Curriculum Vitae

Charles Albert Schmuttenmaer

Address

Department of Chemistry
Yale University
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Research Interests

Laser spectroscopy; THz spectroscopy; sub-ps time-resolved photoconductivity; nanoscale properties and phenomena; electron transfer, proton transfer, solvation, and energy relaxation in liquids; liquid dynamics; reaction dynamics; nonlinear dynamics.

Education and Experience

B. S., University of Illinois at Urbana-Champaign (with H. S. Gutowsky)	1985
Ph.D., University of California, Berkeley (with R. J. Saykally)	1991
Postdoctoral associate, U of Rochester (with R. J. D. Miller)	1992 – 1994
Assistant Professor, Department of Chemistry, Yale University	1994 – 1998
Associate Professor, Department of Chemistry, Yale University	1998 – 2003
Professor, Department of Chemistry, Yale University	2003 –

Honors and Awards

Graduated Magna Cum Laude with Highest Distinction and University Honors
American Institute of Chemists Award, 1985.
University of California Regents Fellowship, 1985.
University of California Chemistry Fellowship, 1985.
Camille and Henry Dreyfus Foundation New Faculty Award, 1994
Yale University Arthur Greer Memorial Prize, 1996
Recipient of the NSF CAREER Award, 1997
Yale University Junior Faculty Fellowship, Academic year 1997 - 1998
Sloan Research Fellowship, 1999 - 2001

Professional Activities

Member: American Chemical Society; American Physical Society; American Association for the Advancement of Science; Optical Society of America

Co-organizer for the DOE-NIH-NSF Workshop on Opportunities in THz Science, Feb. 12 – 14, 2004

Co-organizer for the THz Workshop to be held at the SPIE annual meeting, August 2 – 6, 2004, Denver, CO.

Publications

57. C. A. Schmuttenmaer, "Exploring Dynamics in the Far-Infrared with Terahertz Spectroscopy." *Chem. Rev.*, **104**, 1759 – 1779 (2004).

56. E. Beaurepaire, G. M. Turner, S. M. Harrel, M. C. Beard, J.-Y. Bigot, and C. A. Schmuttenmaer, "Coherent THz Emission from Ferromagnetic Films Excited by Visible Femtosecond Laser Pulses." *Appl. Phys. Lett.*, **84**, 3465 – 3467 (2004).

55. M. C. Beard, G. M. Turner, J. E. Murphy, O. I. Micic, M. C. Hanna, A. J. Nozik, and C. A. Schmuttenmaer, "Electronic Coupling in InP Nanoparticle Arrays." *Nano Lett.*, **3,** 1695 – 1699, (2003).

54. G. M. Turner, M. C. Beard, and C. A. Schmuttenmaer, "Transient Conductivity in Nanocrystalline TiO_2 Measured with THz Spectroscopy." *Ultrafast Phenomena XIII*, N. Scherer, M. Murnane, R. J. D. Miller, and A. Wiener, Eds., 331 – 333 (Springer-Verlag, Berlin, 2003).

53. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Transient Conductivity in CdSe Quantum Dots Measured Using THz Spectroscopy." *Ultrafast Phenomena XIII*, N. Scherer, M. Murnane, R. J. D. Miller, and A. Wiener, Eds., 298 – 300 (Springer-Verlag, Berlin, 2003).

52. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Exploring Sub-picosecond Dynamics in the Far-Infrared with THz Spectroscopy." *Ultrafast Phenomena XIII*, N. Scherer, M. Murnane, R. J. D. Miller, and A. Wiener, Eds., 407 – 411, (Springer-Verlag, Berlin, 2003).

51. G. M. Turner, M. C. Beard, and C. A. Schmuttenmaer, "Transient Photoconductivity in Dye-Sensitized Nanocrystalline TiO_2 Films as Measured by Time-Resolved THz Spectroscopy." *J. Phys. Chem. B*, **106,** 11716-11719 (2002). Includes cover art

50. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Progress Toward Two-Dimensional Biomedical Imaging with THz Spectroscopy." *Physics in Medicine & Biology*, **47,** 3841-3846 (2002).

49. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Size-Dependent Photoconductivity in CdSe Nanoparticles as Measured by Time-Resolved Terahertz Spectroscopy." *Nano Letters*, **2,** 983-987 (2002).

48. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "THz Spectroscopy." Invited Feature Article *J. Phys. Chem. B*, **106,** 7146-7159 (2002). Includes cover art.

47. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Measuring Intramolecular Charge Transfer via Coherent Generation of THz Pulses." *J. Phys. Chem. A*, **106,** 878-883 (2002).

46. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Low Frequency, Collective Solvent Dynamics Probed with Time-Resolved THz Spectroscopy." In *Liquid Dynamics:*

Experiment, Simulation, and Theory, J. T. Fourkas, Ed., pp 44-57, American Chemical Society: Washington, DC, 2002.

45. C. A. Schmuttenmaer, "A New Method for Measuring Intramolecular Charge Transfer." *Science Progress*, **85,** 175 (2002).

44. D. S. Venables, K. Huang, and C. A. Schmuttenmaer, "Effect of Reverse Micelle Size on the Librational Band of Confined Water and Methanol." *J. Phys. Chem. B* **105,** 9132-9138 (2001).

43. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Sub-Picosecond Carrier Dynamics in Low-Temperature Grown GaAs as Measured by Time-Resolved THz Spectroscopy." *J. Appl. Phys*. **90,** 5915-5923 (2001).

42. M. C. Beard and C. A. Schmuttenmaer, "Using the Finite-Difference Time-Domain Pulse Propagation Method to Simulate Time-Resolved THz Experiments." *J. Chem. Phys.* **114**, 2903-2909 (2001).

41. J. P. Wolf, Y. L. Pan, S. Holler, G. M. Turner, M. C. Beard, C. A. Schmuttenmaer, and R. K. Chang "Ballistic Trajectories of Optical Wavepackets Circulating within Micrometer Size Droplets." *Phys. Rev. A*, **64,** 023808 (2001).

40. D. S. Venables and C. A. Schmuttenmaer, "Spectroscopy and Dynamics of Mixtures of Water with Acetone, Acetonitrile, and Methanol." *J. Chem. Phys.* **113,** 11222-11236 (2000).

39. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Measurement of Electromagnetic Radiation Emitted During Rapid Intramolecular Electron Transfer." *J. Am. Chem. Soc.* **122,** 11541-11542 (2000).

38. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Two-Dimensional Time-Resolved THz Spectroscopy of Solvent Response to Photoexcitation." *Ultrafast Phenomena XII*, T. Elsaesser, S. Mukamel, N. Scherer, and M. Murnane, Eds. (Springer-Verlag, Berlin, 2001).

37. M. C. Beard, G. M. Turner, and C. A. Schmuttenmaer, "Transient Photoconductivity in GaAs as Measured by Time-Resolved THz Spectroscopy." *Phys. Rev. B*. **62,** 15764-15777 (2000).

36. D. S. Venables, A. S. Chiu, and C. A. Schmuttenmaer, "Structure and Dynamics of Nonaqueous Mixtures of Dipolar Liquids. I. Infrared and Far-infrared Spectroscopy," *J. Chem. Phys.* **113,** 3243-3248 (2000).

35. D. S. Venables, and C. A. Schmuttenmaer, "Structure and Dynamics of Nonaqueous Mixtures of Dipolar Liquids. II. Molecular Dynamics Simulations," *J. Chem. Phys.* **113,** 3249-3260 (2000).

34. G. M. Turner, M. C. Beard, D. S. Venables, and C. A. Schmuttenmaer, "A Direct Measurement of Intermolecular Solvation Dynamics Using Time-Resolved THz Spectroscopy (TRTS)." Proc. of the 10^{th} Annual Symposium for the Center for Photoinduced Charge Transfer, L. Rothberg, Ed., p. 223-232, (World Scientific, Singapore, 2000).

33. C. A. Schmuttenmaer, "Vibrational Spectroscopy." A chapter in the *Encyclopedia of Chemical Physics and Physical Chemistry*, J. Moore and N. Spencer, Eds. (Institute of Physics, London, 2001).

32. J. T. Kindt and C. A. Schmuttenmaer, "Theory for Determining the Time-Dependent, Intermolecular, Liquid Response Function Using Time-Resolved THz Pulse Spectroscopy." *J. Chem. Phys.*, **110**, 8589-8596 (1999).

31. D. S. Venables and C. A. Schmuttenmaer, "Time-Resolved THz Studies of Liquid Dynamics." *Ultrafast Phenomena XI*, T. Elsaesser, J. G. Fujimoto, D. Wiersma, and W. Zinth, Eds., pp. 565-567 (Springer-Verlag, Berlin, 1998).

30. D. S. Venables and C. A. Schmuttenmaer, "Far-Infrared Spectra and Associated Dynamics in Acetonitrile - Water Mixtures Measured with Femtosecond THz Pulse Spectroscopy." *J. Chem. Phys.*, **108**, 4935-4944 (1998).

29.* C. C. Miller, S. J. Diol, C. A. Schmuttenmaer, J. Cao, D. A. Mantell, R. J. D. Miller, and Y. Gao, "Reverse Surface Photovoltaic Effects in GaAs Surface Quantum Wells." *J. Phys. D: Appl. Phys.*, **30**, 1416-1420 (1997).

28.* S. J. Diol, C. C. Miller, C. A. Schmuttenmaer, J. Cao, Y. Gao, D. A. Mantell, and R. J. D. Miller, "Photogenerated Hot Electron Dynamics at GaAs (100) Surfaces." *J. Phys. D: Appl. Phys.*, **30**, 1427-1431 (1997).

27. J. T. Kindt and C. A. Schmuttenmaer, "Far-Infrared Absorption Spectra of Water, Ammonia, and Chloroform Calculated from Instantaneous Normal Mode Theory." *J. Chem. Phys.*, **106**, 4389-4400 (1997).

26. J. T. Kindt and C. A. Schmuttenmaer, "Far-Infrared Dielectric Properties of Polar Liquids Probed by Femtosecond THz Pulse Spectroscopy." *J. Phys. Chem.*, **100**, 10373-10379 (1996).

25.* C. A. Schmuttenmaer, C. Cameron Miller, J. Cao, D. A. Mantell, Y. Gao, and R. J. D. Miller, "Femtosecond Time-Resolved Photoemission Study of Hot Electron Relaxation at the GaAs(100) Surface." *Chem. Phys.*, **205**, 91-108 (1996)

24.* M. Aeschlimann, E. Hull, C. A. Schmuttenmaer, J. Cao, Y. Gao, D. A. Mantell, and H. E. Elsayed-Ali, "Time-Resolved Electron Diffraction to Study Photoinduced Molecular Dynamics at Single Crystal Surfaces." SPIE Proceedings, July 1995.

23.* M. Aeschlimann, C. A. Schmuttenmaer, H. E. Elsayed-Ali, R. J. D. Miller, J. Cao, Y. Gao, and D.A. Mantell, "Observation of Surface Enhanced Multiphoton Photoemission from Metal Surfaces in the Short Pulse Limit." *J. Chem. Phys.*, **102**, 8606-8613 (1995).

22.* M. Aeschlimann, E. Hull, J. Cao, C. A. Schmuttenmaer, L. G. Jahn, Y. Gao, H. E. Elsayed-Ali, D. A. Mantell, and M. R. Scheinfein, "A Picosecond Electron Gun for Surface Analysis." *Rev. Sci. Instrumen.*, **66**, 1000-1009 (1995).

21.* C. A. Schmuttenmaer, M. Aeschlimann, H. E. Elsayed-Ali, R. J. D. Miller, D. A. Mantell, J. Cao, and Y. Gao, "Time Resolved Two Photon Photoemission from Cu(100): Energy Dependence of Electron Relaxation." *Phys. Rev. B*, **50**, 8957-8960 (1994).

20.* G. C. M. van der Sanden, P. E. S. Wormer, A. van der Avoird, C. A. Schmuttenmaer, and R. J. Saykally, "Close Coupling Results for Inelastic Collisions of NH_3 and Ar. A Stringent Test of a Spectroscopic Potential." *Chem. Phys. Lett.*, **226**, 22-26 (1994).

19.* C. A. Schmuttenmaer, R. C. Cohen, and R. J. Saykally, "Determination of the Intermolecular Potential Energy Surface for Ar-NH_3." *J. Chem. Phys.*, **101**, 146-173 (1994).

18.* C. A. Schmuttenmaer, J. G. Loeser, and R. J. Saykally, "Vibration-Rotation-Tunneling Spectroscopy of Ar-NH_3." *J. Chem. Phys.*, **101**, 139-145 (1994).

17.* C. A. Schmuttenmaer, M. Aeschlimann, J. Cao, Y. Gao, D. A. Mantell, and R. J. D. Miller, "Femtosecond Photoemission Studies of Electron Relaxation at Cu Surfaces." *Ultrafast Phenomena IX*, A. H. Zewail, G. Mourou, W. Knox, and P. F. Barbara, Eds., May, 1994.

16.* C. A. Schmuttenmaer, M. Aeschlimann, J. W. Herman, R. J. D. Miller, D. A. Mantell, J. Cao, and Y. Gao, "Femtosecond Studies of Carrier Relaxation at Single Crystal Metal Surfaces." in *Laser Techniques for Surface Sciences*, H. L. Dai and S. J. Siebner, Eds., Proceedings of the SPIE, **2125**, 98 (1994).

15.* L. Dore, R. C. Cohen, C. A. Schmuttenmaer, K. L. Busarow, M. J. Elrod, J. G. Loeser, and R. J. Saykally, "Far-Infrared Vibration-Rotation-Tunneling Spectroscopy and Internal Dynamics of Methane-Water: A Prototypical Hydrophobic System." *J. Chem. Phys.*, **100**, 863-876 (1994).

14.* S. J. Donnelly, C. A. Schmuttenmaer, J. Qian, and J. M. Farrar, "Frequency- and Time-Resolved Cluster Photodissociation Dynamics of $Sr^+(NH_3)_n$ and $Sr^+(H_2O)_n$." *J. Chem. Soc. Faraday Trans.*, **89**, 1457-1465 (1993).

13.* C. A. Schmuttenmaer, J. Qian, S. G. Donnelly, M. J. DeLuca, D. L. Varley, L. A. DeLouise, R. J. D. Miller, and J. M. Farrar, "Time Dependence of the Photodissociation of $Sr^+(NH_3)_2$." *J. Phys. Chem.*, **97**, 3077-3080 (1993).

12.* J. G. Loeser, C. A. Schmuttenmaer, R. C. Cohen, M. J. Elrod, D. W. Steyert, R. J. Saykally, R. E. Bumgarner, and G. A. Blake, "Vibration-Rotation-Tunneling Spectroscopy of $(NH_3)_2$." *J. Chem. Phys.*, **97**, 4727-4749 (1992).

11.* C. A. Schmuttenmaer, R. C. Cohen, J. G. Loeser, and R. J. Saykally, "Far-Infrared Vibration-Rotation-Tunneling Spectroscopy of Ar-NH_3: Intermolecular Vibrations and Effective Angular Potential Energy Surface." *J. Chem. Phys.*, **95**, 9-21 (1991).

10,9.* G. A. Blake, K. B. Laughlin, R. C. Cohen, K. L. Busarow, D. H. Gwo, C. A. Schmuttenmaer, D. W. Steyert, and R. J. Saykally, "Tunable Far-Infrared Laser Spectrometers." *Rev. Sci. Instrumen.*, **62**, 1693-1700 (1991) and **62**, 1701-1716 (1991).

8.* C. A. Schmuttenmaer, R. C. Cohen, N. Pugliano, J. R. Heath, A. L. Cooksy, K. L. Busarow, and R. J. Saykally, "Tunable Far-IR Laser Spectroscopy of Jet-Cooled Carbon Clusters: The ν_2 Bending Vibration of C_3." *Science*, **249**, 897-900 (1990).

7.* D. H. Gwo, M. Havenith, K. L. Busarow, R. C. Cohen, C. A. Schmuttenmaer, and R. J. Saykally, "Tunable Far-Infrared Laser Spectroscopy of van der Waals Bonds: The $j_K = 1_0 \leftarrow 0_0$ Σ Bending Vibration of Ar-$^{14}NH_3$." *Mol. Phys.*, **71**, 453 (1990).

6.* R. C. Cohen, K. L. Busarow, C. A. Schmuttenmaer, Y. T. Lee, and R. J. Saykally, "Tunable Far-Infrared Laser Spectroscopy of Ultracold Free Radicals." *Chem. Phys. Lett.*, **164**, 321-324 (1989).

5.* J. R. Heath, A. L. Cooksy, M. H. W. Gruebele, C. A. Schmuttenmaer, and R. J. Saykally, "Diode-Laser Absorption Spectroscopy of Supersonic Carbon Cluster Beams: The ν_3 Spectrum of C_5." *Science*, **244**, 564-566 (1989).

4.* H. S. Gutowsky, T. D. Klots, C. Chuang, J. D. Keen, C. A. Schmuttenmaer, and T. Emilsson, "Rotational Spectra and Structures of the Small Clusters Ar_3-HF and Ar_3-DF." *J. Am. Chem. Soc.*, **109**, 5633-5638 (1987).

3.* H. S. Gutowsky, T. D. Klots, C. Chuang, C. A. Schmuttenmaer, and T. Emilsson, "Rotational Spectra and Structures of the Ar_2-H/DF Trimers." *J. Chem. Phys.*, **86**, 569-576 (1987).

2.* H. S. Gutowsky, T. D. Klots, C. Chuang, J. D. Keen, C. A. Schmuttenmaer, and T. Emilsson, "Rotational Spectra and Structures of Small Clusters: Ar_3-HF and Ar_3-DF." *J. Am. Chem. Soc.*, **107**, 7174 (1985).

1.* H. S. Gutowsky, T. D. Klots, C. Chuang, C. A. Schmuttenmaer, and T. Emilsson, "Rotational Spectrum and structure of the Ar_2-HF Trimer." *J. Chem. Phys.*, **83**, 4817 (1985).

* Work identified with an asterisk indicates that it was not carried out in my labs at Yale.

Invited Talks Given

72. "Learning New Chemistry and Physics with THz Light" Jefferson Lab, Newport News, VA, June 9, 2004.

71. "Transient Photoconductivity in CdSe Nanoparticles and Nanocrystalline TiO_2 as Measured by Time-Resolved Terahertz Spectroscopy" Electrochemical Society National Meeting, San Antonio, May 9 – 14, 2004.

70. "Exploring Dynamics in the Far-Infrared with THz Spectroscopy" National High Magnetic Field Lab, May 6, 2004.

69. "Exploring Dynamics in the Far-Infrared with THz Spectroscopy" Brookhaven National Lab, April 13, 2004.

68. "Terahertz Emission Spectroscopy: From Molecular Monolayers to Magnetic Thin Films" ACS National Meeting, Anaheim, March 28, 2004.

67. "Probing Dynamics in the Far-Infrared with THz Absorption and Emission Spectroscopy" IPCMS, Strasbourg, France, March 8, 2004.

66. "THz Absorption and Emission Spectroscopy: New Insights into Chemistry and Materials" Rensselaer Polytechnic Institute, Center for THz Research, December 5, 2003.

65. "Dynamics in Confined Systems", MRS Meeting, Boston, December 1-5 2003.

64. "THz Emission Spectroscopy: From Magnetic Thin Films to Molecular Monolayers" SUNY Buffalo, Department of Physics, November 18, 2003.

63. "Probing Dynamics in the Far-Infrared with THz Absorption and Emission Spectroscopy" Carnegie Mellon University, Department of Chemistry, October 28, 2003.

62. "Probing Solvent Dynamics with THz Absorption and Emission Spectroscopy" Invited Keynote speaker at IRMMW2003 The 28th Conference on Infrared and Millimeter Waves, Otsu, Japan, September 29 – October 3, 2003.

61. "Conductivity in Disordered Solids: What Can THz Spectroscopy Tell Us?", ACS National Meeting, New York, September 2003.

60. "Conductivity in Nanoparticles and Disordered Solids: What Can THz Spectroscopy Tell Us?", SPIE (Int. Soc. Opt. Eng.) 48th Annual Meeting, San Diego, August 3-8, 2003.

59. "Conductivity in CdSe Quantum Dots and TiO_2 Nanoparticles: What Can THz Spectroscopy Tell Us?", Plenary talk at the 2003 International Conference on MEMS, NANO and Smart Systems (ICMENS 2003), Banff, Alberta, Canada, July 20 - 23, 2003.

58. "Conductivity in CdSe Quantum Dots and TiO_2 Nanoparticles: What Can THz Spectroscopy Tell Us?", Department of Physics, University of Alberta, Edmonton, Alberta, Canada, July 10, 2003.

57. "Probing Dynamics in the Far-Infrared with THz Spectroscopy", Physical Sciences, Inc., Andover, MA, June 9, 2003.

56. "Solvent Influence on Intramolecular Charge Transfer", ACS National Meeting, New Orleans, March 23, 2003.

55. "Exploring Sub-picosecond Dynamics in the Far-Infrared with THz Spectroscopy." Yale University, Department of Chemistry, March 4, 2003.

54. "Exploring Sub-picosecond Dynamics in the Far-Infrared with THz Spectroscopy." University of California, Berkeley, Department of Chemistry, February 25, 2003.

53. "Directly Measuring Charge Transfer Using THz Emission Spectroscopy" University of Toronto, Photonics Research Ontario Symposium, February 5, 2003.

52. "Exploring Sub-picosecond Dynamics in the Far-Infrared with THz Spectroscopy." Texas A&M University, January 21, 2003.

51. "Using THz Spectroscopy to Measure Transient Conductivity in CdSe Quantum Dots and Nanocrystalline TiO_2." University of Colorado, Boulder, November 1, 2002.

50. "Using THz Spectroscopy to Measure Transient Conductivity in CdSe Quantum Dots and Librational Motion of Water Confined Within Reverse Micelles." Colorado State University, Fort Collins, October 31, 2002.

49. "Optical Pump – THz Probe Spectroscopy: New Insights into Chemistry and Materials." Annual ILS/OSA Meeting, Orlando FL, September 29 – October 3, 2002.

48. "The Effect of Environment on the Librational Dynamics of Hydrogen Bonding Liquids." Canadian Society for Chemistry Annual Meeting, Vancouver, British Columbia, Canada, June 1 – 5, 2002.

47. "Exploring Sub-picosecond Dynamics in the Far-Infrared with THz Spectroscopy." Ultrafast Phenomena XIII, Vancouver, British Columbia, Canada, May, 2002.

46. "Optical Pump – THz Probe Spectroscopy: New Insights into Chemistry and Materials." Modern Optics and Spectroscopy series, Harrison Spectroscopy Lab, MIT, April 2, 2002.

45. "Optical Pump – THz Probe Spectroscopy: New Insights into Chemistry and Materials." United Technologies, East Hartford, CT March 26, 2002.

44. "Using THz Spectroscopy to Probe Transient Photoconductivity and Intramolecular Electron Transfer." APS March Meeting, Indianapolis, IN, March 18 – 22, 2002.

43. "Optical Pump – THz Probe Spectroscopy: New Insights into Chemistry and Materials." University of Oregon, Departments of Chemistry, March 11, 2002.

42. "Using THz Spectroscopy to Probe Low-Frequency Intermolecular Motions in Liquids and Intramolecular Electron Transfer." Wesleyan University, Department of Chemistry, October 5, 2001.

41. "THz Spectroscopy: An Idea Whose Time has Come." Emory University and Georgia Tech, Departments of Chemistry, October 1, 2001.

40. "Using Time-Resolved THz Spectroscopy (TRTS) to Probe Transient Photoconductivity in Bulk Materials and Nanoparticles." Department of Physics, State University of New York, Buffalo, September 25, 2001.

39. "Exploring Sub-picosecond Dynamics in the Far-Infrared with THz Spectroscopy." New England Regional Meeting of the American Chemical Society, June 25, 2001.

38. "Time-resolved, frequency-dependent complex photoconductivity in GaAs and LT-GaAs as measured with time-resolved THz spectroscopy (TRTS)." Department of Physics, University of Kaiserslautern, Germany, June 12, 2001.

37. "Femtochemistry – watching molecules in reaction." German-American Frontiers of Science, Bad Homburg, Germany, June 7 - 10, 2001. Sponsored by the National Academy of Sciences and Alexander von Humboldt Foundation.

36. "Using THz spectroscopy to probe liquid dynamics and intramolecular charge transfer." University of Bochum, Germany, Department of Chemistry, June 5, 2001.

35. "Using THz Spectroscopy to Probe Low-Frequency Intermolecular Motions in Liquids and Intramolecular Electron Transfer." Naval Research Labs, March 29 2001.

34. "Using Time-Resolved THz Spectroscopy (TRTS) to Probe Transient Photoconductivity in Nanoparticles." 199th Meeting of the Electrochemical Society, March 25-30, 2001.

33. "Time-resolved, frequency-dependent complex photoconductivity in GaAs and dye-sensitized TiO_2 as measured with time-resolved THz spectroscopy (TRTS)." Yale University, Department of Applied Physics, February 21, 2001.

32. "Using THz Spectroscopy to Probe Low-Frequency Intermolecular Motions in Liquids and Intramolecular Electron Transfer." Rutgers University, February 6, 2001.

31. "Probing Collective, Low Frequency, Intermolecular Solvent Dynamics with Time-Resolved THz Spectroscopy (TRTS)." University of Houston, November 1, 2000.

30. "Using THz Spectroscopy to Probe Transient Photoconductivity and Intramolecular Charge Transfer." Rice University, October 30, 2000.

29. "Intramolecular Charge Transfer, and Transient Photoconductivity in Nanoparticles as Probed by Time-Resolved THz Spectroscopy (TRTS)." Argonne National Laboratory, October 23, 2000.

28. "Probing Low-Frequency Intermolecular Dynamics in Liquids with Time-Resolved THz Spectroscopy (TRTS)." Boston University, October 18, 2000.

27. "Probing Low-Frequency Intermolecular Dynamics in Liquids with Time-Resolved THz Spectroscopy (TRTS)." Boston College, October 17, 2000.

26. "Direct Measurement of Intramolecular Electron Transfer using THz Pulse Generation." Gordon Conference on Electron Transfer, August 13-18, 2000.

25. "Probing Collective, Low Frequency, Intermolecular Solvent Dynamics with Time-Resolved THz Spectroscopy (TRTS)." Gordon Conference on Vibrational Spectroscopy August 6-11, 2000.

24. "Probing Collective, Low Frequency, Intermolecular Solvent Dynamics with Time-Resolved THz Spectroscopy (TRTS)." University of Illinois Urbana-Champaign, Department of Chemistry, April 5, 2000.

23. "Studies of Transient Photoconductivity Using Time-Resolved THz Spectroscopy (TRTS)." University of Toronto, Photonics Research Ontario Symposium, March 8, 2000.

22. "Pushing Ultrafast Spectroscopy to New Regimes: What Can We Do with Sub-Picosecond, Far-Infrared Pulses?" Aerospace Corporation, Los Angeles, February 23, 2000.

21. "Pushing Ultrafast Spectroscopy to New Regimes: What Can We Do with Sub-Picosecond, Far-Infrared Pulses?" University of California, Los Angeles, February 22, 2000.

20. "Pushing Ultrafast Spectroscopy to New Regimes: What Can We Do with Sub-Picosecond, Far-Infrared Pulses?" University of Virginia, February 18, 2000.

19. "Measuring Intermolecular Solvent Dynamics Using Time-Resolved THz Spectroscopy (TRTS)." Michigan State University, Department of Chemistry, February 15, 2000.

18. "Studies of Transient Photoconductivity Using Time-Resolved THz Spectroscopy (TRTS)." Optical Society of America Annual Meeting, September 26 - October 1, 1999.

17. "Measuring Intermolecular Solvent Dynamics Using Time-Resolved THz Spectroscopy (TRTS)." Gordon Conference on Chemistry and Physics of Liquids, Holderness, NH, August 1-6, 1999.

16. "A Direct Measurement of Intermolecular Solvation Dynamics Using Time-Resolved THz Spectroscopy (TRTS)." 10^{th} Annual Symposium of the Center for Photoinduced Charge Transfer, University of Rochester, July 26-29, 1999.

15. "A Direct Measurement of Intermolecular Solvation Dynamics Using Time-Resolved THz Spectroscopy (TRTS)." Brown University, Department of Chemistry, April 8, 1999.

14. "Direct Probing of Low-Frequency Intermolecular Modes in Liquids Using Femtosecond THz Pulse Spectroscopy." American Physical Society Annual March Meeting, Atlanta, GA March 1999.

13. "Pump-Probe Spectroscopy in the Far-Infrared Region of the Spectrum: Intermolecular Solvation Dynamics.", University of Massachusetts, Amherst, October 22, 1998.

12. "A Direct Measurement of Intermolecular Solvation Dynamics Using Femtosecond-THz Pulse Spectroscopy." Duquesne University, Pittsburgh, PA, October 2, 1998.

11. "Time-Resolved THz Studies of Liquid Dynamics." American Physical Society Annual March Meeting, Los Angeles, CA March 19, 1998.

10. "Far-Infrared Studies of Polar Liquids and Their Mixtures Using Femtosecond THz Spectroscopy." Brookhaven National Laboratory, Upton, New York, February 11, 1998.

9. "Progress Toward Time-Resolved THz Studies of Liquid Dynamics." 61st Okazaki Conference, Okazaki, Japan, January 23, 1998.

8. "Using Femtosecond THz Pulse Spectroscopy to Probe Low Frequency Dynamics." Optical Society of America Annual Meeting, October 12-17, 1997.

7. "Far-Infrared Spectroscopy and Associated Dynamics Measured with Femtosecond THz Pulses." Conference on Lasers and Electro-Optics / Quantum Electronics and Laser Science Conference (CLEO/QELS), May 21, 1997.

6. "Femtosecond THz Pulses: A Unique Tool for Far-Infrared Spectroscopy and Dynamics." University of Colorado, Boulder, April 25, 1997.

5. "Far-Infrared Spectroscopy and Associated Dynamics Measured with Femtosecond THz Pulses." Colorado State University, Fort Collins, April 24, 1997.

4. "Femtosecond Time Domain Terahertz Studies of Liquids." Wesleyan University, Department of Physics, November 16, 1995.

3. "Studies of Polar Liquids Using Time Domain THz Pulses." New England Regional Meeting of the American Chemical Society, October 24, 1995.

2. "Femtosecond Time Resolved Photoemission Study of Hot Electron Relaxation at the GaAs(100) Surface." New England Regional Meeting of the American Chemical Society, October 24, 1995.

1. "Femtosecond, Time Resolved, Two Photon Photoemission at Metal and Semiconductor Surfaces." Yale University, Department of Applied Physics, September 23, 1994.

Invited Talks Pending

73. "Learning New Chemistry and Physics with THz Light" National Renewable Energy Laboratory, Golden, CO, July 30, 2004.

74. "Scientific Applications of THz Spectroscopy" SPIE National Meeting, Denver, August 2 – 6, 2004.

75. "Terahertz Emission Spectroscopy: From Molecular Monolayers to Magnetic Thin Films" University of Pennsylvania, Department of Chemistry, September, 2004.

76. "Optical Pump - THz Probe Measurements in Chemistry" ILS/OSA meeting, Rochester, New York, October 10 – 14, 2004.

77. "Probing Condensed Phase Dynamics with THz Spectroscopy" OSA Topical Meeting on Optical Terahertz Science and Technology, Orlando, Florida, March 12 – 14, 2005.

Contributed Talks Given

9. "Conductivity in CdSe Quantum Dots and TiO2 Nanoparticles: What Can THz Spectroscopy Tell Us?" The 28th Conference on Infrared and Millimeter Waves, Otsu, Japan, September 29 – October 3, 2003.

8. "Characterizing Intramolecular Charge Transfer via Terahertz Emission Spectroscopy" THz2003 The 11th IEEE Conference on THz Electronics, Sendai, Japan, September 24 – 26, 2003.

7. "Size dependent photoconductivity in CdSe nanoparticles as measured by time-resolved THz spectroscopy." American Chemical Society Meeting, Boston, MA, August 19 – 23, 2002.

6. "Librational motion of water confined within reverse micelles and in proteins." American Chemical Society Meeting, Boston, MA, August 19 – 23, 2002.

5. "Measurement of Electromagnetic Pulse Emitted during Rapid Intramolecular Electron Transfer." American Physical Society March Meeting, Seattle, WA, March 2001.

4. "Time-resolved, frequency-dependent complex photoconductivity in GaAs and dye-sensitized TiO_2 as measured with time-resolved THz spectroscopy (TRTS)." International THz Workshop (ITW2000), Denmark, September 17 – 19, 2000.

3. "Low Frequency, Collective Solvent Dynamics as Probed with Time-Resolved THz Spectroscopy (TRTS)." ACS National Meeting, Washington D. C., August 20-24, 2000.

2. "Two-dimensional time-resolved THz spectroscopy of solvent response to photoexcitation." Ultrafast Phenomena 2000, Charleston SC, July 9 – 14, 2000.

1. "Time-Resolved THz Studies of Liquid Dynamics." XIth International Conference on Ultrafast Phenomena, Garmisch-Partenkirchen, Germany July 13, 1998.

Pending:

Session Chairing, Conference Organizing, etc.

10. Co-organizer for the DOE-NIH-NSF Workshop on Opportunities in THz Science, Feb.12 – 14, 2004

9. Session Chair for "Conductivity in Liquids and Disordered Solids", ACS National Meeting, New York, September 2003

8. Session Chair for the "Femtochemistry" session at the German-American Frontiers of Science, Bad Homburg, Germany, June 7 - 10, 2001.

7. Session Chair for the "Novel Methods" session at International THz Workshop 2000, September 17 – 19, 2000.

6. Session Chair for the "Dynamics in Liquids" session at Ultrafast Phenomena 2000, July 9 – 14, 2000.

5. Session Chair for the "Ultrafast Lasers in Chemistry" Symposium at the ILS/OSA Annual Meeting, September 26-30, 1999.

4. Session Chair for the "Symposium on the Liquid State: Theory and Experiment" Symposium at the American Physical Society 1999 Annual March Meeting

3. Organizer of the "Aspects of THz Spectroscopy in Chemical Physics" Symposium at the American Physical Society 1998 Annual March Meeting

2. Session Chair for a THz Spectroscopy session at the Optical Society of America Annual Meeting, October 12-17, 1997.

1. Discussion leader for the "New Techniques: THz Spectroscopy" session at the Gordon Conference on Vibrational Spectroscopy, July, 1996.