

Curriculum Vitae  
**Dana D. Dlott**  
**William H. and Janet G. Lycan Emeritus Professor of Chemistry**

**Affiliation:** School of Chemical Sciences and Fredrick Seitz Materials Research Laboratory

**Address:**

Box 01-6 CLSL, 600 S. Mathews Ave., Urbana, IL 61801

Phone: (217)-333-3574 Fax: (217)-244-3186

Email: [dlott@illinois.edu](mailto:dlott@illinois.edu) homepage: <http://dlottgroup.scs.uiuc.edu/group/>

**Personal Information**

Date of Birth: September 12, 1952

Place of Birth: Los Angeles, California

Marital Status: Married (Maria), one child

**Education**

*Undergraduate:* Columbia University, 1970-1974, A.B (Chemistry), 1974

*Graduate:* Stanford University, 1974-1979, Ph.D. (Chemistry), 1979, Thesis Title: "*Picosecond Dynamics of Energy Transfer in Pure and Mixed Organic Crystals*". Thesis supervised by Prof. Michael D. Fayer.

**Professional Experience:**

1973-74 Teaching assistant and Research assistant, Columbia University,

1974-79 Teaching assistant and Research assistant, Stanford University

1979-86 Assistant Professor of Chemistry, University of Illinois at Urbana-Champaign

1986 Associate Professor of Chemistry, University of Illinois at Urbana-Champaign

1987 Member of the Graduate College

1993 Professor of Chemistry, University of Illinois at Urbana-Champaign

1999 Associate, Center for Advanced Study

2008 Research Professor, Fredrick Seitz Materials Research Laboratory

2009 William H. and Janet G. Lycan Professor of Chemistry

2011 Professor, Materials Research Laboratory

2017 Research Professor of Chemistry

2017 William H. and Janet G. Lycan Professor of Chemistry Emeritus

**Professional Societies:**

1. American Chemical Society
2. American Physical Society
3. Optical Society of America
4. Alpha Chi Sigma
5. Society for Imaging Science and Technology
6. American Association for the Advancement of Science
7. International Shock Wave Institute

**Professional Activities**

**Editorial Boards**

Journal of Applied Physics 2000-2004

Applied Physics Letters 2000-2004

Journal of Physical Chemistry Editorial Advisory Board 2009-2011

Journal of Physical Chemistry Editorial Advisory Board 2014-2017

Journal of Raman Spectroscopy Editorial Advisory Board 2011-2013

Chemical Physics Editorial Advisory Board, 2012-  
Army Research Laboratory Technical Assessment Board 2013-

### **Conference Sessions Organized**

Annual Meeting of the Electrochemical Society, Chicago, IL 1988  
OE/LASE '94, Los Angeles, CA  
IQEC '94, Los Angeles, CA  
Annual Meeting of the Electrochemical Society, Miami, 1994  
APS Topical Meeting on Shock Compression, 2002

### **Conferences and Symposia Organized**

Fourth International Conference on Chemical Reaction Dynamics in Condensed Phases (with C. Wight), 1996.  
Fifth International Conference on Chemical Reaction Dynamics in Condensed Phases (with A. Apkarian), 1999.  
ACS 2000 Annual Meeting, Aug. 2000 in Washington D. C. Symposium on chemical reactions in extreme conditions (with R. Morris).  
Sixth International Conference on Chemical Reaction Dynamics in Condensed Phases (with A. Apkarian), 2001.  
American Physical Society International Conference on Shock Compression of Condensed Matter, 2000  
American Physical Society International Conference on Shock Compression of Condensed Matter, 2002  
APS International Conference on Shock Compression, 2004, Graduate fellowship committee  
Telluride conference on Vibrational Dynamics, 2009  
International Conference on Raman Spectroscopy, 2010

### **Awards and Honors**

Beckman Fellow in the Center for Advanced Study 1984  
Beckman Research Award 1985  
Alfred P. Sloan Fellow 1984-85  
1993 Journal Award (Science) from the Society for Imaging Science and Technology  
Beckman Research Award 1994  
Fellow of the American Physical Society, 1996  
Guest Scientist at National Institute for Research in Inorganic Materials, Tsukuba, Japan, 1997  
Fellow of the Optical Society of America, 1999  
Associate, Center for Advanced Study, 1999  
Editorial Board, Journal of Applied Physics, 1999  
Editorial Board, Applied Physics Letters, 1999  
2001 Charles E. Ives Award from the Society for Imaging Science and Technology, 2001  
External Review Panel, Interdisciplinary Shock Wave Research Center, Sendai, Japan, 2005  
Fellow of the American Association for the Advancement of Science, 2005  
Vice-Chair APS Topical Group on Shock Compression of Condensed Matter, 2006  
Chair-Elect APS Topical Group on Shock Compression of Condensed Matter, 2007  
Chair APS Topical Group on Shock Compression of Condensed Matter, 2008  
Research Professor, Fredrick Seitz Materials Research Laboratory, 2008  
William H. and Janet G. Lycan Professor of Chemistry, 2009  
Chemical Physics Letters "Most cited paper" 2003-2007 award, 2008  
J. Phys. Chem. A, "Most accessed paper", 2007.  
External Review Panel, Los Alamos National Laboratory LDRD, Apr. 2008.  
Jupiter Laser Facility Program Advisory Committee, Lawrence Livermore National Laboratory, 2008, 2011  
External Advisory Board, PULSE center, Stanford Linear Accelerator Center, Stanford University, 2011-12  
ACS Physical Chemistry Division Award in Experimental Physical Chemistry, 2013.  
Lippincott Award in Vibrational Spectroscopy from the Optical Society of America, 2015.  
Visiting Scholar, Center for High Pressure Science and Technology Advanced Research (HPSTAR), Shanghai, China, Oct. 2017.

### **Students and Postdoctoral Associates**

### **Students who received their degree under my supervision**

1. Claire L. Schosser, Ph.D, 1984 (Monsanto Corp.)
2. Eric L. Chronister, Ph.D, 1985 (Professor, University of California, Riverside)
3. Thomas J. Kopic, Ph.D, 1985 (Hughes Research)
4. Jeffrey R. Hill, Ph.D, 1988 (Los Alamos National Lab)(Stanford University)
5. Jay C. Postlewaite, Ph.D, 1990 (Shell Oil Corp.)
6. Hackjin Kim, Ph.D, 1990 (Professor, Chungnam University)
7. Jeffrey B. Miers, Ph.D, 1992 (Center for Naval Analysis Corp.)
8. Xiaoning Wen, Ph.D, 1993 (Northwestern University)
9. Sheah Chen, Ph.D, 1994 (Institute of Atomic and Molecular Sciences, Taiwan)
10. Sandy Lee, Ph.D, 1995 (Caltech Jet Propulsion Laboratory)
11. Jens Franken, Ph.D., 1998 (Institute of Atomic and Molecular Sciences, Taiwan)
12. Lawrence K. Iwaki, 2000 (Northrop Grumman Space Technology)
13. James Patterson, MS Brigham Young University, Brigham Young University, 2004
14. Yoonsoo Pang, MS Seoul National University, Gwangju Institute of Science and Technology
15. Aaron Lozano, BS Indiana University, MS Chemistry, US Army, 2010.
16. Ying Fang, BS Beijing University, Rice University, CGG Corp.
17. Jeffrey Carter, BS Virginia Tech, Picarro, Inc.
18. Rusty Conner, BA, Trinity University, Intel Corp.
19. Kathryn Brown, BS Cornell College, Los Alamos National Laboratory
20. Brandt C. Pein, BS University of Washington, MIT
21. Christopher M. Berg, BS Lebanon Valley College, Defense Nuclear Facilities Safety Board
22. Yuanxi Fu, BS Nanjing University, Institute for Basic Science, Ulsan Korea
23. William L. Shaw, BS Illinois State University, Lawrence Livermore National Laboratory
24. Yuxiao Sun, BS California Institute of Technology, Epic, Inc.

### **Former postdoctoral associates**

1. Ta-Chau Chang, Ph.D, Iowa State University, Institute for Atomic and Molecular Sciences, Taiwan
2. Taehyoung Zyung, Ph.D, Texas Tech University, Telecommunications Research Institute, Daejeon, Korea
3. Mark Doxtader, Ph.D, University of Pennsylvania, Graphics Technology International Corp.
4. William A. Tolbert, Ph.D, University of Wisconsin, 3M Corporation
5. Xiaoyu Hong, Ph.D, Brown University, SDL Corporation.
6. Sean Kirkpatrick, Ph.D U. Georgia, Naval Research Laboratory
7. David E. Hare, Kansas State University, Lawrence Livermore National Laboratory
8. Guray Tas, Ph.D Brown University, Brown University, Rudolph Technologies
9. Jeffrey R. Hill, Ph.D, University of Iowa
10. J. J. Cavaleri, Ph.D University of Kansas, Los Angeles County Sheriff's Department, Forensic Laboratory
11. John Deak, Ph.D, University of Rochester, Proctor and Gamble Corp.
12. Glennys Mensing, Ph.D, Vanderbilt University (physics), Beckman Institute, University of Illinois
13. Serguei Koulikov, Ph.D, Russian Academy of Sciences, Troitsk, Russia (physics), Informed Diagnostics, Inc.
14. Andrei Pakoulev, Ph.D, Moscow Technical Physics Institute, University of Wisconsin Madison
15. Zhaoyong Sun, Ph.D. Institute of Chemistry, Chinese Academy of Sciences, University of California Davis
16. Yangqiang Yang, Ph.D, Changchun Institute, Chinese Academy of Science (Physics), Dept. of Physics, Harbin Institute of Technology
17. Shufeng Wang, Ph.D. Department of Physics Beijing University, Associate Prof. of Physics, Beijing University.
18. Wentao Huang, PhD, Beijing University, University of Colorado
19. Hyunung Yu, PhD Seoul National University, Korean Institute of Standards and Technology (KIST)
20. Shinsuke Shigeto, PhD Tokyo University, Institute of Molecular Science, College of Science, National Chiao Tung University, Taiwan
21. Mikhail Zamkov, PhD Kansas State University, Assistant Professor of Chemistry, Bowling Green State University
22. S. Eric Surber, PhD University of Arizona, Program Manager, ATK Corp.
24. Selezion Hambir, Ph.D, Michigan State University (chemistry)
25. Zhaohui Wang, Ph.D. Institute of Chemistry, Chinese Academy of Sciences, Professor of Chemistry, Xiamen University
26. Nak-Hyun Seong, PhD Gwang-Ju Institute of Science and Technology, Seoul, S. Korea.

27. Hiroki Fujiwara, PhD Kyoto University, University of Bristol
28. Prabuddha Mukherjee, PhD University of Wisconsin, Materials Research Laboratory University of Illinois.
29. Xianxu Zheng, PhD Institute of Fluid Mechanics, China Academy of Engineering Physics. .
30. Alex Curtis, PhD. Brigham Young University
31. Jue Wang, PhD Princeton University
32. Alexandr Banishev, PhD. Moscow Lomonosov Moscow State University, IPG Photonics, Oxford, MA
33. Shuichi Toyouchi, PhD Tohoku University, Catholic University of Leuven, Belgium.
34. Natalia García Rey, PhD University of Liverpool, University of Muenster

#### **Current Ph.D. students and postdoctoral associates**

1. James Christensen, BS, Utah State University
2. Will P. Bassett, BS, Texas Tech University
3. Mithun Bhomick, PhD Virginia Tech University
4. Zhiwei Men, PhD Jilin University
5. Erin Nissen, BS Colorado Mesa University
6. Alexander Moore, BS Missouri Western State College
7. Xuan Zhou, Ph.D. University of Technology of Troyes, France
8. Sergey Matveev, Ph.D. Bowling Green State University
9. Lawrence Salvati III, BS University of Wisconsin
10. Belinda Johnson, BS Texas Tech University

#### **Consulting activities**

Lasermetrics Corp. Technical consulting on laser design, 1987  
 Rexham Graphics, Inc. Technical consulting on laser ablation imaging, 1990-94.  
 DuPont Corporation. Technical consulting on laser ablation imaging, 1992.  
 Quantum Technology. Technical consulting on new optical materials, 1990-92.  
 Polaroid Corporation. Technical consulting on laser ablation imaging, 1994-5.  
 Presstek Corporation. Technical consulting on laser ablation imaging 1995-present.  
 3M Corporation. Technical consulting on laser ablation, 1995.  
 Abbott Laboratories. Technical consulting on non-imaging applications of lasers in biomedicine, 1997.  
 Markem Corp., Keene, NH. Technical consulting on non-imaging laser manufacturing applications, 1997-present  
 Optodot, Inc., Boston, MA. Technical consulting on ultrafast fiber optic switching applications, 2000-  
 University of Cyprus. External Review of Applied Physics Department Faculty, 2003  
 Haneda Coatings, Inc, Haneda Kibbutz, Israel, Technical consulting on laser ablation imaging, 2003  
 ITRI, Inc., Washington DC. Review of worldwide efforts to simulate detonation of energetic materials, 2003-4  
 MeadWestvaco Corp. Technical consulting on laser photothermal imaging  
 Amster, Rothstein and Ebenstein, Technical consulting on laser photothermal imaging  
 Madico Corp. Technical consulting on laser photothermal imaging  
 National Academies of Sciences, Engineering, and Medicine Intelligence Science and Technology Group

#### **Research interests**

Physical chemistry, chemical physics, materials chemistry and surface and interface chemistry. Ultrafast laser spectroscopy and laser development. Vibrational energy in molecules and materials. Energetic materials, especially nanotechnology energetic materials. High pressure and dynamic shock compression of molecules. Laser-material processes used in high speed imaging. Electrochemical energy generation and storage. Electrochemical surface science.

#### **Patents**

Provisional application 60/327,733, "Jetting behavior in the laser forward transfer of rheological systems"

#### **Past Research Funding**

*University of Illinois Research Board*, 1979, \$14,000  
*American Chemical Society, Petroleum Research Fund*, 1980-81, \$10,000  
*Research Corporation*, 1980, \$15,000

*National Science Foundation*, Division of Materials Research, 1980-83, \$233,300  
*University of Illinois Research Board*, 1983, \$6,150  
*University of Illinois Research Board*, 1984 (With H. Frauenfelder), \$13,200  
*National Science Foundation*, Division of Materials Research, 1984-87, \$315,000  
*University of Illinois Research Board*, 1985, \$20,000.  
*Alfred P. Sloan Foundation*, 1985-86, \$25,000  
*US Army Research Office*, 1986-89, \$242,000  
*National Science Foundation*, Division of Materials Research, 1988-91, \$310,000  
*US Army Research Office*, 1990-92, \$383,950  
*James River Corporation*, 1990, \$15,000  
*Graphics Technology International*, 1991 \$24,000  
*National Science Foundation*, Division of Materials Research, 1991-93, \$343,000  
*US Office of Naval Research*, Biology Division, 1991-1992, \$90,000  
*University of Illinois Research Board*, 1992, \$10,000  
*Graphics Technology International*, 1992 \$15,000  
*US Office of Naval Research*, Biology Division, 1993, \$90,000  
*US Army Research Office*, 1993-1995, \$329,300  
*University of Illinois Research Board*, 1994 \$18,500  
*US Office of Naval Research*, Biology Division, 1994, \$7,000  
*Defense University Research Instrumentation Program (via ARO)*, 1994-1995, \$278,000  
*US Air Force Office of Scientific Research*, 1994-1996, \$441,000  
*National Science Foundation*, Division of Materials Research, 1994-1997, \$357,000  
*US Office of Naval Research*, Biology Division, 1994-1999, \$442,270  
*Presstek Corporation*, 1995-2001, \$503,000  
*US Army Research Office*, AASERT program 1995-98, \$107,000  
*US Army Research Office (for support of 4th Intl. Conf. on Mol. Dyn)*, 1996, \$7,500  
*Office of Naval Research (for support of 4th Intl. Conf. on Mol. Dyn)*, 1996, \$5,000  
*US Army Research Office*, 1996-1999, \$360,000  
*University of Illinois Research Board*, 1997-8, \$30,000.  
*US Air Force Office of Scientific Research*, 1997-1999, \$365,000  
*US Air Force Office of Scientific Research (for support of 5th Intl. Conf. on Mol. Dyn)*, 1997, \$12,000  
*US Office of Naval Research*, (for support of 5th Intl. Conf. on Mol. Dyn), 1997, \$10,000  
*Defense University Research Instrumentation Program (via ARO)*, 1998-9, \$50,700  
*National Science Foundation*, Division of Materials Research, 1998-2000, \$360,000  
*US Army Research Office*, AASERT program 1998-2001, \$107,000  
*University of Illinois Research Board*, 1999-2000, \$10,000  
*Defense University Research Instrumentation Program (via ARO)*, 1999-2000, \$110,000  
*US Department of Energy Seitz MRL*, 1999-2006, \$706,000  
*Defense University Research Instrumentation Program (via ARO)*, 2000-2001, \$80,000  
*Defense University Research Instrumentation Program (via AFOSR)*, 2000-2001, \$99,800  
*US Air Force Office of Scientific Research*, 2000-2003, \$337,000  
*US Air Force Office of Scientific Research*, 2000 (For 6<sup>th</sup> Intl. Conf. on Mol. Dyn), \$15,000  
*US Air Force Office of Scientific Research*, 2000 (For 7<sup>th</sup> Intl. Conf. on Mol. Dyn), \$16,000  
*US Army Research Office*, 2000-2004, \$497,000  
*Defense University Research Instrumentation Program (via ARO)*, 2001-2002, \$102,000  
*Defense University Research Initiative in Nanotechnology (via ARO)*, 2001-2002, \$442,000  
*Optodot Corp.*, 2001, \$12,400.  
*National Science Foundation*, Division of Materials Research, 2001-2004, \$480,000  
*University of Illinois Research Board*, 2002-2003, \$8,500  
*Defense University Research Instrumentation Program (via ARO)*, 2003-2004, \$203,000  
*NNSA DP, Carnegie DOE Alliance Center*. 2003-2009, \$439,262.  
*US Air Force Office of Scientific Research*, 2003-2005, \$502,500  
*Defense University Research Instrumentation Program (via ARO)*, 2004-2005, \$150,000  
*US Air Force Office of Scientific Research* 2005-2008, \$556,000.  
*NSF DMR*, "Ultrafast vibrational dynamics of water and water in confinement", 2005-2008, \$393,000  
*ARO DURIP (instrumentation)*, 2006, \$300,000 (with A. Wieckowski).  
*ARO STIR*, 2009-2010, "What is a shock wave to a molecule", \$50,000

*ARO MURI*, “Nano-engineered energetic materials”, 2004-2010, \$812,500  
NSF, 2008-2010, "Acquisition and development of an ultrafast thermal conductance apparatus for materials research and student training, \$196,000.  
*ARO MURI*, “Insensitive energetic materials”, 2008-2010, \$409,000  
ARO Research Instrumentation, 2010, Acquisition of a 40W pump laser", \$20,500  
ARO Chemistry, 2008-2011, " Femtosecond Broad-Band Sum Frequency Generation Spectroscopy Measurements of Ethanol Fuel Cell Catalysis", \$400,000 (co-PI with A. Wieckowski)  
ARO DURIP, 2010-2011, "Instrumentation for laser generation shock waves", \$84,500  
AFOSR STTR Phase I, 2012, “STTR: Electrochemical conversion of CO<sub>2</sub> and water to syngas”, \$30,000  
ARO, 2010-2013, "Ultrafast dynamics of reactive materials", \$300,000  
*NNSA DP*, Carnegie DOE Alliance Center. 2009-2013, \$416,039.  
NSF DMR, “Molecular vibrational energy with high time and space resolution”, 2009-2013, \$450,000  
ONR DURIP, 2012-2013, “Instrumentation for Fourier-transform surface spectroscopy of energetic materials”, \$200,000.  
*AFOSR*, “Ultrafast dynamics of energetic materials, 2009-2013, \$1,025,000.  
DOE EFRC, 2009-2014, "Center for electrical energy storage: Tailored interfaces", \$700,000  
ONR DURIP, 2013-2014, “Instrumentation to probe the molecular dynamics of shock wave energy dissipation”, \$199,000.  
ARO DURIP, 2013-2014, “Instrumentation for impact initiation of reactive materials”, 105,000.  
ONR, 2011-2015, “Spontaneous energy concentration in energetic molecules, interfaces and composites: response to ultrasound and THz radiation”, \$1,200,000 (with co-PI Ken Suslick).  
*AFOSR STTR* Phase II, 2013-2015, “STTR: Electrochemical conversion of CO<sub>2</sub> and water to syngas”, \$120,000 (with Paul Kenis and Richard Masel).  
*DTRA*, 2012-2017, “Ultrafast diagnostics for high-speed impacts with particulate composites”, \$750,000  
*NSF*, “Ultrafast laser spectroelectrochemistry”, 2014-2017, \$462,000  
*ARO DURIP* (equipment acquisition), “Instrumentation for ultrafast optical measurements of shocked reactive materials”, 4/21/2016-4/20/2017, \$160,000  
*AFOSR*, “Ultrafast spectroscopy of shocked materials and shocked energetic materials”, 2014-2017, \$606,000.

#### **Current active research support**

*NNSA DP*, “Carnegie DOE Alliance Center”. 2013-2017, Support for grad students, \$313,516.  
*ONR MURI*, 2012-2018, “ Shock wave energy dissipation (SWED) by mechanochemically-active materials”, Dlott is PI with five co-PIs. \$7,500,000 (Dlott’s allocation is \$1,250,000).  
*ARO*, 2013-2016, “Impact initiation of reactive materials”, \$520,000  
*AFOSR BRI*, “Real-time dynamics of hot spots in microstructured energetic materials: experiments and simulations”, 11/1/2015-10/31/2018, \$1,350,000 (Dlott is PI with Suslick and Vashishta (USC) co-PIs). Dlott allocation is \$600,000.  
*ARO MURI* via NC State University, “Multi-modal Energy Flow at Atomically Engineering Interfaces”, 6/1/2016-5/31/2021, \$942,708.  
Department of Energy/Lawrence Livermore Laboratory, “Hot spot and reaction temperature using dynamic shock microscopy”, 10/1/2017-9/30/2018, \$170,000.

#### **Pending proposals**

*ARO DURIP*, “Laser Instrumentation to Measure Energy Release Dynamics and Reaction Zone Structures From Shocked Energetic Materials”, requested \$208,787.  
NSF CHE, “Water dynamics in extreme states of high pressure and temperature”, requested \$501,000  
DOE CSGB “Chemistry of Extreme Water”, requested \$681,000.  
ARO, “Detonation on a tabletop”, requested \$720,000.  
*AFOSR*, “Watching the microstructure during shock initiation of energetic materials”, requested \$750,000.

**Publications:** Dana D. Dlott

- 1) "A proposed fluorimetric determination of unsaturated iron-binding capacity", Dana D. Dlott, Malcolm Siegel, and Richard Bersohn, *Am. J. Clin. Pathology*, **64**, pp. 217-224 (1975).
- 2) "Experimental determination of the triplet exciton intermolecular interaction matrix element and the exciton-phonon scattering rate in molecular crystals", Dana D. Dlott and M. D. Fayer, *Chem. Phys. Lett.* **41**, pp. 305-310 (1976).
- 3) "Coherent one-dimensional exciton transport and impurity scattering", Dana D. Dlott, M. D. Fayer, and R. D. Wieting, *J. Chem. Phys.* **67**, 3803-3817 (1977).
- 4) "The effects of impurity scattering on trapping of one-dimensional excitons in molecular crystals", Dana D. Dlott, M. D. Fayer, and R. D. Wieting, *Proceedings of Eighth Molecular Crystals Symposium*, Santa Barbara, CA (1977).
- 5) (*invited paper*) "Energy Transport in Molecular Solids: Application of the Picosecond Transient Grating Technique", Dana D. Dlott, M. D. Fayer, J. R. Salcedo, and A. E. Siegman, in *Picosecond Phenomena*, ed. by C. V. Shank, E. P. Ippen, and S. L. Shapiro (New York: Springer Verlag, 1978).
- 6) "Dynamics of energy transport in molecular crystals: The picosecond transient grating technique", J. R. Salcedo, A. E. Siegman, M. D. Fayer and Dana D. Dlott, *Phys. Rev. Lett.* **41**, pp. 131-134 (1978).
- 7) "The effects of impurity scattering and transport topology on trapping in quasi-one-dimensional systems: Application to excitons in molecular crystals", Dana D. Dlott, M. D. Fayer, and R. D. Wieting, *J. Chem. Phys.* **69**, pp. 1996-2011 (1978).
- 8) "Effects of impurity scattering and transport topology on exciton migration and trapping: An experimental study of quasi-one-dimensional molecular crystals," Dana D. Dlott, M. D. Fayer, and R. D. Wieting, *J. Chem. Phys.* **69**, pp. 2752-2762 (1978).
- 9) (*invited paper*) "Amplitude grating effects induced by picosecond-laser-produced acoustic waves", J. R. Salcedo, A. E. Siegman, Dana D. Dlott, and M. D. Fayer *J. Opt. Soc. Am.* (1978).
- 10) "Excited state dynamics in pure molecular crystals: Perylene and the excimer problem", K. A. Nelson, Dana D. Dlott, and M. D. Fayer, *Chem. Phys. Lett.* **64**, pp. 88-93 (1979).
- 11) "Picosecond Dynamics of Energy Transfer in Pure and Mixed Organic Crystals", Dana D. Dlott, Ph.D. Thesis, Stanford University, 1979.
- 12) "Temperature dependent vibrational dephasing in molecular crystals: A picosecond CARS study of naphthalene", C. L. Schosser, E. L. Chronister and Dana D. Dlott, *Chem. Phys. Lett.* **90**, pp. 386-390 (1982).
- 13) "Vibrational spectroscopy of solid state molecular dimers", T. A. Koscic, C. L. Schosser, and Dana D. Dlott, *Chem. Phys. Lett.* **92**, pp. 57-64 (1983).
- 14) "Vibrational energy transfer and localization in disordered solids by picosecond CARS spectroscopy", E. L. Chronister and Dana D. Dlott, *J. Chem. Phys.* **79**, pp. 5286-5291 (1983).
- 15) "Nanosecond flash photolysis study of carbon monoxide binding to  $\beta$ -chain of hemoglobin Zurich", Dana D. Dlott, H. Frauenfelder, P. Langer, H. Roder, and E. E. DiIorio, *Proc. Natl. Acad. Sci. USA*, **80**, pp. 6239-6243 (1983).
- 16) "Long-lived vibrational modes in amino acid crystals probed by picosecond CARS spectroscopy", T. J. Koscic, R. E. Cline, Jr., and Dana D. Dlott, *Chem. Phys. Lett.* **103**, pp. 109-114 (1983).

- 17) "Temperature dependent libron relaxation in naphthalene", C. L. Schosser and Dana D. Dlott, *J. Chem. Phys.* **80**, pp. 1369-1370 (1984).
- 18) "A picosecond CARS study of vibron dynamics in molecular crystals: Temperature dependence of homogeneous and inhomogeneous linewidths", C. L. Schosser and Dana D. Dlott, *J. Chem. Phys.* **80**, pp. 1394-1406 (1984).
- 19) "Picosecond coherent Raman measurements of optical-phonon relaxation in  $\text{LaF}_3:\text{Ce}^{3+}$ ", C. L. Schosser and Dana D. Dlott, *Phys. Rev.* **B30**, pp. 2149-2157 (1984).
- 20) (*invited paper*) "Optical phonon relaxation in molecular crystals using picosecond CARS: Aromatic molecules, amino acids and peptides", R. E. Cline, Jr., E. L. Chronister, T. J. Koscic, C. L. Schosser, and Dana D. Dlott, *Proceedings of the International Conference on Lasers '83*, ed. by R. C. Powell (STS Press, McLean, Va., 1984) pp. 697-703.
- 21) "Picosecond coherent Raman investigation of the relaxation of low frequency modes in amino acids and peptides", T. J. Koscic, R. E. Cline, Jr., and Dana D. Dlott, *J. Chem. Phys.* **81**, pp. 4932-4949 (1984).
- 22) "Vibrational relaxation in isotopically disordered naphthalene crystals", E. L. Chronister, J. R. Hill, and Dana D. Dlott, *J. Lumin.*, **31**, pp. 622-624 (1984).
- 23) (*invited paper*) "Deuterium isotope effect on vibrational dynamics in molecular crystals: Picosecond experiments on variously deuterated naphthalenes", E. L. Chronister, J. R. Hill, and Dana D. Dlott, *J. Chim. Phys.* **82**, pp. 159-168 (1985).
- 24) (*invited paper*) "Picosecond Vibrational Dynamics of Peptides and Proteins", T. J. Koscic, E. L. Chronister, R. E. Cline, Jr., J. R. Hill, and Dana D. Dlott, in *Ultrafast Phenomena IV*, ed. by D. Auston and K. Eisenthal (Springer Verlag, Berlin, 1985) pp. 452-454.
- 25) (*invited paper*) "Picosecond vibrational dynamics of hydrogen bonded solids: phonons and optical damage", J. R. Hill, T. J. Koscic, and Dana D. Dlott, *Springer Ser. Phys.* **4**, pp. 107-111 (1985).
- 26) "Vibrational dynamics of hydrogen bonded solids: Phonons and optical damage", in *Proceedings of the Second International Conference on Unconventional Photoactive Solids*, ed. by H. Scher (Warrensville, Oh. 1985), pp. 27-30.
- 27) "Picosecond nonlinear investigation of accumulated damage in molecular crystals", T. J. Koscic, J. R. Hill, and Dana D. Dlott, *NBS Spec. Pub.* **746**, pp. 146-151 (1985).
- 28) "Ligand binding to heme proteins: The relevance of low temperature data", A. Ansari, E. E. DiIorio, Dana D. Dlott, H. Frauenfelder, I. E. T. Iben, P. Langer, H. Roder, T. B. Sauke, and E. Shyamsunder, *Biochemistry* **25**, pp. 3139-3146 (1986).
- 29) "Phonons, defects and optical damage in crystalline acetanilide", J. R. Hill, T. J. Koscic, and Dana D. Dlott, *Chem. Phys.* **104**, pp. 169-178 (1986).
- 30) (*invited paper*) "Optical phonon dynamics in molecular crystals", Dana D. Dlott, *Ann. Rev. Phys. Chem.* **37**, 157-187 (1986).
- 31) "Picosecond Vibrational Dynamics in Hydrogen Bonded Molecular Crystals by Time-resolved Coherent Raman Spectroscopy", E. L. Chronister and Dana D. Dlott, in *Laser Applications in Chemistry and Biophysics*, ed. by M. A. El-Sayed (Proc. SPIE **V620**, 1986), pp. 97-101.
- 32) "Matrix effect on vibrational relaxation in molecular crystals", J. R. Hill, E. L. Chronister, J. C. Postlewaite, and Dana D. Dlott, *Springer Ser. Phys.* **46**, pp. 482-84 (1986).



- 33) "Chemical reaction in a glassy matrix: Dynamics of ligand binding to protoheme in glycerol:water", J. R. Hill, M. J. Côte, Dana D. Dlott, J. F. Kauffmann, J. D. McDonald, P. J. Steinbach, J. R. Berendzen, and Hans Frauenfelder, Springer Ser. Phys. **46**, pp. 433-35 (1986).
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- 256) "Study of Ethanol Electrooxidation in Alkaline Electrolytes with Isotope Labels and Sum-Frequency Generation", Robert B. Kutz, Björn Braunschweig, Prabuddha Mukherjee, Dana D. Dlott, and Andrzej Wieckowski, J. Phys. Chem. Lett. **2**, pp. 2236-2240 (2011).
- 257) "In Situ Probing of Solid-Electrolyte Interfaces with Nonlinear Coherent Vibrational Spectroscopy", Prabuddha Mukherjee, Alexei Lagutchev and Dana D. Dlott, J. Electrochem. Soc. 159, pp. A244-A252 (2012).

- 258) “Comparing boron and aluminum nanoparticle combustion in Teflon using ultrafast emission spectroscopy”, Rusty W. Conner and Dana D. Dlott, *J. Phys. Chem. C*, 116, pp. 2751-2760 (2012).
- 259) “Solid Electrolyte Interfaces and Interphases in Lithium Batteries: In Situ Studies Using Nonlinear Optical Probes”, Prabuddha Mukherjee, Alexei Lagutchev and Dana D Dlott, *Mater. Res. Soc. Symp. Proc.* vol. **1388** (2012).
- 260) (*invited*) “Experiments Probing Fundamental Mechanisms of Energetic Material Initiation and Ignition”, Christopher M. Berg, Kathryn E. Brown, Rusty W. Conner, Yuanxi Fu, Hiroki Fujiwara, Alexei Lagutchev, William L. Shaw, Xianxu Zheng and Dana D. Dlott, *MRS Online Proceedings Library* vol. 1405.
- 261) “In Situ Spectroscopic Examination of a Low Overpotential Pathway for Carbon Dioxide Conversion to Carbon Monoxide”, Brian A. Rosen, John L. Haan, Prabuddha Mukherjee, Björn Braunschweig, Wei Zhu, Amin Salehi-Khojin, Dana D. Dlott, Richard I. Masel, *J. Phys. Chem. C* 116, pp. 15307-15312 (2012).
- 262) (*invited feature article + cover art*) “Time-resolved spectroscopy of initiation and ignition of flash-heated nanoparticle energetic materials”, Rusty W. Conner and Dana D. Dlott, *J. Phys. Chem. C* 116, pp. 14737-14747.
- 263) (*invited*) “Vibrational energy and molecular thermometers in liquids: Ultrafast IR-Raman spectroscopy”, Brandt C. Pein and Dana D. Dlott, In “Ultrafast Infrared Spectroscopy”, M. D. Fayer, editor (Taylor and Francis, New York, 2013), pp. 269-304. ISBN 978-1-4665-1013-5
- 264) (*invited*) “Vibrational sum-frequency generation spectroscopy of interfacial dynamics”, Christopher M. Berg and Dana D. Dlott, To appear in: **Vibrational Spectroscopy of Electrically-Charged Interfaces**, Editors A. Wieckowski, C. Korzeniewski and B. Braunschweig (Wiley, Hoboken N. J., 2013).
- 265) “Simplified laser-driven flyer plates for shock compression science”, Kathryn E. Brown, William L. Shaw, Xianxu Zheng and Dana D. Dlott, *Rev. Sci. Instrum.* 83, 103901 (2012).
- 266) “Time-resolved emission of dye probes in a shock-compressed polymer”, Kathryn E. Brown, Yuanxi Fu, William L. Shaw and Dana D. Dlott, *J. Appl. Phys.* **112**, 103508 (2012).
- 268) “Unidirectional vibrational energy flow in nitrobenzene”, Brandt C. Pein, Yuxiao Sun and Dana D. Dlott, *J. Phys. Chem. A* 117, pp. 6066-6072 (2013).
- 269) “Shock initiation of nano-Al + Teflon: time-resolved emission studies”, Xianxu Zheng, Alexander D. Curtis, William L. Shaw and Dana D. Dlott, *J. Phys. Chem. C* 117, pp. 4866-4875 (2013).
- 270) “Probing of molecular adsorbates on Au surfaces with large-amplitude temperature jumps,” Christopher M. Berg, Alexei Lagutchev and Dana D. Dlott, *J. Appl. Phys.* 113, 183509 (2013).
- 271) “Three-dimensional spectroscopy of vibrational energy in liquids: nitromethane and acetonitrile”, Yuxiao Sun, Brandt C. Pein and Dana D. Dlott, *J. Phys. Chem. B* 117, pp. 15444-15451 (2013).
- 272) “Controlling vibrational energy flow in liquid alkylbenzenes”, Brandt C. Pein, Yuxiao Sun and Dana D. Dlott, *J. Phys. Chem. B* 117, pp. 10898-10904 (2013).
- 273) “Temperature-dependent dynamic response to flash heating of molecular monolayers on metal surfaces: vibrational energy exchange”, Christopher M. Berg, Yuxiao Sun and Dana D. Dlott, *J. Phys. Chem. B.* 118, pp. 7770-7776 (2014). DOI: 10.1021/jp410728j.
- 274) “Laser-driven flyer plates for shock compression spectroscopy”, William A. Shaw, Alexander D. Curtis, Alexandr A. Banishev and Dana D. Dlott, *Journal of Physics: Conference Series* **500**, 142011 (2014).
- 275) “Using laser-driven flyer plates to study the shock initiation of nanoenergetic materials”, William A. Shaw, Rayon A. Williams, Edward L Dreizin and Dana D Dlott, *Journal of Physics: Conference Series* **500**, 182010 (2014).

- 276) “Dynamics of shocks in laser-launched flyer plates probed by photon Doppler velocimetry”, Alexander D. Curtis, William A. Shaw, Alexandr A. Banishev and Dana D. Dlott, *Journal of Physics: Conference Series* **500**, 192002 (2014).
- 277) “Picosecond dynamics of shock-compressed and flash-heated nanometer thick films of HMX”, Christopher M. Berg, Yuxiao Sun and Dana D. Dlott, *Journal of Physics: Conference Series* **500**, 142004 (2014).
- 278) “Molecular adsorbates under high pressure: a study using surface-enhanced Raman scattering and vibrational sum-frequency generation spectroscopy”, Yuanxi Fu and Dana D. Dlott, *Journal of Physics: Conference Series* **500**, 122004 (2014).
- 279) “Modifying Vibrational Energy Flow in Aromatic Molecules: Effects of Ortho Substitution”, Brandt C. Pein and Dana D. Dlott, *J. Phys. Chem. A* **118**, 965-973 (2014). DOI: 10.1021/jp4120546
- 280) “Hot spots in energetic materials generated by infrared and ultrasound, detected by thermal imaging microscopy”, Mingwei Chen, Sizhu You, Kenneth S. Suslick and Dana D. Dlott. *Rev. Sci. Instrum.* **85**, 023705 (2014).
- 281) “Picosecond dynamics of hydrogen bond rearrangements during phase separation of a triethylamine and water mixture”, Shinji Kajimoto, Nak-Hyun Seong, Hiroshi Fukumura, and Dana D. Dlott, *Photochem. Photobiol.* **13**, pp. 891-897 (2014). doi: 10.1039/c4pp00048j.
- 282) “Ignition of nanocomposite thermites by electric spark and shock wave”, William L. Shaw, Dana D. Dlott, Rayon A. Williams, Edward L. Dreizin, *Propell. Energet., Pyrotech.* **39**, pp. 444-453 (2014).
- 283) “Hot spot generation in energetic materials created by long-wavelength infrared radiation”, Ming-Wei Chen, Sizhu You, Kenneth S. Suslick and Dana D. Dlott, *Appl. Phys. Lett.* **104**, 061907 (2014).
- 284) “Laser-driven flyer plates for shock compression science: launch and target impact probed by photon Doppler velocimetry”, Alexander D. Curtis, Alexandr A. Banishev, William L. Shaw and Dana D. Dlott, *Rev. Sci. Instrum.* **85**, 043908 (2014).
- 285) “Dynamics of polymer response to nanosecond shock compression”, Alexandr A. Banishev, William L. Shaw and Dana D. Dlott, *Appl. Phys. Lett.* **104**, 101914 (2014).
- 286) “Ultrafast pressure-sensitive paint for shock compression spectroscopy”, Alexandr A. Banishev and Dana D. Dlott, *J. Appl. Phys.* **115**, 203515 (2014).
- 287) “Bright emissive core-shell spherical microparticles for shock compression spectroscopy”, James M. Christensen, Alexandr A. Banishev and Dana D. Dlott, *J. Appl. Phys.* **116**, 033513 (2014).
- 288) “Ultrasonic hammer produces hot spots in solids”, Sizhu You, Ming-Wei Chen, Dana D. Dlott and Kenneth S. Suslick, *Nature Commun* **6**, 6581 (2015).
- 289) “Single Molecules Under High Pressure”, Yuanxi Fu and Dana D. Dlott, *J. Phys. Chem. C* **119**, pp. 6373-6381 (2015).
- 290) “Interfacial Processes of a Model Lithium Ion Battery Anode Observed, in situ, with Vibrational Sum-Frequency Generation Spectroscopy” by Bruno G. Nicolau, Natalia Garcia-Rey, Bogdan Dryzhakov, Dana D. Dlott, *J. Phys. Chem. C*, **119**, pp. 10227-10233 (2015).
- 291) “A Structural Transition in an Ionic Liquid Controls CO<sub>2</sub> Electrochemical Reduction”, Natalia Garcia-Rey and Dana D. Dlott, *J. Phys. Chem. C* **119** (36), pp 20892–20899 (2015). DOI: 10.1021/acs.jpcc.5b03397



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- 293) “Emission lifetimes of a fluorescent dye under shock compression,” Wei-long Liu, Will P. Bassett, James M. Christensen and Dana D. Dlott, *J. Phys. Chem. A* 119, pp. 10910-10916 (2015). doi 10.1021/acs.jpca.5b09695.
- 294) “Photophysics of fluorescent probes under shock compression”, Weilong Liu, James M. Christensen, Will P. Bassett and Dana D. Dlott, *AIP Confer. Proc.* (2015), in press.
- 295) “Laser-excited optical emission response of CdTe quantum dot/polymer nanocomposite under shock compression”, Pan Xiao, Zhitao Kang, Alexandr A. Banishev, Jennifer Breidenich, David A. Scripka, James Christensen, Christopher J. Summers, Dana D. Dlott, Naresh N. Thadhani, and Min Zhou. *Appl. Phys. Lett.* 108, 011908 (2015).
- 296) “High-speed laser-launched flyer impacts studied with ultrafast photography and velocimetry,” Alexandr A. Banishev, William L. Shaw, Will P. Bassett and Dana D. Dlott, *Dynamic Behavior of Materials*, 2, pp. 194-206 (2016).
- 297) “High Dynamic Range Emission Measurements of Shocked Energetic Materials: Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)”, Will P. Bassett and Dana D. Dlott, *J. Appl. Phys.* 119, 225103 (2016). <http://dx.doi.org/10.1063/1.4953353>
- 298) “Exploration of CdTe quantum dots as mesoscale pressure sensors using time-resolved shock-compression spectroscopy”, Zhitao Kang, Alexandr A. Banishev, Gyuhyon Lee, David A. Scripka, Jennifer Breidenich, Pan Xiao, James Christensen, Min Zhou, Christopher J. Summers, Dana D. Dlott, and Naresh N. Thadhani, *J. Appl. Phys.* 120, 043107 (2016). <http://dx.doi.org/10.1063/1.4959257>
- 299) “Pressure-Induced Neutral-to-Ionic Transition in Amorphous Organic Materials, Yi Ren, Semin Lee, James M. Christensen, Mark Burgess, Nikolay Plotnikov, Todd J. Martinez, Dana D. Dlott, Jeffrey S. Moore, *Chem. Mater.* 28, pp. 6446-6449 (2016).
- 300) “Shock Initiation of Explosives: Temperature Spikes and Growth Spurts”, Will P. Bassett and Dana D. Dlott. *Appl. Phys. Lett.*, 109, 091903. doi:<http://dx.doi.org/10.1063/1.4961619>
- 301) “Multichannel Emission Spectrometer for High Dynamic Range Optical Pyrometry of Shock-Driven Materials”, Will P. Bassett and Dana D. Dlott, *Rev. Sci. Instrum.* 87, pp. 103107 (2016). doi:<http://dx.doi.org/10.1063/1.4964386>
- 302) “Vibrational Sum-Frequency Generation Study of the CO<sub>2</sub> Electrochemical Reduction at Pt/EMIM-BF<sub>4</sub> Solid/Liquid Interfaces”, Björn Braunschweig, Prabuddha Mukherjee, John L. Haan, and Dana D. Dlott, *J. Electroanal. Chem.* 800C, pp. 144-150 (2017). <https://doi.org/10.1016/j.jelechem.2016.10.035>
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- 305) “Effects of water on low-overpotential CO<sub>2</sub> reduction in ionic liquid studied by vibrational sum-frequency generation spectroscopy”, Natalia García Rey and Dana D. Dlott, *Phys. Chem. Chem. Phys.* 19, pp. 10491-10501 (2017).
- 306) “Time-dependent pressure distribution in microstructured shocked materials using fluorescent probe dyes”, Alexandr Banishev, James M. Christensen and Dana D. Dlott, *AIP Confer. Proc.* 1793, 060010 (4 pages), (2017). doi: 10.1063/1.4971566

- 307) “32-Channel pyrometer with high dynamic range for studies of shocked nanothermites”, Will P. Bassett and Dana D. Dlott, AIP Confer. Proc. **1793**, 060012 (5 pages), (2017). doi: 10.1063/1.4971568.
- 308) “Shock compression dynamics under a microscope”, Dana D. Dlott, AIP Confer. Proc. **1793**, 020001 (9 pages), (2017) doi: 10.1063/1.4971568.
- 309) “Mechanochemistry for Shock Wave Energy Dissipation”, William L. Shaw and Dana D. Dlott, AIP Confer. Proc. 1793, 030026 (4 pages), (2017) doi: 10.1063/1.4971484.
- 310) “Shock wave chemistry in a metal–organic framework”, Z. Su, W. L. Shaw, Y.-R. Miao, S. You, D. D. Dlott, and K. S. Suslick, J. Am. Chem. Soc. **139**, 4619-4622 (2017). doi: 10.1021/jacs.6b12956
- 311) “Shock initiation of explosives: High temperature hot spots explained”, Will P. Bassett, Belinda Johnson, Nitin K. Neelakantan, Kenneth S. Suslick and Dana D. Dlott, Appl. Phys. Lett. 111, 061902 (2017). doi: 10.1063/1.4985593.
- 312) “Shock compression spectroscopy under a microscope”, Dana D. Dlott, Proceedings of International Symposium on Shock Waves, Nagoya, Japan (in press).
- 313) “Studies in shocked nitromethane through high dynamic range spectroscopy”, Mithun Bhowmick, Erin Nissen, Sergey Matveev and Dana D. Dlott, Proceedings of 20th Biennial APS Conference on Shock Compression of Condensed Matter, submitted 2017.
- 314) “High-throughput shock investigation of thin film thermites and thermites in fluoropolymer binder”, Sergey Matveev, Will P. Bassett, Dana D. Dlott, Evyn Lee and Jon-Paul Maria, Proceedings of 20th Biennial APS Conference on Shock Compression of Condensed Matter, submitted 2017.
- 315) “Fabrication and Characterization of thermite reactive nano-laminates”, Evyn lee, Jon-Paul Maria, Sergey Matveev, Dana D. Dlott, Christina Rost, and Patrick Hopkins, Proceedings of 20th Biennial APS Conference on Shock Compression of Condensed Matter, submitted 2017.
- 316) “Shock compression spectroscopy of quantum dots”, James Christensen, Alexandr Banishev and Dana D. Dlott, Proceedings of 20th Biennial APS Conference on Shock Compression of Condensed Matter, submitted 2017.
- 317) “Molecular probing of shocked water”, Erin Nissen and Dana D. Dlott, Proceedings of 20th Biennial APS Conference on Shock Compression of Condensed Matter, submitted 2017.
- 318) “Shock wave energy dissipation by metal-organic framework” Xuan Zhou, Yurun Miao, Kiettipong Banlusan, William Shaw, Alejandro Strachan, Kenneth S. Suslick and Dana D. Dlott, Proceedings of 20th Biennial APS Conference on Shock Compression of Condensed Matter, submitted 2017.
- 319) “Numerical predictions of shock propagation through unreactive and reactive liquids with experiment validation”, Svjetlana Stekovic, Erin Nissen, Mithun Bhowmick, D. Scott Stewart, Dana D. Dlott, Proceedings of 20th Biennial APS Conference on Shock Compression of Condensed Matter, submitted 2017.
- 320) "Molecular Photophysics Under Shock Compression: Ab Initio Nonadiabatic Molecular Dynamics of Rhodamine Dye", Xin Zhou, Linqiu Li, Dana D. Dlott and Oleg Prezhdo, J. Phys. Chem. C (in press) 2018.

**Invited and contributed presentations: Dana D. Dlott**

1. (*invited*) Aerospace Corporation, El Segundo, CA (July '83), "Vibrational relaxation in molecular crystals".
2. (*invited*) Fourth International Conference on Dynamical Processes in the Excited State of Solids, Stanford University, Stanford, CA (July '83), "Picosecond Raman studies of vibrational relaxation in solids".
3. (*invited*) Massachusetts Institute of Technology, Cambridge, MA (October '83), "Vibrational relaxation in amino acids and peptides using picosecond Raman spectroscopy".
4. (*invited*) Columbia University, New York, NY (October '83), "Vibrational relaxation in amino acids and peptides using picosecond Raman spectroscopy".
5. (*invited*) University of Pennsylvania, Philadelphia PA (October '83), "Vibrational relaxation in amino acids and peptides using picosecond Raman spectroscopy".
6. (*invited*) Purdue University, W. Lafayette, IN (October '83), "Vibrational relaxation in amino acids and peptides using picosecond Raman spectroscopy".
7. (*invited*) University of California, Los Angeles, CA (November '83), "Picosecond coherent Raman studies of vibrational relaxation in amino acids and peptides".
8. (*invited*) California Institute of Technology, Pasadena, CA (December '83), "Picosecond coherent Raman studies of vibrational relaxation in amino acids and peptides".
9. (*invited*) University of Oregon, Eugene, OR (December '83), "Picosecond coherent Raman studies of vibrational relaxation in amino acids and peptides".
10. (*invited*) IBM Almaden Research Laboratory, San Jose, CA (December '83), "Vibrational relaxation in molecular crystals".
11. (*invited*) Stanford University, Stanford, CA (December '83), "Vibrational relaxation in amino acids, peptides, and proteins using picosecond Raman spectroscopy".
12. (*invited*) International Conference on Lasers '83, San Francisco, CA (December '83), "Picosecond Raman Studies of Optical Phonon Relaxation".
13. (*invited*) Iowa State University, Ames, IA (January '84), "Vibrational relaxation in proteins, peptides and amino acids".
14. (*invited*) Rutgers University, New Brunswick, NJ (March '84), "Vibrational dynamics of amino acids and peptides studied by picosecond Raman spectroscopy".
15. (*invited*) Fourth Topical Meeting on Ultrafast Phenomena, Monterey, CA (June '84), "Picosecond vibrational dynamics of peptides and proteins".
16. International Conference on Luminescence, 1984, Madison, WI (August '84), "Vibrational relaxation in isotopically disordered naphthalene crystals".
17. (*invited*) Gordon Conference on Vibrational Spectroscopy, Wolfeboro, NH (August '84), "Picosecond coherent Raman studies of vibrational relaxation in solids".
18. (*invited*) Princeton University, Princeton, NJ (September '84), "Vibrational dynamics and optical destruction in solids".

19. (*invited*) International Conference on Time-resolved Vibrational Spectroscopy, Bayreuth, W. Germany (June '85), "Picosecond vibrational dynamics of hydrogen bonded solids: phonons and optical damage".
20. Gordon Conference on Molecular Electronic Spectroscopy, Wolfeboro, NH (August '85), "Phonons, defects and optical damage in crystalline acetanilide".
21. Second International Conference on Unconventional Photoactive Solids, Cleveland, OH (September '85), "Vibrational dynamics of hydrogen bonded solids: phonons and optical damage".
22. (*invited*) Seventeenth Annual Symposium on Optics for High Power Lasers, Boulder, CO (November '85), "Picosecond non-linear investigation of accumulated damage in molecular crystals".
23. (*invited*) University of California, Riverside, CA (January '86), "Vibrational energy flow through solids".
24. (*invited*) West Coast Spectroscopy Association, Asilomar, CA (January '86), "Vibrational dynamics and solid-state explosions".
25. Fifth Topical Meeting on Ultrafast Spectroscopy, Aspen, CO (June '86), "Optical damage in molecular crystals: a solid state explosion".
26. (*invited*) Tenth International Conference on Raman Spectroscopy, Eugene, OR (September '86), "Vibrational relaxation in molecular crystals".
27. (*invited*) Symposium on Laser Spectroscopy of Biological Systems, University of Pennsylvania, Philadelphia, PA (May '87), "Kinetic and dynamic studies of biological systems with high repetition rate tunable lasers".
28. (*invited*) Stanford University (Department of Chemistry), Stanford, CA (January '88), "Ultrafast studies of solid state photochemistry".
29. (*invited*) Stanford University (Department of Applied Physics), Stanford, CA (February '88), "Applications of ultrafast imaging".
30. (*invited*) American Chemical Society National Meeting, Los Angeles, CA (September '88), "Ultrafast heme-ligand kinetics at low temperature".
31. (*invited*) Indiana University, Bloomington, IN (September '88), "Vibrational relaxation in solids".
32. Electrochemical Society National Meeting, Chicago, IL (Oct. '88), "Ultrafast heme-ligand kinetics at low temperature".
33. (*invited*) University of Kansas, Lawrence, KS (November '88), "Vibrational dynamics of solids and surfaces".
34. (*invited*) Kansas State University (Depts. of Chemistry, Engineering and Physics), Manhattan, KS (November '88), "Laser ablation of polymer surfaces".
35. (*invited*) Army Research Office Workshop on Nitramine Propellants and Combustion, Livermore, CA (December '88), "Ultrafast imaging of high-energy processes at polymer surfaces".
36. (*invited*) APS National Meeting, St. Louis, MO (March 89), "Ultrafast dynamics of heme-ligand chemistry".
37. (*invited*) US Army Ballistics Research Lab, Aberdeen Proving Ground, MD (May '89), "Ultrafast response of organic solids to heat, light and shock pulses".

38. *(invited)* National Institutes of Health, Bethesda, MD (May '89), "Ultrafast ligand rebinding to model heme compounds".
39. *(invited)* APS meeting of the Atomic, Molecular and Optical Physics Division, Windsor, Ontario (May '89), "New results in nonlinear optics of solids".
40. *(invited)* Los Alamos National Lab, Los Alamos, NM (June '89), "Ultrafast dynamics of energetic solid materials".
41. *(invited)* James River Corporation, S. Hadley, MA (August '89), "Fundamental mechanisms of laser ablation".
42. *(invited)* DPC '89, The International Conference on Dynamical Processes in Condensed Phases, Athens GA (August '89), "Vibrational heating (and cooling) of large molecules in solids".
43. *(invited)* American Chemical Society, Annual Meeting, Miami, FL (September '89), "There are 3.6 billion billion femtoseconds in an hour: The rebinding of ligands to heme at all times and temperatures".
44. *(invited)* Northwestern University, Evanston, IL (October '89). "Ultrafast dynamics of ultrahot molecular solids".
45. OE/LASE '90 conference, Symposium on Picosecond and Femtosecond Spectroscopy from Laboratory to Real World, Los Angeles, CA (January '90), "Ultrafast microscopy of solids irradiated by giant picosecond pulses".
46. *(invited)* Stanford SCA/FEL workshop on free-electron on laser applications, Stanford, CA (January '90), "Biophysical and materials applications of the SCA/FEL".
47. *(invited)* University of Washington, Seattle, WA (January '90). "Ultrafast dynamics of ultrahot molecular solids".
48. Sixth International Conference on Ultrafast Phenomena, Monterey, CA (May '90). "Ultrafast microscopy of exploding solids".
49. *(invited)* Michigan State University, E. Lansing, MI (May '90), "Ultrafast optics and solid state chemistry".
50. *(invited)* American Chemical Society Fall Symposium on Femtosecond Chemistry, Rochester, NY (October '90), "Vibrational cooling (and heating) of large molecules in solids".
51. *(invited)* Stanford University, High-energy Physics Laboratory (December '90), "Biophysical and materials applications which exploit the unique properties of the Stanford free-electron laser."
52. *(invited)* Princeton/Coherent Symposium on Advanced Applications of Laser Spectroscopy (December '90), "Some novel applications of picosecond spectroscopy".
53. *(invited)* University of Pennsylvania, Materials Research Laboratory (December '90), "Picosecond dynamics of ultrahot solids".
54. *(invited)* American Physical Society Topical Conference on Shock Wave Compression of Condensed Matter, Williamsburg, VA (June '91), "Ultrafast Vibrational Energy Transfer in Molecular Solids".
55. *(invited)* Thirteenth International Free-Electron Laser Conference, Santa Fe, NM (August '91), "Applications of Infrared Free-Electron Lasers: Basic Research on the Dynamics of Molecular Systems".
56. *(invited)* Seventh Interdisciplinary Laser Science Conference, Monterey, CA (September '91), "Ultrafast Microscopy of Laser Surface Ablation and Laser Ablation Transfer".

57. Seventh Interdisciplinary Laser Science Conference, Monterey, CA (September '91), "Dynamics of Ultrahot Molecular Materials: Vibrational Cooling and Multiphonon Up Pumping".
58. *(invited)* Second Symposium on Molecular Reaction Dynamics in Condensed Matter, Newport Beach, CA (Apr. '92), "Applications of Ultrafast Temperature Jump Spectroscopy to Condensed Matter Molecular Dynamics".
59. *(invited)* University of California Santa Cruz, Santa Cruz CA, (Apr. '92) "Applications of Ultrafast Temperature Jump Spectroscopy to Condensed Matter Molecular Dynamics".
60. *(invited)* American Chemical Society National Meeting, San Francisco, CA (Apr. '92), "Ultrafast Microscopy and Ultrafast Calorimetric Studies of Laser Polymer Ablation".
61. *(invited)* DuPont Corporation, Towanda, Pa, (June '92), "Ultrafast Studies of Laser Ablation Transfer Imaging".
62. *(invited)* Third Gordon Research Conference on "Chemistry of Energetic Materials" (June '92), "Ultrafast Molecular Energy Transfer in Shocked and Superheated Materials".
63. Twentieth International Conference on High Speed Photography and Photonics, Vancouver, BC (Sept. '92), "Ultrafast Microscopy and Ultrafast Calorimetry Studies of Laser Polymer Ablation".
64. *(invited)* University of Utah, Salt Lake City, UT, (Nov. '92), "Applications of Ultrafast Temperature Jump Spectroscopy to Condensed Matter Molecular Dynamics".
65. *(invited)* Iowa State University (April '93), "Applications of Ultrafast Temperature Jump Spectroscopy to Condensed Matter Molecular Dynamics".
66. *(invited)* Second International Conference on Laser Ablation, Knoxville, TN (April '93), "Ultrafast Dynamics of Photothermal Laser Ablation".
67. Society for Imaging Science and Technology 46<sup>th</sup> Annual Meeting, Cambridge, MA (May '93), "Dynamics of Laser Ablation Transfer Imaging Investigated by Ultrafast Microscopy and Ultrafast Spectroscopy".
68. American Physical Society Topical Meeting on Shock Waves in Condensed Matter, Colorado Springs, CO (June '93), "Ultrafast Spectroscopy of Temperature and Pressure Jump and Shock Waves in Molecular Materials".
69. JRDC-KUL Joint International Symposium on Spectroscopy and Chemistry in Small Domains, Brussels, Belgium (Aug. '93). "Highly Time- and Space- Resolved Studies of Superfast Image Production using Laser Ablation Transfer".
70. *(invited)* Northwestern University, Evanston, IL (October '93), "Ultrafast Spectroscopy of Shock Wave Induced Chemistry in Solids".
71. *(invited)* University of Illinois, Urbana, IL (November '93), "The Violent World of Solid-State Chemistry: Ultrafast Spectroscopy of Shock Wave Induced Chemistry in Solids".
72. OE/LASE '94 meeting on Biomedical Optics, sponsored by SPIE (January '94), Los Angeles, CA, "Molecular energy transfer in condensed matter studied by ultrafast vibrational spectroscopy".
73. *(invited)* Third International Symposium on Molecular Reaction Dynamics in Condensed Matter (Apr. '94). Salt Lake City, Utah, "Molecular dynamics behind a shock front".

74. *(invited)* International Conference on Processing and Advanced Applications of Lasers (May '94), Palm Coast, Florida, "Fundamental mechanisms of laser ablation transfer imaging".
75. *(invited)*. Polaroid Corporation, Cambridge, MA (June '94), "Ultrafast spectroscopy of laser ablation transfer imaging".
76. *(invited)*. Gordon Conference on Energetic Materials, New Hampton School, New Hampton, NH (June '94), "Picosecond dynamics behind the shock front".
77. *(invited)* Gordon Conference on Vibrational Spectroscopy, Brewster Academy, Wolfeboro, NH (Aug. '94). "Time resolved vibrational spectroscopy of polymer thin film microchemistry".
78. *(invited)* American Chemical Society Annual Meeting, Washington, D. C. (Aug. '94), "Ultrafast temperature jump spectroscopy in solids".
79. *(invited)* First International Free Electron Laser User's Workshop, Stanford CA. (Aug. '94), "Energy transfer in heme proteins".
80. *(invited)* Second International Workshop on Microscopic and Macroscopic Approaches to Detonation, Saint Malo, France (Oct. '94) "Picosecond time-scale dynamics behind the shock front".
81. *(invited)* Louisiana State University, Baton Rouge, LA (Nov. '94), "Chemistry in hot solids: applications to laser materials processing and high explosives".
82. Tenth International Congress on Advances in Imaging Science and Technology, New Orleans, LA (Nov. '94), "Fundamental Mechanisms of Laser Ablation Transfer Imaging".
83. *(invited)* Optical Society Topical Meeting on Modern Spectroscopy of Gases, Liquids and Solids, Santa Fe, NM (Feb. '95), "Vibrational energy flow in solids".
84. *(invited)* Florida State University (March '95), "Time-resolved vibrational spectroscopy of solids, liquids, polymers and biopolymers".
85. *(invited)* Midwest Organic Solid State Chemistry Symposium, Bloomington, IN (June '95), "Ultrafast polymer and solid-state laser microchemistry".
86. *(invited)* Presstek, Inc., Nashua, NH (June '95), "Fundamental mechanisms of laser ablation transfer imaging".
87. *(invited)* US Army Research Laboratory workshop on Micromechanics and Initiation of Energetic Materials, US ARL, Aberdeen, MD (July '95), "Ultrafast spectroscopy of the first nanosecond".
88. APS Topical Meeting on Shock Compression of Condensed Matter, Seattle, WA (Aug. '95), "Ultrafast spectroscopy of the first nanosecond".
89. *(invited)* International Conference on Free-electron Lasers: FEL '95, New York, NY (Aug. '95), "Vibrational dynamics at the active sites of heme proteins".
90. *(invited)* Annual Meeting of Materials Research Society, Boston, MA (Nov. '95). "Ultrafast Dynamics of Shock Waves and Shocked Energetic Materials"
91. Annual Meeting of Materials Research Society, Boston, MA (Nov. '95). "Vibrational Energy Transfer in High Explosives: Nitromethane".
92. 89. *(invited)* University of Texas at Austin, Austin, TX, (Dec. '95), "Ultrafast dynamics of energetic materials".

93. *(invited)* 3M Corporation, Austin, TX, (Dec. '95), "Mechanisms of ultrafast laser ablation transfer imaging".
94. *(invited)* SDL Corporation, San Jose, CA (Mar. '96), "Fundamental mechanisms of laser thermal imaging".
95. *(invited)* Lawrence Livermore Laboratory, Livermore, CA (Mar. '96), "Ultrafast dynamics of shocked energetic materials".
96. *(invited)* Stanford University, Stanford, CA (Mar. '96) "Ultrafast dynamics of shocked solids".
97. *(invited)* American Physics Society Annual Meeting, St. Louis, MO (Mar. '96) "Ultrafast dynamics of shocked solids: the first nanosecond".
98. *(invited)* Department of Mechanical & Industrial Engineering, University of Illinois, Urbana, IL (Apr. '96), "Picosecond dynamics of laser-driven shock waves in solids".
99. *(invited)* Center for Fundamental Materials Research, Tenth Annual Symposium, Michigan State University, East Lansing, MI (Apr. '96), "Picosecond dynamics of laser-driven shock waves in solids".
100. *(invited)* 49th Annual Meeting of Society for Imaging Science and Technology, Minneapolis, MN (May '96), "Fundamental mechanisms of computer to plate imaging".
101. *(invited)* Gordon Conference on Laser Interactions with Materials, Plymouth, NH (June '96) "Ultrafast dynamics of photothermal laser ablation".
102. *(invited)* American Chemical Society National Meeting, Orlando, CA (Aug. '96), "Vibrational echo studies of protein dynamics".
103. Twelfth International Conference on Digital Printing Technologies, San Antonio, TX (Nov. '96), "Ultrafast time resolved studies of computer-to-plate imaging".
104. *(invited)* University of Delaware, Newark, DE (Nov. '96), "Ultrafast infrared spectroscopy of heme protein dynamics".
105. *(invited)* National Institute for Research in Inorganic Materials, Tsukuba, Japan (Jan., '97), "Shock waves in molecular solids: Ultrafast vibrational spectroscopy of the first nanosecond".
106. *(invited)* Kyushu University, Fukuoka, Japan (Jan. '97), "Ultrafast spectroscopy of shock waves in solids".
107. *(invited)* Kyushu University, Fukuoka, Japan (Jan. '97), "Vibrational echo studies of heme protein dynamics".
108. *(invited)* Osaka University, Osaka, Japan (Jan. '97), "Ultrafast spectroscopy of shock waves in solids".
109. *(invited)* American Physical Society National Meeting, Kansas City, MO (Mar. '97), "Vibrational echo studies of protein dynamics".
110. *(invited)* 50th Annual Meeting of the Society for Imaging Science and Technology, Cambridge, MA (May. '97), "Pulse duration dependence for laser photothermal imaging media".
111. *(invited)* Abbott Laboratories, North Chicago, IL (May '97) "Ultrafast imaging with near infrared pulses".
112. *(invited)* US Army Research Office, Research Triangle Park, NC, Annual Chemistry Program Review (June '97), "Ultrashort light pulses and energetic materials".



113. *(invited)* Eighth International Conference on Unconventional Photoactive Systems, Nara, Japan (Aug. '97), "Ultrafast dynamics of shock waves in molecular materials".
114. *(invited)* Joint AIRAPT-16 and HPCJ-38 International Conference on High Pressure Science and Technology, Kyoto, Japan (Aug. '97) "Ultrafast dynamics of shock waves in molecular materials".
115. *(invited)* SSSW'97 Summer School on Shock Waves, 1997, Lake Biwa, Japan (Aug. '97), "The new wave in shock waves".
116. *(invited)* University of Illinois, Department of Chemistry, (Sept. '97), "The new wave in shock waves".
117. *(invited)* Pennsylvania State University, Department of Chemistry, (Oct. '97), "Ultrafast dynamics of shock waves in molecular materials".
118. *(invited)* American Physical Society, Southeastern Regional Meeting (Nov. '97), "Ultrafast dynamics of shock waves in molecular materials".
119. *(invited)* Los Alamos National Laboratory (Nov. '97), "Vibrational echo and shock wave studies of heme protein dynamics".
120. *(invited)* Los Alamos National Laboratory (Nov. '97), "Ultrafast dynamics of shock waves in molecular materials".
121. *(invited)* Kansas State University (Dec. '97), "Ultrafast spectroscopy of molecular materials: the new wave"
122. *(invited)* Markem Corp., Keene, NH (Dec. '97) "Ultrafast imaging using near infrared lasers".
123. *(invited)* Office of Naval Research Workshop on Energetic Materials (Jan. '98), "Ultrafast dynamics of energetic materials".
124. *(invited)* Department of Physics, Washington State University, Pullman, WA (May '98), "Ultrafast spectroscopy of shock waves in molecular materials".
125. *(invited)* Department of Chemistry, University of Washington, Seattle, WA (May '98), "Ultrafast infrared spectroscopy of vibrational relaxation in proteins and simple liquids"
126. *(invited)* Department of Chemistry and Geology, University of Washington, Seattle, WA (May '98), "Ultrafast vibrational spectroscopy of shock waves in molecular materials".
127. *(invited)* 1998 Air Force Office of Scientific Research Molecular Dynamics Conference, Monterey, CA (May '98), "Ultrafast vibrational dynamics in condensed phases".
128. *(invited)* American Chemical Society, National Meeting, Boston, MA (Aug. '98) "Ultrafast Vibrational Echo and Shock Wave Studies of Heme Protein Dynamics".
129. *(invited)* Department of Chemistry, Colorado State University, Ft. Collins, CO (Sept. '98), "Vibrational energy transfer in polyatomic liquids".
130. *(invited)* Department of Chemistry, University of Colorado, Boulder, CO (Sept. '98), "Vibrational energy transfer in polyatomic liquids".
131. *(invited)* Southeast Regional Meeting of American Physical Society, Miami, FL (Nov. '98), "Ultrafast spectroscopy of shock waves in biophysics".
132. *(invited)* Fifth International Conference on Molecular Dynamics in Condensed Phase, Newport Beach, CA (Feb. '99), "Vibrational energy relaxation in polyatomic liquids".

133. *(invited)* DOE Basic Energy Sciences workshop on High-Pressure Research, Washington, D. C. (June '99) "New frontiers for high pressure: fast dynamics and large molecules".
134. *(invited)* 1999 High Energy Density Matter AFOSR Contractor's Meeting, Cocoa Beach, FL (June '99), "Ultrafast dynamics of energetic materials: towards an understanding of impact sensitivity"
135. *(invited)* American Physical Society topical conference on Shock Compression in Condensed Matter, Snowbird Utah (June '99). "Ultrafast dynamics of nanoshocks in molecular materials".
136. *(invited)* International workshop on new models and predictive methods for shock wave/dynamic processes in energetic materials and related solids, University of Maryland, College Park, MD (July '99), "Ultrafast dynamics of energetic materials: towards an understanding of impact sensitivity".
137. *(invited)* Protein dynamics workshop, Telluride, CO (July '99). "Shock wave studies of protein dynamics".
138. *(invited)* American Chemical Society National Meeting, New Orleans, LA (Aug. '99), "Ultrafast two-dimensional vibrational spectroscopy of water".
139. 136. *(invited)* International Laser Science meeting, Santa Clara, CA (Oct. '99), "Ultrafast two-dimensional vibrational spectroscopy of water".
140. *(invited)* Ohio State University, Department of Chemistry, Columbus, OH (Oct. '99), "Two-dimensional vibrational spectroscopy of liquids".
141. *(invited)* Beckman Laser Institute, University of California, Irvine, CA (Oct. '99), "Ultrafast spectroscopy of nanoshocks in biological materials".
142. *(invited)* University of California, Department of Chemistry, Irvine, CA, (Oct. '99) "Two-dimensional vibrational spectroscopy of liquids".
143. *(invited)* Wellman Laboratories of Photomedicine, Massachusetts General Hospital, Boston, MA (Oct. '99), "Ultrafast spectroscopy of nanoshocks in biological materials".
144. *(invited)* Department of Chemistry, University of California Los Angeles (Feb. '00), "Two-dimensional vibrational spectroscopy of liquids".
145. *(invited)* Department of Chemistry, University of California Berkeley (Feb. '00), "Two-dimensional vibrational spectroscopy of liquids".
146. *(invited)* Department of Chemistry, Stanford University (Feb. '00), "Two-dimensional vibrational spectroscopy of liquids".
147. *(invited)* 8<sup>th</sup> International Symposium on Molecular Processes in Small Time and Space Domains, Nara, Japan (Mar. '00), "Ultrafast microscopy of laser surface modification".
148. *(invited)* Department of Chemistry, Toyama University, Toyama, Japan (Mar. '00), "IR-Raman measurements of vibrational relaxation in liquids:"
149. *(invited)* American Physical Society National Meeting, Minneapolis, MN (Mar. '00), "Vibrational relaxation in liquids via two-dimensional vibrational spectroscopy".
150. *(invited)* American Chemical Society National Meeting, San Francisco, CA (Mar. '00), "Ultrafast spectroscopy of nanoshocks in molecular materials".

151. (*invited*), University of Wisconsin, Department of Chemistry, (May '00) "Vibrational relaxation in liquids via 3D vibrational spectroscopy".
152. (*invited*) International Workshop on Warm Dense Matter, Vancouver, BC (May '00), "Ultrafast spectroscopy of laser-driven shocks in molecular materials".
153. (*invited*) Gordon conference on Energetic Materials, New Hampton, NH (July '00), "Real time observation of hot spot formation in energetic materials".
154. American Chemical Society National Meeting, Washington, DC (Aug. '00), "Vibrational energy relaxation in molecular liquids".
155. Air Force Workshop on High Energy Density Matter, Salt Lake City, UT (Oct. '00), "Real-time vibrational spectroscopy of nanostructured energetics".
156. (*invited*) Sixth International Conference on Molecular Reaction Dynamics in Condensed Phases, Laguna Beach, Ca (Feb. '01), "Three dimensional vibrational spectroscopy of molecular liquids".
157. (*invited*) American Physical Society March Meeting, Seattle, WA (Mar. '01), "Three dimensional vibrational spectroscopy of molecular liquids".
158. (*invited*) Department of Chemistry, Case Western Reserve University, Cleveland, OH (Mar. '01), "Ultrafast spectroscopy of shock waves in molecular materials".
159. (*invited, plenary lecture*), 2001 International Conference on Time-resolved Vibrational Spectroscopy, Okazaki, Japan (May 2001), "Ultrafast three dimensional vibrational spectroscopy of vibrational energy relaxation in liquids".
160. (*invited*) DARPA High Energy Density Materials and Nanotechnology Workshop, Washington, DC (Aug. '01), "Engineered nanometric energetic materials".
161. (*invited*) University of Illinois Department of Ceramics, Urbana, IL (Sept. 2001), "Laser photothermal ablation studied by ultrafast microscopy: fundamental mechanisms of ultra low threshold ablation"
162. (*invited*), International Conference on Laser Ablation 2001, Tsukuba, Japan (Oct. 2001), "Laser photothermal ablation studied by ultrafast microscopy: fundamental mechanisms of ultra low threshold ablation"
163. (*invited*) University of Illinois Department of Chemistry, Urbana, IL (Nov. 2001), "Three-dimensional vibrational spectroscopy".
164. American Chemical Society National Meeting, (Mar. 2002), Ultrafast vibrational sum frequency generation spectroscopy of lubricants at moving metal interfaces.
165. (*invited*) Emory University Department of Chemistry, Atlanta, GA (Apr. 2002), "Three-dimensional spectroscopy of vibrational energy transfer in liquids".
166. (*invited*) Georgia Institute of Technology, Department of Chemistry, Atlanta, GA (Apr. 2002), "Three-dimensional spectroscopy of vibrational energy transfer in liquids".
167. (*invited*) Air Force Workshop on High Energy Density Matter, Waltham, MA (May. '02), "Fast vibrational spectroscopy of shock compression and combustion".
168. Gordon Conference on Energetic Materials, Tilton, NH (June '02), "Ultrafast laser spectroscopy of nanoenergetic materials".

169. *(invited)* Gordon Conference on Vibrational Spectroscopy, Newport, RI (July '02), "Three-dimensional spectroscopy of vibrational energy transfer in liquids".
170. *(invited)* Advanced Energetics Technology Exchange, Lawrence Livermore National Laboratory (Sept. '02), Livermore, CA, "Ultrafast spectroscopy of nanoenergetic materials".
171. *(invited)* Columbia University Department of Chemistry, (Sept. '02), New York, NY, "Three dimensional spectroscopy of vibrational energy transfer in liquids".
172. *(invited)* Yale University Department of Chemistry, (Sept. '02), New Haven, CT, "Three dimensional spectroscopy of vibrational energy transfer in liquids".
173. *(invited)* Wayne State University Department of Chemistry (Oct. '02), Detroit, MI, "Three dimensional spectroscopy of vibrational energy transfer in liquids".
174. *(invited)* Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Providence, RI (Oct. '02) "Three-dimensional spectroscopy of vibrational energy transfer in liquids".
175. *(invited)* *Coblentz Award Symposium*, Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Providence, RI (Oct. '02), "Three-dimensional spectroscopy of vibrational energy transfer in liquids".
176. *(invited)* Northwestern University Department of Chemistry (Nov. '02), Evanston, IL, "Three dimensional spectroscopy of vibrational energy transfer in liquids".
177. *(invited)* 2003 Symposium on Nano Materials for Aerospace (Jan '03), Corpus Christi TX, "Ultrafast spectroscopy of nanoenergetic material ignition".
178. *(invited)* Purdue University (Apr. '03). "Three dimensional spectroscopy of vibrational energy transfer in liquids".
179. *(invited)* Argonne National Laboratory, Advanced Photon Source (May '03), "Vibrational sum-frequency generation spectroscopy at high pressure".
180. *(invited)* Molecular Dynamics of Energetic Materials Workshop, International Technology Research Institute, Inc., Laurel, MD (June '03), "Experimental tests and challenges for molecular dynamics of energetic materials".
181. *(invited)* Molecular Dynamics of Energetic Materials Workshop, International Technology Research Institute, Inc., Laurel, MD (June '03), "New ideas and limits for energetic materials".
182. *(invited)* Femtochemistry VI, Paris, France (July '03), "Three dimensional spectroscopy of vibrational energy relaxation in liquids".
183. APS Conference on Shock Compression of Condensed Matter, Portland, OR, (July '03), "Shock compression of molecules with 1.5 angstrom resolution".
184. *(invited)* Gordon Conference on Liquids, New Hampshire (Aug. '03), "Three dimensional spectroscopy of vibrational energy relaxation in liquids".
185. *(invited)* Second Advanced Energetics Technology Exchange Workshop (Sept. '03), Army Research Laboratory, Aberdeen Proving Grounds, Aberdeen, MD., "Ultrafast vibrational spectroscopy of Energetic Materials"
186. *(invited)* Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign (Oct. '03), Ultrafast spectroscopy of nanoenergetic materials".

187. *(invited)* Materials Research Society National Meeting, Boston, MA (Dec. '03), "Ultrafast spectroscopy of laser-initiated nanoenergetic materials".
188. *(invited)* Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA, (Feb. '04), "Ultrafast spectroscopy of shock compression of condensed matter".
189. *(invited)* Department of Chemistry, Boston College, Boston, MA, (Feb. '04), "Ultrafast spectroscopy of shock compression of condensed matter".
190. Seventh International Conference on Molecular Reaction Dynamics in Condensed Matter, Laguna Beach, CA (Mar. '04), "Molecular dynamics with ultrahigh time and space resolution with multidimensional vibrational spectroscopy".
191. *(invited)* Cyber College Distinguished Lecture Series, University of Arkansas at Little Rock, Little Rock, AR (Mar. '04), "Ultrafast spectroscopy of shock compression of condensed matter".
192. *(invited)* CDAC Workshop, Argonne National Laboratory, Argonne, IL (May '04), "Interface molecular dynamics at high dynamic and static pressure".
193. *(invited)* International workshop on "Materials under extreme conditions: experimental validation of atomistic modeling, European Centre for Atomic and Molecular Computations Lyon, France, (May '04), "Shock compression of molecules with picosecond time resolution and angstrom spatial resolution".
194. *(invited)* Gordon Conference on Energetic Materials, Tilton, NH (June '04), "Time and space resolved ultrafast spectroscopy of nanoenergetic materials".
195. *(invited, Keynote address)*, International Conference on Computational & Experimental Engineering and Sciences, Madeira, Portugal, (July '04). "Nanotechnology energetic material dynamics studied with nanometer spatial resolution and picosecond temporal resolution".
196. *(invited)* American Chemical Society National Meeting, Philadelphia, PA (Aug. '04), "Vibrational energy at interfaces".
197. *(invited)* University of Illinois at Urbana-Champaign Department of Chemistry, Urbana, IL (Sept. '04), "Vibrational energy at interfaces".
198. *(invited)* Argonne National Laboratory Chemistry Division, Argonne, IL (Sept. '04), "Vibrational energy at interfaces".
199. *(invited)* Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Providence, RI (Oct. '04) "Ultrafast three-dimensional IR-Raman spectroscopy"
200. *(invited)* Los Alamos National Laboratory, Physics Division (Feb. '05), "Ultrafast nonlinear spectroscopy of molecular shock compression".
201. *(invited)* 2<sup>nd</sup> International Symposium on Interdisciplinary Shock Wave Research, Sendai, Japan (Mar. '05), "Shock compression of molecules with picosecond time and 1.5 angstrom spatial resolution".
202. *(invited, plenary talk)* Sixth International Symposium on Special Topics in Chemical Propulsion, Santiago, Chile (Mar. '05). "Nanotechnology energetic material dynamics studied with nanometer spatial resolution and picosecond temporal resolution".
203. *(invited)* University of Southern California Department of Physics (Apr. '05), "The new wave in shock waves".
204. *(invited)* University of Southern California Department of Chemistry (Apr. '05), "Vibrational energy in molecules and molecular nanostructures".

205. *(invited)* Air Force Office of Scientific Research Molecular Dynamics Conference (May '05), "Vibrational energy with high time and space resolution".
206. *(invited)* Carnegie Defense Alliance Summer School on High Pressure, Argonne National Laboratory (May '05), "Laser-driven shock waves and molecular spectroscopy".
207. *(invited)* American Physical Society Topical Meeting on Shock Compression of Condensed Matter, Baltimore, MD (July '05), "Shock compression spectroscopy with high time and space resolution".
208. *(invited)* Army Research Office MURI Kick-off meeting, Caltech, Pasadena, CA (July '05), "Insensitive energetic materials".
209. *(invited)* Telluride workshop on vibrational dynamics, Telluride, CO (Aug. '05), "Vibrational energy in molecules and molecular nanostructures".
210. 2005 DOE/BES Biomolecular Materials Program Meeting, Warrenton, Virginia (Aug. '05), "Ultrafast nonlinear vibrational spectroscopy of water and water at biological interfaces".
211. *(invited)* USC Topical Meeting on Shock Waves, Los Angeles, CA (Oct. '05), "Impact initiation of energetic materials: a molecular perspective".
212. *(invited)* University of Maryland Department of Chemistry (Oct. '05), "Vibrational energy in molecules and molecular nanostructures".
213. *(invited)* University of Pennsylvania Department of Chemistry (Oct. '05), "Vibrational energy in molecules and molecular nanostructures".
214. *(invited)* Michigan State University Department of Chemistry (Nov. '05), "Vibrational energy in molecules and molecular nanostructures".
215. *(invited)* University of Michigan Department of Chemistry (Nov. '05), "Vibrational energy in molecules and molecular nanostructures".
216. *(invited)* DARPA workshop on Standoff Detection of Improvised Explosive Devices, Chantilly, VA (Nov. '05), "IED detection by nonlinear coherent vibrational spectroscopy" (With Dr. W. G. Clark).
217. *(invited)* US Army Program Review of Nanotechnology Energetic Materials Efforts (MURI review), Aberdeen, MD (Nov. '05), "Fundamental dynamic mechanisms".
218. *(invited)* Materials Research Society Fall Meeting, Boston, MA (Nov. '05), "Ultrafast dynamics of nanotechnology energetic materials".
219. *(invited)* Materials Research Society Fall Meeting, Boston, MA (Nov. '05), "Vibrational energy transfer in reverse micelles".
220. *(invited)* American Physical Society March Meeting, Baltimore, MD (Mar. '06), "Vibrational energy at interfaces: Material transformation dynamics".
221. *(invited)* Auburn University, Auburn, AL (Apr. '06), "Vibrational energy in molecules and molecular nanostructures".
222. *(invited)* Workshop on synergy of 21st century high pressure science and technology, Argonne National Laboratory (May '06), "Surfaces and interfaces at high pressure via nonlinear optics".
223. *(invited)* Carnegie Institute of Washington Geophysical Laboratory, Washington, D. C. (May '06), "Vibrational spectroscopy with high time and space resolution".

224. (invited) Stockholm Discussion Meeting, Local Structure and Molecular Scale Properties of Liquid Water, Stockholm, Sweden (June '06), "Ultrafast IR-Raman measurements of water vibrations".
225. (invited) Gordon conference on Vibrational Spectroscopy, University of New England, Biddeford, ME (July '06), "Vibrational Dynamics With High Time and Space Resolution"
226. (invited) Telluride summer school on vibrational dynamics, Telluride, CO (July '06), "Vibrational energy relaxation in condensed phases".
227. (invited) Telluride summer school on vibrational dynamics, Telluride, CO (July '06), "Vibrational energy in liquids".
228. (invited) Telluride summer school on vibrational dynamics, Telluride, CO (July '06), "Vibrational energy in water".
229. (invited) International Workshop on Time-Resolved Spectroscopy, RIKEN, Wako-shi, Japan (Aug. '06), "Vibrational Dynamics With High Time and Space Resolution"
230. (invited) International Conference on Raman Spectroscopy, Yokohama, Japan, (Aug. '06), "Vibrational Dynamics With High Time and Space Resolution"
231. (invited) Joint Army-Navy-NASA-Air Force Interagency Propulsion Committee Workshop on R&D Required to Implement New Energetic Ingredients in Munitions, Aberdeen, MD (Aug. '06), "Energetic materials: landscapes, surfaces and interfaces".
232. (invited) American Chemical Society National Meeting, San Francisco, CA (Sep. '06), "Ultrafast dynamics of molecules at interfaces under extreme conditions".
233. (invited) Bowling Green State University, Bowling Green, OH (Oct. '06), "Vibrational Dynamics With High Time and Space Resolution".
234. (invited) University of Southern California, Viterbi College of Engineering, Los Angeles, CA (Oct. '06) "Vibrational Dynamics With High Time and Space Resolution".
235. (invited) Army Research Office review of "Nanotechnology Engineered Energetic Materials", (Nov. '06) Army Research Laboratory, Aberdeen, MD, "Fundamental dynamic mechanisms of nanoenergetic material initiation and ignition".
236. 2007 Stewardship Science Academic Alliances Program, (Feb. '07), Carnegie Institute of Washington, Washington, D. C., "Surfaces and interfaces of high explosives probed by nonlinear coherent vibrational spectroscopy".
237. (invited) MIT Seminar on Modern Optics and Spectroscopy, George R. Harrison Spectroscopy Laboratory, (Feb. '07) "Vibrational energy in molecules with high time and space resolution".
238. (invited) American Chemical Society National Meeting, Chicago, IL (Mar. '07), "Infrared-Raman studies of vibrational energy transfer".
239. (invited) Argonne National Laboratory Users' Week, Workshop on *In Situ* Studies of Interfacial Reactivity, Argonne, IL (May '07), "Vibrational Sum-Frequency Generation Studies of Reactivity and Dynamics at Interfaces".
240. (invited) Department of Energy Materials under Extreme Environments Workshop, Bethesda, MD (June '07).

241. *(invited)* American Physical Society Topical Meeting on Shock Compression of Condensed Matter, Hawaii (June '07), "Ultrafast shock wave coherent dissociation and spectroscopy of materials".
242. *(plenary)*. "Town hall meeting: Future directions in dynamic high pressure research", W. J. Nellis and D. Dlott.
243. *(invited)* International Conference on Femtochemistry, "Femto8", Oxford, England (July '07), "Energy transfer at interfaces".
244. *(invited)* Telluride Vibrational Workshop, Aug. 6-10, 2007, Telluride, CO. "Vibrational energy in molecules and interfaces".
245. *(invited)* Army Research Office MURI Insensitive program review, Sept. 25-26, 2007, Aberdeen, MD. "Spectroscopic observation of structures and molecular response at surfaces of energetic materials".
246. *(invited)* University of Toronto, Department of Chemistry, Oct. 9, 2007. "Vibrational energy in molecules and molecular nanostructures".
247. *(invited)* Federation of Analytical Chemistry and Spectroscopy Societies, Oct. 14-18, 2007. "Ultrafast heat flow at interfaces: time, wavelength, distance, temperature".
248. *(invited)* University of Rochester, Department of Chemistry, Nov. 14, 2007, "Vibrational energy in molecules and molecular nanostructures".
249. *(invited)* Army Research Office MURI NEEM review, Sept. 25-26, 2007, Aberdeen, MD. "Ultrafast dynamics of nanoengineered energetic materials".
250. *(invited)* Advanced Energetics Technology Exchange, Jan 21-25, 2008, Ft. Belvoir, VA, "Ultrafast diagnostics of energetic materials".
251. *(invited)* American Physical Society National Meeting, Mar. 10-14, 2008, New Orleans, LA. "Vibrational energy on surfaces: Ultrafast flash-thermal conductance of molecular monolayers".
252. *(invited)* Army Chemistry Coordinating Committee, Mar. 25, 2008, Aberdeen, MD. "STAR Army Science Objectives 2008".
253. *(invited)* Robert Shaw Festschrift, Mar. 26, 2008, Aberdeen, MD. "Robert Shaw".
254. *(invited)* University of California Davis, Department of Chemistry, Apr. 15, 2008, "Vibrational energy in molecules and nanostructures".
255. *(invited)* Air Force Research Laboratory Nanotechnology Initiative, Fairborn, OH, May 2008, "Vibrational Energy in Molecules and Nanoparticles: Applications to Energetic Materials".
256. *(invited)* Air Force Office of Scientific Research, Molecular Dynamics Contractor's Meeting, Vienna, VA, May 2008, "Vibrational energy with high time and space resolution."
257. *(invited)* Transmission of Information and Energy in Nonlinear and Complex Systems 2008, June, 2008, National University of Singapore, "Heat flow from surfaces to molecular adsorbates probed with high time and space resolution".
258. *(invited)* Gordon conference on energetic materials, June 2008, Tilton, NH, "Advanced diagnostics of energetic material dynamics".
259. *(invited)* Telluride workshop on nonlinear optics at surfaces and interfaces, June 2008, "Vibrational energy at interfaces".



260. *(invited)* American Chemical Society National Meeting, Aug. 2008, Philadelphia, PA, "Vibrational energy with high time and space resolution".
261. *(invited)* International Conference on Raman Spectroscopy XXI, Aug. 2008, London, England, "Watching vibrational energy with high time and space resolution".
262. *(invited)* International Conference on Raman Spectroscopy XXI, Aug. 2008, West London, England, "Measuring the distribution of nanoparticle enhancements on a nanoparticle lattice".
263. *(invited)* Columbia University Department of Chemistry, Oct. 2008, "Vibrational energy with high time and space resolution".
264. *(invited)* Army Research Office Review of Insensitive Munitions Multiuniversity Research Initiative, University of Missouri, Jan. 2009, "Spectroscopic observation of structures and molecular response at surfaces of energetic materials"
265. *(invited)* Department of Energy Carnegie Defense Alliance Center Review, Argonne National Laboratory, Feb. 2009, "Vibrational spectroscopy of surfaces at high pressure".
266. *(invited)* Carnegie Defense Alliance Center Winter Workshop, Argonne National Laboratory, Feb. 2009, "Ultrafast spectroscopy and laser-driven shock compression".
267. *(invited)* International Conference on Time Resolved Vibrational Spectroscopy (TRVS), New Hampshire, May 2009, "Vibrational dynamics at interfaces probed by vibrational sum-frequency generation spectroscopy"
268. *(invited)* ACS Colloids and Surface Chemistry Symposium, Columbia University, June 2009, "Vibrational dynamics at interfaces probed by vibrational sum-frequency generation spectroscopy".
269. APS Topical Meeting on Shock Compression in Condensed Matter, Nashville, TN, June 2009, "Ultrafast vibrational spectroscopy of shock compression with molecular resolution: energetic material simulants".
270. *(invited)* Telluride workshop on Vibrational Dynamics, Telluride, CO, July 2009, "Vibrational energy transport in molecules".
271. *(invited)* Pinhead Institute Town Talk, Telluride Conference Center, Telluride, CO, July 2009, "The science of explosions: Blowing things up for fun, profit, war and medicine".
272. *(invited)* Gordon Conference on Vibrational Dynamics at Surfaces, Proctor Academy, Andover, NH, Aug. 2009, "Dynamics at interfaces probed by time-resolved sum-frequency spectroscopy".
273. *(invited)* 21st Century Needs and Challenges of Compression Science Workshop, Santa Fe, NM, Sept. 2009, "Shock compression of molecules with high time and space resolution"
274. *(invited)* Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) annual meeting, Louisville, KY, Oct. 2009. "Vibrational energy in molecules studied with 2D vibrational sum-frequency generation"
275. *(invited)* North Carolina State University, Jan. 2010, "Vibrational energy in materials with high time and space resolution".
276. *(invited)* Army Research Office Review of Nano-engineered energetic materials, Aberdeen, MD, Mar. 2010, "Ultrafast dynamics of NEEMs".
277. *(invited)* American Chemical Society Annual Meeting, San Francisco, CA Mar. 2010, "Vibrational Energy in Molecules with High Time and Space Resolution"

278. *(invited)* Northwestern University Department of Chemistry, Evanston, IL Mar. 2010, "Vibrational Energy with High Time and Space Resolution"
279. NATO Munitions Safety Information Analysis Center (MSIAC) Workshop on Insensitive Energetic Materials, NATO Headquarters, Brussels, Belgium, May 2010, "Molecular mechanisms of insensitive explosives".
280. *(invited)* Molecular Dynamics Contractors' Meeting, Air Force Office of Scientific Research, Chantilly, VA, May 2010, "Time resolved spectroscopy of molecules at interfaces".
281. *(invited)* Army Research Office Symposium on Insensitive Energetic Materials, Aberdeen, MD, June 2010, "Fundamental Processes and Properties of Insensitive Energetic Materials".
282. *(invited, plenary)*, "Vibrational energy in molecules with high time and space resolution", International Conference on Raman Spectroscopy (ICORS X), Boston, MA, Aug. 2010.
283. *(invited)* "The science of explosions: Blowing things up for fun, profit, war and medicine", Countryside Elementary School, Champaign, IL, Oct. 2010.
284. *(invited)* "Ultrafast Dynamics of Impact Chemistry: Initiation to Detonation", Aug. 2010, Joint JSF-IAS Workshop on Interface Physics Singapore August 29-September 5, 2010
285. *(invited)* "Vibrational energy with high time and space resolution", Dec. 2010, Pacificchem, Honolulu, HI.
286. *(invited)* "Shock compression with atomic resolution", Workshop on Dynamic Phenomena, Jan 2011, Austin, TX.
287. *(invited)* "Molecular transformations and energy transfer at interfaces", USC-DOE conference on "Materials for Energy Applications - Experiment, Modeling and Simulations", Mar. 2011, Los Angeles, CA.
288. *(invited)* "Heat and electrons at interfaces", Workshop on Nonlinear Optics and Interfaces, Apr. 2011, Erlangen, Germany.
289. *(invited)* Air Force Office of Scientific Research Molecular Dynamics Meeting, Pasadena, CA, May 2011, "Nonlinear coherent vibrational spectroscopy in electrochemical surface science and electrocatalysis"
290. *(invited)* Studium Conference on in situ molecular spectroscopic technique and application, Orleans, France, June 2011, "In situ probing by time-resolved vibrational spectroscopy: shocked materials and energy storage media"
291. *(invited)* American Chemical Society National Meeting, Denver, CO Aug. 2011, "Interfaces under extreme conditions"
292. *(invited)*, Federation of analytical chemistry and spectroscopy (FACSS) national meeting, Reno, NV, Oct. 2011, "Three dimensional vibrational spectroscopy of molecular energy".
293. *(invited)* "Interfaces under extreme conditions", Oct. 2011, Rice University Department of Chemistry
294. *(invited)* "Ultrafast shock compression spectroscopy", Oct. 2011, Carnegie Defense Alliance Annual Review, Argonne National Laboratory.
295. *(invited)* Materials Research Society National Meeting, Boston, MA Nov. 2011, "Experiments Probing Fundamental Mechanisms of Energetic Material Initiation and Ignition"
296. Materials Research Society National Meeting, Boston, MA Nov. 2011, "Solid Electrolyte Interfaces and Interphases in Lithium Batteries: In Situ Studies Using Nonlinear Optical Probes".

297. *(invited)* “Interfaces under extreme conditions”, National Chiao Tung University Department of Chemistry, Hsinchu, Republic of China, Feb. 2012.
298. *(invited)* “Nonlinear coherent vibrational spectroscopy of electrochemistry”, Xiamen University Department of Chemistry, Xiamen, P. R. China, Feb. 2012.
299. *(invited)* “Lithium-ion battery SEI formation using nonlinear coherent IR spectroscopy”, The Electrochemical Society National Meeting, Seattle, WA, May, 2012.
300. *(invited)* “Spontaneous energy concentration in energetic molecules, interfaces and composites: response to ultrasound and THz radiation”, Office of Naval Research Program Review, Basic Research - Sciences Addressing Asymmetric Explosive Threats, Arlington, VA May 21, 2012.
301. *(invited)* “Experiments probing initiation and ignition of energetic materials”, International Center for Applied Computational Mechanics (ICACM) symposium New York, NY June 11-13 2012.
302. *(invited)* “Shock physics for dummies!”, Gordon Conference on Energetic Materials, W. Dover, VT, June 2012.
303. *(invited)* “Overview of Shock Wave Energy Dissipation” and “Diagnostics for Shock Wave Energy Dissipation on the nanoscale”, Office of Naval Research, Multiuniversity Research Initiative for Shock Wave Energy Dissipation, Arlington, VA July 30, 2012.
304. *(invited)* “Nonlinear coherent vibrational spectroscopy of electrochemical transformations”, American Chemical Society National Meeting, Philadelphia, PA, Aug. 2012.
305. *(invited)* “Molecular dynamics of explosives” Department of Chemistry, Colorado State University, Ft. Collins, CO, Oct. 2012.
306. *(invited)* “Probing molecular dynamics and transformations at metal-organic interfaces”, University of Colorado, Boulder, CO, Oct. 2012.
307. *(invited)* “Laser-driven flyer plates for shock compression spectroscopy”, International Symposium on Pulsed Power Applications, Kumamoto University, Kumamoto, Japan, Mar. 2013
308. *(invited)* “Ultrafast spectroscopy of molecules at metal surfaces”, University of Florida, Department of Chemical Engineering, Gainesville, FL, Mar. 2013.
309. *(invited)* “Laser-driven flyer plates for shock wave spectroscopy”, Los Alamos National Laboratory, May 2013.
310. *(invited)* “Shock wave energy dissipation”. ONR MURI Review, Arlington, VA, June, 2013.
311. “Laser-driven flyer plates for shock wave spectroscopy”, APS SCCM Meeting, Seattle, WA, July 2013
312. *(invited)* “Ultrafast diagnostics for particulate composites”, DTRA review, Springfield, VA. July 2013
313. *(invited)* “Ultrafast vibrational spectroscopy of energy flow in molecules”, CECAM Workshop on Nanophonics, Bremen, Germany, Aug. 2013
314. *(invited)* “Vibrational energy transfer on surfaces and in liquids”. ACS National Meeting, Indianapolis, IN Sept. 2013.
315. *(invited)* “Laser spectroscopy of molecules with static and dynamic compression”. Carnegie Defense Alliance Center Year 10 Review, Argonne National Laboratory, Sept. 2013.

316. (*invited*) "Molecular dynamics of explosives," Rochester Institute of Technology, Department of Chemistry and Materials Science, Rochester, NY, Oct. 2013
317. (*invited*) "Ultrafast vibrational spectroscopy of shocked energetic materials". AFOSR Dynamic Materials and Interactions Portfolio Review, Arlington, VA, Oct. 2013.
318. (*invited*) "SFG studies of buried electrochemical interfaces," ACS National Meeting, Dallas, TX, Mar. 2014.
319. "Probing dynamic material interfaces using nonlinear coherent vibrational spectroscopy", AFOSR Dynamic Interfaces Workshop, Arlington, VA, Mar. 2014.
320. "Probing shocked microstructured energetic materials", AFOSR Dynamic Interfaces Workshop, Arlington, VA, Mar. 2014.
321. (*invited*) "Vibrational energy transfer on surfaces and in liquids, MIT Modern Optics and Spectroscopy Seminar, Apr. 2014.
322. (*invited*) "Shock wave energy dissipation, ONR SWED MURI review, Arlington, VA, June 2014.
323. (*invited*) "Shock wave energy dissipation, Office of Secretary of Defense 2014 MURI Program Review, Arlington, VA, July 2014.
324. (*invited*) "Ultrafast diagnostics for high-speed impacts with particulate composites", DTRA program review, Springfield, VA, July 2014
325. (*invited*) "Vibrational spectroscopy in extreme environments: Watching stressed-out molecules", Gordon Conference on Vibrational Spectroscopy, Biddeford, ME, Aug. 2014.
326. (*invited*) "Time-resolved spectroscopy of shocked energetic materials", Triservice Energetic Materials Basic Science Review, Arlington, VA, Sept. 2014.
327. (*invited*) "Molecular dynamics of explosions", Departments of Chemistry and Physics, Indiana State University, Terre Haute, IN, Sept. 2014.
328. (*invited*) "Spectroscopy of materials under extreme conditions", Department of Chemistry, Johns Hopkins University, Baltimore, MD, Oct. 2014.
329. (*invited named lectureship*) "Materials chemistry under extreme conditions", Bryce Crawford Lecture, Department of Chemistry, University of Minnesota, Minneapolis, MN, Apr. 2015.
330. (*invited*) "Time-resolved spectroscopy of shock-compressed materials", AFOSR Molecular Dynamics and Theoretical Chemistry contractors' meeting, Albuquerque, NM, May 2015
331. (*plenary*), "Shock compression dynamics under a microscope), APS Biennial Conference on Shock Compression of Condensed Matter, Tampa, FL, June 2015.
332. "Nonlinear vibrational spectroscopy of electrochemical energy conversion and storage," International Conference on Time-Resolved Vibrational Spectroscopy (TRVS), Madison, WI, June 2015.
333. (*invited*) "Ultrafast diagnostics for high-speed impacts with particulate composites", DTRA program review, Springfield, VA, July 2014
334. (*invited*) "Nonlinear coherent vibrational spectroscopy of electrified interfaces", ACS National Meeting, Boston, MA, Aug. 2015.

335. *(invited)*, “Real-time shock compression in microstructured materials”, AFOSR Dynamic Material Interfaces Program Review, Pensacola, FL, Aug. 2015.
336. *(invited)*, “Shock compression spectroscopy under a microscope”, Carnegie Defense Alliance NNSA program review, Argonne National Lab, Dec. 2015.
337. *(invited)*, “Shock compression spectroscopy under a microscope”, Air Force Research Laboratory, Dayton, OH, Mar. 2016.
338. “Ultrafast Spectroelectrochemistry”, ACS National Meeting, San Diego, CA, Mar. 2016.
339. *(invited)* “Shock initiation of energetic materials under a microscope”, Gordon Conference Energetic Materials, Stowe, VT. June 5-10, 2016.
340. Shock Wave Energy Dissipation MURI annual review, Arlington, VA, June 2016.
341. *(invited)* “Spectroelectrochemistry and Ultrafast Spectroelectrochemistry”, Telluride Workshop on Nonlinear Optics at Interfaces, Telluride, CO, June 2016.
342. *(invited)*, “Ultrafast diagnostics for high-speed impacts with particulate composites” July 18-22, DTRA Annual Contractors’ Meeting in Springfield, VA, July 2016
343. *(invited)* “Real-time dynamics of hot spots in microstructured energetic materials: experiments and simulations”, Triservice Energetic Materials Basic Science Program Review, Arlington, VA, Aug. 2016.
344. *(invited)* “Fundamental mechanisms of impact initiation of reactive materials”, Triservice Energetic Materials Basic Science Program Review, Arlington, VA, Aug. 2016.
345. *(invited)*, “Nonlinear coherent laser spectroscopy of electrochemical processes“, International Conference on Energy Conversion & Storage, Friday Harbor, Washington Sept. 7-9 (2016).
346. *(invited)*, “Chemistry under extreme conditions: shock compression spectroscopy under a microscope”, Indiana University Department of Chemistry, Apr 2017.
347. *(invited)* “Shock wave spectroscopy of energetic materials under a microscope”, Sandia National Laboratory, May 2017.
348. *(Plenary)* “Shock wave spectroscopy under a microscope”, International Shock Wave Symposium Workshop, Nagoya, Japan, July 2017.
349. *(invited)* “Ultrafast diagnostics for high-speed impacts with particulate composites”, DTRA program review, Tysons Corner, VA, July 2017
350. *(invited)* “Shock compression spectroscopy under a microscope” Center for High Pressure Science and Technology Advanced Research (HPSTAR), Shanghai, China, Oct. 2017.
351. *(invited)* “Shock compression spectroscopy under a microscope part II: Energetic materials” Center for High Pressure Science and Technology Advanced Research (HPSTAR), Shanghai, China, Oct. 2017.
352. *(plenary)* “Shock compression spectroscopy under a microscope”, International Workshop on Intensive Loading and Its Effects, Beijing China, December 8-10, 2017.
353. *(invited)* “Shock compression spectroscopy under a microscope”, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Orlando, FL February 2018.
354. *(invited)* “Shock compression spectroscopy under a microscope”, Lawrence Livermore National Laboratory, Livermore, CA. March 2018.

Upcoming:

*(invited)* ACS National Meeting, New Orleans, LA Mar. 2018

*(invited)* Mach Conference, Annapolis, MD, Apr. 2018.