RICHARD P. VAN DUYNE

Personal: Richard P. Van Duyne
Born October 28, 1945; Orange, New Jersey

Education: Rensselaer Polytechnic Institute, B.S., 1967
University of North Carolina at Chapel Hill, Ph.D., 1971;
Ph.D. Thesis: "I. Low Temperature Electrochemistry
II. Double Potential Step Chronocoulometry" Thesis Advisor:
Charles N. Reilley, Kenan Professor of Chemistry (deceased 12/31/81)

Employment: Northwestern University

Assistant Professor of Chemistry	(1971-1976)
Associate Professor of Chemistry	(1976-1979)
Professor of Chemistry	(1979-1986)
Morrison Professor of Chemistry	(1986-Present)
Professor of Applied Physics	(2011-Present)
Professor of Biomedical Engineering	(2012-Present)

Field: Analytical Chemistry/Physical Chemistry/Chemical Physics

Research Areas: Surface-enhanced Raman spectroscopy (SERS), electrochemistry, nanosphere lithography (NSL), atomic layer deposition (ALD), localized surface plasmon resonance (LSPR) spectroscopy, molecular plasmonics, surface-enhanced spectroscopic methods for chemical and biological sensing, ultrahigh vacuum tip-enhanced Raman spectroscopy (UHV-TERS) and scanning tunneling microscopy (UHV-STM), MALDI mass spectrometry, application of SERS to the study of works of art. Biomedical optics and in vivo SERS/Raman biosensing.

Awards and Recognitions:
Class of 1902 Research Prize, Rensselaer Polytechnic Institute, 1967
NASA Graduate Fellow, University of North Carolina, 1967-1971
Alfred P. Sloan Fellowship, 1974-1978
Coblentz Memorial Prize in Molecular Spectroscopy, 1980
Fresenius Award (of Phi Lambda Upsilon), 1981
Chairman, Vibrational Spectroscopy Gordon Conference, 1982
Fellow, American Association for the Advancement of Science, 1983
Fellow, American Physical Society, 1985
Pittsburgh Spectroscopy Award, 1991
Excellence in Surface Science Award, Surfaces in Biomaterials Foundation, 1996
The Earle K. Plyler Prize for Molecular Spectroscopy, American Physical Society, 2004
Elected to American Academy of Arts and Sciences, 2004
Nobel Laureate Signature Award for Graduate Education in Chemistry, American Chemical Society, 2005
L'Oreal Art and Science of Color Prize (Silver), 2006
National Science Foundation Creativity Extension Award, 2007

Professeur invite classe exceptionnelle – University Pierre et Marie Curie, Paris, 2008
Ellis R. Lippincott Award, Optical Society of America, 2008
Bomem-Michelson Award, Coblentz Society, 2010
Analytical Chemistry Award, American Chemical Society, 2010
Elected to the National Academy of Sciences, 2010
Thomson Reuters list of top 100 chemists over the period 2000-2010 as ranked by the impact of their published research, 2011
Charles N. Reilley Award, Society for Electroanalytical Chemistry, 2011
Sir George Stokes Award, Royal Society of Chemistry, 2013
Honorary Member, Society of Applied Spectroscopy, 2013
Fellow, Society of Applied Spectroscopy, 2013
Fellow, Royal Society of Chemistry, 2013
E. Bright Wilson Award in Spectroscopy, American Chemical Society, 2014
Charles Mann Award in Applied Raman Spectroscopy, Society of Applied Spectroscopy, 2014
Thomson Reuters list of highly cited researchers, 2014
Theophilus Redwood Award, Royal Society of Chemistry, 2015
Thomson Reuters list of highly cited researchers, 2015
Elected to the American Institute for Medical and Biological Engineering, 2016

Professional Affiliations:
American Association for the Advancement of Science
American Chemical Society
American Physical Society
Materials Research Society
Society of Electroanalytical Chemists

Advisory Boards and Panels:
Enabling Bioanalytical & Imaging Technologies (EBIT) Study Section, NIH: February 2013
Microscopic Imaging Study Section, NIH: October 2007
National Science Foundation, CAREER Panel, November 20-21, 2006
Science Storms Advisory Panel, Museum of Science and Industry (Chicago), 2005-2007
Nanotechnology Special Emphasis Panels, NIH: July 2005
Essential Science Task Force, Museum of Science and Industry (Chicago), 2004-2005
Fakultetsopponent, Public Defense of Doctor's Thesis (Per Hanarp), Department of Applied Physics, Chalmers University of Technology, Göteborg, Sweden, December 16, 2003
Nanotechnology Special Emphasis Panels, NIH: July 2003
American Chemical Society Committee on Professional Training (1983-1988)
Air Force Office of Scientific Research Chemical Sciences Review Panel (1983-87)

Editorial Boards:
Accounts of Chemical Research (2007-13)
Annual Reviews of Physical Chemistry (2007-11)
Langmuir (2013-2015)
Nano Letters (2010-present)
Journal of Physical Chemistry (1983-1988)

Journal of Raman Spectroscopy (2010 – present)
Analytical Instrumentation (1980-1993)

Consultancies or Scientific Advisory Board:
Ohmx (2004 -)
Oxonica, Inc. (2004 - 2010)
Eastman Kodak Company (1977-1991)

Publication Citations:
Web of Science
Search: Author = (Van Duyne RP* OR VanDuyne RP* OR Van Duyne RR*)
H-index = 90
40,224 citations overall; 18,780 citations in last 4.115 years = average of 4564 citations per year

Publications:

1. "A Chemically Selective Polarographic Detector for Gas Chromatography", R. P. Van Duyne, D.A. Aikens, *Anal. Chem.*, 40, 254-256 (1968)

2. "Double Potential Step Chronocoulometry. Part I. A Re-Examination of EC Kinetic Theory Including the Effects of Electrode Reactant and Product Adsorption", T.H. Ridgway, R.P. Van Duyne, C.N. Reilley, *J. Electroanal. Chem.*, 34, 267-282 (1972)

3. "Low-Temperature Electrochemistry. I. Characteristics of Electrode Reactions in the Absence of Coupled Chemical Kinetics", R.P. Van Duyne, C.N. Reilley, *Anal. Chem.*, 44, 142-152 (1972)

4. "Low-Temperature Electrochemistry. II. Evaluation of Rate Constants and Activation Parameters for Homogeneous Chemical Reactions Coupled to Charge Transfer", R.P. Van Duyne, C.N. Reilley, *Anal. Chem.*, 44, 153-158 (1972)

5. "Low-Temperature Electrochemistry. III. Applications to the Study of Radical Ion Decay Mechanisms", R.P. Van Duyne, C.N. Reilley, *Anal. Chem.*, 44, 158-169 (1972)

6. "Double Potential Step Chronocoulometry. Part II. Measurement of the Chemical Reaction Rate in an EC Mechanism When Both Electrode Reactant and Product are Adsorbed", R.P. Van Duyne, T.H. Ridgway, C.N. Reilley, *J. Electroanal. Chem.*, 34, 283-295 (1972)

7. "Quenching of Aromatic Hydrocarbon Excited Singlet States by Wurster's Blue Cation Radical", R.P. Van Duyne, *J. Am. Chem. Soc.*, 95, 7164-7166 (1973).

8. "A Nonadiabatic Description of Electron Transfer Reactions Involving Large Free Energy Changes", R.P. Van Duyne, S.F. Fischer, *Chem. Phys.*, 5, 183-197 (1974).

9. "Mode-locked laser Raman spectroscopy. New technique for the rejection of interfering background luminescence signals", R. P. Van Duyne, D. L. Jeanmaire, and D. F. Shriver, *Anal. Chem.,* 46, 213-222 (1974).

10. "Resonance Raman Spectroelectrochemistry. I. The Tetracyanoethylene Anion Radical", D.L. Jeanmaire, M.R. Suchanski, R.P. Van Duyne, *J. Am. Chem. Soc.*, 97, 1699-1707 (1975).

11. "Resonance Raman Spectroelectrochemistry V. Intensity Transients on the Millisecond Time Scale Following Double Potential Step Initiation of a Diffusion Controlled Electrode Reaction", D.L. Jeanmaire, R.P. Van Duyne, *J. Electroanal. Chem.*, 66, 235-247 (1975).

12. "Resonance Raman Spectroelectrochemistry. 2. Scattering Spectroscopy Accompanying Excitation of the Lowest $^2B_{1u}$ Excited State of the Tetracyanoquinodimethane Anion Radical", D.L. Jeanmaire, R.P. Van Duyne, *J. Am. Chem. Soc.*,98, 4029-4033 (1976).

13. "Resonance Raman Spectroelectrochemistry. 3. Tunable Dye Laser Excitation Spectroscopy of the Lowest $^2B_{1u}$ Excited State of the Tetracyanoquinodimethane Anion Radical", D.L. Jeanmaire, R.P. Van Duyne, *J. Am. Chem. Soc.*,98, 4034-4039 (1976).

14. "A Theoretical Investigation of Double Potential Step Techniques as Applied to the One-Half Regeneration Electrode Mechanism: Chronoamperometry, Chronocoulometry, and Chronoabsorptometry", T.H. Ridgway, R.P. Van Duyne, C.N. Reilley, *J. Electroanal. Chem.*,67, 1-10 (1976).

15. "Resonance Raman Spectroelectrochemistry. IV. The Oxygen Decay Chemistry of the Tetracyanoquinodimethane Dianion", M.R. Suchanski, R.P. Van Duyne, *J. Am. Chem. Soc.*,98, 250-252 (1976).

16. "The Spectroelectrochemical Response for First-Order E.C. Processes with Electrode Product and Reactant Adsorption Following Double Potential Step Excitation", R.P. Van Duyne, T.H. Ridgway, C.N. Reilley, *J. Electroanal. Chem.*,69, 165-180 (1976).

17. "Quenching of Aromatic Hydrocarbon Singlets and Aryl Ketone Triplets by Alkyl Disulfides", W.L. Wallace, R.P. Van Duyne, F.D. Lewis, *J. Am. Chem. Soc.*,98, 5319-5326 (1976).

18. "On the Theory of Electron Transfer Reactions. The Naphthalene-/TCNQ System", S.F. Fischer, R.P. Van Duyne, *Chem. Phys.*,26, 9-16 (1977).

19. "Surface Raman Spectroelectrochemistry Part I. Heterocyclic, Aromatic, and Aliphatic Amines Adsorbed on the Anodized Silver Electrode", D.L. Jeanmaire, R.P. Van Duyne, *J. Electroanal. Chem.*,84, 1-20 (1977).

20. "Applications of Raman Spectroscopy in Electrochemistry", R.P. Van Duyne, *J. Physique*,38, (C5)239-(C5)252 (1977).

21. "Resonance Raman Spectroelectrochemistry of Bacteriochlorophyll and Bacteriochlorophyll Cation Radical", T.M. Cotton, R.P. Van Duyne, *Biochem. Biophys. Res. Commun.*,82, 424-433 (1978).

22. "Cyclic Differential Pulse Voltammetry: A Versatile Instrumental Approach Using a Computerized System", K.F. Drake, R.P. Van Duyne, A.M. Bond, *J. Electroanal. Chem.*,89, 231-246 (1978).

23. "Theory of Raman Scattering by Molecules Adsorbed on Electrode Surfaces", F.W. King, R.P. Van Duyne, G.C. Schatz, *J. Chem. Phys.*,69, 4472-4481 (1978).

24. "Synthesis, Structure, and Spectral Properties of TTF $HgCl_3$: An Unusual Metallotetrathiaethylene", T.J. Kistenmacher, M. Rossi, C.C. Chiang, R.P. Van Duyne, T.W. Cape, A.R. Siedle, *J. Am. Chem. Soc.*,100, 1958-1959 (1978).

25. "Copper Derivatives of Tetrathiafulvalene", A.R. Siedle, G.A. Candela, T.F. Finnegan, R.P. Van Duyne, T.W. Cape, G.F. Kokoszka, P.M. Woyciesjes, *J. Chem. Soc., Chem. Commun.*, 69-70 (1978).

26. "Metallotetrathiaethylenes", A.R. Siedle, G.A. Candela, T.F. Finnegan, R.P. Van Duyne, T.W. Cape, G.F. Kokoszka, P.M. Woyciesjes, J.A. Hashmall, M. Glick, W. Ilsley, *Ann. N. Y. Acad. Sci.*,313, 377-381 (1978).

27. "Orientational Specificity of Raman Scattering from Molecules Adsorbed on Silver Electrodes", C.S. Allen, R.P. Van Duyne, *Chem. Phys. Lett.*,63, 455-459 (1979).

28. "An Electrochemical Investigation of the Redox Properties of Bacteriochlorophyll and Bacteriopheophytin in Aprotic Solvents", T.M. Cotton, R.P. Van Duyne, *J. Am. Chem. Soc.*,101, 7605-7611 (1979).

29. "Resonance Raman Studies and Structure of a Sulfide Complex of Methemerythrin", S.M. Frier, L.L. Duff, R.P. Van Duyne, I. Klotz, *Biochemistry*,24, 5372-5377 (1979).

30. "Synthesis and Characterization of the Metamagnetic 1:1 1-D Phase of Decamethylferrocenium 7,7,8,8-Tetracyano-p-quinodimethanide", J.S. Miller, A.H. Reis Jr., E. Gebert, J.J. Ritsko, W.R. Salanak, L. Kovnat, T.W. Cape, R.P. Van Duyne, *J. Am. Chem. Soc.*,101, 7111-7113 (1979).

31. "The Application of Resonance Raman Spectroscopy to Determine the Solution O-O Stretching Frequency of a Monomeric Dioxygen Cobalt Complex", T. Szymanski, T.W. Cape, F. Basolo, R.P. Van Duyne, *J. Chem. Soc., Chem. Commun.*, 5-6 (1979).

32. "Laser Excitation of Raman Scattering from Adsorbed Molecules on Electrode Surfaces", R.P. Van Duyne. in *Chemical and Biochemical Applications of Lasers*; C.B. Moore, Ed.; Academic Press: New York, 1979; Vol. 4, pp. 101-184.

33. "Resonance Raman Spectroelectrochemistry. 6. Ultraviolet Laser Excitation of the Tetracyanoquinodimethane Dianion", R.P. Van Duyne, M.R. Suchanski, J.M. Lakovits, A.R. Siedle, K.D. Parks, T.M. Cotton, *J. Am. Chem. Soc.*,101, 2832-2837 (1979).

34. "Tunable Laser Excitation Profile of Surface Enhanced Raman Scattering from Pyridine Adsorbed on a Copper Electrode Surface", C.S. Allen, G. C. Schatz, R.P. Van Duyne, *Chem. Phys. Lett.*,75, 201-205 (1980).

35. "Resonance Raman Spectra of Bacteriochlorophyll and Its Electrogenerated Cation Radical. Excitation of the Soret Bands by Use of Stimulated Raman Scattering from Hydrogen and Deuterium", T.M. Cotton, K.D. Parks, R.P. Van Duyne, *J. Am. Chem. Soc.*,102, 6399-6407 (1980).

36. "Surface-Enhanced Resonance Raman Scattering from Cytochrome c and Myoglobin Adsorbed on a Silver Electrode", T.M. Cotton, S.G. Schultz, R.P. Van Duyne, *J. Am. Chem. Soc.*,102, 7960-7962 (1980).

37. "Crystal and Molecular Structure of an Unusual Salt Formed from the Radical Cation of Tetrathiafulvalene and the Trichloromercurate Anion", T.J. Kistenmacher, M. Rossi, C.C. Chiang, R.P. Van Duyne, A.R. Siedle, *Inorg. Chem.*,19, 3604-3608 (1980).

38. "Stimulated Raman Laser Excitation of Spontaneous Resonance Raman Scattering", K.D. Parks, R.P. Van Duyne, *Chem. Phys. Lett.*,76, 196-200 (1980).

39. "Image Field Theory of Enhanced Raman Scattering by Molecules Adsorbed on Metal Surfaces: Detailed Comparison with Experimental Results", G.C. Schatz, R.P. Van Duyne, *Surf. Sci.*,101, 425-438 (1980).

40. "(Tetrathiafulvalene)bis(acetylacentonato)palladium(II), a Metallotetrathiaethylene Containing Neutral Tetrathiafulvalene", A.R. Siedle, T.J. Kistenmacher, R.M. Metzger, C.-S. Kuo, R.P. Van Duyne, T.W. Cape, *Inorg. Chem.*,19, 2048-2051 (1980).

41. "Surface-Enhanced Raman Effect", R.P. Van Duyne, *Physics Today*,33, 18-20 (1980).

42. "Molecular Generality of Surface-Enhanced Raman Spectroscopy (SERS). A Detailed Investigation of the Hexacyanoruthenate Ion Adsorbed on Silver and Copper Electrodes", C.S. Allen, R.P. Van Duyne, *J. Am. Chem. Soc.*,103, 7497-7501 (1981).

43. "Characterization of Bacteriochlorophyll Interactions in Vitro by Resonance Raman Spectroscopy", T.M. Cotton, R.P. Van Duyne, *J. Am. Chem. Soc.*,103, 6020-6026 (1981).

44. "Surface Enhanced Raman Spectroscopy: A Re-Examination of the Role of Surface Roughness and Electrochemical Anodization", S.G. Schultz, M. Janik-Czachor, R.P. Van Duyne, *Surf. Sci.*,104, 419-434 (1981).

45. "Copper and Gold Metallotetrathiaethylenes", A.R. Siedle, G.A. Candela, T.F. Finnegan, R.P. Van Duyne, T.W. Cape, G.F. Kokoszka, P.M. Woyciesjes, J.A. Hasmall, *Inorg. Chem.*,20, 2635-2640 (1981).

46. "Surface-Enhanced Resonance Raman Scattering from Water-Soluble Porphyrins Adsorbed on a Silver Electrode", T.M. Cotton, S.G. Schultz, R.P. Van Duyne, *J. Am. Chem. Soc.*,104, 6528-6532 (1982).

47. "Resonance Raman Scattering from *Rhodopseudomonas Sphaeroides* Reaction Centers Absorbed on a Silver Electrode", T.M. Cotton, R.P. Van Duyne, *FEBS Lett.*,147, 81-84 (1982).

48. "A New 'Cool' Lens Capsulotomy Laser", G.D. Horn, M.V. Johnston, L.E. Arnell, R.P. Van Duyne, *Am. Intra-Ocular Implant Soc. J.*,8, 337-342 (1982).

49. "Surface-Enhanced Raman and Resonance Raman Spectroscopy in a Non-Aqueous Electrochemical Environment: Tris (2,2'-Bipyridine) Ruthenium (II) Adsorbed on Silver from Acetonitrile", A.M. Stacy, R.P. Van Duyne, *Chem. Phys. Lett.*,102, 365-370 (1983).

50. "Time Resolved Studies of Electrochemical SERS: The Pyridine/Cl^-/Ag Model System", A.M. Stacy, R.P. Van Duyne. in *Time-Resolved Vibrational Spectroscopy*; G.H. Atkinson, Ed.; Academic Press: New York, 1983; pp. 377-385.

51. "Surface-Enhanced Resonance Raman Spectroscopy of Adsorbates on Semiconductor Electrode Surfaces: Tris(bipyridine) Ruthenium(II) Adsorbed on Silver-Modified n-GaAs(l00)", R.P. Van Duyne, J.P. Haushalter, *J. Phys. Chem.*,87, 2999-3003 (1983).

52. "Molecular Generality of Surface-Enhanced Raman Spectroscopy: Application to the Study of Surface Resonance Raman-Enhanced Complexes of Iron (II) with l, l0-Phenanthroline on Silver and Iron", R.P. Van Duyne, M. Janik-Czachor, *J. Electrochem. Soc.*,130, 2320-2323 (1983).

53. "Resonance Raman Spectroelectrochemistry of Semiconductor Electrodes: The Photooxidation of Tetrathiafulvalene at n-GaAs(100) in Acetonitrile", R.P. Van Duyne, J.P. Haushalter, *J. Phys. Chem.*,88, 2446-2451 (1984).

54. "Surface-Enhanced Resonance Raman Spectroscopy of Adsorbates on Semiconductor Electrode Surfaces. 2. In Situ Studies of Transition Metal (Fe and Ru) Complexes on Ag/GaAs and Ag/Si", R.P. Van Duyne, J.P. Haushalter, M. Janik-Czachor, N. Levinger, *J. Phys. Chem.*,89, 4055-4061 (1985).

55. "Long Range Resonance Energy Transfer from Aromatic Hydrocarbons to the Anion Radical of TCNQ", L.I. Rangel-Zamudio, D.S. Rushforth, R.P. Van Duyne, *J. Phys. Chem.*,90, 807-811 (1986).

56. "Surface Raman Spectroscopy as an In-Situ Probe of Laser Microchemical Processes", R.P. Van Duyne, R.I. Altkorn, K.L. Haller, *IEEE Circuits and Devices*,2, 61-66 (1986).

57. "Determination of the Extent of Charge Transfer in Partially Oxidized Derivatives of Tetrathiafulvalene and Tetracyanoquinodimethane by Resonance Raman Spectroscopy", R.P. Van Duyne, T.W. Cape, M.R. Suchanski, A.R. Siedle, *J. Phys. Chem.*,90, 739-743 (1986).

58. "Spatially Resolved Surface Enhanced Raman Spectroscopy: Feasibility, Intensity Dependence on Sampling Area and Attomole Mass Sensitivity", R.P. Van Duyne, K.L. Haller, R.I. Altkorn, *Chem. Phys. Lett.*,126, 190-196 (1986).

59. "A Surface Enhanced Resonance Raman Study of Cobalt Phthalocyanine on Rough Ag Films: Theory and Experiment", E.J. Zeman, K.T. Carron, G.C. Schatz, R.P. Van Duyne, *J. Chem. Phys.*,87, 4189-4200 (1987).

60. "A Surface Enhanced Hyper-Raman Scattering Study of Pyridine Adsorbed Onto Silver: Experiment and Theory", J.T. Golab, J.R. Sprague, K.T. Carron, G.C. Schatz, R.P. Van Duyne, *J. Chem. Phys.*,88, 7942-7951 (1988).

61. "Spatially Resolved Surface Enhanced Second Harmonic Generation: Theoretical and Experimental Evidence for Electromagnetic Enhancement in the Near Infrared on a Laser Microfabricated Pt Surface", K.L. Haller, L.A. Bumm, R.A. Altkorn, E.J. Zeman, G.C. Schatz, R.P. Van Duyne, *J. Chem. Phys.*,90, 1237-1252 (1989).

62. "High T_c Y-Ba-Cu-O Films Prepared by Multilayer Reactive Sputtering From Separate Y, Cu, $Ba_{0.5}Cu_{0.5}$ Targets", S.J. Lee, K.C. Sheng, Y.H. Shen, E.D. Rippert, X.K. Wang, R.P. Van Duyne, R.P.H. Chang, J.B. Ketterson. in *Science and Technology of Fast Ion Conductors*; :, 1989; Vol. 199.

63. "Early Stages of Plasma Synthesis of Diamond Films", R. Meilunas, M.S. Wong, K.C. Sheng, R.P.H. Chang, R.P. Van Duyne, *Appl. Phys. Lett.*,54, 2204-2206 (1989).

64. "Raman Studies of Reactive DC-Magnetron Sputtered Thin Films of YBaCuO on MgO", K.C. Sheng, Y.H. Shen, X.K. Wang, E.D. Rippert, R.P. Van Duyne, J.B. Ketterson, R.P.H. Chang, *J. Mater. Res.*,4, 1312-1319 (1989).

65. "Atomic Force Microscopy and Surface-Enhanced Raman Spectroscopy. I. Ag Island Films and Ag Film Over Polymer Nanosphere Surfaces Supported on Glass", R.P. Van Duyne, J.C. Hulteen, D.A. Treichel, *J. Chem. Phys.*,99, 2101-2115 (1993).

66. "Evidence For Retention of Biological Activity of a Non-heme Iron Enzyme Adsorbed on a Ag-Colloid: A Surface-Enhanced Resonance Raman Scattering Study", J.B. Broderick, M.J. Natan, T.V. O'Halloran, R.P. Van Duyne, *Biochemistry*, 32, 13771-13776 (1993).

67. "Surface-enhanced second-harmonic diffraction: Selective enhancement by spatial harmonics", A.C.R. Pipino, G.C. Schatz, R.P. Van Duyne, *Phys. Rev. B*,49, 8320-8330 (1994).

68. "Self-assembled Monolayers of Ferrocenylazobenzenes on Au(111)/mica Films: Surface-Enhanced Raman Scattering (SERS) Response vs. Surface Morphology", W.B. Caldwell, K. Chen, B.R. Herr, C.A. Mirkin, J.C. Hulteen, R.P. Van Duyne, *Langmuir*,10, 4109-4115 (1994).

69. "A Rigorous Electrodynamic Model for Periodic Structure Formation During UV-laser-induced Metal Atom Deposition", A.C.R. Pipino, G.C. Schatz, R.P. Van Duyne, *Chem. Phys. Lett.*,237, 137-144 (1995).

70. "Nanosphere Lithography: A Materials General Fabrication Process for Periodic Particle Array Surfaces", J.C. Hulteen, R.P. Van Duyne, *J. Vac. Sci. Technol. A*,13, 1553-1558 (1995).

71. "Discrete Dipole Approximation for Calculating Optical Absorption Spectra and Surface-Enhanced Raman Intensities for Adsorbates on Metal Nanoparticles with Arbitrary Shapes", W.H. Yang, G.C. Schatz, R.P. Van Duyne, *J. Chem. Phys.*,103, 869-875 (1995).

72. "Optimized Surfaces for Second Harmonic Generation from Surface-Plasmon Polaritons: Theory and Experiment", A.C.R. Pipino, R.P. Van Duyne, G.C. Schatz, *SPIE*,2622, 254-261 (1995).

73. "A surface-enhanced hyper-Raman and surface-enhanced Raman scattering study of *trans*-1,2-bis(4-pyridyl)ethylene adsorbed onto silver film over nanosphere electrodes: Vibrational Assignments-Experiment and Theory", W.H. Yang, J.C. Hulteen, G.C. Schatz, R.P. Van Duyne, *J. Chem. Phys.*,104, 4313-4323 (1996).

74. "Surface-enhanced second-harmonic diffraction: Experimental investigation of selective enhancement", A.C.R. Pipino, G.C. Schatz, R.P. Van Duyne, *Phys. Rev. B*,53, 4162-4169 (1996).

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76. Surface-Enhanced Raman Spectroscopy of *trans*-Stilbene Adsorbed on Silver Film over Nanosphere Surfaces Modified by Platinum or Alkanethiol Deposition", P. Freunscht, R. P. Van Duyne, S. Schneider, *Chem. Phys. Lett.,* 281, 372-378 (1997).

77. "Low-loss liquid-core optical fiber for low-refractive-index liquids: Fabrication, characterization and application in Raman spectroscopy", R. I. Altkorn, I. Koev, R. P. Van Duyne, M. Litorja, *Appl. Opt.,* 36, 8992-8998 (1997).

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79. "Nanosphere Lithography: Surface plasmon resonance spectrum of a periodic array of silver nanoparticles by UV-vis extinction spectroscopy and electrodynamic modeling", T. R. Jensen, G. C. Schatz, R. P. Van Duyne, *J. Phys. Chem. B*, 103, 2394-2401 (1999).

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81. "Nanosphere lithography: Effect of the external dielectric medium on the surface plasmon resonance spectrum of a periodic array of silver nanoparticles", T. R. Jensen, M. L. Duval, L. Kelly, A. Lazarides, G. C. Schatz, R. P. Van Duyne, J. Phys. Chem. B, 103, 9846-9853 (1999).

82. "Surface Enhanced Infrared Spectroscopy: A Comparison of Metal Island Films with Discrete and Non-discrete Surface Plasmons", T. R. Jensen, R. P. Van Duyne, S. A. Johnson, and V. A. Maroni, Appl. Spectrosc., 54, 371-377 (2000).

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84. "Nanosphere Lithography: Tunable Localized Surface Plasmon Resonance Spectra of Silver Nanoparticles", T. R. Jensen, M. Duval Malinsky, C. L. Haynes, R. P. Van Duyne, J. Phys. Chem. B, 104, 10549-10556 (2000).

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Distinguished Lectures:

The 3rd Biennial Tony Fink Memorial Lecture, UC Santa Cruz, October 17, 2014
Plenary Lecture, SES2014, Chemnitz, Germany, August 7, 2014
Plenary Lecture, Italian Group of Interest in Raman Spectroscopy, Parma, Italy, June 9-11, 2014
RSC Sir George Stokes Award Lectureship, Universities of Bristol, Newcastle, & Strathclyde, April 7 - April 11, 2014.
The Eyring Lectures, Arizona State University, February 20-21, 2014
The Meloche Lecture, University of Wisconsin-Madison, October 11, 2012.
The 29th Amy-Mellon Lecture, Purdue University, September 18, 2012
The Barré Lectures, Université de Montréal, September 12-13, 2012
Plenary Lecture, ICORS2012, Bangalore, India, August 12-17, 2012
Summer Lectures, University of Wyoming, July 18-20, 2012
Plenary Lecture (via Skype), Yamada Conference LXVI, June 3-6, 2012
Plenary Lecture 1, EUROPT(R)ODE XI, Barcelona, Spain, Monday April 2, 2012.
3rd Annual Johannes F. Coetzee Lecture, University of Pittsburgh, March 21 2012.
Plenary Lecture, 3rd Asian Spectroscopy Conference, Xiamen, China, November 29, 2011
Dow Lecture in Analytical Chemistry, University of British Columbia, November 01, 2011
The Jortner Lectures, Tel Aviv University, Israel, November 1 and November 4, 2010.
G. F. Smith Memorial Lecture, University of Illinois Urbana-Champaign, October 14-15, 2010.
The Kolthoff Lectures, University of Minnesota, September 20-23, 2010
Keynote Address, Gordon Research Seminar on Electrochemistry, Ventura, CA, January 9, 2010
Centennial Lecture, University of Texas, Austin, September 11, 2008
Plenary Lecture, Swedish Chemical Society, Analysdagarna, Göteborg, Sweden, June 16, 2008
Professeur invite classe exceptionnelle, Université Pierre et Marie Curie, April 06-25, 2008
Plenary Lecture, Colloquium Spectroscopicum Internationale XXXV, 2007
Harteck Lecture, Rensselaer Polytechnic Institute, 2007
Keynote Lecture, The International Symposium on SERS, 2006
Plenary Lecture, International Conference on Raman Spectroscopy (ICORS), 2006
Lipscomb Lecture, University of South Carolina, 2006
Welch Foundation Lecturer, 2005
The Introductory Lecture, Faraday Discussion 132, 2005
Plenary Lecture, 3rd International Conference on Vibrational Spectroscopy, 2005
Frontiers in Chemistry Lecture, Case Western Reserve University, 2003
Summer Lecturer, University of Colorado, 2000
Miller and Trapp Family Lecturer, Iowa State University, 1998
Arthur A. Vernon Lecturer, Northeastern University, 1992
Henry Werner Lecturer, The University of Kansas, 1986
O.K. Rice Lecturer, University of North Carolina at Chapel Hill, 1984
Distinguished Speaker Lecturer, University of Utah, 1983
Kilpatrick Lecturer, Illinois Institute of Technology, 1982
McElvain Lecturer, University of Wisconsin at Madison, 1982
Camille and Henry Dreyfus Lecturer, University of Colorado, 1981
Frontiers in Chemistry Lecture, Case Western Reserve University, 1981
Distinguished Visiting Professor Lectureship, University of Texas at Austin, 1979
Von Humboldt Lecture, Fritz-Haber-Institut der Max-Planck Gessellschaft, Berlin, 1974

Invited Lectures:

"MURI: Electrochemical Imaging & Mechanistic Studies on the Nanoscale," AFOSR NMS&E Program Review, Fort Walton Beach, FL, Dec. 7, 2015

"Single Molecule Chemistry at the Nanometer Length Scale and Picosecond Time Scale," TERS-V (via Facetime), Osaka, Japan, October 28-30, 2015

"Detecting Organic Dyestuffs in Art with Surface-Enhanced Raman Spectroscopy," Rotary Club of Evanston Lighthouse, Evanston, IL 60202, September 22, 2015

"Detecting Organic Dyestuffs in Art with Surface-Enhanced Raman Spectroscopy," Iota Sigma Pi, Skokie, IL September 11, 2015

"Recent Advances in Tip-Enhanced Raman Spectroscopy," Japan Analytical and Scientific Instrument Show (JASIS) 2015, Tokyo, Japan, September 2, 2015

"Electrochemical Imaging & Mechanistic Studies on the Nanoscale," MURI Program Review, OSDS&E, Arlington, VA, August 3-4, 2015

"Tip-Enhanced Raman Spectroscopy," 15th International Conference on Vibrations at Surfaces, San Sebastian, Spain June 22-26, 2015.

"Recent Progress in the Study of Single Molecule Electrochemistry Using Surface-Enhanced and Tip-Enhanced Raman Spectroscopy," 227th ECS Meeting, Chicago, IL, May 25, 2015

"Single Molecule Chemistry at the Nanometer to Atomic Length Scale and Picosecond to Femtosecond Time Scale," Analytical Seminar, Penn State University, April 2, 2015

"Single Molecule Chemistry Probed by SERS and TERS at the nanometer length scale and picosecond time scale," Symposium on Probing Nano-Plasmonic Phenomena at the Single Molecule, Single Electron, and Single Photon Level, 249th ACS National Meeting, Thursday, March, 26, 2015, Denver, CO.

"Tip-Enhanced Raman Spectroscopy," SPECIAL SESSION: International Year of Light (SAS) Session, Pittcon 2015, New Orleans, LA, March 10, 2015

"Single Molecule and Single Nanoparticle Plasmonics," Symposium on Analytical Chemistry at the Single Molecule and Single Particle Level, Pittcon 2015, New Orleans, LA, March 9, 2015

"Recent Progress in the Study of Single Molecule Chemistry at the Nanometer to Atomic Length Scale and Picosecond to Femtosecond Time Scale," Nanoscale Science and Engineering (NSE) seminar, UC Berkeley, February 06, 2015

"The Nanotechnology of Light," Westminster Place, Evanston, IL, November 6, 2014

"Molecular Plasmonics for Nanoscale Spectroscopy," 2014 Tony Fink Symposium (via Skype), University of California Santa Cruz, October 17, 2014

"New Tools for the Study of Single Molecule Chemistry at the Atomic Length Scale and Femtosecond Time Scale," SciX 2014, 2014 Charles Mann Award Address, 9/30/14-, Reno, NV

"Glucose Sensing with SERS," SciX 2014, SPR Symposium, 5 speakers, 20 min each, 9/30/14, Reno, NV

"Surface and Tip-Enhanced Spectroscopies at the Limits of Sensitivity, Space, and Time," Plenary Lecture, SES2014, Technische Universität Chemnitz, D-09111 Chemnitz, Germany, August 7, 2014

"Single Molecule and Low Temperature Tip-Enhanced Raman Spectroscopy," Gordon Research Conference on Vibrational Spectroscopy, University of New England in Biddeford, ME., August 4, 2014

"Surface and Tip-Enhanced Spectroscopies at the Limits of Sensitivity, Space, and Time," CaSTL Summer School, University of California, Irvine, July 08-10, 2014

"New Approaches in Molecular Plasmonics for Biosensing," Gordon Research Conference on Bioanalytical Sensors, Salve Regina University, Newport, RI, June 22-27, 2014

"SERS at the Single Nanoparticle, Single Molecule, and Ultrafast Levels," Plenary Lecture (via Adobe-Connect), Italian Group of Interest in Raman Spectroscopy, Parma, Italy, June 9-11, 2014

"New Tools for the Study of Single Molecule Chemistry at the Atomic Length Scale and Femtosecond Time Scale," RSC Sir George Stokes Award Lectureship, University of Strathclyde, April 11, 2014.

"New Tools for the Study of Single Molecule Chemistry at the Atomic Length Scale and Femtosecond Time Scale," RSC Sir George Stokes Award Lectureship, University of Newcastle, April 9, 2014.

"New Tools for the Study of Single Molecule Chemistry at the Atomic Length Scale and Femtosecond Time Scale," RSC Sir George Stokes Award Lectureship, University of Bristol, April 7, 2014.

"Surface and Tip-Enhanced Spectroscopies at the Limits of Sensitivity, Space, and Time," ACS Meeting, E. Bright Wilson Award, March 18, Dallas, TX

"Ultrafast Plasmonics: Surface-Enhanced Femtosecond Stimulated Raman Spectroscopy," "Advances in Raman Spectroscopy," Organizer: Sandy Asher, Pittcon 2014, Monday afternoon, March 3, 2014, McCormick Place Convention Center, Chicago, IL

"Single Molecule and Low Temperature Tip-Enhanced Raman Spectroscopy," "Biological TERS: Instrumentation Development and Applications," Organizers: Volker Deckert and Igor K. Lednev, Wednesday morning, March 5, 2014, Pittcon 2014, McCormick Place Convention Center, Chicago, IL

"New Tools for the Study of Single Molecule Chemistry at the Atomic Length Scale and Femtosecond Time Scale," Technical Lecture, Spring 2014 Eyring Lectures, Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ, February 20-21, 2014

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," General Lecture (SERS, NSL, LSPR), Spring 2014 Eyring Lectures, Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ February 20-21, 2014

"Detecting Organic Dyestuffs in Art with SERS," "Preserving Our Cultural Heritage: Science in the Service of Art," AAAS Meeting in Chicago, February 14, 2014

"New Approaches in Molecular Plasmonics," Atlanta Area Chemical Physics Seminar, Emory University/Georgia Institute of Technology, Atlanta, GA, January 28-29, 2014.

"Ultra-High Vacuum Tip-Enhanced Raman Spectroscopy with Molecular-Resolution Scanning Tunneling Microscopy," 60th AVS International Symposium, Long Beach, CA, October 30, 2013 (presented by Dr. Nan Jiang).

"Toward UV-Surface Enhanced (Resonance) Raman Spectroscopy," UV-DUV Plasmonics and Nanophotonics Workshop(UPN2013), Osaka, Japan, October 28-29, 2013

"SERS and TERS for Catalysis," ARO Workshop on Surface Plasmons, Metamaterials, and Catalysis, Rice University, Houston TX October 21-23, 2013

"Advances in Ultrahigh Vacuum TERS," SCIX, Charles Mann Award Symposium, Milwaukee, WI, Monday September 30, 2013

"Ultrafast SERS," SCIX, SERS Symposium, Milwaukee, WI, Tuesday October 1, 2013

"New Approaches to Localized Surface Plasmon Resonance Biosensing," SCIX, SPR Symposium, Milwaukee, WI, Thursday October 3, 2013.

"Advances in Ultrahigh Vacuum Tip-Enhanced Raman Spectroscopy," Symposium on Nanoscale Analytical, 246th National Meeting of the American Chemical Society, 1:05 pm - 1:35 pm, Indiana Convention Center, Room: 115, September 09, 2013

"New Advances in Molecular Plasmonics," Symposium on Chemistry at the Space-Time Limit, 246th National Meeting of the American Chemical Society, 1:30 pm - 2:15 pm, Indiana Convention Center, Room: 241, September 08, 2013

"Single Molecule, Picosecond, and Low Temperature Ultrahigh Vacuum TERS," TERS III Workshop, ETH, Zurich, Switzerland, August 16-20, 2013

"Molecular Plasmonics for Nanoscale Spectroscopy and Sensing," Distinguished invited speaker, Moskovits Special Symposium at 96th Canadian Chemical Society Meeting, Québec City, Québec, Monday, May 27th, 2013.

"Extreme Molecular Plasmonics: The Ultimate Limits of Time, Space, and Number Density," CaSTL NSF CCI Site Review, UC Irvine, Irvine, CA, May 8-10, 2013

DARPA Kickoff for IVN:Dx, San Diego, CA, April 23-25, 2013

"Single Nanoparticle Plasmonics," Symposium to Honor Younan Xia for the ACS Award in the Chemistry of Materials, 245th ACS National Meeting, Monday April 08, 2013, New Orleans, LA.

DARPA Q6 Review Meeting, San Diego, CA, April 2-4, 2013

"SERS and TERS for Catalysis," UniCat-Northwestern, Berlin, March 17-20, 2013

"Glucose Sensing by Surface-Enhanced Raman Spectroscopy," Pittcon 2013, Symposium on Advances in Blood Glucose Monitoring, Tuesday morning, March 19, 2013, Pennsylvania Convention Center, Philadelphia, PA. (Presented by Bhavya Sharma)

"IRG3: Plasmonically Encoded Materials for Amplified Sensing and Information Manipulation," NSF MRSEC Review, Northwestern, March 14, 2013

"Raman Spectroscopy-Based Platform Technologies for Monitoring Drug Infusion," Baxter Healthcare Corporation, PI Meeting, Deerfield IL, 9am-12noon, February 21, 2013

"New Approaches in Molecular Plasmonics for Nanomedicine," Small Sciences Symposium for Nanomedicine, Mandarin Orchard Hotel, Singapore, December 10-12, 2012.

"Pushing the Sensitivity, Space and Time Limits of Nanoscale Spectroscopy," invited talk, 59th AVS International Symposium, Tampa, Florida, October 28, 2012 - November 2, 2012.

"New Directions in Molecular Plasmonics: Pushing the Sensitivity, Space, and Time Limits," Meloche Lecture, Department of Chemistry, University of Wisconsin, Madison, October 11, 2012.

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," The 29th Amy-Mellon Lecture, Department of Chemistry, Purdue University, September 18, 2012.

"New Directions in Molecular Plasmonics: Pushing the Sensitivity, Space, and Time Limits," Lecture #2, Barré Lectures at the Université de Montréal, Quebec, Canada, Thursday September 13, 2012

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Lecture #1, Barré Lectures at the Université de Montréal, Quebec, Canada, Wednesday September 12, 2012

"New Directions in Surface-Enhanced Raman Spectroscopy: Pushing the Sensitivity, Space, and Time Limits ," 3rd Japan-US Exchange Symposium, September 5, 2012 for JASIS 2012. JASIS 2012 will be held September 5-7, 2012 at Makuhari Messe, in Chiba Japan. (RVD Canceled)

"New Directions in Molecular Plasmonics: Pushing the Sensitivity, Space, and Time Limits," Plenary Lecture (via Skype), ISACS 9, Challenges in Nanoscience, Xiamen, China, August 31, 2012 - September 3, 2012

"Nanoplatforms for Molecular Plasmonics," Plenary Lecture (35 minutes with 10 minute question time), nanopatterns for surface plasmonic applications, IEEE 2012 International Conference on Nanotechnology (IEEE NANO 2012), Birmingham, UK, August 20-23, 2012. (RVD Canceled)

"New Directions in Surface-Enhanced Raman Spectroscopy: Pushing the Sensitivity, Space, and Time Limits," Plenary Lecture, ICORS2012, Bangalore, India, August 12-17, 2012

"Surface Enhanced Raman Spectroscopy for Art Conservation," Gordon Research Conference on Scientific Methods in Cultural Heritage Research, Mount Snow Resort, West Dover, VT, July 29 – August 3, 2012.

Summer Lectures at The University of Wyoming, July 18-20, 2012. Lecture 1: "Surface-Enhanced Raman Spectroscopy." Lecture 2: "Biosensing with Plasmonic Nanosensors" Lecture 3: "New Directions in Surface-Enhanced Raman Spectroscopy: Pushing the Sensitivity, Space, and Time Limits"

"New Tools for the Study of Chemical Reactions at the Atomic Length Scale and Femtosecond Time Scale," CaSTL 3rd Annual Meeting, UC Irvine, Irvine, CA, June 17-19, 2012

"New Directions in Plasmonics for Energy Conversion Research: Pushing the Sensitivity-Space-Time Limit," Plenary Lecture (via Skype), "International Conference on the Nanostructure-Enhanced Photo-Energy Conversion (Yamada Conference LXVI), The National Museum of Emerging Science and Innovation (Miraikan), Tokyo, Japan, June 5, 2012.

"Nanoplasmonics for High Sensitivity Biosensing," Plenary Lecture 1, Conference on Optical Chemical Sensors and Biosensors, EUROPT(R)ODE XI, Barcelona, Spain, Monday April 2, 2012.

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," 3rd Annual Johannes F. Coetzee Memorial Lecture, Department of Chemistry, University of Pittsburgh, Wednesday, March 21, 2012.

"New Directions in Plasmonics: Pushing the Space-Time Limit," "Chemical Physics of Clusters, Nanoparticles, and Nanoscale Materials" American Physical Society Meeting, Boston, MA, Session P34, (Focus Session: Nano III: New Nanoscale Fabrication and Sensing); 9:00-9:36 AM Wednesday 02/29/12, Room 107A.

"Pushing the Sensitivity, Space and Time Limits of Plasmonics," Revolutionary Solar Photoconversion Seminar, University of Colorado, Boulder, Colorado, February 9, 2012

"Pushing the Sensitivity, Space and Time Limits of Plasmonics," Department of Chemistry, Rice University, Houston, TX, January 25, 2012

"Pushing the Sensitivity, Space and Time Limits of Surface Enhanced Raman Spectroscopy," Department of Materials Science and Engineering, Nanyang Technological University, Singapore, Friday, December 2, 2011.

"Pushing the Limits of Surface-Enhanced Raman Spectroscopy: Single Molecules, Single Particles and Femtosecond Time Resolution" Plenary Lecture, Third Asian Spectroscopy Conference (ASC), Xiamen, China, Tuesday November 29, 2011

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Dow Lecture in Analytical Chemistry at University of British Columbia, November 01, 2011

"New Directions in Plasmonics: Pushing the Space-Time Limit," Faculty Lunch Seminar at Northwestern University, Tuesday, October 11, 2011

"Spectroscopy and Sensing at the Single Molecule and Single Nanoparticle Level," Nanoplasmonic sensors and spectroscopy 2011 (NSS'2011), Göteborg, Sweden, September 18 – 23, 2011

"Recent Advances in Molecular Plasmonics," Curie Symposium, 242nd ACS National Meeting, 2:30 pm to 3:00 pm, Sunday August 28, 2011

"Pushing the Limits: Single Molecule and Single Particle Surface-Enhanced Raman Spectroscopy," Advances in SERS and Molecular Plasmonics Symposium, 242nd ACS National Meeting, 08:30-08:50 August 28, 2011

"Nanoplasmonic Sensors and Spectroscopy," Invited Lecture, International Workshop on Nanoplasmonics for Energy and the Environment, Vigo, Spain, June 8-10, 2011

"Molecular Plasmonics: Nanoscale Spectroscopy and Sensing," Keynote Lecture, International Conference on Analytical Science (ICAS), May 23-26, 2011, Kyoto, Japan

"New Tools for the Study of Photocatalysis at the Atomic Length Scale and Femtosecond Time Scale," CaSTL NSF Site Visit, Irvine, CA May 12-13, 2011

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Joint NU/Tel Aviv/Bangalore Meeting, Northwestern University, Evanston, IL March 23-25, 2011

"Surface Enhanced Raman Spectroelectrochemistry," Charles N. Reilley Award Address, Pittcon 2011, Room 312 Georgia World Congress Center Convention Center, Atlanta, GA, Monday, 02:10 – 02:45 PM, March 14, 2011

"SERS of Hot Spots: Single Molecules and Single Particles," Symposium on "Building and Characterizing Hot Spots in SERS," Michael Natan Organizer, Pittcon 2011, Room 312 Georgia World Congress Center, Atlanta, GA, Sunday, 01:40 -02:15 PM, March 13, 2011

"Pushing the Limits: Single Molecule and Single Nanoparticle Spectroscopy," University of Washington, Seattle, Mar. 9, 2011

"Nanoplasmonic Spectroscopy and Sensors," Faculty Lunch Seminar at Northwestern University, Tuesday, February 22, 2011

"Single Molecule and Single Particle SERS," Pacifichem 2010, Symposium #72 (organizer = Yukihiro Ozaki), Honolulu, Hawaii, USA, December 18, 2010 from 7:30 AM to 8:10 AM; Location: Molokai (Sheraton Waikiki)

"High Resolution and High Throughput Plasmonic Biosensors," GE Global Research, Niskauyna, NY, November 17-18, 2010

"Pushing the Limits: Single Molecule and Single Nanoparticle Spectroscopy," The Jortner Lectures, Tel Aviv University, Israel, November 4, 2010

"Pushing the Limits: Single Molecule and Single Nanoparticle Spectroscopy," Chemistry Colloquium, Weizmann Institute of Science, Rehovot, Israel, November 3, 2010

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Institute Seminar at the Institute of Chemistry, Hebrew University, Jerusalem, Israel, November 2, 2010

"Molecular Plasmonics: Nanoscale Spectroscopy and Sensing," The Jortner Lectures, Tel Aviv University, Israel, November 1, 2010

"SERS Nanosensors for Art, Biomedical, and Biowarfare Applications," NU/AIC Symposium, Northwestern University, October 28, 2010

"Single Molecule and Single Nanoparticle Surface Enhanced Raman Spectroscopy," Keynote Lecture, Raman Spectroscopy Workshop, Argonne National Labs, October 22, 2010

Lecture #1 = "Molecular Plasmonics: Nanoscale Spectroscopy and Sensing, Lecture #2 = Surface-Enhanced Raman Spectroscopy: Single Molecules and Single Nanoparticles," The 2010 G. F. Smith Memorial Lecture, University of Illinois Urbana-Champaign, October 14-15, 2010.

Lecture 1: "Molecular Plasmonics: Nanoscale Spectroscopy and Sensing," Lecture 2: "Single Molecule and Single Nanoparticle Surface Enhanced Raman Spectroscopy," Lecture 3: "High Resolution and High Throughput Plasmonic Biosensors," Fall 2010 Kolthoff Lecture Series, University of Minnesota, September 20-23, 2010.

"Single Molecule Surface-Enhanced and Tip-Enhanced Raman Spectroscopy," CaSTL Symposium, UC Irvine, September 17-18, 2010

New Graduate Student Seminar, Northwestern University, Evanston, IL, 2:20 - 2:50 PM, TECH LR3, Friday September 10, 2010

"Applications of SERS to problems in Bioanalytical Chemistry and Art Conservation," A Half-Century at the Crossroads of Chemistry: Symposium in Honor of Royce Murray's 50 Years at Carolina, 240th ACS National Meeting, Boston, MA, Wednesday, August 25, 2010.

"Single Molecule and Single Nanoparticle Surface-Enhanced Raman Spectroscopy," ACS Award in Analytical Chemistry: Symposium in Honor of Richard Van Duyne, 240th ACS National Meeting, Boston, MA, Monday, August 23, 2010

"Wide-field LSPR Imaging: Single Nanoparticle Spectroscopy, Diffusional Dynamics, and Structural Characterization," New Frontiers in Single Molecule Detection and Single Cell Analysis, 240th ACS National Meeting, Boston, MA, Sunday August 22, 2010

"SERS, TERS, and Catalysis," UniCat-NU Annual Scientific Meeting, Evanston, IL August 19-20, 2010.

"Single Molecule and Single Nanoparticle Surface-Enhanced Raman Spectroscopy," Invited Lecture, XXII International Conference on Raman Spectroscopy, Boston, MA, Monday August 9, 2010

"Single Molecule and Single Particle SERS," SPIE 2010 Conference / Metallic Nanostructures and Their Optical Properties VIII, San Diego, CA, 1:30 PM Monday August 2, 2010 (presented by Dr. Anne-Isabelle Henry)

"SERS Nanoantennas with EF > 10^9: Lessons from Single Nanoparticles & Photonic Substrates," AFOSR Contractor's Meeting, Westfield's Marriott Hotel Washington Dulles, 14750 Conference Center Drive, Chantilly, Virginia 20151, May 23-26, 2010

"New Approaches in Plasmonics: Evaluating the Role of Surface Enhanced Nonlinear Optical Microscopy (via Skype)," microCARS Spring Workshop, Göteborg, Sweden May 9-11th

"SERS Nanoantennas with EF > 10^9: Lessons from Single Particle Nanoantennas & Photonic Substrates," SERS S&T, DARPA Review, Minneapolis MN, April 29, 2010
"High Resolution and High Throughput Plasmonic Biosensors (via Adobe Connect)," Functionalized plasmonic nanostructures for biosensing, Ascona, Switzerland, April 18-23, 2010

"Atomic Layer Deposition and Surface-Enhanced Raman Spectroscopy for Catalysis," George A. Olah Award Symposium in honor of Peter C. Stair, 239th ACS National Meeting, San Francisco, California, 2:30 PM, March 23, 2010

"Plasmonic Sensors Based on Anisotropic Metal Nanoparticles," Symposium on Analytical Applications of Anisotropic Metal Nanoparticles, Pittcon 2010, Orlando, FLA, Thursday, March 04, 2010

"Applications of SERS to Problems in Biomedical Science and Art Conservation," Pittcon 2010, Orlando, FLA, Wednesday, March 03, 2010

"Single Molecule Surface-Enhanced Raman Spectroscopy," Bomem-Michelson Award Address, Pittcon 2010, Orlando, FLA, Tuesday, March 02, 2010

"The Central Role of Electrochemistry in the Discovery and Evolution of Surface-Enhanced Raman Spectroscopy," Keynote Address, The Gordon Research Seminar on Electrochemistry, Ventura, CA, January 8-11, 2010

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Colloquium, Columbia University, New York, New York, December 10, 2009.

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Physical Chemistry seminar, University of California - Berkeley, Berkeley CA, November 10, 2009.

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Colloquium, Cornell University, Ithaca, New York, September 21, 2009.

"Exploring single-molecule SERS, the plasmonic periodic table, and plasmon microscopy," JNCASR Workshop, Bangalore, India, August 29 - September 3, 2009. Presented by Paige Hall for RVD.

"Molecular Plasmonics for Nanoscale Sensing,"ACS Meeting,Washington DC, Sunday August 16, 2009. Presented by Kristin Wustholz for RVD

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Research seminar for NSEC, MRSEC, and CCNE REU's, Nano4003, Northwestern University, Evanston, IL, 4-5 pm August 6, 2009

"Exploring single-molecule SERS and single-nanoparticle plasmon microscopy," Conference on *Plasmonics: Metal Nanostructures and Their Optical Properties VII,* SPIE 2009 Optics and Photonics, San Diego, CA, August 2, 2009

NSF Workshop on "Chemistry and Materials Research at the Interface between Art and Science," Washington, DC, July 6-8, 2009
"Molecular Plasmonics," AFOSR Contractor's Meeting, San Diego, CA, May 17-19, 2009

"Molecular Plasmonics," Faculty Lunch Seminar at Northwestern, May 05, 2009

"Single Molecule Surface Enhanced Raman Spectroscopy," Time Resolved Vibrational Spectroscopy, The Inn and Spa at Mill Falls, Meredith, New Hampshire, May 9-14, 2009

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Nano Institute Seminar, University of Utah, Salt Lake City, UT, April 23-24, 2009

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Analytical Seminar, Notre Dame University, South Bend, IN, April 16, 2009

"Exploring single molecule SERS, the plasmonic periodic table, and plasmon microscopy," Symposium on "Frontiers in Nanoparticles and Nanoparticle Materials," 237th National American Chemical Society Meeting, Salt Lake City, UT, March 22-26, 2009

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," 7th annual iNANO meeting, University of Aarhus, DK-8000 Aarhus C, Denmark, January 21, 2009

"Ultrahigh Performance Nanoantennas for Surface Enhanced Raman Spectroscopy," DARPA SERS S&T PI Meeting, Minneapolis, MN, January 6-7, 2009

"Ultrahigh Performance Nanoantennas for Surface Enhanced Raman Spectroscopy," DARPA Kickoff NU SERS S&T Center, Northwestern University, December 17, 2008

"Localized Surface Plasmon Resonance Biosensors," Extreme Biosensing 2008, December 11-13, Maui, HI

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy" Optical Biosensor Symposium, Fall MRS Meeting, Boston, MA, December 1-5, 2008

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy" 2008 Lippincott Award Address, FACSS Conference, Reno, Nevada, September 28-October 2, 2008.

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," The Centennial Lecture, University of Texas, Austin, September 11, 2008

"SERS Fundamentals and Outlook, ICORS XXI, Brunel University, West London, England, August 17-22, 2008.

"SERS Fundamentals and Outlook" Gordon Research Conference on Plasmonics, Tilton School, Tilton, NH, July 27 - August 1, 2008.

"Ultrahigh Performance Nanoantennas for Surface Enhanced Raman Spectroscopy," DARPA MEMS PI Meeting, Vail, CO, July 22-24, 2008

"Surface-Enhanced Raman Spectroscopy: Some Fundamentals and Sensing Applications," The Swedish Chemical Society, Analysdagarna, Spectroscopy Symposium, Göteborg, Sweden, June 18, 2008

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Plenary Lecture, The Swedish Chemical Society, Analysdagarna, Göteborg, Sweden, June 16, 2008

"Ultrahigh Performance Nanoantennas for Surface Enhanced Raman Spectroscopy," DARPA Kickoff Meeting, Minneapolis, MN, May 22, 2008

Université Pierre et Marie Curie (Paris VI), April 08-18, 2008, R. P. Van Duyne

1. "Nanosphere Lithography: A Versatile Nanofabrication Tool for Molecular Plasmonics"
2. "Localized Surface Plasmon Resonance Spectroscopy: Fundamentals"
3. "Localized Surface Plasmon Resonance Spectroscopy: Chemical and Biological Sensing"
4. "Surface-Enhanced Raman Spectroscopy: Fundamentals"
5. "Surface-Enhanced Raman Spectroscopy: Applications in Electrochemistry, Surface, Science, Biosensing, and Art Conservation"

Workshop Honoring Richard P. Van Duyne, "Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," University Pierre et Marie Curie, Paris, April 10, 2008, R. P. Van Duyne

"Single Molecule Surface-Enhanced and Tip-Enhanced Raman Spectroscopy," NSF CBC Site Visit, University of California, Irvine, February 5, 2008.

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," Seminar, Department of Chemistry, University of California, Irvine, February 4, 2008.

"Molecular Plasmonics for Surface Enhanced Sensing and Raman Spectroscopy," Colloquium, Department of Chemistry, University of Arizona, Tucson, AZ, November 15, 2007

"Molecular Plasmonics: Nanoscale Sensing and Spectroscopy," International Institute of Nanotechnology Symposium, Northwestern University, October 23-24, 2007.

"Molecular Plasmonics," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, October 16, 2007.

"Molecular Plasmonics," 7th Annual Meeting of the Fitzpatrick Institute for Photonics (FIP), Duke University, Durham, North Carolina, October 11-12, 2007.

"Surface Enhanced Raman Spectroscopy: New Insights From Coupled Molecular and Plasmon Resonances," Plenary Lecture, Colloquium Spectroscopicum Internationale XXXV, Xiamen, China, September 23-27, 2007.

"Spectroscopic antennas: SERS substrates for the enhanced detection of artists' red colorants", invited oral presentation at the IV International Conference on the Application of Raman Spectroscopy in Art and Archaeology 5-8th September 2007 - Modena (Italy), presented by F. Casadio.

"Molecular Plasmonics for Surface Enhanced Sensing and Raman Spectroscopy," International Conference on Molecular Photonics: Interaction of Light with Nanostructured Materials, The Friday Harbor Laboratories, University of Washington, San Juan Islands, WA, August 28-31, 2007. (Declined)

"Coupled Molecular and Plasmon Resonances," SPIE, Plasmonics: Metallic Nanostructures And Their Optical Properties V (OP213) San Diego, CA, August 26, 2007. (Presented by Jing Zhao)

"Localized surface plasmon resonance spectroscopy and sensing" 234th American Chemical Society National Meeting, Boston, MA, Sunday, 19 August 2007, 2:00 PM to 2:30 PM

"Molecular Plasmonics for Surface Enhanced Sensing and Raman Spectroscopy," Harteck Lecture, Department of Chemistry, Rensselaer Polytechnic Institute, Troy, NY, June 06, 2007.

"Nanotechnology for sensing: SERS substrates for the identification of artists' red colorants" invited oral presentation at the European Materials Science Symposium, 2007 Spring meeting, Workshop: Science & Technology of Cultural heritage Materials: Art conservation and Restoration. May 28 - June 1, 2007, Strasbourg (France), presented by F. Casadio.

"Coupled Molecular and Plasmon Resonances," AFOSR Molecular Dynamics and Theoretical Chemistry Contractors Meeting, Irvine, CA, May 20-22, 2007.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Seminar, Department of Chemistry & Biochemistry, University of Maryland, College Park, MD, April 27, 2007.

"Molecular Plasmonics for Surface Enhanced Sensing and Raman Spectroscopy," Seminar, Department of Chemistry, Tufts University, Boston, MA, April 17, 2007.

"Towards Understanding the Relationship Between a Single Nanoparticle's Structure and its Localized Surface Plasmon Resonance," Midwest MRSEC 2007 Symposium, April 14, 2007, Lecture delivered by Dr. Katherine A. Willets.

"Plasmonics and Diffractive Coupling in 1D and 2D Arrays of Nanoparticles Produced by Electron Beam Lithography," Pittcon 2007, Chicago, IL, Thursday March 01, 2007.

"Surface Enhanced Raman Sensors," Pittcon 2007, Chicago, IL, Tuesday February 27, 2007.

"Localized Surface Plasmon Resonance Spectroscopy," Pittcon 2007, Chicago, IL, Tuesday February 27, 2007.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," 1st International Max Planck Research School, "Complex Surfaces in Materials Science (IMPRS-CS)," Ringberg Castle, Germany, February 5-9 2007.

"Surface-Enhanced Raman Sensors: Theory and Experiment," JSTO PST Basic Science Review, Lorton, VA, February 7-8, 2007.

"Molecular Plasmonics for Surface Enhanced Sensing and Raman Spectroscopy," Seminar, Department of Chemistry, Stanford University, Stanford, CA, January 29, 2007.

"Nanoparticle/Solution and Electrode/Solution Interfaces Studied by Surface-Enhanced Raman Spectroscopy," 2007 Electrochemistry Gordon Research Conference, Ventura, CA, January 14 - 19, 2007.

"Single Molecule SERS: Existence Proof & Dynamics," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, October 17, 2006.

"Regular and random nanoparticle arrays for LSPR and SERS," 232nd American Chemical Society National Meeting, San Francisco, CA, September 10-14, 2006, Lecture delivered by Dr. Katherine A. Willets.

"Operando surface-enhanced Raman spectroscopy (SERS)," 232nd American Chemical Society National Meeting, San Francisco, CA, September 10-14, 2006, Lecture delivered by Ms. Alyson V. Whitney.

"SERS 2006: New Concepts, Materials, and Characterization Methods," Keynote Lecture, The International Symposium of Surface Enhanced Raman Scattering and Spectroscopy (SERSS-2006), Kwansei Gakuin University Convention Center, Nishinomiya, Hyogo, Japan, August 28-30, 2006.

"Molecular Plasmonics for Surface Enhanced Sensing and Raman Spectroscopy," Plenary Lecture, International Conference on Raman Spectroscopy (ICORS) 2006, Yokohama, Japan, August 20-25, 2006.

"Size and Shape Effects on Plasmon Resonances" Gordon Research Conference on Plasmonics, Keene State College, Keene, NH, July 23-28, 2006, Lecture delivered by Dr. Amanda J. Haes.

"Surface Enhanced Raman Sensors for Metabolic Analytes," Gordon Research Conference on Lasers In Medicine & Biology, Holderness School, Plymouth, NH, July 2-7 2006.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Colloquium, Laboratory for Nanophotonics, Rice University, Houston, TX, May 10, 2006.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Colloquium, Department of Chemistry, Texas A&M University, College Station, TX, May 2, 2006.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," 2006 Guy Fleming Lipscomb Lecture, Department of Chemistry and Biochemistry, University of South Carolina, Columbia, SC, April 21, 2006.

"Nanoparticle Optics: New Materials, Concepts, and Applications," 2006 Optical Science and Technology Center Symposium, Department of Chemistry, University of Iowa, Iowa City, IA, April 10, 2006.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Inorganic Chemistry Seminar, Department of Chemistry, University of Pennsylvania, Philadelphia, PA, April 4, 2006.

"Plasmonic nanostructures for highly sensitive detection of traditional artists' red dyestuffs with surface enhanced Raman spectroscopy," presented by F. Casadio at the Young Chemists' workshop on Chemistry for the Conservation of Cultural heritage: Present and Future Perspectives, Perugia, March 19-22, 2006

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Modern Optics and Spectroscopy Seminar, G.R. Harrison Spectroscopy Laboratory, Massachusetts Institute of Technology, Cambridge, MA, March 21, 2006.

"Surface-Enhanced Raman Sensors for Quantitative Biowarfare Agent Detection," Pittcon 2006, Orlando, FL, Tuesday March 14, 2006.

"Nanoparticle Optics: New Materials, Concepts, and Characterization Methods," Invited Talk, American Physical Society Meeting, Baltimore, MD, Monday March 13, 2006.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Chemistry Division Colloquium, Naval Research Laboratory, Washington, DC, January 19, 2006.

"Surface Enhanced Raman Spectroscopy: New Materials, Concepts, Characterization Tools, and Applications," Society for Applied Spectroscopy, Chicago Section, Arlington Heights, IL Tuesday, January 10, 2006.

"New Directions in Nanoparticle Optics," Pacifichem 2005, Waianae (Sheraton Waikiki), Honolulu, Hawaii, 12:35-1:05 PM, December 15, 2005.

"Biomedical Applications of Molecular Plasmonics," Pacifichem 2005, Ballroom Salon G (Renaissance Ilikai), Honolulu, Hawaii, 9:20-9:50 AM, December 15, 2005.

"Molecular Plasmonics for Biosensing: New Concepts, Materials, and Methods," Nanobiotech 2005, Lahaina, Hawaii, December 11-15, 2005.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Seminar, Department of Chemistry, University of Cincinnati, Cincinnati, OH, December 2, 2005.

"Molecular Plasmonics," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, November 15, 2005.

"Nanoparticle/Solution Interfaces Studied by Surface-Enhanced Raman Spectroscopy," 2005 Welch Foundation Conference on Chemical Research, Houston, Texas, October 24-25, 2005.

"Silver island films as substrates for surface-enhanced Raman spectroscopy (SERS): a methodological study of their applications to artists' red dyestuffs," SPIE Optics East Conference in Boston, MA, October 23-26, 2005, Lecture delivered by Ms. Alyson V. Whitney.

"From Dinner at the Carolina Inn to Molecular Plasmonics," Pete Kissinger Symposium on Advances in Bioanalytical Chemistry and the Changing Climate for Academic Engagement with Commercial Entities, Department of Chemistry, Purdue University, West Lafayette, IN, October 6-7, 2005.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," The Introductory Lecture, Faraday Discussion 132: Surface Enhanced Raman Spectroscopy, Imperial College London, London, United Kingdom, September 19-21, 2005.

"An innovative Surface-Enhanced Raman Spectroscopy (SERS) method for the Identification of Traditional Red Lakes and Dyestuffs," 3rd International Conference on the Application Raman Spectroscopy in Art and Archaeology, Paris, France, Alyson Whitney, August 31 – September 03, 2005.

"First steps toward understanding Alzheimer's Disease using localized surface plasmon resonance spectroscopy," 230th American Chemical Society National Meeting, Washington, DC, August 31, 2005, delivered by Dr. Amanda J. Haes.

"Nanostructures for SERS," 230th American Chemical Society National Meeting, Washington, DC, August 28, 2005.

"Molecular plasmonics for ultrasensitive biosensing," 230th American Chemical Society National Meeting, Washington, DC, August 28, 2005.

"Molecular Plasmonics for Biosensing," Abbott Laboratories, Diagnostics Division, Abbott Park, IL, August 23, 2005.

"Molecular Plasmonics for Surface Enhanced Sensing and Spectroscopy," Plenary Lecture, Third International Conference on Advanced Vibrational Spectroscopy, Lake Lawn Conference Center, Delavan, WI, August 14, 2005.

"Chem/Bio Sensors Using Surface-Enhanced Raman Scattering," DARPA Workshop on SERS, San Francisco, CA, July 29, 2005.

"Tip-Enhanced Raman Spectroscopy for Applications in Nanotribology and High Spatial Resolution Chemical Analysis," Graduate Research Seminar and Gordon Research Conference on Analytical Chemistry, Roscoff, France, Matthew Young, June 10-17, 2005.

"New Materials and Characterization Methods for Molecular Plasmonics," Surface Plasmon Photonics 2, SPP2, Auditorium, University of Graz, Universitätsplatz 3, 1st floor, Graz (Austria), May 22-26, 2005.

"Molecular Plasmonics: Origins, Fundamentals, and Sensor Applications," Molecular Plasmonics International Symposium, Institute for Physical High Technology, Jena (Germany), May 19-21, 2005.

"Molecular Plasmonics for Surface-Enhanced Spectroscopy and Biosensing," Atlanta Area Chemical Physics Seminar, Emory University/Georgia Institute of Technology, Atlanta, GA May 02-03, 2005.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," Nanotechnology Seminar, University of Washington, Seattle, WA, April 26, 2005.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," Chemistry Department Colloquium, The Pennsylvania State University, University Park, PA, April 21, 2005.

"Molecular Plasmonics for Surface-Enhanced Spectroscopy and Biosensing," Chemistry Department Seminar, Clemson University, Clemson, SC, April 14, 2005.

"From the Fundamentals of Nanoparticle Optics to the Development of Practical Chemical and Biological Sensors based on Surface-Enhanced Raman Scattering," 2005 Nobel Laureate Signature Award for Graduate Education, American Chemical Society National Meeting, San Diego, CA, March 15, 2005.

"Nanoscale Optical Biosensors," Pittcon 2005, Orlando, FL, March 2, 2005.

"Spectroscopic Detection of Glucose with Novel Surface Enhanced Raman Substrates," Pittcon 2005, Orlando, FL, March 2, 2005.

"Molecular Plasmonics for Surface-Enhanced Spectroscopy and Biosensing," Analytical Division Seminar, Purdue University, West Lafayette, IN, February 15, 2005.

"Molecular Plasmonics for Surface-Enhanced Spectroscopy and Biosensing," National Institute of Science and Technology, Gaitherburg, MD, January 28, 2005.

"Molecular Plasmonics for Biosensing and Surface-Enhanced Spectroscopy," Nanoplex Technologies, Inc., Menlo Park, CA, January 11, 2005.

"Molecular Plasmonics for Biosensing and Surface-Enhanced Spectroscopy," IBNAM, Northwestern University, January 7, 2005.

"Molecular Plasmonics for Surface-Enhanced Spectroscopy and Biosensing," Tamar Seideman Group Meeting, Northwestern University, January 6, 2005.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," Inter-Pacific Workshop on Nanoscience and Nanotechnology, City University of Hong Kong, November 23, 2004.

"Molecular Plasmonics for Surface-Enhanced Spectroscopy and Biosensing," Graz-Mainz Joint Seminar on Plasmonics, Max Planck Institut für Polymerforschung, Universität Mainz, Germany, November 19, 2004.

"Plasmonic Nanosensors," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, October 26, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," Chemistry Department Colloquium, University of Chicago, Chicago, IL, October 25, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," Materials Science & Engineering Department, University of Illinois, Urbana-Champaign, IL, September 27, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," University of Michigan, Ann Arbor, MI, September 16, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," University of North Carolina, Chapel Hill, NC, August 30, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," North Carolina State University, Raleigh, NC, August 27, 2004.

"Metal Nanoparticle Interfaces as Studied by Surface-Enhanced Spectroscopy and Scanning Probe Microscopy," Gordon Research Conference on Chemistry at Interfaces, Kimball Union Academy, Meriden, NH, August 15, 2004.

"Surface-Enhanced Raman Scattering: Detection of Glucose in Physiological Conditions", Presented by Chanda Ranjit Yonzon, ICORS2004, International Conference on Raman Spectroscopy, Brisbane, Australia, August 08-13, 2004.

"Surface-Enhanced Raman Spectroscopy (SERS): Where Have We Been and Where are We Going?" Gordon Research Conference on Vibrational Spectroscopy, Roger Williams University, Bristol, RI, July 15, 2004.

"Nanoscale Optical Biosensors," Gordon Research Conference on Bioanalytical Sensors, Queen's College, Oxford, UK, July 06, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," Surface Analysis 04/PNWAVS Conference, Pacific Northwest National Laboratory, Richland, WA, June 16, 2004.

"Nanoparticles: Applications in Clinical Diagnostics," Distinguished Speakers Forum, Abbott Laboratories, Diagnostics Division, Abbott Park, IL, May 11, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Raman Spectroscopy," Chicago Section, American Chemical Society, Chicago, IL, April 23, 2004.

"Analysis of Biological Targets using Localized Surface Plasmon Resonance Spectroscopy", Department of Chemistry, Northwestern University, 2004 Industrial Associates Meeting, Chemistry of Life Processes and Nanobiotechnology, Amanda J. Haes, April 20, 2004.

"A Glucose Biosensor based on Surface-Enhanced Raman Spectroscopy," 227th American Chemical Society National Meeting, Anaheim, CA, April 01, 2004.

"Optimization of Nanoparticle Biosensors Based On Localized Surface Plasmon Resonance Spectroscopy," 227th American Chemical Society National Meeting, Anaheim, CA, March 31, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Raman Spectroscopy," 227th American Chemical Society National Meeting, Anaheim, CA, March 29, 2004.

"Nanoparticle Optics: From Surface-Enhanced Raman Scattering, to Localized Surface Plasmon Resonance Spectroscopy, to Single Nanoparticle Sensors," 2004 Earle K. Plyler Prize Address, Annual American Physical Society March Meeting, Montreal, Quebec, Canada, March 23, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing," Pittcon 2004, Chicago, IL, March 12, 2004.

"Opportunities for Analytical Chemistry in Nanoscale Science and Technology," Pittcon 2004, Chicago, IL, March 10, 2004.

"Localized Surface Plasmon Resonance Nanosensors," Pittcon 2004, Chicago, IL, March 10, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy," 7th Symposium on Molecular Reaction Dynamics in Condensed Matter, Laguna Beach, CA, March 3-6, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy", CPCC Seminar, Northwestern University, February 09, 2004.

"Refractive index sensitive, plasmon resonant scattering, and surface enhanced Raman scattering nanoparticles and arrays as biological sensing platforms," SPIE Photonics West (BiOS 2004), Symposium on Plasmonics In Biology And Medicine, San Jose, CA, January 26, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy", Nanophotonics Workshop, Stanford Photonics Research Center, Stanford University, Stanford, CA, January 24, 2004.
"Localized Surface Plasmon Resonance Nanosensors", Nanobiotech 2004, Kohala Coast, Hawaii, January 09, 2004.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy", Workshop France-USA, Molecular Scale Electronics, Paris, France, December 19, 2003

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy", Department of Applied Physics, Chalmers University, Göteborg, Sweden, December 15, 2003.

"Probing the Long Range Distance Dependence of Noble Metal Nanoparticles," Materials Research Society Meeting, Boston, MA, December 2003.

"Searle Fellows Retreat," Harrison Conference Center, Lake Bluff, IL, November 21-22, 2003.

"Nanoparticle Optics", Seminar, Materials Science Program and Materials Science Center, Miami University Nanotechnology Symposium, Oxford, OH, November 13-14, 2003.

"Noble Metal Nanoparticles: Fabrication, Structure, and Size-Dependent Optical Properties", The University of Wisconsin-Madison, Madison, WI, Materials Science Seminar, Materials Science Department, November 06, 2003.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy", Seminar, Materials Science, University of Tennessee, Knoxville, TN, October 23, 2003.

"Nanoparticle Optics for Chemical and Biological Sensing", FACSS Meeting, Ft. Lauderdale, FL, October 19-23, 2003.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy", Seminar, Department of Chemistry, University of California-Berkeley, Berkeley, CA, October 2, 2003.

"Nanoparticle Optics for Surface-Enhanced Sensing and Spectroscopy", Inorganic and Electrochemistry Seminar, California Institute of Technology, Pasadena, CA, September 30, 2003.

"Nanoporus Membranes Fabricated by Nanosphere Lithography and Reactive Ion Etching", Poster Session, Annual Scientific Meeting of Molecular Modeling as a Mainstream Research Tool in Catalysis, Northwestern University, September 16, 2003.

"Nanosphere Lithography: Nanoparticle Optics, Biosensors, and Surface-Enhanced Spectroscopy", Research Seminar for New Graduate Students, Department of Chemistry, Northwestern University, September 4, 2003.

"Noble Metal Quantum Dots: Fabrication, Structure, and Size-Dependent Optical Properties", 2nd Annual Workshop on the Evolution and Self-Assembly of Quantum Dots, Northwestern University, August 27, 2003.

"Optical Nanoarrays SRG & Nanopatterning SRG", NU-NSEC Annual Review Meeting, Center for Nanofabrication & Molecular Self-Assembly, Northwestern University, Evanston, IL, August 21, 2003.

"An Electrochemical Surface-Enhanced Raman Spectroscopy Approach to Anthrax Detection", SPIE Annual Meeting, San Diego, CA, August 3-8, 2003.

"Localized Surface Plasmon Resonance Immunoassay and Verification Using Surface-Enhanced Raman Spectroscopy", SPIE Annual Meeting, San Diego, CA, August 3-8, 2003.

"Nanoparticle Optics: Sensing with Nanoparticle Arrays and Single Nanoparticles", SPIE Annual Meeting, San Diego, CA, August 3-8, 2003.

"Nanoscale Optical Biosensors Based on Localized Surface Plasmon Resonance Spectroscopy", SPIE Annual Meeting, San Diego, CA, August 3-8, 2003.

"Nanoscale Optical Biosensors", Northwestern University, Medtronics, Evanston Northwestern Hospital/Northwestern University Sensors Group, Evanston, IL, July 18, 2003.

"Nanoscale Optical Biosensors", Center for Nanofabrication & Molecular Self-Assembly, NSEC NSF Site Visit, June 4-5, 2003.

"Nanoscale Optical Biosensors Based on Localized Surface Plasmon Resonance Spectroscopy," Great Lakes Regional ACS Meeting, Chicago, IL, May 2003.

"Multidimensional Surface-Enhanced Sensing and Spectroscopy", AFOSR Molecular Dynamics and Theoretical Chemistry Contractors Meeting, San Diego, CA, May 19, 2003.

"Silver Nanoparticles: Size Dependent Optical Properties, Biosensors, and Surface-Enhanced Spectroscopy", Department of Chemistry, Northwestern University, 2003 Industrial Associates Meeting on Electrons, Photons, Chemistry, and Materials, May 09, 2003.

"Toward a Glucose Biosensor Based on Surface-Enhanced Raman Spectroscopy", Institute for Bioengineering and Nanoscience in Advanced Medicine Symposium, Northwestern University, Galter Pavilion, Chicago, IL, May 02, 2003.

"Nanoscale Optical Biosensors", Northwestern University, Abbott Laboratories, Center for Nanofabrication and Molecular Self-Assembly, April 29, 2003.

"Nanoscale Optical Biosensors Based On Localized Surface Plasmon Resonance Spectroscopy", 225th ACS National Meeting, New Orleans, LA, March 23-27, 2003.

"Nanoparticle Optics: Single Silver Nanoparticles as Chemical Sensors", 225th ACS National Meeting, New Orleans, LA, March 24, 2003.

"Surface-Enhanced Raman Spectroscopy: A Funny Thing Happened to me on the Way to Southampton," Symposium on That'll Never Work: Analytical Chemists Doing the Perceived Impossible, 225th ACS National Meeting, New Orleans, LA, March 23, 2003.

"Nanoparticle Optics: Surface-Enhanced Spectroscopy", Symposium in Memory of Mike Weaver, 225th ACS National Meeting, New Orleans, LA, March 23, 2003.

"Nanoscale Optical Biosensors", Northwestern University, Air Products & Chemicals, Center for Nanofabrication and Molecular Self-Assembly, Evanston, IL, March 17, 2003.

"Nanoparticle Optics for Chemical/Biological Sensing and Surface-Enhanced Spectroscopy", PITTCON 2003, Orlando, FL, March 11, 2003.

"Silver Nanoparticles: Size Dependent Optical Properties, Biosensors, and Surface-Enhanced Spectroscopy", Frontiers in Chemistry Lecture, Department of Chemistry, Case Western Reserve University, Cleveland, Ohio, February 20, 2003.

"Surface Methods for Optical Biosensing", Invited Speaker at World Technology Evaluation Center (WTEC) Biosensing Workshop, National Institutes of Health, Baltimore, MD, December 4, 2002.

"Nanoscale Optical Biosensors", Invited Speaker at Lester Wolfe Workshop in Laser Biomedicine, Massachusetts Institute of Technology, Cambridge, MA, December 3, 2002.

"Nanoparticle Optics: Localized Surface Plasmon Resonance (LSPR) Immunoaasay, Single Nanoparticles, and SERS Glucose," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, November 19, 2002.

"Localized Surface Plasmon Resonance Spectroscopy", Department of Chemistry, Indiana University, Bloomington, IN November 7, 2002.

"Nanosphere Lithography: Nanoparticle Optics, Biosensors, and Surface-Enhanced Spectroscopy", FACSS 2002, Providence, RI, October 17, 2002.

"Nanosphere Lithography: Nanoparticle Optics, Biosensors, and Surface-Enhanced Spectroscopy", Department of Chemistry, The University of Illinois, Urbana-Champaign, IL, September 20, 2002.

"Nanosphere Lithography: A Versatile Platform for the Study of Size Dependent Nanoparticle Optical Properties", SPIE 47th Annual Meeting, Seattle, WA, July 7-11, 2002.

Seminar, Nanoplex Technologies, Inc., Mountain View, CA, June 16-17, 2002.

"Nanosphere Lithography: A Versatile Nanofabrication Tool for the Study of Size-Dependent Material Properties", US Nanofab Delegation to Korea, Seoul, Korea, June 3, 2002.

"Fundamental Studies and Applications of Noble Metal Nanoparticles", Industrial Associates Meeting – Colloids and Surface Science, Department of Chemistry, Northwestern University, May 26, 2002.

"New Advances in Electrochemical Surface-Enhanced Raman Spectroscopy", 201st Electrochemical Society Meeting, Symposium on Progress in Methods Used to Solve Electrochemical Problems: Part #3 New Developments in Optical Methods, Philadelphia, PA, May 15, 2002.

"Nanosphere Lithography: Nanoparticle Optics, Biosensors, and Surface-Enhanced Spectroscopy", Department of Chemistry, University of California, Irvine, CA, May 07, 2002.

"Triangular Silver Nanoparticles Fabricated by Nanosphere Lithography are Ultrasensitive Biosensors", 223rd ACS National Meeting, Orlando, FL, April 07, 2002.

"Nanosphere Lithography: Nanoparticle Optics, Biosensors, and Surface-Enhanced Spectroscopy", Departments of Chemistry and Materials Science and Engineering, The University of Delaware, Newark, DE, March 22, 2002.

"Surface-Enhanced Raman Spectroscopy: Reminiscences, Nanostructures, and New Directions", Institut für Physik der kondensierten Materie, Lehrstuhl Für Oberflächenwissenschaft, Heinrich-Heine-Universität, Düsseldorf, FR Germany, EU, October 24, 2001.

"Nanosphere Lithography: Nanoparticle Optics, Biosensors, and Surface-Enhanced Spectroscopy", Department of Chemistry, The University of Wisconsin-Madison, Madison, WI, October 11, 2001.

"Nanosphere Lithography: A Versatile Nanofabrication Tool for Studies of Size-Dependent Properties of Materials", Society for Analytical Chemists of Pittsburgh, Duquesne University, Pittsburgh, PA, October 01, 2001.

"Nanosphere Lithography: Nanoparticle Optics, Biosensors, and Surface-Enhanced Spectroscopy", Department of Chemistry, The University of Texas at Austin, Austin, TX, September 27, 2001.

"Chemical and Biological Sensors Fabricated by Nanosphere Lithography", 222nd ACS National Meeting, Chicago, IL, August 29, 2001.
"Playing with Light: Nanosphere Lithography, Nanoparticle Optics, and Surface-Enhanced Raman Spectroscopy", Gordon Research Conference on Analytical Chemistry, Connecticut College, New London, CT, June 24-29, 2001.

"Core-Shell Nanoparticles as Organic Dye Replacements" Proctor & Gamble Company, University Exploratory Research Program, Cincinnati, OH, May 21, 2001.

"Nanosphere Lithography: Self-Assembled Photonic and Magnetic Materials," Materials Research Society Fall Meeting, Boston, MA, November 28-December 1, 2000.

"Nanoparticle Optics," Northwestern University Department of Chemistry, Faculty Luncheon Seminar, Tuesday, October 31, 2000.

"Nanoparticle Optics: Applications to Surface-Enhanced Optical Interactions and Biosensors", Sensing and Information Nanotechnology Workshop, University of New Mexico, Albuquerque, NM, October 10-12, 2000.

"New Concepts in Surface-Enhanced Spectroscopy and Nanoparticle Optics", Invited Lecture, ICORS2000, International Conference on Raman Spectroscopy, Peiking University, Beijing, China, August 21-25, 2000.

"Surface-Enhanced Spectroscopy: It's 2000 - What Do We Know Now?" Plenary Lecture, SRS2000, International Symposium on Progress in Surface Raman Spectroscopy, University of Xiamen, Xiamen, China, August 14-17, 2000.

"Nanoparticle Optics: Local Dielectric Environment, Nanosensors, and Surface-Enhanced Spectroscopy", University of Colorado, Lecture #5 Summer 2000 Analytical/Environmental Lecture Series, Boulder, CO, June 16, 2000.

"Nanoparticle Optics: Synthesis, Structure, and Properties of Nanoparticles in the Sub-100 nm Size Regime" University of Colorado, Lecture #4 Summer 2000 Analytical/Environmental Lecture Series, Boulder, CO, June 15, 2000.

"Ultrahigh Vacuum SERS: Benzene, Pyridine, Carbon Clusters" University of Colorado, Lecture #3 Summer 2000 Analytical/Environmental Lecture Series, Boulder, CO, June 14, 2000.

"Electrochemical SERS: Structure, Orientation, and Electron Transfer Dynamics of Cytochrome *c* on Ag" University of Colorado, Lecture #2 Summer 2000 Analytical/Environmental Lecture Series, Boulder, CO, June 13, 2000.

"Surface-Enhanced Spectroscopy: History, Overview, Mechanism" University of Colorado, Lecture #1 Summer 2000 Analytical/Environmental Lecture Series, Boulder, CO, June 12, 2000.

"Core-Shell Nanoparticles as Organic Dye Replacements" Proctor & Gamble Company, University Exploratory Research Program, Cincinnati, OH, March 24, 2000.

"Surface-Enhanced Spectroscopy: Nanoparticles, Clusters, and Biomolecules" Ohio State University, Department of Chemistry, Joint Physical and Analytical Seminar, Columbus, OH, February 22, 2000.

"[I. Silver Nanoparticles], [II. Carbon Clusters], and [III. Nickel Nanomagnets]" Atomic Cluster Derived Materials, MURI Review Meeting, APG, MD, June 10-11, 1999.

"Surface-Enhanced Spectroscopy: I. Silver Nanoparticles II. Carbon Clusters," Northwestern University Department of Chemistry, Faculty Luncheon Seminar, Tuesday, May 18, 1999.

"Surface-Enhanced Spectroscopy: Nanoparticles, Clusters, Biomolecules, and Surfaces," Cornell University, Department of Chemistry and Chemical Biology, General Colloquium, Ithaca, NY, March 4, 1999.

"Structural, Optical, and Magnetic Properties of Size-Tunable Nanoparticle Arrays," Materials Research Society Fall Meeting, Boston, MA, November 30, 1998.

"Surface-Enhanced Spectroscopy: New Insights and Applications from Nanofabrication and Atomic Force Microscopy," University of Notre Dame, Department of Chemistry, Colloquium, Notre Dame, IN, October 15, 1998.

"New Approaches to the Study of Adsorbed Biological Molecules by Electrochemical SERS," 31st Great Lakes Regional ACS Meeting, Milwaukee, WI, June 1-3, 1998.

"Structural, Optical, and Magnetic Properties of Size-Tunable Periodic Particle Arrays," Northwestern University, Department of Chemistry, Faculty Luncheon Seminar, May 12, 1998.

"Structural, Optical, and Magnetic Properties of Size-Tunable Nanoparticle Arrays," 1998 International Conference on Quantum Electronics and Conference on Lasers and Electro-optics (IQEC/CLEO '98), San Francisco, CA, May 07, 1998.

"Structural, Optical, and Magnetic Properties of Size-Tunable Nanoparticle Arrays," Columbia University, Department of Chemistry, Colloquium, New York, NY, April 30, 1998.

"Synthesis and Properties of Size-Tunable Nanoparticle Arrays," Iowa State University, Department of Chemistry, 1998 Miller and Trapp Family Lecture#2, Ames, IA, April 10, 1998.

"New Concepts in Surface-Enhanced Spectroscopy Revealed By Studies of Aromatic, Biological, and Atomic Cluster Adsorbates," Iowa State University, Department of Chemistry, 1998 Miller and Trapp Family Lecture#1, Ames, IA, April 09, 1998.

"New Approaches in Electrochemical and Ultrahigh Vacuum SERS", 5th Chemical Congress of North America, 20th Anniversary SERS Symposium, Cancun, Mexico, November 11-15, 1997.

"New Approaches to Surface-Enhanced Spectroscopy," FACSS '97, Providence, RI, October 26-30, 1997.

"Surface-Enhanced Spectroscopy," Colloquium, Department of Chemistry, Michigan State University, E. Lansing, MI, October 16, 1997.

"Nanosphere Lithography," Center on Polymer Interfaces and Macromolecular Assemblies (CPIMA), Stanford University, Stanford, CA, August 3-5, 1997.

"Nanosphere Lithography," Gordon Research Conference on Clusters, Nanocrystals, and Nanostructures, Plymouth State College, Plymouth, NH, July 26-August 1, 1997.

"Nanosphere Lithography," Adriatico Research Conferences: STM-Based Lithography and Atomic Electronics, International Center for Theoretical Physics (ICTP), Trieste, Italy, July 15-18, 1997.

"An Introduction to Raman Spectroscopy and Its Applications to Surface Science and Catalysis," UOP, Des Plaines, IL, June 2, 1997.

"Control of Interfacial Reactivity by Design: The Key to SERS Studies of Proteins, Clusters, and Thermaly Labile Adsorbates," Industrial Associates Meeting, Northwestern University, Evanston, IL, May 1-2, 1997.

"Nanosphere Lithography: Structural and Optical Properties of Tunable Periodic Particle Arrays," ACS Meeting, San Fransisco, CA, April 13-17, 1997.

"New Approaches to the Study of Adsorbed Biomolecules by SERS," Colloquium, Department of Chemistry, University of Wisconsin, Milwaukee, WI, September 30, 1996.

"New Approaches to the Study of Adsorbed Biological Molecules by SERS," Excellence in Surface Science Award, Surfaces in Biomaterials Foundation, Phoenix, AZ, September 7, 1996.

"Nanosphere Lithography (NSL): A New Tool for Studying the Optical Properties of Nanostructured Materials," Illinois AVS Meeting, Northwestern University, Evanston, IL, June 4, 1996.

"Characterization of Inorganic and Organic Surfaces by Laser Spectroscopy and Scanning Probe Microscopy," Industrial Associates Spring Meeting, Northwestern University, Evanston, IL, May1-2, 1996.

"Nanosphere Lithography (NSL): Fabrication, AFM Characterization. Optical Properties and Applications to SERS," Molecular and Electronic Nanostructure Seminar, University of Illinois, Beckman Institute, Urbana, IL, April 24, 1996.

"New Approaches to Surface-Enhanced Spectroscopy," Symposium on the Electrochemistry of Surfaces and Interfaces, Argonne National Laboratory, Argonne, IL, March 14, 1996.

"New Approaches in Surface-Enhanced Spectroscopy," Colloquium, Department of Chemical Engineering, Northwestern University, Evanston, IL, November 9, 1995.

"New Approaches to Understanding SERS," FACSS '95, Cincinnati, OH, October 17, 1995.

"New Approaches to Electrochemical SERS," Pittcon '95, C. N. Reilley Award Symposium for Bill Heineman, New Orleans, LA, March 8, 1995.

"Nanosphere Lithography," American Vacuum Society, Denver, CO, October 26-27, 1994.

"New Approaches to Understanding SERS: Atomic Force Microscopy, Nanofabrication, and Hyper-Raman Scattering," Seminar, Department of Chemistry, Colorado State University, Fort Collins, CO, April 27, 1994.

"New Approaches to Understanding SERS: Atomic Force Microscopy, Nanofabrication, and Hyper-Raman Scattering," Seminar, Department of Chemistry, University of Colorado, Boulder, CO, April 26, 1994.

"Surface Enhanced Resonance Raman Spectroscopy and Biological Structure," PHARMACOPEIA, Princeton, NJ, December 9, 1993.

"Surface Laser Spectroscopy: 1. Advanced Raman and Hyper-Raman Techniques, 2. 3D Imaging of Nanofabricated Surfaces by AFM, 3. Attomolar Chemical Analysis, 4. Applications in Materials Science," Seminar, 3M Center, St. Paul, MN, November 13, 1992.

"Surface Laser Spectroscopy: Hyper-Raman, Nanostructures, and Epitaxial Layers," Colloquium, NIST Chemical Science and Technology Laboratory (CSTL), Gaithersburg, MD, October 7, 1992.

"Near-Infrared Surface Laser Spectroscopy," 25th Great Lakes Regional ACS Meeting, Marquette University, Milwaukee, WI, June 2, 1992.

"Near-Infrared and Time-Resolved Surface Laser Spectrroscopy: Structure and Dynamics at Electrochemical Interfaces," ECS/SAS Meeting, Department of Chemistry, Marquette University, Milwaukee, WI, June 2, 1992.

"Laser Spectroscopy of Surfaces and Solids: Nanostructures and Epitaxial Layers," Industrial Associates Meeting, Northwestern University, Evanston, IL, May 7, 1992.

"Surface Laser Spectroscopic Probes of Interfacial Structucture and Dynamics," Colloquium, Department of Chemistry, Northeastern University, Boston, MA, April 30, 1992.

"Near Infrared and Time-Resolved Surface-Enhanced Raman Spectroscopy", Spectroscopy Society of Pittsburgh, Pittsburgh, PA, November 20, 1991.

"Near Infrared and Time-Resolved Surface Laser Spectroscopic Probes of Interfacial Structure and Dynamics," Seminar, Department of Chemistry, The Pennsylvania State University, University Park, PA, October 23, 1991.

"Near Infrared and Time-Resolved Surface Enhanced Raman Spectroscopy," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, March 12, 1991.

"Nonlinear and Time-Resolved Surface Laser Spectroscopic Probes of Interfacial Structure and Dynamics," Seminar, Department of Chemistry, Iowa State University, Ames, IA, November 29, 1990.

"Surface Laser Spectroscopic Probes of Interfacial Molecular Structure and Dynamics," Seminar, Department of Chemistry, University of Illinois at Urbana-Champaign, Urbana, IL, September 29, 1990.

"Surface-Enhanced Hyper-Raman Spectroscopy (SEHRS), Seminar, Department of Chemistry, University of Wyoming, Laramie, WY, April 19-20, 1990.

"Nonlinear and Time-Resolved Surface Laser Spectroscopic Probes of Interfacial Structure and Dynamics," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, April 10, 1990.

"Recent Advances in Surface-Enhanced Raman Spectroscopy: Concepts and Instrumentation," Physical Sciences, Andover, MA, January 25, 1990.

"Surface-Enhanced Raman Spectroscopic Probes of Interfacial Structure and Dynamics, Seminar, Rohm & Haas Company, Bristol, PA, November 29, 1989.

"Recent Advances in Surface Laser Spectroscopy," Seminar, Department of Chemistry, Southern Illinois University at Carbondale, Carbondale, IL, October 6, 1989.

"Recent Advances in Surface Laser Spectroscopy," FACSS XVI, Chicago, IL, October 4, 1989.

"Surface Laser Spectroscopic Probes of Interfacial Structure and Dynamics," Seminar, Department of Chemistry, University of Pennsylvania, Philadelphia, PA, September 28, 1989.

"Surface Laser Spectroscopic Probes of Interfacial Structure and Dynamics," Seminar, Princeton University, Princeton, NJ, September 27, 1989.

"Surface Laser Spectroscopy and Microfabrication of Thin Film Materials," Symposium, The Materials Research Center, Northwestern University, Evanston, IL, September 15, 1989.

"Recent Advances in Laser Spectroscopy of Surfaces," Annual Scientific Meeting, Center for Catalysis and Surface Science, Northwestern University, Evanston, IL, August 31, 1989.

"Surface Laser Spectroscopic Probes of Interfacial Structure and Dynamics," 42nd ACS Division of Analytical Chemistry Summer Symposium, Virginia Polytechnic Institute and State University, Blacksburg, VA, July 23-26, 1989.

"Surface Laser Spectroscopic Probes of Interfacial Molecular Structure and Dynamics in Electrochemical Systems," Seminar, Brookhaven National Laboratory, Long Island, NY, June 28, 1989.

"Surface Laser Spectroscopic Studies of Electropolymerization, Radical Ion Adsorption, and Adsorption/Desorption Dynamics," US/Japan Seminar on Spectroscopic Characterization of Electrode Processes, East-West Center, Honolulu, Hawaii, June 6-9, 1989.

"Development of Laser Direct-Write Processes for the Deposition of Copper on Ceramic and Polymeric Substrates," Seminar, Akzo Chemicals Inc., Mc Cook, IL, May 10, 1989.

"Surface Laser Spectroscopic Studies of: Centrosymmetric Adsorbate Molecules, Immobilized Ag Particles, and Adsorption/Desorption Dynamics," Seminar, Eastman Kodak Company, Rochester, NY, April 27, 1989.

"Applications of Surface Laser Spectroscopy to Materials Chemistry," Materials Science Colloquium, Northwestern University, Evanston, IL, January 3, 1989.

"Surface Laser Spectroscopy as an in situ Diagnostic for Laser Microchemistry," 23rd Midwest Regional ACS Meeting, University of Iowa, Iowa City, IA, November 16-18, 1988.

"Recent Developments in Surface Laser Spectroscopy," Colloquium, Department of Chemistry, University of Pittsburgh, Pittsburgh, PA, October 28, 1988.

"Electrochemistry and Photoelectrochemistry," DOE Review Panel for Brookhaven National Laboratory, Long Island, NY, October 23-25, 1988.

"New Approaches in Surface Enhanced Laser Spectroscopy: Picosecond Non-Linear Optics, Submicron Microscopy and New Materials," Seminar, Department of Chemistry, Pennsylvania State University, University Park, PA, October 21, 1988.

"New Approaches to Surface-Enhanced Laser Spectroscopy," Department of Chemistry, Seminar, University of Illinois at Chicago, Chicago, IL, September 29, 1988.

"An Overview of Surface Laser Spectroscopy," W. R. Grace Co., Columbia, MD, August 4, 1988.

"Lasers in Materials Chemistry," High School Student Research Apprentice Program Visit to Materials Research Center (MRC) and Basic Industry Research Laboratory (BIRL), Northwestern University, Evanston, IL, July 15, 1988.

"Picosecond and Submicron Surface Laser Spectroscopy," 41st ACS Annual Summer Symposium on Analytical Chemistry, Stanford University, Stanford, CA, June 26-29, 1988.

"New Approaches in Surface-Enhanced Laser Spectroscopy," Consulting, Eastman Kodak Company, Rochester, NY, May 12, 1988.

"Recent Developments in Surface Laser Spectroscopy," 35th Western Spectroscopy Annual Conference, Asilomar, CA, January 20-22, 1988.

"Laser Raman Spectroscopy," Society for Applied Spectroscopy, Chicago, IL, March 22, 1988.

"Molecules on Surfaces: Laser Techniques to Answer the Questions – What?, When?, and Where?," Lecture at New Building Dedication, Department of Chemistry, University of North Carolina, Chapel, NC, October 30-November 3, 1987.

"An Overview of Surface Laser Spectroscopy," Eastman Kodak Company, Kingsport, TN, October 12-13, 1987.

"Analytical Chemistry Seminar," Department of Chemistry, University of Illinois, Urbana-Champaign, Urbana, IL, October 2, 1987.

"Introductory talk" at the Willard Gibbs Metal Award Banquet for Dr. Allen J. Bard, Chicago Section, ACS, Chicago, IL, May 22, 1987.

"The Excitement of Science: Four Perspectives on Discovery in Chemistry," Inaugural Symposium of Charles E. and Emma H. Morrison Professors of Chemistry, Northwestern, University, Evanston, IL, May 19, 1987.

"Applications of Surface Laser Spectroscopy (SLS): Electropolymerization, Adsorbed Radical Ions, and Laser-Induced Chemical Processing," Eastman Kodak Company, Rochester, NY, March 12, 1987.

"Applications of Surface Laser Spectroscopy (SLS): Electropolymerization, Adsorbed Radical Ions, and Laser-Induced Chemical Processing," Colloquium, Department of Chemistry, University of Rochester, Rochester, NY, March 11, 1987.

"An Overview of Surface Laser Spectroscopy," University of Iowa, Iowa City, IA, February 19, 1987.

"Laser Surface Spectroscopy," Colloquium, Department of Chemistry, University of Iowa, Iowa City, IA, August 21-22, 1986.

"Spatially Resolved Surface Laser Spectroscopy," Eastman Kodak Company, Rochester, NY, March 20, 1886.

"Surface Enhanced Raman Spectroscopy of Composite Materials," Gordon Research Conference on Chemistry at Interfaces, Kimball Union Academy, Meriden, NH, July 22-26, 1985.

"Surface Enhanced Raman Spectroscopy," 38th Annual Summer Symposium on Analytical Chemistry, Clarkson University, Pottsdam, NY, June 18-20, 1985.

"Surface Laser Spectroscopy of the Electrode/Solution Interface: Composite Materials, Picosecond Techniques, and SERS Microscopy," Chicago ACS Meeting, Chicago, IL, September 8-13, 1985.

"What SERS Tells us about Electrode Surfaces," Electroanalytical Symposium, Hyatt Regency, Woodfield, IL, May 29-31, 1985.

"Applications of Surface Laser Spectroscopy to Problems in Microelectronics and Microfabrication," Seminar, Eastman Kodak Company, Rochester, NY, March 21, 1985.

"Surface Laser Spectroscopy of Electrodeposited Thin Metal Films," 189th ACS National Meeting, Miami Beach, FL, April 28-May 3, 1985.

"Surface Raman Spectroscopy: A Tool to Study Corrosion," NACE Corrosion Research Symposium, Boston, MA, March 25-27, 1985.

Discussion Leader, Gordon Research Conference on Chemistry of Electronic Materials, Laser Induced Chemistry, Santa Barbara, CA, February 18-22, 1985.

"New Techniques in Surface Vibrational Spectroscopy," Society for Applied Spectroscopy, Milwaukee, WI, November 14, 1984.

"New Techniques in Surface Vibrational Spectroscopy," Seminar, Department of Chemistry, University of North Carolina, North Carolina, Chapel Hill, NC, November 6, 1984.

"Surface Laser Spectroscopy," O. K. Rice Lectures, Department of Chemistry, University of North Carolina, Chapel Hill, NC, October 29-November 7, 1984.

"Molecular Structure and Dynamics of Electrode Surfaces," Southeastern Regional ACS Meeting, North Carolina State University, Raleigh, NC, October 24, 1984.

"New Techniques in Surface Vibrational Spectroscopy," Seminar, Radiation Laboratory, University of Notre Dame, Notre Dame, ID, October 11, 1984.

"New Techniques in Surface Vibrational Spectroscopy," Seminar, Standard Oil Company, Naperville, IL, October 2, 1984.

Discussion Leader, Gordon Research Conference on Vibrational Spectroscopy, Brewster Academy, Wolfeboro, NH, August 20-24, 1984.

"Solid State Analytical Spectroelectrochemistry," 37th Annual Summer Symposium on Analytical Chemistry, Gaithersburg, MD, June 11-14, 1984.

"Recent Advances in Surface Laser Spectroscopy: Seminar, Composite Materials, Microstructure Dynamics, and Picosecond Nonlinear Optics," Eastman Kodak Company, Rochester, NY, May 31-June 1, 1984.

"Applications of Lasers to Problems in Chemistry, Physics, Biochemistry, Materials Science and Ophthalmology," Sigma XI Lecture, Northwestern University, Evanston, IL, February 14, 1984.

"An Effective Vacuum Ultraviolet Light Source Generated by Stimulated Raman Scattering," Pittsburgh Conference, Atlantic City, NJ, March 6, 1984.

"Surface Raman Spectroscopy of Semiconductors," Seminar, Eastman Kodak Company, Rochester, NY, December 1-2, 1983.

"New Approaches to Improving the Sensitivity and Generality of Surface Enhanced Raman Spectroscopy," Seminar, Eastman Kodak Company, Rochester, NY, September 27, 1982.

"Surface Enhanced Raman Spectroscopy as a Generalized Analytical Tool," Seminar, Eastman Kodak Company, Rochester, NY, November 5, 1981.

"Recent Developments in Surface Enhanced Raman and Resonance Raman Spectroscopy," Seminar, Department of Chemistry, Rensselaer Polytechnic Institute, Troy, NY, October 6, 1981.

"Lecture 1. Surface Enhanced Raman Spectroscopy: An Overview of Experiment, Theory and Applications, Lecture 2. Surface Enhanced Raman Spectroscopy: Its Development Through Theory/Experiment Interaction, Lecture 3. Beyond SERS: The Approach to General Applicability to Surface Problems in Physics, Chemistry, and the Life Sciences," Dreyfus Lectures, Department of Chemistry, University of Colorado, Boulder, CO, September 14-16, 1981.

"Surface Enhanced Raman Scattering," Gordon Research Conference on Vibrational Spectroscopy, Brewster Academy, Wolfeboro, NH, July 19, 1981.

"Vibrational Spectroscopy in Electrochemistry," Electrochemical Society Meeting, Minneapolis, MN, May 10-15, 1981.

"Surface Enhanced Raman Spectroscopy," Industrial Associates Meeting, Northwestern University, Evanston, IL, May 5, 1981.

"Stimulated Raman Laser Excited Laser Raman Spectroscopy (SRL-LRS)," Seminar, Eastman Kodak Company, Rochester, NY, April 2, 1980.

Distinguished Visiting Lectures, 1. "Resonance Raman Spectroelectrochemistry: Principles, Techniques, and Applications to the Study of Electron Transfer," 2. "Resonance Raman Spectroelectrochemistry: A New Probe of Bacterial Photosynthesis," 3. "Resonance Raman Spectroscopy: Determination of the Extent of Solid State Charge Transfer," 4. "Surface Enhanced Raman Spectroscopy: Phenomenology, Theory, and its Application to the Molecular Characterization of the Solid-Liquid Interface," 5. "Surface Enhanced Raman Spectroscopy: Its Generality and Future Prospects," and "Nonlinear Raman Spectroscopies: Applications to

Excited Stabes, Electron Transfer, and Surfaces," Department of Chemistry, University of Texas, Austin, Texas, July 23-27, 1979.

"Recent Developments in Surface Enhanced Raman Spectroscopy," Seminar, Gould Laboratories, Rolling Meadows, IL, June 26, 1979.

"Recent Developments in Surface Enhanced and Resonance Enhanced Raman Spectroelectrochemistry," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, May 29, 1979.

"Surface-Enhanced Raman Spectroscopy," Seminar, Exxon Research and Engineering Company, Linden, NJ, April 16, 1979.

"Enhanced Raman Spectroscopy of Organic Metals and Metal Metals," Seminar, Allied Chemical, Morristown, NJ, April 25, 1979.

"Enhancement of Raman Scattering by Molecules Adsorbed on Metters," Chicago Meeting of American Physical Society, Chicago, IL, March 19-23, 1979.

"Laser Research in Chemistry at Northwestern University," Presentation to Standard Oil Companies, Northwestern University, Evanston, IL, February 19, 1979.

"Surface Enhanced Raman Spectroscopy (SERS)," American Association for the Advancement of Science Symposium on Future Developments in Electrochemistry and Related Fields, Houston, TX, January 2, 1979.

"Surface Enhanced Raman Spectroscopy (SERS)," Seminar, Bell Laboratories, Murray Hill, NJ, November 21, 1978.

"The Surface Enhanced Raman Effect," Colloquium, Department of Chemistry, Indiana University, Bloomington, IN, November 8, 1978.

"Raman Spectroscopy of Organic Metals and Metal Surfaces," Colloquium, Rockwell International Science Center, Thousand Oaks, CA, November 3, 1978.

"The Liquid-Solid Interface: Characterization by Electrochemical Reactions and Laser Spectroscopy," Seminar, Industrial Affilates Program of Departments of Chemistry and Chemical Engineering, Stanford University, Stanford, CA, October 9, 1978.

"Chemical Applications of Raman Spectroscopies with Enhanced Sensitivity," 3M Company Central Research Laboratories, Saint Paul, MN, September 22, 1978.

"Enhanced Raman Spectroscopy of Surfaces," Gordon Research Conference on Vibrational Spectroscopy, Brewster Academy, Wolfeboro, NH, August 22, 1978.

"Resonance Raman Spectroscopy of Electrically Conducting Solids and Related Materials," Colloquium, IBM, Yorktown Heights, NY, July 12, 1978.

"Raman Spectroscopy of the Electrode/Solution Interface," Seminar, Department of Chemistry, Iowa State University, Ames, IA, May 4, 1978.

"Studies of Radical Ions by Resonance Raman Spectroscopy," Colloquium, Department of Chemistry, Case Western Reserve University, Cleveland, OH, April 20, 1978.

"Surface Raman Spectroelectrochemistry – Update," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, April 4, 1978.

"Probing the Electrochemical Environment with Resonance Raman and Surface Enhanced Raman Spectroscopy," Colloquium, Harvard-MIT, Cambridge, MA, March 23, 1978.

"Raman Spectroscopy of the Electrode/Solution Interface," Gordon Research Conference on Electrochemistry, Santa Barbara, CA, January 26, 1978.

"Resonance Raman Spectroscopy: Concepts and Applications," Chemical Applications of Lasers Present Status, Department of Chemistry, University of North Carolina, Chapel Hill, NC, November 30-December 2, 1977.

"Resonance Raman Spectroscopy Applied to the Study of Organic Metals and Electrode Surfaces," Lasers in Chemistry Lecture, Department of Chemistry, Washington State University, Pullman, WA, October 24-28, 1977.

"Molecular Characterization of Electrode Surfaces by Raman and Resonance Raman Spectroscopy," Seminar, Department of Physics, University of Pennsylvania, Philadelphia, PA, October 14, 1977.

"Potentiostatic Techniques," Electrochemistry Seminar Series, Diamond Shamrock Corporation, Painesville, OH, October 10, 1977.

"Molecular Characterization of Electrode Surfaces by Raman and Resonance Raman Spectroscopy," Chicago ACS Meeting, Chicago, IL, August 28-September 2, 1977.

"Resonance Raman Spectroscopy of TTF-TCNQ and Related Materials," Chicago ACS Meeting, Chicago, IL, August 31, 1977.

"Resonance Raman Spectroelectrochemistry: A Molecularly Specific Probe of the Electrode-Solution Interface," IBM, Yorktown Heights, NY, July 19, 1977.

"Raman Spectroscopy of Adsorbed Molecules at the Solid-Liquid Interface," Seminar, Physik-Department, The Technische Universiät München, München, Germany, June 2, 1977.

"Applications of Raman Spectroscopy in Electrochemistry," CNRS, La Colle sur Loup, France, May 23-28, 1977.

"Surface Raman Spectroelectrochemistry," Faculty Luncheon Seminar, Department of Chemistry, Northwestern University, Evanston, IL, May 3, 1977.

"Analytical Characterization of One-Dimensional Organic Electrical Conductors by Resonance Raman Spectroscopy," Materials Research Center Luncheon Seminar, Northwestern University, Evanston, IL, May 2, 1977.

"Resonance Raman Spectroscopy of Radical Ions and Surfaces," Seminar, Department of Chemistry, Ohio State University, Columbus, OH, April 19, 1977.

"Applications of Resonance Raman Spectroscopy to the Study of Radical Ions and Surfaces," Colloquium, Department of Chemistry, Syracuse University, Syracuse, NY, April 15, 1977.

"Resonance Raman Spectroelectrochemistry of the Radical Anions and Radical Cations Involved in one-Dimensional Organic Electrical Conductors," Colloquium, Department of Chemistry, Johns Hopkins University, Baltimore, MD, April 5, 1977.

"Resonance Raman Spectroelectrochemistry in Solution and at Surfaces," Conference on Recent Advances in Fundamental Electrochemistry, Industrial Associates, California Institute of Technology, Pasadena, CA, March 30-31, 1977.

"Resonance Raman Spectroelectrochemistry: A Molecularly Specific Probe of the Electrode – Solution Interface," Seminar, IBM, Thin Film and Plasma Science Division, San Jose, CA, March 28, 1977.

"Applications of Resonance Raman Spectroscopy to the Study of Radical Ions and Electrode Surfaces," Seminar, Department of Chemistry, University of Tennessee, Knoxville, TN, February 15, 1977.

"Resonance Raman Spectroscopy of Radical Ions," Seminar, Department of Chemistry, University of Chicago, Chicago, IL November 8, 1976.

"Applications of Resonance Raman Spectroscopy to the Study of Radical Ions and Surfaces, Physical Chemistry Seminar, Department of Chemistry, University of California, Berkeley, Berkeley, CA, November 2, 1976.

"Resonance Raman Spectroelectrochemistry in Non-Aqueous Solvents," ACS Meeting, San Francisco, CA, August 31-September 1, 1976.

"Spectroscopic and Electrochemical Characterization of Solute Species in Non-Aqueous Solvents," 172nd National American Chemical Society Symposium, San Francisco, CA, August 19-September 3, 1976.

"Resonance Raman Spectroscopy of the Electrogenerated Tetracyanoquinodimethane Anion Radical and the Tetrathiofulvalence Cation Radical," 5th International Conference on Raman Spectroscopy, Universität Freiburg, Freiburg, Germany, September 2-8, 1976.

"Laser Raman Spectroscopy," 10th Great Lakes Reginal ACS Meeting, Northwestern University, Evanston, IL, June 17-19, 1976.

"Applications of Raman Spectroscopy to Electrochemistry: Solutions and Surfaces," Seminar, Eastman Kodak Company, Rochester, NY, June 4, 1976.

"Studies of Radical Ions by Resonance Raman Spectroscopy," Frontiers in Chemistry Lecture Series, Department of Chemistry, Wayne State University, Detroit, MI, May 24, 1976.

"Resonance Raman Spectroscopy of Radical Ion Systems," Seminar, Department of Chemistry, University of Cincinnati, Cincinnati, OH, May 7, 1976.

"Studies of Electrochemically Generated Species by Resonance Raman Spectroscopy, Seminar, Department of Chemistry, Georgetown University, Washington, D.C., May 5, 1976.

"Spectroscopic Methods in Electrochemical Studies," 149th Electrochemical Society Symposium, Washington, D.C., May 2-7, 1976.

"Resonance Raman Spectroscopy of Radical Ion Systems," Seminar, National Bureau of Standards, Washington, D.C., May 5, 1976.

"Resonance Raman Spectroscopy of Radical Ion Systems," Seminar, Department of Chemistry, Princeton University, Princeton, NJ, April 28, 1976.

"Resonance Raman Spectroscopy of Radical Ion Systems," Seminar, Department of Chemistry, University of Nebraska, Lincoln, NE, April 21, 1976.

"Resonance Raman Spectroscopy of Radical Ions," Seminar, Department of Chemistry, Northern Illinois University, Dekalb, IL, April 6, 1976.

"Studies of Electrochemically Generated Radical Ions by Resonance Raman Spectroscopy," Inorganic-Electrochemistry Seminar, Department of Chemistry, California Institute of Technology, Pasadena, CA, January 16, 1976.

"Tunable Dye Laser Resonance Raman Spectroscopy in Electrochemistry," Gordon Research Conference Electrochemistry, Santa Barbara, CA, January 19-23, 1976.

Colloquium, Department of Chemistry, Michigan State University, East Lansing, MI, October 21, 1975.

"Tunable Dye Laser Resonance Raman Spectroscopy," 170th National American Chemical Society Meeting on Lasers in Chemical Analysis, Chicago, IL, August 25, 1975.

"Tunable Dye Laser Resonance Raman Spectroscopy in Analytical and Electroanalytical Chemistry," Gordon Research Conference on Analytical Chemistry, New Hampton, NH, August 11-15, 1975.

Lectures at Process and Environmental Analytical Instrumentation Short Course, Instrument Society of America, Robert Morris College, Pittsburgh, PA, August 6, 1075.

"Resonance Raman Spectroelectrochemistry – Technique and Applications," Chemical Physics Colloquium joint with Analytical Chemistry Division, University of North Carolina at Chapel Hill, Chapel Hill, NC, Aprial 10, 1975.

"Resonance Raman Scattering in Radical Ions," Seminar, Analytical Chemistry, Purdue University, West Lafayette, IN, February 25, 1975.

"Chemical Applications of Single Photon Timing Spectroscopy," Colloquium, Department of Chemistry, Illinois Institute of Technology, Chicago, IL, December 11, 1794.

"Resonance Raman Spectroelectrochemistry," Special Seminar, Analytical Chemistry, University of Wisconsin at Madison, November 26, 1974.

"Radical Ion Annihilation Kinetics in Electrochemiluminescence," 25th International Society for Electrochemistry Symposium on Electron and Atom Transfer Processes, Brighton, England, September, 1974.

"Nonadiabatic Electron Transfer Reactions – Theory and Experiment," Von Humboldt Lecture, Fritz-Haber-Institut der Max-Planck Gessellschaft, Berlin, Germany, September 19, 1974.

"Resonance Raman Spectroelectrochemistry," 168th National American Chemical Society Symposium on Spectroelectrochemistry, Atlantic City, NJ, September 9, 1974.

Lectures at Process and Environmental Analytical Instrumentation Short Course, Instrument Society of America, Colorado Women's College, August 14, 1974.

"Chemical Applications of Nanosecond Photon Timing Experiments," Seminar, Department of Chemistry, Southern Illinois University, Carbondale, IL, June 14, 1974.

"The Kinetics of Radical Ion Annihilation Reactions: Theory and Experiment," 145th Electrochemical Society Symposium on Electronic Excitation and Chemiluminescence from Redox Processes, San Francisco, CA, May 15, 1974.

"Chemical Applications of Nanosecond Photon Timing Experiments," Lecture Series, Department of Chemistry, University of Kentucky, Lexington, KY, April 30, 1974.

"Chemical Applications of Nanosecond Photon Timing Experiments," Colloquium, Department of Chemistry, Loyola University of Chicago, March 19, 1974.

"Chemical Applications of Single Photon Timing Spectroscopy," Colloquium, Department of Chemistry, Northwestern University, Evanston, IL, March 1, 1974.

"Chemical Applications of Nanosecond Photon Timing Experiments," Seminar, Analytical Chemistry, University of Illinois, Champaign-Urbana, IL, December 14, 1973.

"Computerized Luminescence Spectroscopy," Seminar, Eastman Kodak, Rochester, New York, November 19, 1973.

"Mode-Locked Laser Raman Spectroscopy – A New Technique for the Rejection of Interfering Luminescence Signals," Eastern Analytical Symposium, New York, NY, November 16, 1973.

"Applications of Nanosecond Photon Timing Experiments to Chemistry," Colloquium, Department of Chemistry, Pennsylvania State University, University Park, PA, October 4, 1973.

"Computerized Electrochemiluminescence Spectroscopy," Electrochemical Measurements by Digital Computer, 143rd Electrochemical Society Symposium on Electrochemical Measurements by Digital Computer, Chicago, IL, May 16, 1973.

"Computerized Luminescence Spectroscopy," 1972 Anachem Conference, Detroit, MI, October 10, 1972.

"Electron Transfer Processes in Electrochemiluminescence as Studied by a Single Photon Counting Technique," Gordon Research Conference on Electrochemistry, Santa Barbara, CA, January 8-15, 1972.

"Low Temperature Electrochemistry," Colloquium, Department of Chemistry, University of Cincinnati, October 9, 1971.

GRADUATE STUDENTS:

1. David L. Jeanmaire	1973-1977	Ph.D.(1977)	Res. Chemist, Eastman Kodak
2. Mary R. Suchanski	1973-1977	Ph.D.(1977)	Res. Chemist, Eastman Kodak (Deceased)
3. William L. Wallace	1973-1977	Ph.D.(1977)	Sr. Scientist, NREL
4. Dennis S. Rushforth	1971-1977	Ph.D.(1977)	Principal Scientist, Appl. Phys. Southwest Research Institute
5. Thomas W. Cape	1974-1979	Ph.D.(1979)	Res. Manager, PPG Industries
6. Kenneth F. Drake	1971-1979	Ph.D.(1979)	Res. Chemist, Exxon Corp.
7. Craig S. Allen	1976-1980	Ph.D.(1980)	CTO, SACHEM
8. Joseph M. Lakovits	1975-1981	Ph.D.(1981)	Computer Systems Manager, Chemistry Department Northwestern University.
9. Alice B. Apkarian	1978-1982	Ph.D.(1982)	Saddleback College, Mission Viejo, CA (Faculty)
10. Steven G. Schultz	1977-1981	Ph.D.(1981)	Res. Chemist, Abbott Laboratories
11. Keith D. Parks	1975-1983	Ph.D.(1983)	Res. Chemist, Du Pont
12. Keith T. Carron	1980-1985	Ph.D.(1985)	University of Wyoming (Faculty), President, Snowy Range Instruments
13. Mark A. Barr	1978-1987	Ph.D.(1987)	Staff Scientist, Nanophase Tech. Corp.
14. Ellen J. Zeman	1982-1987	Ph.D.(1987)	Journal Editor, University of Vermont
15. Kurt L. Haller	1983-1988	Ph.D.(1988)	Sr. Appl. Devel. Engineer,Tencor Instruments
16. Brian E. Miller	1980-1989	Ph.D.(1989)	Wheaton College (Faculty)
17. Shuming Nie	1984-1989	Ph.D.(1989)	Emory University, Georgia Tech, & Nanjing Unviversity (Faculty)
18. Julian R. Sprague	1983-1989	Ph.D.(1989)	Medical School, University of Virginia (Faculty)
19. Lloyd A. Bumm	1982-1990	Ph.D.(1990)	University of Oklahoma (Faculty)
20. Li Sun	1984-1990	Ph.D.(1990)	Director of Research, Pine Instruments
21. David A. Treichel	1987-1991	Ph.D.(1991)	Nebraska Wesleyan University (Faculty)
22. Wen Hui Yang	1990-1995	Ph.D.(1995)	Staff Scientist, Planck Engineering
23. John C. Hulteen	1990-1995	Ph.D.(1995)	Sr. Chemist, 3M Environmental Lab.
24. Andrew C. Pipino	1990-1995	Ph.D.(1995)	Program Manager, ONR.
25. Lisa A. Dick	1990-1996	Ph.D.(1996)	Sr. Chemist, 3M Drug Delivery
26. Maritoni Litorja	1990-1996	Ph.D.(1996)	Res. Chemist, NIST
27. William C. Lackowski	1991-1998	Ph.D.(1998)	Director, Surface Sci. Facility, University of Texas, Austin
28. Traci R. Jensen	1994-1999	Ph.D.(1999)	High school teacher, Vermont
29. Matthew T. Smith	1993-1999	Ph.D.(1999)	Res. Chemist., Union Carbide Corp.
30. Michelle D. Malinsky	1995-2000	Ph.D.(2000)	Sr. Chemist, 3M Environmental Lab.
31. Anjeanette D. Ormonde	1996-2001	Ph.D.(2001)	Sr. Scientist, Unilever HPC-USA
32. Lance K. Kelly	1996-2002	Ph.D.(2002)	Lead Scientist, 5 Stones Research Title ?, Lynntech, Inc. (after 5/28/15)
33. Christy L. Haynes	1998-2003	Ph.D.(2003)	University of Minnesota (Faculty)
34. Amanda J. Haes	1999-2004	Ph.D.(2004)	University of Iowa (Faculty)

35. Adam D. McFarland	1999-2004	Ph.D.(2004)	Res. Scientist, Eli Lily
36. Xiaoyu Zhang	2001-2006	Ph.D.(2006)	Res. Scientist, Eli Lily
37. Chanda Yonzon	2001-2006	Ph.D.(2006)	Research Scientist II, Gilead Sciences
38. Alyson V. Whitney	2002-2007	Ph.D.(2007)	Chemist, British Petroleum
39. Leif J. Sherry	2002-2007	Ph.D.(2007)	High School Teacher, LA
40. Matthew A. Young	2002-2007	Ph.D.(2007)	Hillsdale College (Faculty)
41. Erin C. McLellan	2002-2007	Ph.D.(2007)	Res. Scientist, IBM Albany Research Center
42. Jiha Sung	2002-2007	Ph.D.(2007)	Dongduk University, Korea (Faculty)
43. Jing Zhao	2003-2008	Ph.D.(2008)	University of Connecticut (Faculty)
44. David Q. Andrews	2003-2008	Ph.D.(2008)	Environmental Working Group, Washington DC (Sr. Scientist)
45. George H. Chan	2003-2008	Ph.D.(2008)	SRI International (Research Engineer)
46. Jenny M. Roden	2006-2008	M.S. (2008)	High School Teacher, Chicago
47. Jon A. Dieringer	2003-2008	B.S.(2003)	Northwestern University, Instrumentation Engineer & Senior Research Associate, Electronics & Laser Systems Core
48. Nilam C. Shah	2004-2009	M.S.(1997)	Res. Asst. Professor, NU (Van Duyne Group)
49. Kevin Biggs	2004-2009	B.S.(2004)	Cordis Corp. (Sr. Scientist)
50. W. Paige Hall	2005-2010	B.S.(2005)	Pacific University (Faculty)
51. Julia M. Bingham	2005-2010	B.S.(2005)	St. Xavier University (Faculty)
52. Kathryn M. Kosuda	2005-2010	B.S.(2002)	Vaxess Technologies
53. Jon Yuen	2004-2010	B.S.(2004)	Postdoc, Wash U. (Holton Group)
54. Samuel L. Kleinman	2007-2012	B.S.(2007)	Postdoc, NU (Van Duyne Group)
55. Emilie Ringe	2008-2013	B.S.(2008)	Rice University (Faculty)
56. Matthew Sonntag	2008-2013	B.S.(2008)	Postdoc, NU (Van Duyne Group)
57. Lauren Kreno	2008-2013	B.S.(2008)	Exxon Mobil
58. Nathan Greeneltch	2008-2013	B.S.(2008)	Enhanced Plasmonics LLC; Intel (process engineer)
59. Natalie Ray	2008-2013	B.S.(2008)	British Petroleum
60. Ke Ma	2008-2013	B.S.(2008)	Biomed. Engineer, MedSphere Corp.
61. Laura Ruvuna	2008-2013	B.S.(2008)	Abbott
62. Jordan Klingsporn	2009-2014	B.S.(2009)	Intel (process engineer) jmklingsporn@gmail.com
63. Alex Peroff	2009-2014	B.S.(2009)	Electroanalytical Sales Scientist, Pine Research Instrumentation
64. Eric Smoll	2009-2014	B.S.(2009)	Terminal Masters
65. Amber Davis	2010-2012	M.S.(2012)	Abbott (Quality Control)
66. Natalie Gruenke	2010-2015	B.S.(2010)	Postdoc, Berkeley. (Graham Fleming Group)
67. Sicelo Masango	2010-2015	B.S.(2010)	Intel (process engineer)
68. Cassandra George	2011-2016	B.S.(2011)	5th YR GS (Joint w. Peter Stair)
69. Eric Pozzi	2011-2016	B.S.(2011)	5th YR GS (Joint w. Mark Hersam)
70. Stephanie Zaleski	2011-2016	B.S.(2011)	5th YR GS

71. Alyssa Zrimsek	2011-2016	B.S.(2011)	5th YR GS
72. Naihao Chiang	2012-2017	B.S.(2012)	4th YR GS (Joint w. Tamar Seideman, Appl. Physics)
73. Emily Sprague	2012-2017	B.S.(2012)	4th YR GS (Applied Physics)
74. Michael McAnally	2012-2017	B.S.(2012)	4th YR GS (Joint w. George Schatz)
75. Nolan Wong	2013-2018	B.S.(2013)	3rd YR GS
76. Michael Mattei	2013-2018	B.S.(2013)	3rd YR GS
77. Xu Chen	2013-2018	B.S.(2013)	3rd YR GS (Applied Physics)
78. Hannah Mayhew	2014-2019	B.S.(2014)	2nd YR GS
79. Ryan Hackler	2014-2019	B.S.(2014)	2nd YR GS (joint w. Peter Stair)
80. Tyler Ueltschi	2015-2020	B.S.(2015)	1st YR GS
81. Gyeongwon (Kevin) Kang	2015-2020	B.S.(2015)	1st YR GS (joint w. George Schatz)

POSTDOCTORAL FELLOWS:

1. Therese M. Cotton	1976-1980	Iowa State University (Faculty, deceased)
2. Maria Janik-Czachor	1983-1985	Polish Academy of Sciences (Faculty)
3. Murray V. Johnston	1980-1982	University of Delaware (Faculty) mvj@udel.edu
4. Jeanne P. Haushalter	1981-1983	Santa Clara University (Lecturer)
5. Angelica M. Stacy	1981-1983	University of California, Berkeley (Faculty)
6. John A. Roper	1982-1983	Dow Chemical Company (Sr. Res. Chemist)
7. Alanah Fitch	1984-1985	Loyola University of Chicago (Faculty)
8. Robert I. Altkorn	1984-1986	Ram Consulting, Oak Brook, IL (Consultant)
9. Michael J. Natan	1989-1991	Cabot Security Materials, Inc. (Executive Director)
10. Adina K. Ott	1997-1999	Northwestern University (Lecturer)
11. Jimmy Castillo	1999-2001	Universidad Central, Venezuela (Faculty)
12. K. Shafer-Peltier	2001-2002	Midwest Research Institute (Sr. Scientist)
13. Adam D. McFarland	2004-2005	Eli Lily (Research Scientist)
14. Douglas A. Stuart	2003-2006	University of West Georgia (Faculty)
15. Katherine A. Willets	2005-2007	University of Texas, Austin (Faculty); Temple University (Faculty)
16. Jeffrey N. Anker	2005-2008	Clemson University (Faculty)
17. Jon Camden	2006-2008	University of Tennessee, Knoxville (Faculty); Notre Dame University (Faculty) jon.camden@nd.edu
18. Paul L. Stiles	2006-2007	ZEV Capital Research (Analysis & Systems Design)
19. Rebecca L. Stiles	2007-2008	Physical Sciences Division, Avon (Program Manager)
20. David Q. Andrews	Summer 2008	Environmental Working Group, Washington DC (Sr. Scientist)
21. Christa Brosseau	2007-2009	Saint Mary's University, Halifax, Nova Scotia, Canada (Faculty) christa.brosseau@smu.ca
22. Jon A. Dieringer	2008-2009	Northwestern University, Instrumentation Engineer & Senior Research Associate, Electronics & Laser Systems Core jdieringer@northwestern.edu
23. Kristin L. Wustholz	2008-2011	The College of William and Mary (Faculty) kwustholz@wm.edu
24. Nilam C. Shah	2009-2015	Lake Forest College (Faculty)
25. Faith C. Boman	2009-2011	Stepan Company (Research Scientist)
26. Edward T. Foley	2008-2012	Ochanomizu University, Tokyo, Japan (Faculty)

27. Laura B. Sagle	2009-2012	University of Cincinnati (Faculty)
28. Julia Ruemelle	2009-2011	Illinois Toolworks (Research Scientist)
29. Julia M. Bingham	2010-2011	Saint Xavier College (Faculty)
30. Dragos Segehte	2010-2011	Intel (process engineer)
31. Jon Yuen	2010-2012	Washington University St. Louis (Postdoc, Holton Group)
32. Renee R. Frontiera	2010-2013	The University of Minnesota (Faculty) rrf@umn.edu
33. Sam L. Kleinman	7/1/12-12/31/2	Postdoctoral Fellow
	1/1/13-6/25/13	Research Associate (Research Engineer) for DARPA IVN:Dx
	7/1/13 -	Research Scientist, Ondavia, Inc.
34. Matthew Sonntag	2013-2014	Albright College (Faculty) msonntag@albright.edu
35. Nan Jiang	2010-2015	University of Illinois Chicago (Faculty) njiang@uic.edu
36. Bhavya Sharma	2011-2015	University of Tennessee (Faculty) bhavya.sharma@utk.edu
37. Anne-Isabelle Henry	2008-2016	
38. Maria Fernanda Cardinal	2012-2016	
39. Bogdan Negru	2013-2016	Sonoma State University (Faculty)
40. Lauren Buchanan	2013-2016	Vanderbilt University (Faculty)
41. Dmitri Kurouski	2013-2015	Boehringer Ingelheim Pharmaceuticals, Inc. (Senior Scientist)
42. Guillaume Goubert	2014-2016	
43. Song Jiang	2016-2018	

UNDERGRADUATE STUDENTS:

Camilla Durbin	1972	B.S. (1972)	
Jeffrey McVey	1972	B.S. (1972)	
Kristin Milby	1976	B.S. (1976)	Postdoc Zarelab 1981-1983
Nancy E. Levinger	1982-1983	B.A. (1983)	Colorado State University (Faculty)
Douglas C. Meier	1995-1996	B.S. (1996)	Res. Chemist, NIST
Emily Smith	1997-1998	B.S. (1998)	Iowa State University (Faculty)
John Gaebler	Summer 2002	MRSEC REU	Rice University
Jonathan Riboh	Summer 2002	NSEC REU	Medical School, Stanford University
W. Paige Hall	Summer 2003	NSEC REU	Graduate Student in Chemistry, Van Duyne Group, Northwestern University
Heyjin (Chris) Park	2004 – 2005	B.S. (2005)	Graduate Student in BME Purdue University

J. Russell Renzas	Summer 2004	NSEC REU	Graduate Student in Chemistry, Somorjai Group, University of California, Berkeley
Jessica Huber	Summer 2005	NSEC REU	St. Louis University
Andrew Loeffler	Summer 2006	MRSEC REU	Marquette University
Salome Ngatia	Summer 2006 and 2007	NSEC REU	Smith College
Alessa Gambardella	AY2006 AY2007 AY2008		Graduate Student in Chemistry, Murray Group, University of North Carolina, Chapel Hill,
Heather Hoke	AY2007 AY2008 AY2009		Northwestern University
David No	Summer 2007	CCNE REU	Northwestern University
Eunice Sapp	Summer 2007	MRSEC REU	Carleton College
Nathan Greeneltch	Summer 2008	1st YR NU Grad Student	University of Central Florida
Evan R. Delgado	Summer 2008	NSEC REU	SUNY Albany
Katie Mauck	Summer 2008	AIC/NU REU	Oberlin College
Coral Pagan	Summer 2008	MRSEC REU	University of Puerto Rico
Kari Rayner	AY2009 AY2010		Northwestern University
Shenille Straker	Summer 2009	NSEC REU	South Carolina State University
Nevette Bailey Chandler	AY2010 CHEM 399		Northwestern University
Nathan Daly	AY2010 CHEM 399		Northwestern University
Zelaya Meadows	AY2010		Northwestern University
Maria Victoria Abrenica	Summer 2010	NSEC REU	Wellesley College (Mentor was Laura Sagle)
Alyssa Zrimsek	Summer 2010	MRSEC REU	Washington & Jefferson College (Mentor was Faith Boman)

Ingrid Mielke-Maday	Summer 2011	NSEC REU	The College of William and Mary (Mentor was Lauren Kreno)
Shayla Gilmore	Summer 2011	NSEC REU	Benedict College (Mentor was Laura Ruvuna)
Luis Garibay	Summer 2011	MRSEC REU	Andrews University (Mentor was Matt Sonntag); M.S. Program in Chemistry, University of North Texas.
Ben Paul Godek	Summer 2012	MRSEC REU	Northwestern University (Mentor was Matt Sonntag)
Kunal Prashant Shukla	Fall 2012		Northwestern University (Mentor was Fernanda Cardinal) Junior Physics major; work-study program; started 11/15/12
HongKwon (Aidan) Lee	Fall 2012		Northwestern University (Mentor was Fernanda Cardinal) Freshman; work-study program; started 11/15/12
James Brooks	Summer 2013	MRSEC REU from Gustavus Adolphus College	(Mentor was Fernanda Cardinal) Graduate School, Chemistry, University of Minnesota
Huayi Wang	5/2013 - 3/2014 CHEM 399		(Mentor was Stephanie Zaleski) Northwestern University
Kathleen Anne Clark	4/2015 – present; work study	NU Sophomore	(Mentor is Stephanie Zaleski) Northwestern University
Samantha L. Miller millersl@mx.lakeforest.edu	Summer 2015	MRSEC REU from …	(Mentor was Alyssa Zrimsek)
Madison Marie Smith	1/3/16-present; Chem 399	NU Junior	(Mentor is Stephanie Zaleski) Northwestern University

RESEARCH EXPERIENCE FOR TEACHERS (RET):

Elizabeth A. Watkins	Summer 2003	NSEC RET	Niles West High School, Skokie IL
Keshia G. Korman	Summer 2004	MRSEC RET	Stone Scholastic Academy, Chicago, IL
Elizabeth A. Watkins	Summer 2004	NSEC RET	Niles West High School, Skokie IL
Joseph LaMendola	Summer 2005	MRSEC RET	Steinmetz Academic Center, Chicago, IL
David E. Ashkenaz	Summer 2005	NSEC RET	Steinmetz Academic Center, Chicago, IL
Dana Shabica	Summer 2006	NSEC RET	Michele Clark High School, Chicago, IL
Daniel Caldwell	Summer 2007	NSEC RET	Northside College Prep High School, Chicago, IL
David E. Ashkenaz	Summer 2008	NSEC RET	Bronzevile Academic Center - Youth Connection Charter School, Chicago, IL
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