

RESUME

(10/09)

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APPOINTMENTS

Visiting Professor 8/08-8/09.

ICFO - Institut de Ciències Fotoniques, Barcelona, Spain.

Professor of Optics and Physics since 3/07.

Institute of Optics and Department of Physics, University of Rochester, Rochester, NY, U.S.A.

Professor of Biomedical Engineering since 3/07.

Department of Biomedical Engineering, University of Rochester, Rochester, NY, U.S.A.

Biophysics and Structural Biology Cluster Member since 2/06.

University of Rochester Medical Center, Rochester, NY, U.S.A.

Associate Professor of Optics since 9/03-2/07.

The Institute of Optics, University of Rochester, Rochester, NY, U.S.A.

Research Scientist since 7/00.

Laboratory for Laser Energetics, Rochester, NY, U.S.A.

Assistant Professor of Optics 7/99 - 8/03.

The Institute of Optics, University of Rochester, Rochester, NY, U.S.A.

Research Fellow 4/96 - 6/99.

Pacific Northwest National Laboratory, Richland, WA, U.S.A.

Physics of Nanometer Scale Phenomena.

EDUCATION

Dr. sc. techn. (Doctor of Technical Sciences), degree 1996.

Swiss Federal Institute of Technology. Zürich, Switzerland. In collaboration with IBM Research Division, Rüschlikon, Switzerland.

PhD thesis: Light Propagation and Light Confinement in Near-field Optics.

Dipl. El-Ing. ETH (Certified Electrical Engineer), degree 1992.

Swiss Federal Institute of Technology. Zürich, Switzerland.

Diploma thesis: Detection of High Frequency Signals in Scanning Tunneling Microscopy.

Matura Typus C (Maturity Type C = Natural Sciences), degree 1986.

Mathematisch Naturwissenschaftliches Gymnasium. Zürich, Switzerland.

Major: Natural Sciences, Mathematics.

AWARDS AND HONORS

M. T. Thomas Award 1997

awarded annually by the Pacific Northwest National Laboratory for outstanding postdoctoral achievement.

ETH Medal 1997

awarded annually by the Swiss Federal Institute of Technology for outstanding dissertation.

AWU Fellowship 1996-1999

Fellowship grant awarded by Associated Western Universities.

2006 OSA Fellow

for pioneering contributions to the field of nanoscale spectroscopy and for leadership in the community of near-field optics.

PATENTS AND INVENTIONS

- [1] L. Novotny and B. Deutsch, "Common-path interferometer rendering amplitude and phase of scattered light, *U.S. Patent Application*, No. 12/210,693 (2008).
- [2] L. Novotny and F. Ignatovitch, "Multi-color heterodyne interferometric apparatus and method for sizing nanoscale particles," *U.S. Patent Application*, No. 11/710,976 (2007).
- [3] L. Novotny and F. Ignatovitch, "Apparatus and method for sizing nanoparticles based on interferometric field detection," *U.S. Patent*, No. 7,528,959 B2 (2009).
- [4] L. Novotny and T. Brown, "System and method for high resolution optical imaging, data storage, lithography, and inspection," *U.S. Patent*, No. 7,526,158 (2009).
- [5] L. Novotny, X. S. Xie, R. X. Bian, and E. J. Sanchez, "Near-field optical imaging and optical tweezers using metallic tips," *U.S. Department of Energy, Invention E-1530 under Contract DE-AC06-76RLO 1830*, September (1996).
- [6] B. Hecht, H. Heinzelmann, L. Novotny, and D. W. Pohl, "Near-field Optical Microscope," *IBM Corp., International Patent WO 95/10060*, October (1993).

BOOKS

- [1] L. Novotny and B. Hecht, *Principles of Nano-Optics*, Cambridge University Press (2006).

PEER REVIEWED JOURNAL PUBLICATIONS (h=35)

- [1] J. Renger, R. Quidant, N. Van Hulst, S. Palomba, and L. Novotny, "Free-space excitation of propagating surface plasmon polaritons," *Phys. Rev. Lett.*, submitted (2009).
- [2] A. Mitra, B. Deutsch, F. Ignatovich, and L. Novotny, "Nano-optofluidic detection of single viruses," *Nature Photonics*, submitted (2009).
- [3] B. Deutsch, R. Hillenbrand, and L. Novotny, "Imaging the optical interaction tensor of a gold nanoparticle pair," *Nano Lett.*, submitted (2009).
- [4] L. G. Cancado, A. Jorio, A. Hartschuh, A. Ismach, E. Joselevich, and L. Novotny, "Near-field Raman enhancement in one-dimensional systems," *Phys. Rev. Lett.*, in print (2009).
- [5] C. Georgi, M. Boehmler, H. Qian, L. Novotny, and A. Hartschuh, "Probing exciton propagation and quenching in carbon nanotubes with near-field optical microscopy," *Phys. Stat. Sol. (b)* **246**, in print (2009).

- [6] Z. Shi, G. Piredda, A. C. Liapis, M. A. Nelson, L. Novotny, and R. W. Boyd, "Surface plasmon polaritons on metal-dielectric nanocomposite films," *Opt. Lett.*, in print (2009).
- [7] P. Bharadwaj, B. Deutsch, and L. Novotny, "Optical antennas," *Adv. Opt. Photon.* **1**, 438483 (2009).
- [8] L. G. Cancado, A. Hartschuh, and L. Novotny, "Tip enhanced Raman scattering of carbon nanotubes," *J. Raman Spec.* **40**, 1420-1426 (2009).
- [9] S. Palomba, M. Danckwerts, and L. Novotny, "Nonlinear plasmonics with gold nanoparticle antennas," *J. Opt. A: Pure Appl. Opt.* **11**, 114030 (2009).
- [10] S. Palomba and L. Novotny, "Near-field imaging with a localized nonlinear light source," *Nano Lett.* **9**, DOI: 10.1021/nl901986g (2009).
- [11] H. Qian, N. Anderson, C. Georgi, L. Novotny, and A. Hartschuh, "Tip-enhanced optical microscopy", in *Nano-Optics and Near-Field Optical Microscopy*, A. Zayats & D. Richards (eds.), Artech House, Boston/London (2009)
- [12] A. Hartschuh, H. Qian, C. Georgi, and L. Novotny, "Tip-enhanced near-field optical microscopy of carbon nanotubes," *Anal. and Bioanal. Chem.*, **394**, 1787-1795 (2009).
- [13] L. Ding, G. Cancado, L. Novotny, N. Anderson, R. I. Blackwell, J. F. Künzler, and W. Knox, "Micro-Raman spectroscopy of refractive index microstructures in silicone-based hydrogel polymers created by high-repetition-rate femtosecond laser micromachining," *J. Opt. Soc. Am. B* **26**, 595-602 (2009).
- [14] C. Hoepfner, R. Beams, and L. Novotny, "Background suppression in near-field optical imaging," *Nano Lett.* **9**, 903908 (2009).
- [15] L. Novotny, "Optical antennas tuned to pitch," *Nature* **455**, 879 (2008).
- [16] I. O. Maciel, N. Anderson, M. A. Pimenta, A. Hartschuh, H. Qian, M. Terrones, H. Terrones, J. Campos-Delgado, A. M. Rao, L. Novotny, and A. Jorio, "Electron and phonon renormalization at defect/doping sites in carbon nanotubes," *Nature Materials* **7**, 878 - 883 (2008).
- [17] H. Qian, P. T. Araujo, C. Georgi, T. Gokus, N. Hartmann, A. A. Green, A. Jorio, M. C. Hersam, L. Novotny, and A. Hartschuh, "Visualizing the local optical response of semiconducting carbon nanotubes to DNA-wrapping," *Nano Lett.* **8**, 2706-2711 (2008).
- [18] S. Palomba and L. Novotny, "Nonlinear excitation of surface plasmon polaritons by four-wave mixing," *Phys. Rev. Lett.* **101**, 056802 (2008).
- [19] H. Qian, C. Georgi, N. Anderson, A. A. Green, M. C. Hersam, L. Novotny, and A. Hartschuh, "Exciton transfer and propagation in carbon nanotubes studied by near-field optical microscopy," *Phys. Stat. Sol. (b)* **245**, 2243-2246 (2008).
- [20] C. Hoepfner and L. Novotny, "Imaging of membrane proteins using antenna-based optical microscopy," *Nanotechnology* **19**, 384012 (2008).
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- [22] S. Palomba, L. Novotny, and R. E. Palmer, "Blue-shifted plasmon resonance of individual size-selected gold nanoparticles," *Opt. Commun.* **281**, 480-483 (2008).
- [23] H. Qian, C. Georgi, N. Anderson, A. A. Green, M. C. Hersam, L. Novotny, and A. Hartschuh, "Exciton energy transfer in pairs of single-walled carbon nanotubes," *Nano Lett.* **8**, 1363-1367 (2008).

- [24] L. Novotny and C. Henkel, "Van der Waals versus optical interaction between metal nanoparticles," *Opt. Lett.* **33**, 1029-1031 (2008).
- [25] C. Hoepfener and L. Novotny, "Antenna-based optical imaging of single Ca²⁺ transmembrane proteins in liquids," *Nano Lett.* **8**, 642-646 (2008).
- [26] B. Deutsch, R. Hillenbrand, and L. Novotny, "Near-field amplitude and phase recovery using phase-shifting interferometry," *Opt. Express* **16**, 494-497 (2008).
- [27] R. J. Moerland, T. H. Taminiau, L. Novotny, N. F. van Hulst, and L. Kuipers, "Reversible polarization control of single molecule emission," *Nano Lett.* **8**, 606-610 (2008).
- [28] L. Novotny, "The history of near-field optics," *Progress in Optics* **50**, 137-180, E. Wolf (ed.), Elsevier, Amsterdam (2007).
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- [31] P. Bharadwaj and L. Novotny, "Spectral dependence of single molecule fluorescence enhancement," *Opt. Express* **15**, 14266-14274 (2007).
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- [35] N. Anderson, A. Hartschuh, and L. Novotny, "Chirality changes in carbon nanotubes studied with near-field Raman spectroscopy," *Nano Lett.* **7**, 577-582 (2007).
- [36] M. Danckwerts and L. Novotny, "Optical frequency mixing at coupled gold nanoparticles," *Phys. Rev. Lett.* **98**, 026104 (2007).
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- [42] M. R. Beversluis, L. Novotny, and S. J. Stranick, "Programmable vector point-spread function engineering," *Opt. Express* **14**, 2650 (2006).

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- [45] L. Novotny and S. J. Stranick, "Near-field optical microscopy and spectroscopy with pointed probes," *Ann. Rev. Phys. Chem.* **57**, 303-331 (2006).
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- [47] P. Anger, P. Bharadwaj, and L. Novotny, "Enhancement and quenching of single molecule fluorescence," *Phys. Rev. Lett.* **96**, 113002 (2006).
- [48] N. Anderson, P. Anger, A. Hartschuh, and L. Novotny, "Sub-surface Raman imaging with nanoscale resolution," *Nano Lett.* **6**, 744-749 (2006).
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- [115] D. W. Pohl and L. Novotny, “Near-field optics: Light for the world of NANO,” *J. Vac. Sci. and Technol. B* **12**, 1441–1446 (1994).
- [116] B. Michel, L. Novotny, and U. Dürig, “Low-temperature compatible I-V converter,” *Ultramicroscopy* **42-44**, 1647–1652 (1992).

COMMITTEES AND PROFESSIONAL ACTIVITIES

- [1] General Chair, OSA Annual Meeting, Frontiers in Optics
Rochester, NY, USA, October (2010).
- [2] Program committee, SPIE Optics & Photonics 2010, Plasmonics VI,
San Diego, CA, USA, August (2010).

- [3] Program committee, SPIE Optics & Photonics 2009, Metal Nanoplasmonics, *San Diego, CA, USA*, August (2009).
- [4] Program committee, NanoMeta 2009, *Seefeld, Austria*, January (2009).
- [5] Scientific advisory committee, 4th Int'l Conf. on Surface Plasmon Photonics (SPP4), *Amsterdam, The Netherlands*, June (2009).
- [6] Chair, OSA Annual Meeting, Frontiers in Optics *Rochester, NY, USA*, October (2008).
- [7] Program committee, SPIE Optics & Photonics 2008, Metal Nanoplasmonics, *San Diego, CA, USA*, August (2008).
- [8] Scientific Advisory Board (since '07), "*Nano-Light*", Spanish Ministry of Science and Education.
- [9] Technical Advisory Board (since 2006), RHK Technology, Troy, MI.
- [10] Proposal Evaluation Board '07-'08, Center for Nanoscale Materials (CNM), Argonne National Laboratory.
- [11] Scientific Review Panel '08, Condensed Matter Physics (CMP), Oak Ridge National Laboratory.
- [12] International advisory committee, 10th International Conference on Near-field Optics, *Buenos Aires, Argentina*, September, 1-5 (2008).
- [13] Technical committee, IEEE/LEOS Nanophotonics 2007.
- [14] Program committee, SPIE Optics & Photonics 2007, Metal Nanoplasmonics, *San Diego, CA, USA*, August (2007).
- [15] International advisory committee, 9th International Conference on Near-field Optics, *Lausanne, Switzerland*, September (2006).
- [16] Executive Committee of the Science & Engineering Council (ECSEC), Optical Society of America (OSA).
- [17] Charles Hard Townes Award Committee (since '07), Optical Society of America (OSA).
- [18] Program committee, SPIE Optics & Photonics 2006, Complex Light and Optical Forces, *San Diego, CA, USA*, August (2006).
- [19] Program committee, SPIE Optics & Photonics 2006, Metal Nanoplasmonics, *San Diego, CA, USA*, August (2006).
- [20] Program committee, Int'l Conference on Nanoscience and Technology ICN&T , *Basel, Switzerland*, July/August, 2006.
- [21] Technical committee, IEEE/LEOS Nanophotonics 2006.
- [22] Organizing Committee, Int'l Workshop on Nanophotonics and Nanobiotechnology, *Istanbul, Turkey*, Koc University, June 2005.
- [23] Chair, Nano-Optics Subcommittee *CLEO/QELS* , *Baltimore, ML, USA*, May (2005).
- [24] Program committee, 5th International Conference on Photonics, Devices, and Systems, *Prague, Czech Republic*, June (2005).

- [25] Program committee, SPIE Optics & Photonics 2005, Plasmonics, *San Diego, CA, USA*, August (2005).
- [26] Committee member, OSA Topical Meeting on Nanophotonics for Information Systems, *San Diego, CA, USA*, April (2005).
- [27] Technical committee, IEEE/LEOS Nanophotonics 2005.
- [28] Program committee, SPIE / Photonics West, Nano-Manipulation with Light, *San Jose, CA, USA*, January (2005).
- [29] International advisory committee, 8th International Conference on Near-field Optics, *Seoul, Korea*, September (2004).
- [30] Review Board, NIH Panel on Nanotechnology, *Washington, DC*, December (2004).
- [31] Symposium Organizer, *Microscopy and Dynamics Beyond the Diffraction Limit* American Chemical Society National Meeting, *Anaheim, CA*, 28 March - 1 April (2004).
- [32] Program committee member *CLEO/IQEC* , *San Francisco, CA, USA*, May (2004).
- [33] Int'l Program Committee, XI Int'l Conference on Laser-Matter Interaction (LMI-11), *St. Petersburg, Russia*, 30 June - 2 July (2003).
- [34] Conference Chair and Organizer, 7th International Conference on Near-field Optics, *Rochester, NY, USA*, 17-21 August (2002).
- [35] Symposium co-Organizer, Progress in Electromagnetics Research Symposium, *Cambridge, MA, USA*, 1-5 July (2002).
- [36] Program committee member *CLEO/QELS* , *Long Beach, CA, USA*, May (2002).
- [37] Program committee member *CLEO/QELS* , *Baltimore, ML, USA*, 6-11 May (2001).
- [38] International Advisory Committee, 6th International Conference on Near-field Optics, *Twente, The Netherlands*, 27-31 August (2000).
- [39] Symposium co-Organizer, Materials Research Society, *San Francisco CA, USA*, April 1999.

TEACHING

- Fall 99 : Quantum Mechanics of Optical Materials and Devices (OPT223)
- Fall 00 : Nano-Optics (OPT592)
- Spring 01: Physical Optics II (OPT462)
- Fall 01 : Nano-Optics (OPT592)
- Spring 02: Quantum Mechanics of Optical Materials and Devices (OPT223)
- Fall 02 : Quantum Mechanics of Optical Materials and Devices (OPT223)
- Spring 03: Optics Laboratories (OPT256)
- Fall 03 : Nano-Optics (OPT592)
- Spring 04: Quantum Mechanics of Optical Materials and Devices (OPT223)
- Fall 04 : Nano-Optics (OPT592)
- Spring 05: Quantum Mechanics of Optical Materials and Devices (OPT223)
- Fall 05 : Nano-Optics (OPT463)
- Spring 06: Quantum Mechanics of Optical Materials and Devices (OPT223)

Fall 06 : Nano-Optics (OPT463)
Spring 07: Quantum Mechanics of Optical Materials and Devices (OPT223)
Fall 07 : Nano-Optics (OPT463)
Spring 08: Quantum Mechanics of Optical Materials and Devices (OPT223)
Fall 09 : Nano-Optics (OPT463)

CONFERENCE PRESENTATIONS (since 2003)

- [1] DARPA Optical Nanoantennas Workshop (invited),
Defence Science Research Council
Arlington, VA, October 2009.
- [2] Nanostructures at Surfaces- Spectroscopy at the Atomic and Molecular Scale (invited) ,
Monte Verita, Switzerland, September 2009.
- [3] Frontiers of Engineering, National Academy of Engineering (invited) ,
Irvine, CA, September 2009.
- [4] AFOSR Joint Electronics Workshop (invited) ,
Arlington, VA, May 2009.
- [5] American Physical Society (APS) Meeting (invited) ,
Pittsburgh, PA, March 2009.
- [6] IONS-5, International OSA Network of Students (plenary) ,
Barcelona, Spain, February 2009.
- [7] Workshop on Nanoantennas (invited) ,
Paris, France, January 2009.
- [8] Nanometa 2009 (invited) ,
Seefeld, Austria, January 2009.
- [9] Future of Light Symposium, Boston University Photonics Center (invited plenary) ,
Boston, MA, December 2008.
- [10] 2008 NSF Nanoscale Science and Engineering Conference (invited plenary) ,
Arlington, VA, December 2008.
- [11] OSA Topical Meeting on Plasmonics and Metamaterials (invited) ,
Rochester, NY, October 2008.
- [12] Symposium on Advanced Microscopy Techniques for Immunoscopes (invited) ,
Barcelona, Spain, October 2008.
- [13] Atomic Scale Functional Imaging Workshop (invited) ,
Annapolis, MD, September 2008.
- [14] 10th Int'l Conference on Near-field Optics and Related Techniques (invited) ,
Buenos Aires, Argentina, September 2008.
- [15] Workshop on Numerical Methods for Optical Nanostructures (invited)
ETH Zurich, Switzerland, July 2008.
- [16] Crossborder Workshop (invited)
Cornell, NY, June 2008.

- [17] Frontiers in Nanoscience (invited)
Schloss Ringberg, Germany, April 2008.
- [18] Industrial Associates Meeting, The Institute of Optics, University of Rochester
Rochester, NY, March 2008.
- [19] SPIE Photonics West Conference (invited)
San Jose, CA, January 2008.
- [20] Physics of Quantum Electronics Conference (PQE2008) (invited)
Snowbird, UT, January 2008.
- [21] Materials Research Society Meeting (invited)
Boston, MA, November 2007.
- [22] 96th Int'l Titisee Conference "Trends in Biological Optical Microscopy" (invited)
Titisee, Germany, November 2007.
- [23] Canadian Institute for Advanced Research Nanoelectronics Meeting (invited),
Vancouver, Canada, November 2007.
- [24] APS Laser Science XXIII & OSA Annual Meeting (invited),
Symposium on *Nanoscale Localization of Light*,
San Jose, CA, September 2007.
- [25] SPIE Conference on Nanoplasmonics (invited),
San Diego, CA, August 2007.
- [26] 8th Int'l Conference on Carbon Nanotubes, NT07,
Belo Horizonte, Brazil, June 2007.
- [27] 3rd Int'l Conference on Surface Plasmons Polaritons (invited),
Dijon, France, June 2007.
- [28] Gordon Conference on Mechanisms of Membrane Transport (invited),
Tilton, NH, June 2007.
- [29] Imaging Cell Signaling Symposium (invited),
Rochester, NY, January 2007.
- [30] APS Laser Science XXII & OSA Annual Meeting (invited),
Symposium on *Carbon Nanotube Spectroscopy*,
Rochester, NY, October 2006.
- [31] 9th Int'l Conference on Near-field Optics and Related Techniques (invited) ,
Lausanne, Switzerland, September 2006.
- [32] SPIE Optics & Photonics 2006, Metal Nanoplasmonics (invited)
San Diego, CA, USA, August 2006.
- [33] Int'l Conference on Nanoscience and Technology ICN&T (invited) ,
Basel, Switzerland, July/August 2006.
- [34] Workshop on Numerical Methods for Optical Nano Structures (invited) ,
Zurich, Switzerland, July 2006.
- [35] Workshop on Advanced Scanning Probes for Innovative Nanoscience (invited) ,
Barcelona, Spain, May 2006.
- [36] Department of Energy Separations & Analysis Contractors' Meeting (invited) ,
Airlie, VA, April 2006.

- [37] Int'l Winterschool on Electronic Properties of Novel Materials (invited) ,
Kirchberg, Austria, March 2006.
- [38] Int'l Symposium on Scientific Imaging: Seeing the Invisible (invited) ,
Madrid, Spain, Fundacion Ramon Areces, November 2005.
- [39] OSA Annual Meeting *Frontiers in Optics* (invited),
Tucson, AZ, October 2005.
- [40] Gordon Conference on Quantum Control of Light and Matter (invited) ,
Waterville, ME, Colby College, August 2005.
- [41] Int'l Workshop on Nanotube Optics and Nanospectroscopy (invited) ,
Telluride, CO, July 2005.
- [42] Int'l Workshop on Nanophotonics and Nanobiotechnology (invited) ,
Istanbul, Turkey, Koc University, June 2005.
- [43] 5th Int'l Conference on Photonics, Devices, and Systems (invited) ,
Prague, Czech Republic, June 2005.
- [44] SPIE Conference on Smart Structures and Materials (invited) ,
San Diego, CA, March 2005.
- [45] Workshop on Nanoscale Subsurface Spectroscopy and Tomography (invited) ,
Lenox, MA, Cranwell Resort, February 2005.
- [46] Winter College on Optics and Photonics in Nanoscience and Nanotechnology (invited) ,
Trieste, Italy, Abdus Salam Int. Centre for Theoretical Physics, February 2005.
- [47] Int'l Workshop on Nanoscale Spectroscopy and Nanotechnology (invited) ,
College Park, MD, University of Maryland, December 2004.
- [48] Fall Meeting of the Material Research Society (invited),
Panel discussion on *Future SPM Challenges and Opportunities*,
Boston, MA, November/December 2004.
- [49] Fall Meeting of the Material Research Society (invited),
Symposium on *Scanning-Probe and Other Novel Microscopies*,
Boston, MA, November/December 2004.
- [50] AFOSR Meeting on *Multidimensional Sensing and Spectroscopy* (invited),
Dayton, OH, November 2004.
- [51] OSA Annual Meeting *Frontiers in Optics* (invited),
Rochester, NY, October 2004.
- [52] Gordon Research Conference on Laser Interactions with Materials (invited),
Andover, NH, August 2004.
- [53] Great Lakes Photonics Symposium (invited),
Cleveland, OH, June 2004.
- [54] Symposium on "20 years of Nano-Optics" (invited),
Basel, Switzerland, University of Basel, April 2004.
- [55] American Chemical Society Meeting (invited),
Symposium on *Microscopy Beyond the Diffraction Limit*,
Anaheim, CA, March 2004.

- [56] National Nanotechnology Initiative Interagency Workshop (plenary speaker)
"Instrumentation and Metrology for Nanotechnology" (Grand Challenge Workshop),
National Institute of Standards and Technology, Gaithersburg, January 2004.
- [57] XXI Brazilian Physical Society Meeting (invited),
Fortaleza CE, Brazil, November 2003.
- [58] DARPA 2003: University Opto Centers Conference (invited),
Coronado CA, USA, September 2003.
- [59] Stanford Photonics Research Center Annual Meeting (invited),
Stanford CA, USA, September 2003.
- [60] Atomic Molecular and Optical Sciences Meeting (invited),
DOE, Basic Energy Sciences
Tahoe City CA, USA, September 2003.
- [61] Microscopy and Microanalysis 2003 Meeting (invited),
Symposium on *Focus on Raman and Infrared Microanalysis*,
San Antonio TX, USA, August 2003.
- [62] International Conference on Laser-Matter Interaction, LMI-11 (invited),
St. Petersburg, Pushkin, Russia, June/July 2003.
- [63] 2003 CLEO/QELS Conference (invited),
Symposium on *Nano-Optics*,
Baltimore MA, USA, June 2003.
- [64] 2003 Photonics North (invited),
Montreal, Canada, May 2003.
- [65] Meeting of the Royal Microscopy Society (invited),
UK Scanning Probe Microscopy Meeting
Swansea, UK, April 2003.
- [66] DARPA Biophotonics Workshop (invited),
Defence Science Research Council
Arlington, VA, March 2003.
- [67] Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (invited),
Symposium on *Bioanalytical Microsystems*
Orlando FL, USA, March 2003.
- [68] Annual American Physical Society (APS) meeting (invited),
Symposium on *Nanophotonics*
Austin TX, USA, March 2003.
- [69] SPIE Photonics West Meeting (invited),
Symposium on Multiphoton Microscopy in the Biomedical Sciences III,
San Jose CA, USA, January 2003.

COLLOQUIA AND SEMINARS (since 2003)

- [1] Rice University, Keck Seminar, TX, November 13 (2009).
- [2] University of Ottawa, Ottawa, Canada, August 27 (2009).
- [3] Universidad de Zaragoza, Dept. de Fisica de la Mat. Cond., Zaragoza, Spain, May 22 (2009).
- [4] Instituto de Optica - CSIC, Madrid, Spain, April 24 (2009).

- [5] St. Andrews University, Department of Physics, UK, March 06 (2009).
- [6] University of Stuttgart, Department of Physics, Germany, February 17 (2009).
- [7] Cambridge University, Cambridge, Great Britain, December 12 (2008).
- [8] Institut de Ciències Fòniques (ICFO), Castelldefels (Barcelona), Spain, Sep. 9/10 (2008).
- [9] Washington University, Seattle, WA, May 22 (2008).
- [10] University of Utah at Salt Lake City, Salt Lake City, UT, April 3 (2008).
- [11] Argonne National Laboratory, Argonne, IL, March 19 (2008).
- [12] State University of New York at Buffalo, Buffalo, NY, March 27 (2008).
- [13] Phelps Colloquium, University of Rochester, Rochester, NY, March 6 (2008).
- [14] University of Texas at Austin, Austin, TX, February 21 (2008).
- [15] University of Konstanz, Department of Physics, Germany, November 19 (2007).
- [16] University of Illinois, Urbana-Champaign, IL, October 25 (2007).
- [17] Ohio State University, Columbus, OH, October 11 (2007).
- [18] Agilent, Santa Clara, CA, September 17 (2007).
- [19] Johns Hopkins University, Baltimore, MD, January 10 (2007).
- [20] University of Pennsylvania, Philadelphia, PA, January 8 (2007).
- [21] Rochester Institute of Technology, Rochester, NY, December 13 (2006).
- [22] McGill University, Department of Physics, Montreal, Canada, November 30 (2006).
- [23] Center for NanoScience, Ludwig Maximilian University, Munich, Germany, July 14 (2006).
- [24] National Research Council, Steacie Research Center, Ottawa, Canada, May 5 (2006).
- [25] Duke University, Fitzpatrick Institute for Photonics, Durham, NC, April 4 (2006).
- [26] University of Vienna, Department of Physics, Vienna, Austria, March 13 (2006).
- [27] Queens University, Department of Physics, Kingston, Canada, December 7 (2005).
- [28] University of Rochester, Department of Biomedical Engineering, September 20 (2005).
- [29] University of Tuebingen, Department of Physical Chemistry, Germany, June 16 (2005).
- [30] Swiss Federal Institute of Technology, ETH Zurich, Switzerland, June 1 (2005).
- [31] University of Basel, Department of Physics, Switzerland, May 25 (2005).
- [32] Cornell University, Department of Applied Physics, May 11 (2005).
- [33] IBM Research Laboratories, T.J. Watson Research Center, Yorktown NY, April 29 (2005).
- [34] Purdue University, Department of Computer and Electrical Engineering, April 8 (2005).
- [35] University of Rochester, Department of Physics and Astronomy, March 30 (2005).
- [36] Los Alamos National Laboratory, Center for Integrated Nanotechnologies, March 8 (2005).
- [37] University at Albany, College of Nanoscale Science and Engineering, February 25 (2005).

- [38] University of Connecticut, Materials Science & Engineering, January 19 (2005).
- [39] Indiana University, Department of Chemistry, November 11 (2004).
- [40] Lawrence Livermore National Laboratory, October 18 (2004).
- [41] SUNY Brockport, Department of Physics / Chemistry, October 7 (2004).
- [42] University of Twente, Enschede, The Netherlands, June 25 (2004).
- [43] Bristol-Myers Squibbs, New Brunswick, NJ, May 27 (2004).
- [44] Texas Instruments, Dallas, TX, May 18 (2004).
- [45] Brown University, Dept. of Chemistry, March 12 (2004).
- [46] University of California at Berkeley, Physical Chemistry Seminar, February 24 (2004).
- [47] Swiss Federal Institute of Technology (ETH), Quantum Optics Seminar, February 9 (2004).
- [48] Cornell University, Center for Nanoscale Systems, February 5 (2004).
- [49] Massachusetts Institute of Technology, Harrison Spectroscopy Lab., January 14 (2004).
- [50] Vanderbilt University, Department of Physics, September 10 (2003).
- [51] University of Siegen, Dept. of Physical Chemistry, Germany, July 18 (2003).
- [52] University of Dresden, Institute of Photophysics, Germany, July 17, 2003.
- [53] Max-Planck Institute for Biophysics, Goettingen, Germany, July 16, 2003.
- [54] University of Bielefeld, Department of Physics, Germany, July 14 (2003).
- [55] Ludwig Maximilian University, Department of Physics, Munich, Germany, July 11 (2003).
- [56] Max-Planck Institute for Biochemistry, Munich (Martinsried), Germany, July 10 (2003).
- [57] University of Basel, Department of Physics, Switzerland, July 7 (2003).
- [58] Swiss Federal Institute of Technology, Zurich, Switzerland, July 4, 2003.
- [59] University of Cincinnati, Department of Physics, May 19 (2003).
- [60] University of Chicago, James-Franck Institute, Chicago, May 13 (2003).
- [61] Eastman Kodak Company, April 22 (2003).

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

- [1] Optical Society of America.
- [2] American Physical Society.
- [3] American Association of Physics Teachers.
- [4] American Association for the Advancement of Science.