (Cambridge) in a highly competitive competition
- 2016 European Molecular Biology Organisation Travel Fellowship Recipient
Received €10,000 to conduct research at the University of Torino (Italy) for the computational study of anharmonicity in solid materials

Advising and Supervision

Doctoral Advisement

- 2018–Present **Peter A. Banks**, *University of Vermont*, Chemistry.
- 2018–Present **Zihui Song**, *University of Vermont*, Materials Science.
- 2019–Present **Emily Verhaeg**, *University of Vermont*, Chemistry.
- 2019–Present **Raymond Schireman**, *University of Vermont*, Materials Science.
- 2017–2018 **Qi Li**, *University of Cambridge*, Chemical Engineering.
- 2017–2018 **Johanna Köbel**, *University of Cambridge*, Chemical Engineering.

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Master's Advisement

2016–2018 **Martin Huter**, *University of Cambridge*, Chemistry.

Bachelor's Advisement

2019–Present **Mark Mancini**, *University of Vermont*, Chemistry.

2018–2019 **Luke Burgess**, *University of Vermont*, Chemistry.

2017 **Mark Clapp**, *University of Cambridge*, Chemistry.

2017 **James Miller**, *University of Cambridge*, Chemical Engineering.

2017 **Mario Gaimann**, *University of Cambridge*, Chemical Engineering - DAAD RISE.

Professional Activities and Involvement

Editorial Board Memberships

- Journal of Infrared, Millimeter, and Terahertz Waves
- PeerJ Chemistry

Reviewer For Chemistry, Physics, Optics, and Pharmaceutics Journals

A full peer review record is available from [Publons](#)

- Journal of the American Chemical Society
- Chemical Science
- ACS Central Science
- Journal of Physical Chemistry
- Chemical Communications
- Molecular Pharmaceutics
- Polymer
- Applied Physics Letters
- Physical Chemistry Chemical Physics
- Chemical Physics Letters
- Journal of Infrared, Millimeter, and Terahertz Waves
- Optical Materials
- International Journal of Infrared and Millimeter Waves
- Spectrochimica Acta
- International Journal of Plant & Soil Science

Member Organizations

- | | |
|---|--|
| - American Chemical Society (ACS) | - Royal Society of Chemistry (RSC) |
| - Centre Européen de Calcul Atomique et Moléculaire (CECAM) | - American Association of Pharmaceutical Scientists (AAPS) |
| - Pharmaceutical Solid State Research Cluster (PSSRC) | - Infrared Raman Discussion Group (IRDG) |

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Peer-Reviewed Publications

[Google Scholar](#) h-index of 12 and i10-index of 16

Hash (#) represents UVM student author, asterisk (*) represents corresponding authorship, and dagger (†) represents shared first-authorship

41. P. A. Banks[#], L. Burgess[#], and **M. T. Ruggiero**^{*}. The Importance of Periodic Models for Simulating and Assigning Solid-State Terahertz Vibrational Spectra. *Physical Chemistry Chemical Physics, Submitted, 2020.*
40. A. D. Stephens, M. N. Qaisrani, **M. T. Ruggiero**, S. T. E. Jones, E. Poli, A. D. Bond, P. J. Woodhams, E. M. Kleist, L. Grisanti, R. Gebauer, J. A. Zeitler, D. Credgington, A. Hassanali, and G. S. Kaminski-Schierle. *Science, Submitted, 2020. Preprint Available on BioRxiv, doi:10.1101/2020.01.22.915306*
39. P. A. Banks^{†#}, Z. Song^{†#}, and **M. T. Ruggiero**^{*}. Assessing the Performance of Density Functional Theory Methods on the Prediction of Low-Frequency Vibrational Spectra. *Journal of Infrared, Terahertz, and Millimeter Waves, In Review, 2020.*
38. W. Zhang[†], Z. Song^{†#}, **M. T. Ruggiero**^{*}, and D. M. Mittleman. Guest Capture Reaction in Organic Clathrates Driven by Terahertz Oscillations. *Physical Review Letters, In Review, 2020.*
37. M. Hutereau[†], P. A. Banks^{†#}, B. Slater, J. A. Zeitler, A. D. Bond, and **M. T. Ruggiero**^{*}. Spatially Resolving Anharmonic Lattice Dynamics in Molecular Crystals with X-ray Diffraction and Terahertz Spectroscopy. *Physical Review Letters, In Review, 2020. Preprint Available on ChemRxiv, doi:10.26434/chemrxiv.10277783.v1*
36. W. Zhang[†], Z. Song^{†#}, **M. T. Ruggiero**^{*}, and D. M. Mittleman. Assignment of Terahertz Modes in Hydroquinone Clathrates. *Journal of Infrared, Terahertz, and Millimeter Waves, In Press, 2020.*
35. **M. T. Ruggiero**^{*}. Invited Review: Modern Methods for Accurately Simulating the Terahertz Spectra of Solids. *Journal of Infrared, Terahertz, and Millimeter Waves, In Press, 2020.*
34. H. Hoshina, T. Kanemura, and **M. T. Ruggiero**^{*}. Exploring the Dynamics of Bound Water in Nylon Polymers with Terahertz Spectroscopy. *Journal of Physical Chemistry B, 124 (2), 422–429, 2020. Featured on Journal Cover.*
33. E. O. Kissi, **M. T. Ruggiero**, N.-J. Hempel, Z. Song[#], H. Grohganz, T. Rades, K. Löbmann. Characterising Glass Transition Temperatures and Glass Dynamics in Mesoporous Silica-Based Amorphous Drugs. *Physical Chemistry Chemical Physics, 21, 19686–19694, 2019.*
32. G. Schweicher[†], G. D'Avino[†], **M. T. Ruggiero**^{†*}, D. J. Harkin, K. Broch, D. Venkateshvaran, G. Liu, A. Richard, C. Ruzie, J. Armstrong, A. R. Kennedy, K. Shankland, K. Takimiya, Y. H. Geerts, J. A. Zeitler, S. Fratini, H. Siringhaus. Chasing the 'Killer' Phonon Mode for the Rational Design of Low Disorder, High Mobility Molecular Semiconductors. *Advanced Materials, 1902407, 2019.*

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31. **M. T. Ruggiero**, S. Ciuchi, S. Fratini, and G. D'Avino, Electronic Structure, Electron-Phonon Coupling and Charge Transport in Crystalline Rubrene Under Mechanical Strain. *Journal of Physical Chemistry C*, 123 (26), 15897–15907, 2019. *Invited Contribution*.
30. R. S. C. M. Q. Antonino, **M. T. Ruggiero**, Z. Song[#], T. L. Nascimento, E. M. Lima, A. Bohr, M. M. Knopp, K. Löbmann. Impact of Drug Loading in Mesoporous Silica-Amorphous Formulations on the Physical Stability of Drugs with High Recrystallization Tendency. *International Journal of Pharmaceutics: X*, 1, 10026, 2019.
29. S. Fan, **M. T. Ruggiero**, Z. Song[#], Z. Qian, and V. P. Wallace. Correlation Between Saturated Fatty Acid Chain-Length and Intermolecular Forces Determined with Terahertz Spectroscopy. *Chemical Communications*, 55, 3670–3673 (2019).
28. J. Hou, P. D. Sutrisna, T. Wang, S. Gao, Q. Li, C. Zhou, S. Sun, H.-C. Yang, F. Wei, **M. T. Ruggiero**, J. A. Zeitler, A. K. Cheetham, K. Liang, and V. Chen. Unraveling the Interfacial Structure-Performance Correlation of Flexible Metal-Organic Framework Membranes on Polymeric Substrates. *ACS Applied Materials and Interfaces*, 11 (5), 5570–5577 (2019).
27. N. Azzarelli, S. Ponnala, A. Aguirre, S. J. Dampf, M. P. Davis, **M. T. Ruggiero**, V. Lopez Diaz, J. W. Babich, M. Coogan, T. Korter, R. P. Doyle, J. Zubieta. Defining the Origins of Multiple Emission/Excitation in Rhenium-Bisthiazole Complexes. *Inorganica Chimica Acta*, 489 (1), 301–309 (2019).
26. J. Maul, M. R. Ryder, **M. T. Ruggiero**, and A. Erba. Pressure Driven Mechanical Anisotropy and Destabilization in Zeolitic Imidazolate Frameworks. *Physical Review B* 99, 014102, (2018).
25. W. Zhang, J. Maul, D. Vulpe, P. Moghadam, D. Fairen-Jimenez, D. M. Mittleman, J. A. Zeitler, A. Erba*, **M. T. Ruggiero***. Probing the Mechanochemistry of Metal-Organic Frameworks with Low-Frequency Vibrational Spectroscopy. *Journal of Physical Chemistry C*, 122(48), 27442–27450 (2018). Featured on **Journal Cover**.
24. Y. Sun, R. Degl'Innocenti, D. A. Ritchie, H. E. Beere, L. Ziao, **M. T. Ruggiero**, J. A. Zeitler, R. I. Stanchev, D. Chen, Z. Peng, E. MacPherson, and X. Liu. Graphene-Loaded Metal Wire Grating for Deep and Broadband THz Modulation in Total Internal Reflection Geometry. *Photonics Research*, 6(12), 1151–1157 (2018).
23. **M. T. Ruggiero***, J. J. Sutton, S. J. Fraser-Miller, A. J. Zaczek, T. M. Korter, and J. A. Zeitler. Revisiting the Thermodynamic Stability of Indomethacin Polymorphs with Low-Frequency Vibrational Spectroscopy and Quantum Mechanical Simulations. *Crystal Growth and Design*, 18(11), 6513–6520 (2018).
22. Q. Li, A. J. Zaczek, T. M. Korter, J. A. Zeitler, and **M. T. Ruggiero***. Methyl-Rotation Dynamics in Metal-Organic Frameworks Probed with Terahertz Spectroscopy. *Chemical Communications*, 54, 5776–5779 (2018).

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21. **M. T. Ruggiero***, W. Zhang, A. D. Bond, D. M. Mittleman, and J. A. Zeitler. Uncovering the Connection Between Low-Frequency Dynamics and Phase Transformation Phenomena in Molecular Solids. *Physical Review Letters*, 120, 196002 (2018).
20. **M. T. Ruggiero***, J. Kölbl, Q. Li, and J. A. Zeitler. Predicting the Structures and Associated Phase Transitions Mechanisms in Disordered Crystals via a Combination of Experimental and Theoretical Methods. *Faraday Discussions*, 211, 425–439 2018.
19. E. O. Kissi, H. Grohganz, K. Lobmann, **M. T. Ruggiero**, J. A. Zeitler, and T. Rades. The β -Relaxation Glass-Transition Temperature as the Single Predictive Parameter for Recrystallization of Neat Amorphous Drugs. *Journal of Physical Chemistry B* 122 (10), 2803–2808, 2017.
18. **M. T. Ruggiero**, J. Sibik, A. Erba, J. A. Zeitler, and T.M. Korter. Quantification of Cation-Anion Interactions in Crystalline Monopotassium and Monosodium Glutamate Salts. *Physical Chemistry Chemical Physics* 19, 28647–28652 (2017).
17. **M. T. Ruggiero**, J. A. Zeitler, and T.M. Korter. Concomitant Polymorphism and the Martensitic-Like Transformation of an Organic Crystal. *Physical Chemistry Chemical Physics*, 19, 28502–28506 (2017).
16. **M. T. Ruggiero**, M. Krynski, E. O. Kissi, J. Sibik, D. Markl, N. Y. Tan, D. Arslanov, W. v. d. Zande, B. Redlich, T. M. Korter, H. Grohganz, K. Lobmann, T. Rades, S. R. Elliott, and J. A. Zeitler. The Significance of the Amorphous Potential Energy Landscape for Dictating Glassy Dynamics and Driving Solid-State Crystallisation. *Physical Chemistry Chemical Physics*, 19, 30039–30047 (2017).
15. A. S. Larsen[†], **M. T. Ruggiero**[†], K. E. Johannson, J. A. Zeitler, and J. Rantanen. Tracking Dehydration Mechanisms in Crystalline Hydrates with Molecular Dynamics Simulations. *Crystal Growth and Design*, 17 (10), 5017–5022 (2017).
14. **M. T. Ruggiero***, J. A. Zeitler, and A. Erba. Intermolecular Anharmonicity in Molecular Crystals: Interplay Between Low-Frequency Dynamics and Quantum Quasi-Harmonic Simulations of Solid Purine. *Chemical Communications*, 53, 3781-3784 (2017).
13. **M. T. Ruggiero**, and J. A. Zeitler. Resolving the Origins of Crystalline Anharmonicity Using Terahertz Time-Domain Spectroscopy and *ab initio* Simulations. *Journal of Physical Chemistry B*, 120 (45), 11733–11739 (2016).
12. D. Markl, **M. T. Ruggiero**, and J. A. Zeitler. Pharmaceutical Applications of Terahertz Spectroscopy and Imaging. *European Pharmaceutical Review*. 21 (4), 45–50 (2016). (Featured on **Journal Front Cover**)
11. **M. T. Ruggiero**, J. Sibik, J. A. Zeitler, and T.M. Korter. Examination of L-Glutamic Acid Polymorphs by Solid-State Density Functional Theory and Terahertz Spectroscopy. *The Journal of Physical Chemistry A*. 120 (38), 7490–7495 (2016).

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10. **M. T. Ruggiero**, J. Sibik, R. Orlando, J. A. Zeitler, and T.M. Korter. Measuring the Elasticities of Poly-L-Proline Helices with Terahertz Spectroscopy. *Angewandte Chemie*, 128, 6991–6995 (2016). (Featured on **Journal Front Cover**, featured in **C&E News**, *Terahertz Spectroscopy Probes Polymers*, 94 (33), 30–31, 2016).
9. **M. T. Ruggiero**, J. Gooch, J. Zubieta, and T. M. Korter. Evaluation of Range-Corrected Density Functionals for the Simulation of Pyridinium-Containing Molecular Crystals. *The Journal of Physical Chemistry A*. 120 (6), 939-947 (2016).
8. **M. T. Ruggiero**, and T. M. Korter. The Crucial Role of Water in Shaping Low-Barrier Hydrogen Bonds. *Physical Chemistry Chemical Physics*. 18 (7), 5521–5528 (2016).
7. **M. T. Ruggiero**, T. M. Korter. Uncovering the Terahertz Spectrum of Copper Sulfate Pentahydrate. *The Journal of Physical Chemistry A*, 120 (2), 227–232 (2016).
6. **M. T. Ruggiero**, A. Erba, R. Orlando, and T. M. Korter. Origins of Contrasting Copper Coordination Geometries in Crystalline Copper Sulfate Pentahydrate. *Physical Chemistry Chemical Physics*, 17 (46), 31023-31029 (2015).
5. A. Erba, **M. T. Ruggiero**, T. M. Korter, and R. Dovesi. Piezo-Optic Tensor of Crystals from Quantum-Mechanical Calculations. *The Journal Chemical Physics*, 143 (14), 144504 (2015).
4. N. Y. Tan, **M. T. Ruggiero**, C. Orellana-Tavra, T. Tian, A. D. Bond, T. M. Korter, D. Farien-Jimenez, and J. A. Zeitler. Investigation of the Terahertz Vibrational Modes of ZIF-8 and ZIF-90 with Terahertz Time-Domain Spectroscopy. *Chemical Communications*, 51 (89), 16037–16040 (2015). (Featured on **Journal Front Cover**)
3. **M. T. Ruggiero**, T. Bardon, M. Strlic, P. F. Taday, and T. M. Korter. The Role of Terahertz Polariton Absorption in the Characterization of Crystalline Iron Sulfate Hydrates. *Physical Chemistry Chemical Physics*, 17 (14), 9326–9334 (2015).
2. D. V. Nickel, **M. T. Ruggiero**, T. M. Korter, and D. M. Mittleman. Terahertz Disorder-Localized Rotational Modes and Lattice Vibrational Modes in the Orientationally Disordered and Ordered Phases of Camphor. *Physical Chemistry Chemical Physics*, 17 (10), 6671–7078 (2015). (Featured on **Journal Front Cover**)
1. **M. T. Ruggiero**, T. Bardon, M. Strlic, P. F. Taday, and T. M. Korter. Assignment of the Terahertz Spectra of Crystalline Copper Sulfate Hydrates via Solid-State Density Functional Theory. *The Journal of Physical Chemistry A*, 118 (43), 10101–10108 (2014).

Conference Proceedings

8. **M. T. Ruggiero**. Terahertz Vibrational modes Dictate and Drive the Properties of Advanced Materials. *44th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Paris (2019).
7. P. A. Banks[#] and **M. T. Ruggiero**. Identification And Characterization Of 'Killer-Modes' In Organic Semiconductors With Terahertz Spectroscopy. *44th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Paris (2019).
6. **M. T. Ruggiero**, Q. Li, W. Zhang, J. Maul, A. Erba, D. M. Mittleman, and J. A. Zeitler. Structural and Mechanical Properties of Metal-Organic Frameworks Probed with Terahertz Time-Domain Spectroscopy. *43rd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Nagoya (2018).
5. **M. T. Ruggiero**, J. Köbel, W. Zhang, D. M. Mittleman, and J. A. Zeitler. The Atomic Dynamics of Disordered Crystals Elucidated with Terahertz Time-Domain Spectroscopy and ab initio Simulations. *43rd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Nagoya (2018).
4. **M. T. Ruggiero**, and J. A. Zeitler. Amorphous Terahertz Dynamics At The Atomic Level - Insights From A Dual Experimental And Theoretical Approach. *42nd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Cancun (2017).
3. **M. T. Ruggiero**, J. Sibik, and J. A. Zeitler. The Influence of Intermolecular Forces on the Terahertz Response of Amorphous Materials. *41st International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Copenhagen (2016).
2. **M. T. Ruggiero**, and T. M. Korter. Measuring Protein Elasticity with Terahertz Spectroscopy. *41st International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Copenhagen (2016).
1. N. Y. Tan, **M. T. Ruggiero**, C. Orellana-Tavra, T. Tian, A. D. Bond, T. M. Korter, D. Farién-Jimenez, and J. A. Zeitler. Investigation of the Terahertz Vibrational Modes of ZIF-8 and ZIF-90 with Terahertz Time-Domain Spectroscopy. *40th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, Hong Kong (2015).

Presentations

Invited Seminars

14. **M. T. Ruggiero**. Terahertz Radiation – A Powerful Tool for the Pharmaceutical Industry. Invited Speaker, University of Helsinki. Helsinki, Finland. September 27, 2019.
13. **M. T. Ruggiero**. Terahertz Vibrational modes Dictate and Drive the Properties of Advanced Materials. 44th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz). Paris, France. September 1 – 6, 2019.

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12. **M. T. Ruggiero.** Harnessing Terahertz Vibrational Modes to Characterize and Drive the Properties of Advanced Materials. TransMIT Workshop on Modern Spectroscopic Techniques. Elba, Italy. June 16 – 22, 2019.
11. **M. T. Ruggiero.** Terahertz Vibrational Modes Establish and Drive the Properties of Advanced Materials. International Workshop on Terahertz Technology (IWOTT). Banff, Canada. April 11 – 14, 2019.
10. **M. T. Ruggiero.** Probing the Structure–Dynamics Relationship in Advanced Materials with Terahertz Spectroscopy. Worcester Polytechnic University Energy Seminar Series. Worcester, MA. January 28, 2019.
9. **M. T. Ruggiero.** Terahertz Spectroscopy as a Probe of Pharmaceutical Technology and Biopolymer Strength. Invited Speaker, University of Helsinki Seminar Series. Helsinki, Finland. September 31, 2018.
8. **M. T. Ruggiero** and J. A. Zeitler. Terahertz Time-Domain Spectroscopy of Amorphous Solids. MTSA2017. Okayama, Japan. November 24 – 26, 2017.
7. **M. T. Ruggiero**, Eric Kissi, Thomas Rades, and J. Axel Zeitler. The Role of the β -Relaxation on the Solid-State Crystallization of Amorphous Drugs. PSSRC2017. **Featured Presentation.** Graz, Austria. June 28 – 30, 2017.
6. **M. T. Ruggiero.** Elucidating the Molecular Dynamics of Amorphous Sorbitol with Terahertz Spectroscopy and *ab initio* Simulations. SON2017: Complementary Between Optics and Neutron Spectroscopy in the THz Domain **Invited Speaker.** Grenoble, France. June 19 – 20, 2017.
5. **M. T. Ruggiero.** Probing the Origins of Intermolecular Vibrational and Relaxational Dynamics in Organic Solids with CP2K. CP2K: Fourth Annual CP2K-UK Users Meeting **Invited Speaker.** Edinburgh, United Kingdom. January 9, 2017.
4. **M. T. Ruggiero**, and J. A. Zeitler. Using Terahertz Spectroscopy and *ab initio* Simulations for the Characterisation of Solid-State Pharmaceutical Systems. University of Minnesota Department of Pharmaceutical Sciences **Invited Speaker.** Minneapolis, Minnesota. September 20, 2016.
3. **M. T. Ruggiero**, and J. A. Zeitler. The Influence of Intermolecular Forces on Amorphous Stability Probed by Terahertz and Low-Frequency Raman Spectroscopy. SciX 2016 **Invited Speaker.** Minneapolis, Minnesota. September 18 – 23, 2016.
2. **M. T. Ruggiero.** How Do Intermolecular Forces in Crystalline Solids Influence Bulk Properties? A combined Experimental and Theoretical Perspective. SUNY Geneseo Senior Seminar **Invited Speaker.** Geneseo, New York. September 16, 2016.
1. **M. T. Ruggiero**, and T. M. Korter. The Elasticity of Biopolymers Explored Using Terahertz Time-Domain Spectroscopy. Advances in Terahertz Spectroscopy Meeting, Cambridge, United Kingdom. March 17 – 18, 2016.

Contributed Talks

12. P. A. Banks[#] and **M. T. Ruggiero**. Identification And Characterization Of 'Killer-Modes' In Organic Semiconductors With Terahertz Spectroscopy. 44th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz). Paris, France. September 1 – 6, 2019.
11. P. A. Banks[#] and **M. T. Ruggiero**. Simulating Terahertz Spectra Requires Periodic Boundary Conditions, Period. Optical Terahertz Science and Technology. Santa Fe, NM. March 10 – 15, 2019.
10. **M. T. Ruggiero**. Low-Frequency Vibrational Spectroscopy as a Mechanochemical Probe of Metal-Organic Frameworks. 6th International Conference on Metal-Organic Frameworks (MOF 2018). Auckland, New Zealand. December 9 – 13, 2018.
9. **M. T. Ruggiero**, Q. Li, W. Zhang, J. Maul, A. Erba, D. M. Mittleman, and J. A. Zeitler. Structural and Mechanical Properties of Metal-Organic Frameworks Probed with Terahertz Time-Domain Spectroscopy. 43rd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz). Nagoya, Japan. September 9 – 14, 2018.
8. **M. T. Ruggiero**, J. Kölbl, W. Zhang, D. M. Mittleman, and J. A. Zeitler. The Atomic Dynamics of Disordered Crystals Elucidated with Terahertz Time-Domain Spectroscopy and *ab initio* Simulations. 43rd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz). Nagoya, Japan. September 9 – 14, 2018.
7. **M. T. Ruggiero**, J. Kölbl, Q. Li, and J. A. Zeitler. Predicting the Structures and Associated Phase Transitions Mechanisms in Disordered Crystals via a Combination of Experimental and Theoretical Methods. Faraday Discussions – Methods and Applications of Crystal Structure Prediction. Cambridge, United Kingdom, July 11 – 13, 2018.
6. **M. T. Ruggiero**, A. Erba, and J. A. Zeitler. Anharmonic Terahertz Dynamics Characterized With First-Principles Simulations. 42nd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz). Cancun, Mexico. August 27 – September 1, 2017.
5. **M. T. Ruggiero**, and J. A. Zeitler. Amorphous Terahertz Dynamics At The Atomic Level - Insights From A Dual Experimental And Theoretical Approach. 42nd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz). Cancun, Mexico. August 27 – September 1, 2017.
4. **M. T. Ruggiero**, J. Sibik, and J. A. Zeitler. The Influence of Intermolecular Forces on the Terahertz Response of Amorphous Materials. 41st International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz). Copenhagen, Denmark. September 26 – 30, 2016.
3. **M. T. Ruggiero**, and J. A. Zeitler. The Origins of Amorphous Stability Probed via Terahertz Spectroscopy and *ab initio* Simulations. Pharmaceutical Solid State Research Cluster 2016 Meeting. Copenhagen, Denmark. July 6 – 8, 2016.

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2. **M. T. Ruggiero**, and J. A. Zeitler. Tracking the Dynamics of Molecular Crystals with *ab initio* Simulations. PRACE Spring School 2016 and E-CAM Tutorial on Molecular and Atomic Modeling. Dublin, Ireland. May 16 – 20, 2016.
1. **M. T. Ruggiero**, J. Sibik, and J. A. Zeitler. Stability Prediction of Amorphous Drug Molecules. 10th Annual Pharmaceuticals, Biopharmaceutics and Pharmaceutical World Meeting, Glasgow, United Kingdom. April 4 – 7, 2016.

Contributed Posters

9. Z. Song[#] and **M. T. Ruggiero**. Insight into the Intermolecular Forces Driving the Stabilization of Pharmaceutical Solids on the Surface of Porous Solid Materials. The Role of Form and Formulation Development in Transforming a New Era of Molecules into Therapeutics Gordon Research Conference. Waterville Valley, New Hampshire. June 9 – 14, 2017.
8. **M. T. Ruggiero**, and J. Axel Zeitler. The Low-Frequency Dynamics of Amorphous Solids and Relationship to the Glass-Transition. Time-Resolved Vibrational Spectroscopy 2017. Cambridge, United Kingdom. July 14 – 20, 2017.
7. **M. T. Ruggiero**, and T. M. Korter. Metal-Mediated Proton Transfer in Maleic Acid and Implications for Enzyme Catalysis. 249th ACS National Meeting, Denver, CO, United States. March 22 – 26, 2015.
6. I. Corcione, J. J. Peterson, W. C. Stephens, and **M. T. Ruggiero**. Low Temperature, Size-Selective Fluorescence Spectroscopy of PbSe Quantum Dots. 249th ACS National Meeting, Denver, CO, United States. March 22 – 26, 2015.
5. **M. T. Ruggiero**, and T. M. Korter. Assignment of the Terahertz Spectra of Crystalline Copper Sulfate and Its Hydrates via Solid State Density Functional Theory. MSSC2014 Ab Initio Modeling in Solid State Chemistry, Imperial College, London, United Kingdom. September 15 – 19, 2014.
4. **M. T. Ruggiero**, T. M. Korter. Terahertz Spectroscopy for Characterizing Copper Sulfate in Historical Inks. Quantum ESPRESSO Workshop, Pennsylvania State University, State College, PA, USA. June 16 – 20, 2014.
3. **M. T. Ruggiero**, and T. M. Korter. Substituent Effects on Pyridinium Ring Stacking Interactions in the Solid State. 246th ACS National Meeting, Indianapolis, IN, United States. September 8 – 12, 2013.
2. **M. T. Ruggiero**, and T. M. Korter. Substituent Effects on Pyridinium Ring Stacking Interactions in the Solid State. MSSC2013, Turin, Italy. September 1 – 5, 2013.
1. W. C. Stephens, **M. T. Ruggiero**, M. S. Azzaro, and J. J. Peterson. Low Temperature Photoluminescence Excitation Spectroscopy of PbSe Quantum Dots. 245th ACS National Meeting, New Orleans, LA, United States. April 7 – 11, 2013.

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