

Curriculum Vitae

Robert J. Levis
Department of Chemistry
Temple University
Philadelphia, PA 19122

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EDUCATION:

Ph.D., Chemistry, 1988, The Pennsylvania State University
B.A., Chemistry, 1984, La Salle College
Postdoctoral Associate with Professor Stephen Leone, 1988-1990, The Joint Institute for
Laboratory Astrophysics, University of Colorado, Boulder

EXPERIENCE:

AWARDS:

1991 National Science Foundation Young Investigator Award
1992 National Institutes of Health Research Career Development Award
1993 American Society for Mass Spectrometry Research Award
1995 Camille Dreyfus Teacher-Scholar Award
1996 Alfred P. Sloan Research Fellow
2002 Wayne State University Teaching Award
2005 Fellow American Physical Society
2007 ACS Philadelphia Section Award

PROFESSIONAL SOCIETY MEMBERSHIPS:

American Chemical Society
American Physical Society

COURSES TAUGHT:

Chemical Kinetics
Quantum Chemistry
Molecular Spectroscopy
Modern Methods of Experimental Chemistry
Reactions at Surfaces
Physical Chemistry
Physical Chemistry Laboratory
Biological Physical Chemistry
Honors General Chemistry II
Chemistry of Wine

FUNDING HISTORY:

Current Funding:

U.S. Army Research Office/ JIEDDO

“Shaped Intense Laser Detection and Surveillance”

12/1/07 - 11/30/2012 Total = \$5,000,000 PI: Robert J. Levis

Office of Naval Research

“Multidimensional Detection of Explosive Devices”

12/1/09 - 11/30/2012 Total = \$900,000 PI: Robert J. Levis

Office of Naval Research

“Picosecond Laser for Stand Off Detection of Explosives”

07/1/10 - 03/14/2011 Total = \$150,000 PI: Robert J. Levis

National Science Foundation

“Strong Field Control of Molecular Processes”

07/1/10 – 06/30/2013 Total = \$445,000 PI: Robert J. Levis

Air Force Office of Scientific Research

“Mathematical Modeling and Experimental Validation of Ultrafast Nonlinear Light-Matter Coupling Associated with Filamentation in Transparent Media”

08/01/10- 07/31/2015 Total = \$399,991 PI: Robert J. Levis

Proposed & Pending Funding:

Joint Improvised Explosive Device Defeat Org.DoD

“Stand-Off Detection of Vehicle Borne Improvised Explosive Devices via Impulsive Raman Analysis”

03/01/2010-02/29/2012 Total = \$991,628 PI: Robert J. Levis

Air Force Office of Scientific Research

“Spatio-Temporal Characterization and Control of Gas Phase Femtosecond Laser-Based Filaments”

03/01/2010-02/2013 Total = \$493,212 PI: Robert J. Levis

Air Force Office of Scientific Research

“Spatial-Spectral Control of Radiation Generated by Dynamics”

08/18/2010-08/17/2015 Total = \$2,500,000 PI: Robert J. Levis

Air Force Office of Scientific Research

“Intense Femtosecond Laser Pulse Interactions with Solid Targets in High pressure Environments: Characterization and Model Development”

09/18/2010-09/17/2015 Total=\$2,500,000 PI: Robert J. Levis

Office of Naval Research

“A Proposal to Purchase a High Energy Femtosecond Duration Laser system for Multi-Dimensional Detection of Explosive Devices”

06/15/2011-06/14/2012 Total=\$329,600 PI: Robert J. Levis

Past Funding:

National Science Foundation

“Strong Field Chemistry”

09/01/05 - 12/31/08 Total = \$405,000 PI: Robert J. Levis

STTR – Army Research Office

“Fast Laser Pulse Shaping for Molecular Control”

10/05/05 – 10/04/08 Total = \$253,386 PI: Robert J. Levis

U.S. Army Research Office

“Laser Pulse Shaping for Remote Detection of Explosives”

12/15/06 - 03/31/08 Total = \$1,000,000 PI: Robert J. Levis

Levis = \$300,000

DARPA (Air Force Office for Scientific Research)

“Photonic Reagents: The Production of cyclic ozone”

12/01/04 – 12/31/07 Total = \$2,500,000 PI: Robert J. Levis

Levis = \$850,000

Army Research Office, MURI Program

“Optimal Quantum Dynamic Discrimination of Chemical and Biological Agents”

12/01/02 - 11/30/07 Total = \$3,375,000 PI: Herschel Rabitz

Levis = \$977,083 CO-PI: Robert J. Levis

National Science Foundation

“Strong Field Chemistry”

8/01/02 - 7/31/05 Total = \$364,500 PI: Robert J. Levis

STTR – Army Research Office

“Fast Laser Pulse Shaping for Molecular Control”

9/01/04 – 8/31/05 Total = \$30,011 PI: Robert J. Levis

Department of Defense DURIP Program

“Laser System for Optimal Quantum Dynamic Discrimination of Chemical and Biological Agents”

4/1/03 - 3/31/04 Total = \$309,000 PI: Robert J. Levis

Department of Defense DURIP Program

“Laser System for Strong Field Control of Chemical Reactivity”

4/1/01 - 3/31/02 Total = \$243,000 PI: Robert J. Levis

National Science Foundation

“Dynamics of Polyatomic Molecules in Intense Laser Fields”

8/15/99 - 5/31/02 Total = \$341,000 PI: Robert J. Levis

Office of Naval Research

“Optimal Control of Chemical Reactivity in the Strong Field Regime”

7/1/00 – 9/30/02 Total = \$400,000 PI: Robert J. Levis (50%)

CO-PI: Herschel Rabitz

National Science Foundation Young Investigator Award

1/1/92 - 12/31/97 Total = \$312,500 PI: Robert J. Levis

Dreyfus Foundation

Camille Dreyfus Teacher-Scholar Award

9/1/95-8/31/99 Total = \$60,000 PI: Robert J. Levis

Sloan Foundation

Alfred P. Sloan Research Fellow

1996-1998 Total = \$35,000 PI: Robert J. Levis

National Institutes of Health

“Laser-Based DNA Sequencing”

9/1/94 - 8/31/96 Total = \$320,000 PI: Robert J. Levis

National Institutes of Health

“Rapid, Low Cost DNA Sequencing by Mass Spectrometry”

9/16/91 - 9/16/94 Total = \$683,000 PI: Robert J. Levis

National Institutes of Health Research Career Development Award

“DNA Sequencing by Laser-Based, Mass Spectral Methods”

6/1/92 - 5/31/97 Total = \$262,440 PI: Robert J. Levis

American Society for Mass Spectrometry Young Mass Spectrometrist Award

“Femtosecond Ionization for TOF-MS of Large Biological Molecules”

7/1/93 - 6/31/94 Total = \$25,000 PI: Robert J. Levis

Office of Naval Research, Air Force Office of Scientific Research (DURIP)

“High Energy Femtosecond Duration Laser System for Multi-Dimensional Detection of Explosive Devices”

6/15/11 – 6/14/2012 Total = \$329,600 PI: Robert J. Levis

LEVIS RESEARCH GROUP:

Graduate Students:

- | | |
|--------------------------------------|----------------------|
| 1. Champagne, Mark (M. 1994) | 15. Matt Coughlan |
| 2. DeWitt, Merrick (Ph.D. 1996) | 16. Ryan Compton |
| 3. Rajan, Jannavi (Ph. D. 1995) | 17. George Heck |
| 4. Szulczewski, Gregory (Ph.D. 1995) | 18. John Brady |
| 5. Velic, Dusan (Ph.D. 1996) | 19. Johanan Odhner |
| 6. Okike, Uchechuku | 20. Beth Judge |
| 7. Richard Billotto (Ph.D. 1999) | 21. Paul Flanigan |
| 8. Gowri Narayanaswami (Ph.D. 1999) | 22. Erin McCole |
| 9. Ravi Amungama (Ph.D. 2001) | 23. Maryam Tarazkar |
| 10. William Faber (M.S. 2001) | 24. Qiong Feng |
| 11. Noel Moore (Ph.D. 2001) | 25. Timothy Bohinski |
| 12. Alexei Markevitch (Ph.D. 2002) | 26. Santosh Karki |
| 13. Getahun Menkir (Ph.D. 2005) | |
| 14. Lalinda Palliyaguru (Ph.D. 2008) | |

Undergraduate Students:

1. Donita Lozada
2. Kuriakos Simon
3. Laine Radell
4. Dan Evenson

Site Reviews

- FOCUS: Frontiers in Optical Coherent and Ultrafast Science Site visit, University of Michigan, Ann Arbor, Michigan, April 2005.
- NSF-Colorado State University, Engineering Research Center for Extreme Ultraviolet Science and Technology, University of Berkeley, CA, May 2008.
- NSF-Colorado State University, Engineering Research Center for Extreme Ultraviolet Science and Technology, University of Colorado, Fort Collins, CO, May 2009.

Committees and Offices

Director, Center for Advanced Photonics Research, 2002 – Present
Chair, Graduate Student Recruiting Committee; 2003–2004
University Tenure & Promotion Committee; 2003–2004, 2004–2005
Interim Department Chairman; 2003 – 2005
Chairman Department of Chemistry 2005-Present
VP Research, Research Postdoctoral Fellows Committee
VP Research, Incentive Grant Review Committee; 2003 – Present

Faculty Search Committee; 2002 – 2005
American Chemical Society Executive Committee, Physical Chemistry Division 2004-2007
U.S. Representative on the Ultrafast Intense Laser Science COAST Program 2004-Present
Organizer, 2005 Pacifichem Symposium on “Chemistry with Ultra Short Intense Laser Pulses: The Next Frontier”
Organizer, Ultrafast, Ultraintense Laser Chemistry, American Physical Society March Meeting 2006
Organizer, “Ultrafast Laser Chemistry and Physics” Temple University, March 2006
Reviewer, “Optical Control of Chemical Reactivity” University of Michigan, October 2010
Reviewer, “High gain Backward Lasing in Air”, Science Magazine, Europe Office, November 2010
Reviewer, Journal of Energetic Materials "Laser Ignitibility of LOVA Propellants", December 2010
Reviewer for the NSF
Reviewer for Science
Reviewer for Nature
Reviewer for Physical Review Letters
Reviewer for the Journal Surface Science
Reviewer for Journal of Chemical Physics
Reviewer for Optics Communications
Reviewer for Chemical Physics
Reviewer for Chemical Physics Letters
Reviewer for International Journal of Mass Spectroscopy
Reviewer for Surface Science
Reviewer for Journal of Physical Chemistry
Reviewer for Analytical Chemistry
Reviewer for Journal of Mass Spectroscopy and Ion Processes

PUBLICATION LIST:

- 1.) Levis, R. J., Jiang, Z. C. Winograd, N., “An Ultrahigh-Vacuum Investigation of the Production of Methanol on Pd{111},” *Proceedings of the VIth International Conference on Secondary Ion Mass Spectrometry*, edited by A. Benninghoven, 1987.
- 2.) Levis, R. J., DeLouise, L. A., Winograd, N., “Influence of Surface Atomic Steps on Site-Selective Adsorption Processes. Ethylidyne Formation on Rh{111} and Rh{331},” *J. Am. Chem. Soc.* 1987 109 6873.
- 3.) Levis, R. J., Jiang, Z. C., Winograd, N., “Evidence for Activation of the C-O Bond of Methanol on Pd{111} after Low Temperature Adsorption,” *J. Am. Chem. Soc.* 1988 110 4431.
- 4.) Levis, R. J., Jiang, Z. C., Akhter, S., White, J. M., Winograd, N., “Methyl Formation from Methanol Decomposition on Pd{111} and Pt{111},” *Catalysis Letters* 1988 1 385.
- 5.) Levis, R. J., Jiang, Z. C., Winograd, N. “The Thermal Decomposition of CH₃OH adsorbed on Pd{111}: a New Reaction Pathway Involving CH₃ Formation,” *J. Am. Chem. Soc.* 1989 111 4605.
- 6.) Cousins, L. M., Levis, R. J., Leone, S. R., “Observation of Translationally Hot, Rotationally Cold NO Molecules Produced by 193 nm Laser Vaporization of Multilayer NO Films,” *J. Phys. Chem.* 1989 93 5325.
- 7.) Cousins, L. M., Levis, R. J., Leone, S. R., “Translation and Internal State Distributions of NO Molecules Produced in the 193 nm Explosive Vaporization of Cryogenic NO films: Rotationally Cold, Translationally Fast NO Molecules,” *J. Chem. Phys.* 1989 91 5731.
- 8.) Levis, R. J., DeLouise, L. A., White, E. J., Winograd, N., “Defect-Induced Surface Chemistry: A Comparison of the Adsorption and Thermal Decomposition of C₂H₄ on Rh{111} and Rh{331},” *Surf. Sci.* 1990 230 35.

- 9.) Levis, R. J., Waltman, C. J., Cousins, L. M., Copeland, R. G., Leone, S. R., "A Hyperthermal (0.1-4 eV) F Atom Beam Source Suitable for Surface Etching Investigations," *J. Vac. Sci. Technol. A.* 1990 8 3118.
- 10.) Levis, R.J., Romano, L.J., "Laser Vaporization of Single-Stranded DNA; A Study of Photoinduced Phosphodiester Bond Cleavage," *J. Am. Chem. Soc.* 1991 113, 7802.
- 11.) Romano, L.J., Levis, R.J., "Nondestructive Laser Vaporization of High Molecular Weight, Single-Stranded DNA," *J. Am. Chem. Soc.* 1991 113 9665.
- 12.) Levis, R.J., Romano, L.J., Rajan, J., Schilke, D., DeWitt, M., "Laser Vaporization and REMPI TOF Detection for DNA Sequencing," *Proceedings of the 1992 Conference on Instrumentation for Time-of-Flight Mass Spectrometry*, Chestnut Ridge, NY, Nov. 1992.
- 13.) Levis, R.J., Romano, L.J., Rajan, J., Schilke, D., DeWitt, M., "High Speed DNA Sequencing in the Gas Phase," *Proceedings of the SPIE Biomedical Optics Society Meeting on Advances in DNA Sequencing*, 1992 1891 102.
- 14.) Levis, R. J., "Laser Vaporization and REMPI TOF Detection for DNA Sequencing," *Proceedings of the 41st ASMS Conference on Mass Spectrometry*, San Francisco, CA June, 1993, 786.
- 15.) Szulczewski, G., Levis, R.J., "A Theory for Determining Surface-Adsorbate Bond Energies from Desorption Threshold Measurements," *J. Chem. Phys.* 1993 5974 98.
- 16.) Szulczewski, G, Levis, R.J., "Nonthermal Surface Chemistry: Collision-Induced Reactions of NH₃ on Pt{111}," *Proceedings of the OE/LASE '94 SPIE Laser Techniques for Surface Science* 1994 2125 252.
- 17.) Schilke, D. and Levis, R.J., "A Laser Desorption, Laser Ionization Time-of-Flight Mass Spectrometer for the Interrogation of Fragile Biomolecules," *Review of Scientific Instruments*, 1994 65 1903.
- 18.) Levis, R.J. "Laser Desorption and Ejection of Biomolecules from the Condensed Phase into the Gas Phase," *Annual Review of Physical Chemistry* 1994 45 483.
- 19.) Szulczewski, G., Levis, R.J., "Determination of a Chemisorption Bond Strength by Direct Measurement of the Threshold Desorption Energy; NH₃ on Pt{111}," *J. Chem. Phys.* 1994 101 11070.
- 20.) DeWitt, M., Levis, R.J., "Near-Infrared Femtosecond Photoionization of Cyclic Aromatic Hydrocarbons," *J. Chem. Phys.* 1995 102 8670.
- 21.) Srinivasan, J., Romano, L. and Levis R.J., "Laser Vaporization and Multiphoton Ionization of an Anthracene-Labeled Nucleotide," *J. Phys. Chem.* 1995 99 13272.
- 22.) Szulczewski, G., Levis, R.J., "Collision-Induced Desorption of Ammonia on Pt{111}: From Direct Measurement of the Threshold Energy to Determination of the Surface-Adsorbate Bond Strength," *J. Chem. Phys.* 1995 103 10238.
- 23.) Velic, D. and Levis R.J., "Selective Collision-Induced Desorption: Measurement of the π -C₂H₄ Binding Energy on Pt{111} Precovered with Atomic Oxygen," *J. Chem. Phys.* 1996 104 9629.
- 24.) Szulczewski, G., Levis, R.J., "Using Collision-Induced Desorption to Measure the di- σ Bond Strength of Ethylene Chemisorption on Pt{111}," *J. Am. Chem. Soc.* 1996 118 3521.
- 25.) DeWitt, M., Levis, R.J., "High-Field Ionization of Molecules Using Ultrafast Radiation," *Femtochemistry, Ultrafast Chemical and Physical Processes in Molecular Systems*, M. Chergui, Ed. World Scientific, 1996 pgs. 129-134.
- 26.) Levis, R.J., "Laser Ejection of Oligonucleotides," in *Large Ions, Their Vaporization, Detection and Structural Analysis*, Tomas Baer ed. Wiley, London, 1996, pg. 104-125.

- 27.) Levis, R.J., DeWitt, M.J., "Photoionization of Polyatomic Molecules Using Intense, Near-Infrared Radiation of Femtosecond Duration," in *Resonance Ionization Spectroscopy*, N. Winograd, ed. AIP Press, NY, 1997 pgs. 45-50.
- 28.) Velic, D., Levis, R.J., "A Model for Estimating the Surface Effective Mass During Collision-Induced Processes on Pt{111}," *Chemical Physics Letters* 1997 269 59.
- 29.) DeWitt, M.J., Peters, D.W., Levis, R.J., "The Photoionization/Dissociation of Alkyl Substituted Benzene Molecules Using Intense Near-Infrared Radiation," *Chemical Physics* 1997 218 211.
- 30.) Narayanaswami, G., Levis, R.J., "Detection of an Oligonucleotide Hybridized to a Planar Surface Using Laser Ejection, Mass Spectroscopy," *J. Am. Chem. Soc.* 1997 119 6888.
- 31.) Velic, D. Levis, R.J., "Collision Induced Desorption of NO from Pt{111}, a Comparison of Activation Energies for Desorption and CID Binding Energies," *Surface Science* 1998 396 327.
- 32.) DeWitt, M.J. and Levis R.J., "Calculating the Keldysh Adiabaticity Parameter for Atoms, Molecules and Polyatomic Molecules," *J. Chem. Phys.* 1998 108 7739.
- 33.) DeWitt, M.J. and Levis R.J., "The role of electron delocalization in the ionization of C6 hydrocarbons using intense 780nm laser pulses of femtosecond duration," *J. Chem. Phys.* 1998 108, 7045.
- 34.) DeWitt, M.J. and Levis R.J., "Observing the Transition From Multiphoton to Field Ionization for Molecules in Intense Laser Fields," *Physical Review Letters*, 1998 81, 5101-5104.
- 35.) DeWitt, M.J. and Levis R.J., "Concerning the Ionization of Polyatomic Molecules in Intense Laser Fields," *J. Chem. Phys.* 1999 110, 11368-11375.
- 36.) Levis, R.J. and DeWitt, M.J., "Photoexcitation, Ionization and Dissociation of Molecules Using Intense Near-Infrared Radiation of Femtosecond Duration," Feature Article in *J. Phys. Chem.* 1999 103, 6493-6507.
- 37.) Prall, B.S., DeWitt, M.J., and Levis R.J., "Predicting Intense Field Laser Ionization Probabilities: The Application to C₂H_n Species," *J. Chem. Phys.* 1999 111, 2865-2868.
- 38.) Billotto, R. and Levis, R.J., "On the Coupling Mechanism of a 780 nm Femtosecond Laser with Biphenyl, Diphenylmethane and Diphenylethane," *J. Phys. Chem. A*, 1999 103: (41) 8160-8168.
- 39.) Moore, N.P., and Levis, R.J., "The Strong Field Photoelectron Spectroscopy of Acetylene: Evidence for Short-lived *4p Gerade* States via Electric Field-induced REMPI," *J. Chem. Phys.* 2000 112, 1316-1320.
- 40.) Arnolds, H., Rehbein, C., Roberts, G., Levis, R.J., King, D.A., "Femtosecond Near-infrared Laser Desorption of Multilayer Benzene on Pt{111}: Spatial Origin of Hyperthermal Desorption," *Chem. Phys. Lett.* 1999 314, 389-395.
- 41.) Arnolds, H., Rehbein, C., Roberts, G., Levis, R.J., King, D.A., "Femtosecond Near-infrared Laser Desorption of Multilayer Benzene on Pt{111}: A Molecular Newton's Cradle?," *J. Phys. Chem. B* 2000, 104, 3375-3382.
- 42.) DeWitt, M.J., Prall, B.P., Levis, R.J., "Orientational Averaging in the Intense Field Tunnel Ionization of Molecules," *J. Chem. Phys.* 2000 113, 1553-1558.
- 43.) Moore, N.P. and Levis R.J., "Strong Field Photoelectron Spectroscopy of Polyatomic Molecules: Acetylene," in *Multiphoton Processes*, L.F. DiMauro, R.R. Freeman and K.C. Kulander, Eds. AIP Press, NY, 2000.
- 44.) Levis, R.J., Menkir, G., Rabitz, H., "Selective Bond Dissociation and Rearrangement with Optimally Tailored, Strong-Field Laser Pulses" *Science* 2001 292 (5517), 709-713.

- 45.) Markevitch A.N., Moore, N.P., and Levis, R.J., "The influence of Molecular Structure on Strong Field Energy Coupling and Partitioning," *Chemical Physics* 2001 267 131-140.
- 46.) Moore, N.P., Markevitch A.N., Menkir G.M., Levis, R.J., "The Mechanisms of Strong Field Control of Chemical Reactivity using Tailored Laser Pulses," a peer reviewed book chapter in *Laser Control and Manipulation of Molecules*, A.D. Bandrauk and R.J. Gordon eds. ACS Press 2002 821, 207-220.
- 47.) R.J. Levis and H. Rabitz, "Closing the Loop on Bond Selective Chemistry Using Tailored Strong Field Laser Pulses," *J. Phys. Chem. A* 2002 106, 6427-6444.
- 48.) N.P. Moore, A.N. Markevitch, and R.J. Levis, "Influencing Strong Field Excitation Dynamics through Molecular Structure," *J. Phys. Chem. A* 2002 106, 1107-1112.
- 49.) P. Graham, G. Menkir, and R.J. Levis, "An Investigation of the Effects of Experimental Parameters on the Closed-Loop Control of Photoionization/Dissociation Processes in Acetophenone," *Spectrochimica Acta B*, 2003 58, 1097-1108.
- 50.) H. Arnolds, R.J. Levis, D.A. King, "Vibrationally Assisted DIET Transient Temperature Rise: The Case of Benzene on Pt{111}," *Chem. Phys. Lett.* 2003 380 (3-4) 444-450.
- 51.) A.N. Markevitch, D.M. Romanov, S.M. Smith, H.B. Schlegel, M.Y. Ivanov, R.J. Levis, "Nonadiabatic Dynamics of Polyatomic Molecules and Ions in Strong Laser Fields," *Phys. Rev. A* 2003 68 (1).
- 52.) Smith, S.M., Markevitch, A.N., Romanov, D.A., Li, X., Levis, R.J., Schlegel, H.B., "Static and Dynamic Polarizabilities of Conjugated Molecules and Their Cations," *J. Phys. Chem. A*. 2004 108 (50): 11063-11072.
- 53.) Anand, S., Zamari, M.M., Menkir, G., Levis, R.J., Schlegel, H.B., "Fragmentation Pathways in a Series of CH₃COX Molecules in the Strong Field Regime," *J. Phys. Chem. A*. 2004 108 (15): 3162-3165.
- 54.) A. Markevitch, D. Romanov, S. Smith, H.B. Schlegel, M. Ivanov, R.J. Levis, "Sequential Nonadiabatic Excitation of Large Molecules and Ions Driven by Strong Laser Fields," *Phys. Rev. A*. 2004 69 (1): Art. No. 013401.
- 55.) A. Markevitch, D. Romanov, S. Smith, R.J. Levis, "Coulomb Explosion of Large Polyatomic Molecules Assisted by Nonadiabatic Charge Localization," *Phys. Rev. Lett.* 2004 92 (6): Art. No. 063001.
- 56.) R.J. Levis, "Coherent control," *Encyclopedia of Modern Optics*, Ed. Bob D. Guenther, Elsevier, 2005.
- 57.) Li, X., Smith, S.M., Markevitch, A.N., Romanov, D.A., Levis, R.J., Schlegel, H.B., "A Time-dependent Hartree-Fock Approach for Studying the Electronic Optical Response of Molecules in Intense Fields," *Phys. Chem.* 2005 7 (2): 233-239.
- 58.) Elliott, R., Compton, R., Levis, R., Matsika, S., "Excited Electronic States of the Cyclic Isomers of O₃ and SO₂," *J. Phys. Chem. A*. 2005 109 (49): 11304-11311.
- 59.) Smith, S. M., Li, X. S., Markevitch, A. N., Romanov, D. A., Levis, R. J., Schlegel, H. B., "A Numerical Simulation of Nonadiabatic Electron Excitation in the Strong Field Regime: Linear Polyenes," *J. Phys. Chem. A*. 2005 109 (23): 5176-5185.
- 60.) Smith, S. M., Li, X. S., Markevitch, A. N., Romanov, D. A., Levis, R. J., Schlegel, H. B., "Numerical Simulation of Nonadiabatic Electron Excitation in the Strong Field Regime. 2. Linear Polyene Cations," *J. Phys. Chem. A*. 2005 109 (46): 10527-10534.
- 61.) Heck G., Sloss J., Levis, R. J., "Adaptive Control of the Spatial Position of White Light Filaments in an Aqueous Solution," *Optics Communications* 2006 259 (1): 216-222.
- 62.) Markevitch A.N., Romanov D.A., Smith S.M., et al., "Rapid proton transfer mediated by a strong laser field," *Physical Review Letters* 2006 96 (16): Art. No.163002.

- 63.) Tran, H.T., Romanov D.A., Levis R.J., "Control Goal Selection through Anti-Correlation Analysis in the Detection Space," *J. Phys. Chem. A*. 2006 110 (36): 10558-10563.
- 64.) Markevitch A.N., Romanov D.A., Smith S.M., Levis R.J., "Probing Strong-Field Electron-Nuclear Dynamics of Polyatomic Molecules Using Proton Motion," *Physical Review A*. 2007 75 (1): 053402.
- 65.) Smith, S. M., Li, X. S., Markevitch, A. N., Romanov, D. A., Levis, R. J., Schlegel, H. B., "A Numerical Simulation of Non-Adiabatic Electron Excitation in the Strong-Field Regime: 3. Polyacene Neutrals and Cations," *J. Phys. Chem. A*. 2007 111 (30): 6920-6932.
- 66.) Lorenc, D., Velic, D., Markevitch, A. N., Levis, R. J., "Adaptive Femtosecond Pulse Shaping to Control Supercontinuum Generation in a Microstructure Fiber," *Optics Communications* 2007 276: 288-292.
- 67.) Romanov, D., Filin, A., Compton, R., Levis, R.J., "Phase matching in femtosecond BOXCARS," *Optics Letters* 2007 32 (21): 3161-3163.
- 68.) Palliyaguru, L., Sloss, J., Rabitz, H., Levis, R., "Multicomponent Control via Shaped, Strong Laser Fields Mass Spectroscopy," *Journal of Modern Optics* 2008 55 (1), 177-185.
- 69.) Compton, R., Filin, A., Romanov, D., Levis, R., "Elucidating the Spectral and Temporal Contributions From the Resonant and Nonresonant Response to Femtosecond Coherent Anti-Stokes Raman Scattering," *J. Chem. Phys.* 2008 128 (15), 154517-1.
- 70.) Romanov, D., Healy, D., Brady, J., Levis, R., "Adaptive Reshaping of Objects in (multiparameter) Hilbert Space for Enhanced Detection and Classification: An Application of Receiver Operating Curve Statistics to Laser-Based Mass Spectroscopy," *Journal of Opt. Soc. Am. A*. 2008 25 (5): 1039-1050.
- 71.) Bowlan, P., Gabolde, P., Coughlan, M.A., Trebino, R., Levis, R.J., "Measuring the Spatiotemporal Electric Field of Ultrashort Pulses with High Spatial and Spectral Resolution," *J. Opt. Soc. Am. B* 2008 25 (6): A81-A92.
- 72.) Coughlan, M.A., Plewicky, M, Weber, S.M., Bowlan, P., Trebino, R., Levis, R.J., Shaped Pulse Electric-Field Construction and Interferometric Characterization: The SPECIFIC Method, *J. Phys. Chem.*, Submitted (2008).
- 73.) Plewicky, M. and Levis, R.J. "Femtosecond Stimulated Raman Spectroscopy of Methanol and Acetone in a Non-collinear Geometry using a Supercontinuum Probe," *J. Opt. Soc. Am. B*, 2008 25 (10): 1714-1719.
- 74.) Heck G., Judge E.J., Odhner J., Plewicky, M., Levis R.J., "Remote Sensing via Femtosecond Filament Based Technologies," *GomacTech Digest Conference*, Orlando, FL, Presented (March 2009).
- 75.) Robert J. Levis, "Response to Zhu et al.: Experimental requirements for strong field control in the picosecond regime," *J. Phys. Chem.* 2009 113(17), 5267-5268.
- 76.) Judge E.J., Heck G., Cerkez, C.B., and Levis R.J., "Discrimination of Composite Graphite Samples Using Remote Filament-induced Breakdown Spectroscopy," *Analytical Chemistry* 2009 81: 2658-2663.
- 77.) Filin, A., Compton, R., Romanov, D.A., Levis, R.J., "Impact Ionization Cooling in Femtosecond Laser-Induced Plasma Channels," *Physical Review Letters* 2009 102, 155004.
- 78.) Odhner, J., Romanov, D., Levis, R.J., "Ro-Vibrational Wavepacket Dispersion during Femtosecond Laser Filamentation in Air", *Physical Review Letters* 2009 103, 075005.
- 79.) Coughlan, M.A., Plewicky, M., Levis, R.J., "Parametric Spatio-Temporal Control of Focusing Laser Pulses," 2009 17 (18): 15808-15820.
- 80.) Brady, J.J., Judge, E.J., Levis, R.J., "Mass Spectrometry of Intact Neutral Macromolecules Using Intense Non-Resonant Femtosecond Laser Vaporization with

- Electrospray Post-Ionization,” *Rapid Communications in Mass Spectrometry* 2009 23 (19): 3151-3157.
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 - 88.) Romanov, D.A., Compton, R., Filin, A., Levis, R.J., “Dynamics of Strong-Field Laser-Induced Microplasma Formation in Noble Gases,” *Physical Review* 2010 81 (3): 033403.
 - 89.) Judge, E.J., Brady, J.J., Dalton, D., Levis, R.J., “Analysis of Pharmaceutical Compounds from Glass, Fabric, Steel, and Wood Surfaces at Atmospheric Pressure Using Spatially Resolved, Nonresonant Femtosecond Laser Vaporization Electrospray Mass Spectrometry,” *Analytical Chemistry* 2010 82 (8): 3231-3238.
 - 90.) Brady, J.J., Judge, E.J., Levis, R.J., “Identification of Explosives and Explosive Formulations using laser electrospray mass spectrometry,” *Rapid Communications in Mass Spectrometry* 2010 24 (11): 1659-1664.
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 - 96.) Judge, E.J., Brady, J.J., Levis, R.J., “Mass Analysis of Biological Macromolecules at Atmospheric Pressure Using Nonresonant Femtosecond Laser Vaporization with Electrospray Post-ionization,” *Analytical Chemistry*, 2010.

- 97.) Brady, J.J., Judge, E.J., and Levis, R.J., "Laser Electrospray Mass Spectrometry of Amphiphilic Lipids and Hydrophobic Proteins," *Journal of the American Society of Mass Spectrometry*, **Accepted 2011**
- 98.) Compton, R., Filin, A., Romanov, D. A., Levis, R. J., "Broadband Time-Dependent Rabi Shifting in Micro-Plasmas: the Origin, the Dynamics, the Applications," *Phys. Rev. A*, Submitted.
- 99.) E. J. Judge, Brady, J.J., Barbano, P., Levis, R.J., "Nonresonant Femtosecond Laser Vaporization with Electrospray Post-Ionization for Ex Vivo Plant Tissue using a Compressive Linear Classifier," *Analytical Chemistry* (Accepted 2011)

PATENTS:

1. Robert J. Levis and Louis J. Romano, "A Method for Analyzing an Organic Sample", US Patent # 5,210,412.
2. Robert J. Levis and Louis J. Romano, "Vaporization and Sequencing of Nucleic Acids", Patent Pending.

PAPERS PRESENTED AND INVITED TALKS:

- 1) "Ethylidyne Formation and Decomposition on Rh{111} and Rh{331}," Central Regional American Chemical Society Meeting, Ohio State University, June 1987.
- 2) "An Ultrahigh Vacuum investigation of the Production of Methanol on Pd{111}," Vith International Conference on secondary Ion Mass Spectrometry, Versailles, France, September 1987.
- 3) "Evidence for Activation of the Methanolic C-O Bond on Pd{111}," Regional Meeting of the American Chemical Society, Millersville State University, May 1988.
- 4) "Hyperthermal Molecular Beams via Laser Vaporization," University of Illinois, Chicago, November 1989.
- 5) "Hyperthermal Molecular Beams via Laser Vaporization," Washington University, November 1989.
- 6) "Hyperthermal Molecular Beams via Laser Vaporization," University of Pittsburgh, November 1989.
- 7) "Hyperthermal Molecular Beams via Laser Vaporization," Wayne State University, November 1989.
- 8) "Hyperthermal Molecular Beams via Laser Vaporization," University of California, Irvine, November 1989.
- 9) "Hyperthermal Molecular Beams via Laser Vaporization," Rutgers University, December 1989.
- 10) "Hyperthermal Molecular Beams via Laser Vaporization," University of Maryland, December 1989.
- 11) "Hyperthermal Molecular Beams via Laser Vaporization," Cornell University, December 1989.
- 12) "Hyperthermal Molecular Beams via Laser Vaporization," University of Nebraska, January 1990.
- 13) "Hyperthermal Molecular Beams via Laser Vaporization," University of Rochester, January 1990.
- 14) "Hyperthermal Molecular Beams via Laser Vaporization," University of Wisconsin, Madison, January 1990.

- 15) "Laser Vaporization, from Hyperthermal Molecular Beams to Ultrasensitive Surface Analysis," Kalamazoo College, October 1990.
- 16) "Laser Vaporization of Biological Molecules: Gas Phase Chemistry of High Molecular Weight Single-Stranded DNA," La Salle University, Philadelphia, PA, April 1991.
- 17) "Developing Surface Sensitive Experiments for Complex Molecules," Scientific Research Laboratories, Ford Motor Company, February 1991.
- 18) "High Speed DNA Sequencing," LeCroy Corp. Chestnut Ridge, NY, August 1991.
- 19) "Laser Vaporization of High Molecular Weight, Single Stranded DNA," American Chemical Society Meeting, New York, August 1991.
- 20) "Laser Vaporization and Ionization of Single-Stranded DNA," The University of Pennsylvania, Philadelphia, November 1991.
- 21) "Laser Vaporization of Single-Stranded DNA and REMPI -TOF Detection," American Society for Mass Spectrometry Meeting on Lasers in Mass Spectrometry, Sanibel Island, FL, January 1992.
- 22) "Laser Vaporization and REMPI-TOF Detection of Biological Molecules," Anachem Meeting, Detroit, MI, February 1992.
- 23) "Laser Vaporization of Biological Molecules: Gas Phase Chemistry of High Molecular Weight Single-Stranded DNA," Saginaw Valley State University, February 1992.
- 24) "New Laser-Based Methods for Probing Biological Materials: The Impact on High Speed DNA Sequencing," Wayne State University, Detroit, MI, March 1992.
- 25) "High Speed DNA Sequencing using Laser Based Methods," Boehringer Mannheim Corp. May 1992.
- 26) "Laser Vaporization and REMPI-TOF Detection of Single-Stranded DNA," Michigan Mass Spectroscopy Discussion Group Meeting, Ann Arbor, MI, May 1992.
- 27) "Determining Surface-Adsorbate Bond Energies From Collision-Induced Desorption Threshold Measurements," AVS Meeting, Ann Arbor Michigan, June 1992.
- 28) "Laser Vaporization and REMPI-TOF Detection of Large Biological Molecules; Toward high Speed DNA Sequencing," North East Regional American Chemical Society Meeting, The University of Syracuse, Syracuse, NY, June 1992.
- 29) "DNA Sequencing in the Gas Phase," Human Genome '92, The Human Genome Project International Conference, Nice, France, October 1992.
- 30) "DNA Sequencing in the Gas Phase," Department of Chemistry Seminar, The Pennsylvania State University, November 1992.
- 31) "DNA Sequencing Using Laser Vaporization and REMPI-TOF Mass Spectroscopy," Instrumentation for Time-of-Flight Mass Spectrometry Meeting, New York, November 1992.
- 32) "Laser Vaporization and Laser Ionization Techniques for DNA Sequencing," Department of Physics Colloquium, Wayne State University, November 1992.
- 33) "High Speed DNA Sequencing in the Gas Phase," SPIE Biomedical Optics Society Meeting, Los Angeles, CA, January 1993.
- 34) "The Spectroscopy of Single Stranded DNA in the Gas Phase," Department of Chemistry Seminar, The University of Waterloo, Canada, February 1993.
- 35) "Nonthermal Chemistry, from Diatomic Desorption to DNA Sequencing," Frontiers in Chemistry Lecture, Department of Chemistry, Wayne State University, February 1993.

- 36) "Chemistry at 20,000 K, from Nanoscale Surface Reactions to High Speed DNA Sequencing," Wayne State University Academy of Scholars Lecture, April 1993.
- 37) "Laser Vaporization and REMPI TOF Detection for DNA Sequencing" 41st ASMS Conference on Mass Spectrometry, San Francisco, CA, June 1993.
- 38) "Determining Surface-Adsorbate Bond Energies using Collision-Induced Desorption," Department of Chemistry, Oakland University, September 1993.
- 39) "532nm Laser Vaporization and Resonant Photoionization for Fragile Biomolecules," 10th Asilomar Conference on Mass Spectrometry, Estes Park, CO, October 1993.
- 40) "Laser-Based, Time-of-Flight Methods for DNA Sequencing," FACSS 20, Detroit, MI, October 1993.
- 41) "Laser Ionization for Gas Phase Biomolecules," FACSS 20, Detroit, MI, October 1993.
- 42) "Towards High Speed DNA Sequencing via Laser-Based, Mass Spectrometry," Genome Sequencing and Analysis Conference, Hilton Head, S.C., October 1993.
- 43) "Chemistry at 20,000 F, from Nanotechnology to Gas Phase DNA Sequencing," University of Maryland, College Park, MD, January 1994.
- 44) "Chemistry at 20,000 F, from Nanoscale Surface Reactions to Gas Phase DNA Sequencing," Bowling Green University, Bowling Green, OH, January 1994.
- 45) "Chemistry at 20,000 F, from Nanotechnology to Gas Phase DNA Sequencing," Arizona State University, Tempe, AR, January 1994.
- 46) "Laser Vaporization and Spectroscopy of Biomolecules in the Gas Phase," SPIE Meeting on Laser Techniques for Surface Science, Los Angeles, CA, January 1994.
- 47) "Determination of the NH₃/Pt{111} Bond Energy from the Collision-Induced Desorption Threshold," SPIE Meeting on Laser Techniques for Surface Science, Los Angeles, CA, January 1994.
- 48) "Chemistry at 10,000 C, from Nanoscale Surface Chemistry to Gas Phase DNA Sequencing," The Pennsylvania State University, University Park, PA, February 1994.
- 49) "Experimental Observables and Theoretical Considerations for the Laser Ejection of Biomolecules," American Society for Mass Spectrometry Meeting Chicago, IL, May 1994.
- 50) "Laser-Based Mass Spectroscopy for DNA Analysis and Sequencing," Genome Sequencing and Analysis Meeting, Hilton Head, SC, September 1994.
- 51) "Laser-Based Mass Spectroscopy, from DNA Analysis to Femtosecond Photoionization," Bay Area Mass Spectrometry Meeting, San Francisco, CA, September 1994.
- 52) "Laser-Based Mass Spectroscopy, from DNA Analysis to Femtosecond Photoionization," University of British Columbia, Vancouver Canada, September 1994.
- 53) "Laser-Based Mass Spectroscopy, from Oligonucleotide Analysis to Femtosecond Photoionization," Department of Chemistry, Hope College, January 1995.
- 54) "Laser-Based Mass Spectroscopy, from Oligonucleotide Analysis to Femtosecond Photoionization," Calvin College Departmental Seminar, January 1995.
- 55) "Femtosecond Laser Ionization," Chemistry Department Colloquium, The University of Notre Dame, South Bend, IN, February 1995.
- 56) "Impulsive Ejection of Adsorbates," The American Physical Society Meeting, San Jose, CA, March 1995.
- 57) "Laser Ejection and Ionization of Biological Molecules," SPIE Meeting on Laser Surface Interactions, San Diego, CA, July 1995.

- 58) "The Interaction of Ultrafast Light Pulses with Polyatomic Molecules," Femtochemistry, The Lausanne Conference, Lausanne, Switzerland, September 1995.
- 59) "The Near Infrared Femtosecond Photoionization of Polyatomic Molecules," Interdisciplinary Laser Science Meeting, Optical Society of America, Portland, OR, September 1995.
- 60) "Laser Ejection and Femtosecond Photoionization of Biomolecules," Department of Chemistry, University of California, Berkeley, September 1995.
- 61) "Laser Ejection and Femtosecond Photoionization of Biomolecules," Department of Chemistry, Ohio State University, Columbus, OH, October 1995.
- 62) "Laser Ejection and Femtosecond Photoionization of Biomolecules," Department of Chemistry, University of Illinois, Chicago, IL, February 1996.
- 63) "Biomolecular Mass Spectrometry" The Waksman Institute, Rutgers University, Piscataway, NJ, March 1996.
- 64) "Photoionization of Polyatomic Molecules Using Intense, Near-Infrared Radiation of Femtosecond Duration," RIS-96, University Park, PA, July 1996.
- 65) "Photoionization of Molecules using Intense Radiation Fields" PITSA Meeting, Argonne National Laboratories, Argonne IL, 1996.
- 66) "Ultrafast Chemistry in High Electric Fields," University of Akron, November 1996.
- 67) "Ultrafast Photoionization of Polyatomic Molecules Using Intense Laser Fields" University of Toledo, February 1997.
- 68) "Experiment and Theory of Collision-Induced Desorption of NO from Pt{111} Using Supersonic Beams of Xe and Kr," Ultrafast Surface Dynamics, Ascona, Switzerland, 1997.
- 69) "Molecules in Strong Laser Fields: On the Mechanism of Photoionization Using Near-Infrared Pulses of Femtosecond Duration," Molecular Electronic Spectroscopy and Dynamics Gordon Conference, Oxford, England, September 1997.
- 70) "Impulsive Ejection: From Measurement of the Surface-Adsorbate Bond Energy via Collision-Induced Desorption to DNA Diagnostics," Cambridge University, September 1997.
- 71) "Impulsive Chemistry: From Measuring Surface-Adsorbate Binding Energies to DNA Diagnostics," Northwestern University, October 1997.
- 72) "Observing the Transition From Multiphoton to Field-Mediated Coupling in Intense Laser-Molecule Interactions" Gordon Research Conference, Tilton School, NH, June 1998.
- 73) "Coupling High Intensity Near-IR Femtosecond Pulses Into Phenylalkanes," 1998 Summer Gordon Conference on Multiphoton Processes, Tilton School, Tilton, NH, June 1998.
- 74) "Polyatomic Molecules in Intense Near-Infrared Laser fields in Femtosecond Duration" French Atomic Energy Commission SACLAY, France, October 1998.
- 75) "The Interaction of Polyatomic Molecules With Intense Near-Infrared Radiation of Femtosecond Duration," University of Cambridge, October 1998.
- 76) "The Interaction of Polyatomic Molecules With Intense Near-Infrared Radiation of Femtosecond Duration," Imperial College, London, UK, November, 1998.
- 77) "Molecules in Intense Laser Fields: Observing the Transition from Multiphoton to Field-Mediated Processes," University of Toronto, February, 1999.
- 78) "Molecules in Intense Laser Fields: Observing the Transition from Multiphoton to Field-Mediated Processes," Central Michigan University, February, 1999.

- 79) "Molecular Ionization Using Intense Near-Infrared Radiation," Gaseous Ions, Structure and Reactivity Gordon Research Conference, Venture Beach, CA, February 1999.
- 80) "Perturbing the Molecular Hamiltonian With 1-10 V/Å Laser Fields," Michigan State University, March 1999.
- 81) "Energetic Mechanisms in the High Field Ionization of Polyatomic Systems," American Physical Society Meeting, Atlanta, GA, March 1999.
- 82) "Observing the Transfer from Multiphoton to Field Ionization for Molecules in Intense Laser Fields," American Physical Society Meeting, Atlanta, GA, March 1999.
- 83) "Photoionization of Molecules in Intense Laser Fields," 1st Cross-Border Workshop on Laser Science: Coherent Dynamics in Quantum Complex Systems, National Research Council of Canada, Ottawa, CA, May 1999.
- 84) "Photoionization of Molecules in Intense Laser Fields," Canadian Society for Chemistry Meeting, Toronto, Canada, June 1999.
- 85) "Photochemistry of Polyatomic Molecules in Intense Ultrafast Laser Pulses," American Chemical Society Meeting, Columbus, OH, June 1999.
- 86) "Strong Field Chemistry: Molecules in Intense Ultrafast Laser Pulses" International Conference on Multiphoton Processes Monterey, CA, September, 1999.
- 87) "Strong Field Chemistry: Molecules in Intense Laser Fields" Physical Chemistry Seminar Princeton University October 1999.
- 88) "Perturbing the Molecular Hamiltonian Using Intense Laser Fields" Chemistry Department Colloquium, Hillsdale College November 1999.
- 89) "Strong Field Chemistry: Polyatomic Molecules in Intense Near-IR Laser Fields" Chemical Physics Colloquium University of Colorado, Boulder, February, 2000.
- 90) "The Role of Molecular Structure in Strong Field Photochemistry," The second Annual Cross Border Workshop on Laser Science. Ann Arbor, MI, May, 2000.
- 91) "The Strong Field Photoelectron Spectroscopy of Naphthalene," 2000 Gordon Research Conference on Multiphoton Processes, Tilton, NH, June 2000.
- 92) "Strong Field Chemistry," Pacificchem, Hawaii, December 2000.
- 93) "Strong Field Photoelectron Spectroscopy," ACS National Meeting, San Diego, CA, April, 2001.
- 94) "The Effects of Molecular Structure on the Strong-Field Coupling of Anthracene and Anthraquinone," ACS National Meeting, San Diego, CA, April, 2001.
- 95) "The Strong Field Photoelectron Spectroscopy of Benzene; Channel Switching In Polyatomic Molecules," ACS National Meeting, San Diego, CA, April, 2001.
- 96) "Strong Field Photochemistry," American Physical Society, DAMOP Meeting, London. Ontario, May, 2001.
- 97) "The Role of Molecular Structure in Strong Field Photochemistry," Gordon Research Conference, Nonlinear Optics, New Hampshire, July 2001.
- 98) "The Role of Molecular Structure in Strong Field Photochemistry," Gordon Research Conference, Quantum Control, New Hampshire, July 2001.
- 99) "Tailoring Hamiltonians for Reaction Control Using Strong Field Combinatorial Photochemistry," Massachusetts Institute of Technology, September, 2001.
- 100) "Strong Field Chemistry: Teaching Lasers to Selectively Make and Break Bonds," University of Virginia, October, 2001.
- 101) "Tailoring Hamiltonians for Reaction Control using Shaped Strong Field Laser Pulses," University of Illinois, November, 2001.

- 102) "Tailoring Hamiltonians for Reaction Control Using Strong Fields" Physics Colloquium, Temple University, November 2001.
- 103) "Tailoring Hamiltonians for Reaction Control Using Shaped Strong Field Laser Pulses", Max Planck Gesellschaft Conference on Optimal Control of Quantum Dynamics, Ringberg Castle, Germany, December 2001.
- 104) "Chemical Control Using Tailored Strong Field Laser Pulses", 2002 Physics of Quantum Electronics Conference, Snowbird, Utah, January 2002.
- 105) "Chemical Control Using Tailored Strong Field Laser Pulses", Temple University Department of Chemistry, January 2002.
- 106) "Chemical Control Using Tailored Strong Field Laser Pulses", Eastern Michigan University Department of Chemistry, March 2002.
- 107) "Controlling Chemistry with Tailored Strong Field Laser Pulses", University of Alabama, April 2002.
- 108) "Controlling Chemistry with Tailored Strong Field Laser Pulses", Ultrafast Phenomena, Vancouver, Canada, May 2002.
- 109) "Controlling Chemistry with Tailored Strong Field Laser Pulses," LAP 2002, Leuven, Netherlands, July 2002.
- 110) "Coulomb Explosion of Polyatomic Molecules in Saturation Regime," Gordon Research Conference, August 2002.
- 111) "Controlling Chemistry with Tailored Strong Field Laser Pulses," OSA/Laser Science XVIII, Orlando, Florida, October 2002.
- 112) "Adaptive Strong Field Control of Chemistry: Exciting the Quasi-continuum," 2003 Physics of Quantum Electronics Conference, Snowbird, Utah, January 2003.
- 113) "Controlling Chemistry with Tailored, Strong Field Laser Pulses," La Salle University Department of Chemistry, March 2003.
- 114) "Controlling Chemistry with Tailored, Strong Field Laser Pulses," University of Wisconsin, Madison, April 2003.
- 115) "Engineering Shaped Laser Pulses for Advanced Technologies," San Diego, CA, July 2003.
- 116) "Controlling Chemistry with Tailored Strong Field Laser Pulses," Femtochemistry VI, Paris, France, July 2003.
- 117) "Control in the Strong Field Regime: Manipulating Chemical Reactivity with Tailored Laser Pulses," SPIE Annual Meeting, San Diego, CA, August 2003.
- 118) "Probing Strong Field Electron-Nuclear Dynamics of Polyatomic Molecules using Proton Motion," Gordon Research Conference, Mt. Holyoke College, South Hadley, Massachusetts, August 2003.
- 119) "Combinatorial Photonics, Controlling Chemistry with Tailored Strong Field Laser Pulses", Physcon 2003, St. Petersburg, Russia, August 2003.
- 120) "Combinatorial Chemistry with Adaptively-Tailored Strong Field Laser Pulses," University of the Sciences, Philadelphia, Pennsylvania, September 2003.
- 121) "Combinatorial Chemistry with Adaptively-Tailored Strong Field Laser Pulses," Laval University International Symposium, Quebec City, Quebec, September 2003.
- 122) "Controlling Chemistry with Tailored, Strong Field Laser Pulses," Laser Science XIX, Tucson, Arizona, October 2003.
- 123) "Strong Field, Closed Loop Control of Chemistry," Pennsylvania State University, State College, Pennsylvania, October 2003.

- 124) "Combinatorial Chemistry with Adaptively-Tailored Strong Field Laser Pulses," Binghamton University, Binghamton, New York, November 2003.
- 125) "Controlling Chemistry with Tailored Strong Field Laser Pulses," International Workshop on Optimal Control of Quantum Dynamics, Max-Planck- Institute, Tegernsee, Germany, December 2003.
- 126) "Combinatorial Chemistry with Ultrafast Laser Pulses," St. Joseph's University, Philadelphia, Pennsylvania, March 2004.
- 127) "Adaptive Control in the Strong Field Regime," Institute for Molecular Sciences, Okasaki, Japan, July 2004.
- 128) "Molecules in Intense Laser Fields," Department of Chemistry, University of Tokyo, July 2004.
- 129) "Strong Field Chemistry and Control," Physics and Physical Chemistry, Sendai, Japan, August 2004.
- 130) "Control of Molecules and Clusters," Session Leader, International Symposium on Ultrafast Intense Laser Science III, Sicily, Italy, September 2004.
- 131) "Combinatorial Chemistry with Ultrafast Laser Pulses," SUNY at Stony Brook, Stony Brook, New York, December 2004.
- 132) "Strong Field Optimal Detection of Chemical Warfare Agents," DARPA/ARO Workshop on Metrics and Standards for Evaluation and Comparison of CW Detectors, Aberdeen, Maryland, December 2004.
- 133) "Strong Field Optimal Control" Quantum Control Workshop, Princeton University, Princeton, New Jersey, March 2005.
- 134) "Rapid Proton Transfer Mediated by a Strong Laser Field," Femtochemistry 2005, Washington DC, July 2005.
- 135) "Nonadiabatic Dynamics of Polyatomic Molecules in Strong Laser Fields," International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC), Rosario, Argentina, July 2005.
- 136) "Control of Chemistry," Quantum Control of Light and Matter, Gordon Research Conference, Colby College, New Hampshire, August 2005.
- 137) "Strong Field Chemistry," A Graduate Student Recruiting Talk for the ACS Student Affiliate Chapter at the University of Delaware, September 2005.
- 138) "Strong Field Chemistry," Department of Chemistry, Rowan University, Glassboro, New Jersey, October 2005.
- 139) "Adaptive Manipulation of Objects in Hilbert Space via Strong Field Lasers" Institute for Mathematics and Applications, University of Minnesota, Minneapolis, November 2005.
- 140) "Active Manipulation of Objects in Hilbert Space via Strong Field Lasers" 4th International Workshop on "Optimal Control of Quantum Dynamics: Theory and Experiment", Ringberg Castle, Tegernsee, Germany, December 2005.
- 141) "Dynamics of Molecular Fragmentation mediated by Charge Transfer States" Chemistry with Ultrashort Intense Laser Pulses: The Next Frontier, Pacificchem Meeting, Honolulu, Hawaii, December 2005.
- 142) "Evolving Laser Pulses for Chemistry: From Reaction Control to Weapons Detection", American Chemical Society, Temple University, Philadelphia, February 2006.
- 143) "Adaptive Control of the Spatial Position of White Light Filaments in an Aqueous Solution", American Physical Society, Baltimore, March 2006.

- 144) “Nonadiabatic Dynamics during Strong Field Excitation of Molecules”, Max Born Institute, Berlin, Germany, March 2006.
- 145) “Controlling Complex Chemical Systems Using Adaptively Shaped Strong Field Laser Pulses”, Sfb 450: Analysis & Control of Ultrafast Photoinduced Reactions, Free University of Berlin, Germany, March 2006.
- 146) “Nonadiabatic Dynamics during Strong Field Excitation of Molecules”, 5th Photo-Molecular Science Forum “*Frontiers in Photo-Molecular Science I*”, Okazaki, Japan, May 2006.
- 147) “Control of Complex Molecular Processes Using Adaptively-shaped, Intense Laser Field”, Ultrafast Surface Dynamics Conference, Abashiri, Japan, May 2006.
- 148) “Strong Field, Optimal Laser Mass Spectrometry for Chemical Warfare Agent Detection”, International Symposium on Spectral Sensing Research (ISSSR 2006), Bar Harbor, Maine, May-June 2006.
- 149) “Applications of Strong Field Quantum Control: Spinning Straw into Gold”, Gordon Research Conference on Multiphoton Processes, Tilton School, NH, June 2006.
- 150) “Adaptive Control of the Spatial Position of White Light Filaments in an Aqueous Solution”, International Conference CCFP 2006 “*Coherent Control of the Fundamental Processes in Optics and X-ray-Optics*”, Nizhny Novgorod, Russia, June-July 2006.
- 151) “Photonic Reagents: Shaped, Strong Field Laser Pulses for Controlling Chemistry”, 2006 Monday Morning Seminar Series, Chemistry Division Argonne National Laboratory, Argonne, IL, October 2006.
- 152) “Photonic Reagents: Shaped, Strong Field Laser Pulses for Controlling Chemistry”, Physical Chemistry Seminar, University of Washington, Seattle, WA, October 2006.
- 153) “Photonic Reagents: Shaped, Strong Field Laser Pulses for Controlling Chemistry”, Rutgers State University, Newark, NJ, November 2006.
- 154) “Control of Multi-component Systems with Strong Laser Fields: A New Paradigm for Sensing”, 37th Winter Colloquium on *The Physics of Quantum Electronics*, Snowbird, Utah, January 2007.
- 155) “Atomic and Molecular Dynamics Observation and Control”, Université Paul Sabatier, Toulouse, France, March 2007.
- 156) “Control of Complex Molecular Processes Using Adaptively-Shaped, Intense Laser Fields”, Stevens Institute of Technology, Hoboken, NJ, April 2007.
- 157) “Molecules in Strong Optical Fields”, *Division of Atomic, Molecular, and Optical Physics (DAMOP) Conference*, Calgary, Canada, June 2007.
- 158) “DARPA Tech 2007 Conference”, Anaheim, California, August 2007.
- 159) “Molecules in Strong Laser Fields, from Stand off Detection to Photonic Reagents”, Drexel University, Philadelphia, PA, October 2007.
- 160) “Complexity Management in Strong Field-Molecule Interactions: Lessons from Evolution and Dimensionality Reduction”, Center for Ultracold Atoms, MIT/Harvard University, Boston, MA, November 2007.
- 161) “High Speed Detection of Chemical Warfare Agents”, Bloomsburg University, Bloomsburg, PA, November 2007.
- 162) “Complexity Management in Strong Field Molecule Interactions: Lessons from Evolution and Dimensionality Reduction”, 5th *International Workshop on Optimal Control of Quantum Dynamics: Theory and Experiment*, Ringberg Castle, Tegernsee, Germany, November 2007.

- 163) "Ultrafast, Laser-Generated Filament Plasma-Dynamics as Probed by Femtosecond Box-CARS", *38th Winter Colloquium on The Physics of Quantum Electronics*, Snowbird, Utah, January 2008.
- 164) "Complexity Management in Strong Field Molecule Interactions: Lessons from Evolution and Dimensionality Reduction", *COAST/CORAL Winter School on Advanced Laser Science*, University of Tokyo & Napsa New Otani, Yuzawa, Japan, January 2008.
- 165) "Adaptive Control of Laser Filamentation", *Photonics West 2008 LASE Conference and Exhibition*, San Jose, CA, January 2008.
- 166) "Beyond ISP: Intense Laser Hamiltonian Control for Selective Sensing", *Pittsburgh Conference (PittCon 2008)*, New Orleans, LA, March 2008.
- 167) "Controlling and Understanding Laser Filamentation in the Solution and Gas Phase Molecular Systems", *APS 2008 March Meeting*, New Orleans, LA, March 2008.
- 168) "Impact Ionization Cooling in Laser-Induced Plasma Filaments", *Gordon Research Conference on Multiphoton Processes*, Tilton, NH, June 2008.
- 169) "Manipulating Molecular Plasma and Filament Dynamics Using Strong Laser Fields", *Gordon Research Conference on Atomic & Molecular Interactions*, New London, NH, July 2008.
- 170) "Nonadiabatic Excitation and Electron Impact Cooling During Gas Phase Laser Filamentation", *Sixth Congress of the International Society for Theoretical Chemical Physics (ISTCP-VI)*, Vancouver, BC, Canada, July 2008.
- 171) "Adaptive control of filamentation and ultrafast plasma dynamics", *2nd International Symposium on Filamentation 2008*, Paris, France, September 2008.
- 172) "Nonadiabatic Attosecond Electron Dynamics during Strong Field Control of Molecules", *International Symposium on Ultrafast Intense Laser Science (ISUILS7)*, Tokyo & Kyoto, Japan, November 2008.
- 173) "Filament-Induced Breakdown Spectroscopy for Remote Detection", *NATO Advanced Study Institute 2008, Laser Control & Monitoring in New Materials, Biomedicine, Environment, Security and Defense*, Ottawa, Canada, December 2008.
- 174) "Femtosecond Stimulated Raman Spectroscopy using a Filament-Based Continuum Source", *NATO Advanced Study Institute 2008, Laser Control & Monitoring in New Materials, Biomedicine, Environment, Security and Defense*, Ottawa, Canada, December 2008.
- 175) "Remote sensing via femtosecond filament-based technologies", *GOMACTech 2009 Conference*, Orlando, Florida, March 2009.
- 176) "Simulation of attosecond electron dynamics in CO₂", *237th ACS National Meeting*, Salt Lake City, Utah, March 2009.
- 177) "Enhancing Nonlinear Signatures via Femtosecond Lasers", *Gordon Research Conference on Detecting Illicit Substances: Explosives & Drugs*, Les Diablerets, Switzerland, June 2009.
- 178) "Filament-Molecule Interactions", *International Symposium on Ultrafast Intense Laser Science (ISUILS8)*, Crete, Greece, October 2009
- 179) "Laser Filament-based Control of Vibrational, Rotational, and Translational Degrees of Freedom in Molecules: Applications in Sensing Biology", *University of Sherbrooke, Canada*, October 2009
- 180) "Controlling of Electronic to Translational Modes of Molecules: From Remote Sensing to Biology", *Universite de Sherbrooke, Canada*, October 2009

- 181) “Controlling Electric to translational Modes of Molecules with Strong Laser Fields: From Remote Sensing to Biology”, University of Colorado and Colorado State University and Engineering Research Center for Extreme Ultraviolet Science and Technology, November 2009
- 182) “New tools for Quantum Mechanics: Filament-Based Control of Electronic, Vibrational and Translational Degrees of Freedom”, University of Colorado, and Colorado State University and Engineering Research Center for Extreme Ultraviolet Science and Technology, November 2009
- 183) “Controlling Electric to Translational Modes of Molecules with Strong Laser Fields: From Remote Sensing to Biology”, California State University of Pennsylvania, November 2009
- 184) “Laser-Based Sensing, Chemistry and Molecular Microscopy”, Temple University, 2009
- 185) “The Time Dependent Generalized Rabi Oscillation: Using Molecules to Control Light and Light to Control Molecules For New Linear Sources”, Symposium on Physics and Chemistry of Coherently Controlled Quantum Systems, Nagoya, Japan, March 2010
- 186) “Probing Laser Filamentation using Impulsive Raman Spectroscopy”, 6th International Workshop on Optimal Control of Quantum Dynamics: Theory and Experiment, Munich, Germany, May 2010
- 187) “Probing Laser Filamentation using Impulsive Raman Spectroscopy”, 3rd International Symposium on Filamentation (COFIL), Crete, Greece, June 2010
- 188) “Strong Field Chemistry:Light Bullets, Flying Proteins,and Biological Tissue-Typing”, University of Notre Dame, 2010
- 189) “Time-Dependent Density Functional Theory Calculations of Ehrenfest Dynamics of Laser Controlled Dissociation of NO+: Pulse Length and Sequential Multiple Single-Photon Processes”2010
- 190) “Non-resonant Femtosecond Vaporization and Mass Analysis of Solid State Biomolecules at Atmospheric Pressure” 2010
- 191) “Spatio-Temporal Dynamics of Laser Filamentation Measured via Impulsive Raman Scattering” 17th International *Conference on Ultrafast Phenomena (UP)*, Optical Society Conference, Snowmass Village, CO, July 2010
- 192) ARO-JIEDDO Conference at MIT, Boston, MA, July 2010
- 193) ARO-JIEDDO Conference, Washington, D.C., July 2010
- 194) Chancellor Review American Chemical Society, Boston , MA, August 2010
- 195) “Nonlinear Processes Occurring in Molecules in Strong Fields”, Scientific Research (AFOSR) Nonlinear Optics Meeting, Albuquerque, MN, September 2010
- 196) “Multi-Dimensional Detection of Explosives: Filament-Based Impulsive Raman Spectroscopy and Femtosecond Vaporization of Explosives”, ONR Sciences Addressing Asymmetric Explosive Threats Fall Technical Review, SAEET Review, Atlanta, GA, October 2010
- 197) 6th International Symposium on Ultrafast Intense Laser Science, Maui, HI, December 2010
- 198) International Committee on Intense Laser Science Committee Meeting, Maui, HI, December 2010
- 199) “Probing Laser Filamentation Using Impulsive Raman Spectroscopy”, PacifiChem December 2010, Honolulu, HI,

- 200) ONR Basic Research Activities and details on the Counter IED Basic Research Program, SAAET Colloquium, Temple University, Philadelphia, PA, January 2011