

CRAIG T. CHAPMAN

Department of Chemistry
Materials Science Program
University of New Hampshire
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Professional Appointments

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| 2018-present | Joint Appointment | Materials Science Program, University of New Hampshire, Durham, NH |
| 2017-present | Assistant Professor | Department of Chemistry, University of New Hampshire, Durham, NH |

Education

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| 2010 | Ph.D., Chemistry | University of Oregon, Eugene, OR |
| 2003 | B.S., Chemistry with honors minor in Mathematics | Stockton University, Pomona, NJ |

Research Experience

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| 2014–2017 | Postdoctoral Research Fellow | Department of Chemistry, Northwestern University, Evanston, IL Advisor: George C. Schatz Conducted research on energy transfer mechanisms in solar materials, simulated nanoscale wrinkling of polymeric materials, and modeled electrostatics of plasmonic nanoparticles. |
| 2010–2013 | Postdoctoral Research Fellow | Department of Chemistry, University of Washington, Seattle, WA Advisor: Xiaosong Li Investigated charge transfer dynamics in organic photovoltaics and developed algorithms for simulating solvation dynamics. |
| 2003–2010 | Graduate Research Fellow | Department of Chemistry and Biochemistry, University of Oregon, Eugene, OR Advisor: Jeffrey A. Cina Formulated and implemented a novel theory for molecular energy transfer dynamics. Simulated ultrafast nonlinear spectroscopic signals from molecular systems. |
| 2001 | NSF REU | Department of Chemistry and Biochemistry, University of South Carolina, Columbia, SC Advisor: Hans-Conrad zur Loye Synthesized and characterized novel metal-organic-frameworks resulting in several publications. |

Awards

Faculty Development Award UNH April 2018

Teaching Experience

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| At UNH | Fall 2017 | <i>Computational Chemistry</i> , CHEM 926, New graduate-level course Enrollment: 14, Eval: 4.2/5.0 |
| | Spring 2018 | <i>Physical Chemistry Laboratory II</i> , CHEM 686 Enrollment: 41, Eval: N/A <i>Student Research Experience/Chemistry</i> , INCO 590 Enrollment: 1, Eval: N/A |
| | Fall 2018 | <i>Advanced Physical Chemistry</i> , CHEM 905 Enrollment: N/A, Eval: N/A |
| Guest Lectures | Fall 2017 | <i>Computational Bioengineering</i> , BENG 755, DFT in force field development, for Prof. Harish Vashisth, 1 Lecture |
| Prior to UNH | 2003–2010 | Teaching Assistant, University of Oregon General chemistry laboratory (10 sections) Physical chemistry laboratory (6 sections) Physical chemistry (1 section) Statistical mechanics (1 section) |
| | 2001–2003 | Teaching Assistant, Stockton University General chemistry laboratory (1 section) Inorganic chemistry laboratory (1 section) |

Funding

Proposals Funded

Real-Time Electronic Dynamics Simulations of Single-Molecule-Based Plasmonic Structures, NSF XSEDE Startup allocation, 50,000 SU, PI: Craig T. Chapman, March 3, 2018 – March 3, 2019, Current

Rapid Assessment of Gas Capacity in MOFs Through Machine Learning, NSF XSEDE Startup allocation, 50,000 SU, PI: Craig T. Chapman, March 3, 2018 – March 3, 2019, Current

Proposals Submitted

New Hampshire Center for Multiscale Modeling and Manufacturing of Biomaterials (NH BIO-MADE), NSF EPSCoR RII Track 1, \$20M, PI: Brad Kinsey (UNH), Senior Personnel: Craig T. Chapman, \$431,290, 2019-2024, Submitted: August 2017

Personnel Mentored

- At UNH** Shan Chen, Graduate Student, Chemistry, 2017-
Dylan Glazier, Undergraduate Student, Chemistry, 2018-
Ryan Collette, Undergraduate Student, Mathematics, 2018-
Richard Gowers, Postdoc, 2018-
- Prior to UNH** Michael McAnally, Graduate Student, Northwestern University
Colin Egan, Undergraduate Student, Northwestern University

Service

- Department of Chemistry** Co-Chair, Library Committee, 2017-
Graduate Student Recruiting and Admissions Committee, 2017-
Graduate Student Thesis Committee:
Shan Chen, PhD Student, 2017-
Jillian Morang, PhD Student, 2017-
Chang Liu, PhD Student, 2017-

Professional Development

- 2018 Making Your NSF CAREER Proposal Count UNH

Publications at UNH

1. **Craig T. Chapman**, "Spin polarization dynamics in molecular plasmons," *in preparation*

Publications Prior to UNH

24. **Craig T. Chapman**, George C. Schatz, "Exciton down conversion through space-separated singlet fission," *in preparation*
23. Matthew S. Kirschner, Wendu Ding, Yuxiu Li, **Craig T. Chapman**, Aiwen Lei, Xiao-Min Lin, Lin X. Chen, George C. Schatz, and Richard D. Schaller, "Phonon-Driven Oscillatory Plasmonic Excitonic Nanomaterials," *Nano Lett.* **2018**, *18*, 442-448
22. Mohamad S. Kodaimati, Chen Wang, **Craig Chapman**, George C. Schatz and Emily A. Weiss, "The Distance-Dependence of Inter-Particle Energy Transfer in the Near-Infrared within Electrostatic Assemblies of PbS Quantum Dots," *ACS Nano* **2017**, *11*, 5041-5050
21. Jeffrey T. Paci, **Craig T. Chapman**, Won-Kyu Lee, Teri W. Odom, and George C. Schatz, "Wrinkles in Polytetrafluoroethylene on Polystyrene: Persistence Lengths and the Effect of Nanoinclusions," *ACS Appl. Mat. Interfaces*, **2017**, *9*, 9079-9088
20. Alyssa Zrimsek, Naihao Chiang, Michael Mattei, Stephani Zaleski, Michael McAnally, **Craig T. Chapman**, Anne-Isabelle Henry, George C. Schatz, Richard P. Van Duyne, "Single-Molecule Chemistry with Surface- and Tip-Enhanced Raman Spectroscopy," *Chem. Rev.*, Article ASAP
19. Eric Pozzi, Guillame Goubert, Naihao Chiang, Nan Jiang, **Craig T. Chapman**, Michael McAnally, Anne-Isabelle Henry, Tamar Seideman, George C. Schatz, Mark Hersam, Richard P. Van Duyne, "Ultrahigh vacuum tip-enhanced Raman spectroscopy," *Chem. Rev.*, Article ASAP

18. **Craig T. Chapman**, Jeffrey T. Paci, Won-Kyu Lee, Clifford J. Engel, Teri W. Odom, George C. Schatz, "Interfacial Effects on Nanoscale Wrinkling in Gold-Covered Polystyrene", *ACS Appl. Mat. Interfaces* **2016**, *8*, 24339–24344
17. **Craig T. Chapman**, Wenkel Liang, and Xiaosong Li, "Solvent effects on intramolecular charge transfer dynamics in a fullerene derivative," *J. Phys. Chem. A* **2013**, *117*, 2687–2691
16. Feizhi Ding, **Craig T. Chapman**, Wenkel Liang, and Xiaosong Li, "Mechanisms of bridge-mediated electron transfer: a TDDFT electronic dynamics study," *J. Chem. Phys.* **2012**, *137*, 22A512
15. Wenkel Liang, **Craig T. Chapman**, Feizhi Ding, and Xiaosong Li, "Modeling ultrafast solvated electronic dynamics using time-dependent density functional theory and polarizable continuum model," *J. Phys. Chem. A* **2012**, *116*, 1884–1890
14. Feizhi Ding, Wenkel Liang, **Craig T. Chapman**, Christine M. Isborn, and Xiaosong Li, "On the gauge invariance of the time-dependent Hartree-Fock and Kohn-Sham electronic dynamics," *J. Chem. Phys.* **2011**, *135*, 164101
13. Sean A. Fischer, **Craig T. Chapman**, and Xiaosong Li, "Surface hopping with Ehrenfest excited potential," *J. Chem. Phys.* **2011**, *135*, 144102
12. Wenkel Liang, **Craig T. Chapman**, and Xiaosong Li, "Efficient first-principles electronic dynamics," *J. Chem. Phys.* **2011**, *134*, 184102
11. **Craig T. Chapman**, Wenkel Liang, and Xiaosong Li, "Ultrafast coherent electron-hole separation dynamics in a fullerene derivative," *J. Phys. Chem. Lett.* **2011**, *2*, 1189–1192
10. **Craig T. Chapman**, Xiaolu Cheng, and Jeffrey A. Cina, "Numerical tests of a fixed vibrational basis/Gaussian bath theory for small-molecule dynamics in low-temperature media," *J. Phys. Chem. A* **2011**, *115*, 3980–3989
9. **Craig T. Chapman**, Wenkel Liang, and Xiaosong Li, "Open-system electronic dynamics and thermalized electronic structure," *J. Chem. Phys.* **2011**, *134*, 024118
8. Wenkel Liang, **Craig T. Chapman**, Michael J. Frisch, and Xiaosong Li, "Geometry optimization with multilayer methods using least-squares minimization," *J. Chem. Theory Comput.* **2010**, *6*, 3352–3357
7. Heide N. Ibrahim, **Craig T. Chapman**, Hiroyuki Katsuki, Jeffrey A. Cina, and Kenji Ohmori, "Wave packet reconstruction on unknown potential surfaces by two-colour non-linear wave packet interferometry," *Proceedings of the 17th International Conference on Ultrafast Phenomena*, Springer, New York **2010**
6. **Craig T. Chapman** and Jeffrey A. Cina, "Semiclassical treatments for small-molecule dynamics in low-temperature crystals using fixed and adiabatic vibrational bases," *Journal of Chemical Physics* **2007**, *127*, 114502
5. **Craig T. Chapman**, Mary A. Rohrdanz, and Jeffrey A. Cina, "Intermolecular communication and a vibrationally adiabatic basis treatment of small-molecule dynamics in low temperature solids," *Proceedings of the 15th International Conference on Ultrafast Phenomena*, Springer, New York **2006**
4. Jeffrey E. Fiscus, Sandra Shotwell, Ralph C. Layland, Rachael E. Hipp, Andrea M. Goforth, **Craig T. Chapman**, Mark D. Smith, Uwe H. F. Bunz, and Hans-Conrad zur Loye, "Coordination dimers constructed from metal (II) halides and the new ligand 1,2-dimethoxy-4,5-bis(2-pyridylethynyl)benzene," *J. Chem. Crystallogr.* **2005**, *35*, 903–912
3. Jeffrey E. Fiscus, Neil G. Pschirer, Rachael E. Hipp, Andrea M. Goforth, **Craig T. Chapman**, Sandra Shotwell, Ralph C. Layland, Mark D. Smith, Uwe H. F. Bunz, and Hans-Conrad zur Loye, "Synthesis and structural characterization of five new coordination polymer chain structures using a new, Z-shaped ligand, 2,2'-bis(4-pyridylethynyl)tolane," *J. Chem. Crystallogr.* **2005**, *35*, 125–134
2. **Craig T. Chapman**, Andrea M. Goforth, Neil G. Pschirer, Mark D. Smith, Uwe H. F. Bunz and Hans-Conrad zur Loye, "Synthesis and crystal structure of *catena*-poly[Rh₂(OAc)₄(C₂₇H₁₅N₃)]·2CH₂Cl₂, a novel Rh(II) organic/inorganic coordination polymer," *J. Chem. Crystallogr.* **2003**, *33*, 885–890

1. **Craig T. Chapman**, Delia M. Ciurtin, Mark D. Smith and Hans-Conrad zur Loye, "A new mixed-metal Mn-Rh coordination polymer assembled from Mn-containing molecular building blocks and Rh₂(OAc)₄ dimers," *Solid State Sciences* **2002**, *4*, 1187-1191

Conference Presentations

- 2018 256th National Meeting of the American Chemical Society, *contributed talk*, August 2018
- 2018 Workshop on Machine Learning in Materials Science, University of Utah, *Contributed Talk*, March 2018
- 2016 252nd National Meeting of the American Chemical Society, *two contributed talks, one SciMix poster, one ACS video presentation*, August 2016
- 2016 Chemistry at the Space-Time Limit (NSF CCI) Meeting, *invited tutorial on wave packet dynamics*, July 2016
- 2015 American Physical Society March Meeting, *contributed talk*, March 2015
- 2012 244th National Meeting of the American Chemical Society, *invited talk*, August 2012
- 2012 243rd National Meeting of the American Chemical Society, *invited talk*, March 2012
- 2010 American Physical Society March Meeting, *contributed talk*, March 2010
- 2009 56th Annual Meeting of the Western Spectroscopy Association, *contributed poster*, January 2009
- 2008 55th Annual Meeting of the Western Spectroscopy Association, *contributed poster*, January 2008
- 2006 Optical Society of America 15th International Conference on Ultrafast Phenomena, *contributed poster*, July 2006
- 2006 53rd Annual Meeting of the Western Spectroscopy Association, *contributed poster*, January 2006
- 2006 Gordon Research Conference on Vibrational Spectroscopy, *contributed poster*, July 2006

Invited Talks

- 2018 "From Molecules to Materials," Materials Science Program, University of New Hampshire, March 28, 2018

Professional Activities

- Reviewer *The Journal of Physical Chemistry, The Journal of Chemical Theory and Computation, Organic Electronics*
- Member American Chemical Society, American Physical Society
- Founding Member Optical Society of America, University of Oregon Student Chapter

Outreach and Science Policy

- 2013 **Huskies on the Hill Lobby Day** Olympia, WA
Advocated for scientific research funding and graduate student support with legislators.
- 2016 **Adler After Dark** Adler Planetarium, Chicago, IL
Communicated the science behind alternative energy sources to the general public. Ran interactive demonstrations of solar cell construction, ~1000 participants.
- 2016 **NanoScout Day** Northwestern University
"Ask a Scientist" panelist for Boy and Girl scouts and parents on the topic of nanoscience.

2017 **Science Policy and Outreach Task Force** Northwestern University
Founding member. Advocated for science policy.