Edward Van Keuren

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Education

Ph.D. Physics, Carnegie Mellon University, Pittsburgh, PA, May 1990. Thesis dissertation: "Light Scattering Studies of Magnetic Particle Dispersions" Advisors: Dr. Alfred Bortz, Prof. Stanley Charap.
M.S. Physics, Carnegie Mellon University, May 1986. QPA: 3.62/4.0.
B.S. Physics, Rensselaer Polytechnic Institute, Troy, NY, May 1984. Summa cum Laude; QPA 3.93/4.0.
One year of B.S. studies as exchange student, Swiss Federal Institute of Technology (ETH), Zürich, Switzerland, Department of Physics, October 1982-July 1983.

Employment

- Department of Physics, Georgetown University; 1999-2005: Assistant Professor, 2005-present Associate Professor,
  2000-01, 2003-07: Director of Graduate Studies
  2007-present: Chair
  - Departmental administration of 13 tenure line faculty, three non teaching faculty, and 5 staff.
  - Teach undergraduate level courses in mechanics, optics, and experimental methods and a graduate course in advanced characterization methods.
  - Developed several types of biomedical microchips for biomarker detection, including a microfluidic/microphotonic chip with detection based on competitive binding, and a 2 dimensional separations chip for protein analysis.
  - Developed new optical imaging methods for studying molecular environments, including a new technique to enable three dimensional thermal imaging.
  - Designing planar waveguide circuits and nanophotonics waveguides, including beam propagation modeling and design and fabrication of switching elements using thermooptic mode transfer.
  - Researching organic nanoparticle preparation and characterization using fluorescence correlation spectroscopy, dynamic light scattering and optical spectroscopy;
  - Developing nanoparticles for various applications, including as MRI contrast agents or as active materials for organic photovoltaic cells
  - In collaboration with colleagues at NIST, investigating the entanglement of photons from separate sources.

- 1/96-5/99: Research Scientist, BASF AG, Advanced Polymer Research, Yokkaichi, Japan. Manager of BASF's nonlinear optics research lab in Japan. Contact person in Japan for

BASF as member of the Nonlinear Photonics Materials project sponsored by the Japanese government (MITI).

- Investigated third order nonlinear optical properties of conjugated polymers and organic small-molecular systems.
- Developed method for determination of population decay times, homogeneous and inhomogeneous linewidths from nonlinear optical measurements.
- Built two-photon fluorescence apparatus and developed analysis procedure.
- Developed new method for analysis of nonlinear refraction and absorption.
- Made triannual presentations to project members as well as at various conferences.
- Coordinated administrative requirements of the project.
- Maintained research contacts for BASF in Japan.

- 5/93-1/96: Visiting researcher, National Institute of Materials and Chemical Research, Tsukuba, Japan (Dept. of Polymer Chemistry, Dr. Hiro Matsuda). Built up laboratory for pump/probe measurements and characterized nonlinear optical properties of organic nanoparticles, metal complexes and polydiacetylenes.

- 1/93-5/93: Visiting researcher, Department of Chemistry, Carnegie Mellon University (Prof. G. Patterson). Renovated experiment for measurement of third harmonic generation.

- 9/90-10/92: Post-doctoral fellow, BASF AG, Department of Solid State Physics, Ludwigshafen, Germany.
  - Developed novel fiber optic implementation of diffusing wave spectroscopy, used it to characterize concentrated polymer dispersions, emulsions and pigments.
  - Successfully built “micro” dynamic light scattering apparatus; measured single scattering in highly concentrated dispersions.
  - Programmed Monte-Carlo simulations of photon diffusion in random media.

- 1/85-5/90: Research assistant, Magnetics Technology Center, Carnegie Mellon University. Ph.D. thesis project. Designed and built apparatus to characterize magnetic particle dispersions using static light scattering; studied various commercial formulations of magnetic dispersions.

- 05/87-08/87: Research assistant, Disk Development Lab, IBM General Products Division, San Jose, CA. Applied technique for dispersing particles by adhesion of colloidal silica to the surface to Ba-ferrite magnetic particle systems.

- 05/85-08/85: Summer intern, Magnetic Media Lab, Eastman Kodak, Co., Rochester, NY. Renovated a titration calorimeter and measured the heats of adsorption of surfactants onto magnetic particles.

Research
Publications and presentations

Peer-reviewed publications:

1. C. Perrin, M. Dobish, **E. Van Keuren** and J. Swift "Monosodium Urate Monohydrate Crystallization" invited paper, CrystEngComm, **13** (2011) 1111-1117..
2. C. Ma, Q. Zhang, **E. Van Keuren**, „Direct integration of nanoscale conventional and slot waveguides" J. Nanosci. Nanotech. **11**, 2524-2527 (2011)
3. M. Helle, D. Gordon, D. Kaganovich, **E. Van Keuren,** A. Ting "Extending Electro-Optic Detection of Short Particle Beams Beyond the Transverse Phonon Resonance" Advanced Accelerator Concepts **1299** (2010) 561-564
4. **E. Van Keuren** and M. Nishida, "Synthesis of nanocomposite materials using the reprecipitation method" Computers, Materials & Continua (CMC) vol.**409**, no.1, pp.61-77, 2010.
5. S. Qi, X. Liang, H. Lu, C. Ma, **E. Van Keuren** "The refractive index change and self-defocusing effect of Methyl Red Doped Polymer" Jap. J. Appl. Phys. **48** (2009) 11503.
6. C. Ma, S. Qi, Q. Zhang, **E. Van Keuren**, "High efficiency right-angle bending structures in continuous slot waveguides" J. Opt. A: Pure Appl. Opt. **11** (2009) 105702
7. R. Ross, C. Cardona, F. Swain, Dirk M. Guldi,, S. Sankaranarayanan, **E. Van Keuren**, B. Holloway, M. Drees "Tuning Conversion Efficiency in Metallo Endohedral Fullerene-Based Organic Photovoltaic Devices" Adv. Funct. Mater. **19** (2009), 1–6.
8. J. Mertzman S. Kar, S. Lofland, T. Fleming, **E. Van Keuren**, Y Tong, S. Stoll "Surface attached manganese-oxo clusters as potential contrast agents" Chem. Commun. **7** (2009) 788-790.
9. R. Ross, C. Cardona, D. Guldi, S. Sankaranarayanan, M. Reese, N. Kopidakis, J. Peet, B. Walker, G. Bazan, **E. Van Keuren**, B. Holloway, M. Drees, "Endohedral fullerenes for the advancement of organic photovoltaic devices" Nature Materials **8** (2009) 208-212.
10. C. Ma, Q. Zhang, **E. Van Keuren**, "Analysis of symmetric and asymmetric nanoscale slab slot waveguides" Opt. Commun. **282** (2009) 324-328.
11. C. Ma, Q. Zhang, **E. Van Keuren**, " Right-angle slot waveguide bends with high bending efficiency" Opt. Express **16** (19) September 2008, 14330-34.
12. **E. Van Keuren**, A. Bone, C. Ma, "Phthalocyanine Nanoparticle Formation in Supersaturated Solutions" Langmuir **24,** (2008), 6079-6084.
13. Q. Zhang, C. Ma and **E. Van Keuren**, "Confinement analysis in symmetric and asymmetric nanoscale slab slot waveguides," in Coherent Optical Technologies and Applications/Integrated Photonics and Nanophotonics Research and Applications/Quantum Entanglement and Decoherence: 3rd International Conference on Quantum Information/Slow and Fast Light on CD-ROM (The Optical Society, Washington, DC, 2008), IWH1.
14. C. Ma, **E. Van Keuren** "A three-dimensional wide-angle BPM for optical waveguide structures" Optics Express, Vol. **15**, Issue 2, pp. 402-407, January 2007
15. K. P. Bloschock, T. W. Schneider, Abul Hussam, **E. Van Keuren**, " Development of a MEMS-fabricated SU-8 device for 2D separations " Proc. SPIE Vol. 6380, 63800I, Smart Medical and Biomedical Sensor Technology IV; Brian M. Cullum, J. Chance Carter; Eds., Oct. 2006.

16. Jonathan Rogers, Changbao Ma, Makarand Paranjape, **Edward Van Keuren**, "A multimode thermo-optic beam steering switch ", Proc. SPIE Vol. 6368, 636815, Optoelectronic Devices: Physics, Fabrication, and Application III; Joachim Piprek, Jian Jim Wang; Eds., Oct. 2006
17. Changbao Ma, **Edward Van Keuren**, "Three dimensional iterative beam propagation method for optical waveguide devices", Proc. SPIE Vol. 6389, 63890E, Active and Passive Optical Components for Communications VI; Achyut K. Dutta, Yasutake Ohishi, Niloy K. Dutta, Jesper Moerk; Eds., Oct. 2006
18. C. Ma, **E. Van Keuren**, "New design of a beam-steering thermooptic multimode polymer waveguide switch" Applied Physics B, Lasers and Optics 85 (4) (2006) 619-623 DEC.
19. C. Ma**, E. Van Keuren**, "A simple three dimensional wide-angle beam propagation method" Optics Express 14 (2006) 4668-4674.
20. C. Luo, X. Liu, R. Poddar, J. Garra, A. Gadre, **E. Van Keuren**, T. Schneider, R. White, J. Currie, M. Paranjape, "Thermal ablation of PMMA for water release using a microheater" J. Micromech. Microeng. **16** (2006) 580-588.
21. C. Luo, X. Liu, R. Poddar, J. Garra, A. Gadre, **E. Van Keuren**, T. Schneider, R. White, J. Currie, M. Paranjape "An innovative all-polymeric drug-supply device" Proc. SPIE Vol. 5763 Smart Structures and Materials 2005: Smart Electronics, MEMS BioMEMS and Nanotechnology **5763** (2005) 301-309.
22. **E. Van Keuren**, R. White, "Structure/property relations in conjugated polymers for photonics" Nonlinear Optics, Quantum Optics **33** (2005) 63-96.
23. **E. Van Keuren** "Refractive index measurement using total internal reflection" Amer. J. Phys., **73**(7) (2005) 611-614.
24. **E. Van Keuren**, O. Albertini, M. Cheng, J. Currie, C. Luo, M. Paranjape "Fluorescent microthermal imaging of MEMS heaters", Sensors and Materials A, vol. **17** (2004) 1-6.
25. **E. Van Keuren**, D. Littlejohn, W. Schrof, "Three dimensional thermal imaging using two-photon microscopy" J. Phys. D. Appl. Phys. **37** (2004) 1-6.
26. A. Leeds, **E. Van Keuren**, T. Schneider, J. Currie, M. Durst, M. Paranjape, "Single Mask Integration of Micro-Fluidic and Micro-Optical Elements" Sensors and Actuators A 115 (2-3) (2004) 571-580.
27. C. Ma, **E. Van Keuren**, "Simulation of Thermo-optic Effects in Beam Propagation" SPIE Proceedings, vol. 5595, 2004, pp. 394-403.
28. K. Bloschock, J. Flyer, T. Schneider, A. Hussam, **E. Van Keuren**, "Development of a MEMS 2d Separations Device" SPIE Proceedings, Vol 5591, 2004. pp 72-79.
29. **E. Van Keuren**, "Polymer nanoparticles synthesized with solvent shifting" Journal of Dispersion Science and Technology, **25**, (2004) 547-553.
30. **E. Van Keuren**, W. Schrof, "Fluorescence recovery after two-photon bleaching for the determination of dye diffusion in polymer systems" Macromol. **15** (2003) 5002-5007
31. **E. Van Keuren**, E. Georgieva, M. Durst, "Kinetics of the Growth of Anthracene Nanoparticles" J. Disp. Sci. & Tech. **24**(5) (2003) 721-729.
32. **E. Van Keuren**, W. Schrof, "Two-photon Pattern Bleaching for Characterizing Structural Changes in Polymer Films" Macromol. Rapid Commun. **23** (18) (2002) 1138-1140.
33. **E. Van Keuren**, J. Currie, M. Nelson, M. Paranjape, T. Schneider, R. Smith, P. Treado, J. Ward, R. White, "Three Dimensional Thermal Effects in MEMS Devices" Mat. Res. Soc. Symp. Proc. **687** (2002) B.1.3.1-B.1.3.6

34. **E. Van Keuren**, R. Andreaus, H. Möhwald, W. Schrof, T. Wakebe, V. Belov, H. Matsuda, R. Rangel-Rojo, "Structure/property relations in the linear and third order nonlinear optical properties of substituted oligothiophenes", Nonlinear Optics, **28** (2001) 61-76.
35. T. Hartmann, W. Schrof, V. Belov, H. Möhwald, S. Barth, **E. Van Keuren**, R. Mahrt, "Charge induced dephasing in thin polythiophene films" Phys. Rev. B **64**, (2001) 235205.
36. **E. Van Keuren**, E. Georgieva, J. Adrian, "Kinetics of the Formation of Organic Molecular Nanocrystals", Nano Letters, **1**(3) (2001) 141-144.
37. **E. Van Keuren**, T. Wakebe, R. Andreaus, H. Möhwald, W. Schrof, V. Belov, H. Matsuda, R. Rangel-Rojo, "Frequency dependence of the third order nonlinear optical properties of a polythiophene/selenophene derivative film" Appl. Phys. Lett., **75** (1999) 3312-3314.
38. **E. Van Keuren**, T. Wakebe, H. Möhwald, S. Rozouvan, W. Schrof, V. Belov, H. Matsuda, R. Rangel-Rojo, S. Yamada, "Numerical Modeling of Saturation Effects in Nonlinear Optical Transmission and Refraction", Nonlinear Optics **22** (1999) 315-318.
39. W. Schrof, R. Andreaus, H. Möhwald, S. Rozouvan, V. Belov, **E. Van Keuren**, T. Wakebe, "Nonlinear optics of polythiophene films" Nonlinear Optics **22** (1-4) (1999) 295-300.
40. T. Wakebe, **E. Van Keuren**, "Two Photon Induced Fluorescence Spectra of Xanthene Dyes" Jpn. J. Appl. Phys. part 1 **38** (6A) (1999) 3556.
41. **E. Van Keuren**, V. Belov, H. Matsuda, H. Möhwald, S. Rozouvan, W. Schrof, S. Yamada, "Linear and third order nonlinear optical properties of substituted oligothiophenes" J. Chem. Phys. **110** (1999) 3584-3590.
42. **E. Van Keuren**, V. Belov, H. Matsuda, H. Möhwald, S. Rozouvan, H. Saitoh, W. Schrof, S. Yamada, "Nonlinear Optical Properties of a Novel Polythiophene Derivative Copolymer Determined by Third Harmonic Generation, Degenerate Four-Wave Mixing and Z-scan", Mol. Cryst. Liq. Cryst. **315** (1998) 71-82.
43. **E. Van Keuren**, H. Matsuda, T. Kamata, T. Fukaya, F. Mizukami, "Pump probe method for the determination of imaginary $\chi^{(3)}$ of $Ni(dmg)_2$", J. Phys. D: Appl. Phys **31** (1998) 3051-3056.
44. W. Schrof, S. Rozouvan, **E. Van Keuren**, D. Horn, J. Schmitt, G. Decher, "Nonlinear Optics of Polyelectrolyte Thin Films Containing Gold Nanoparticles Investigated by Wavelength Dispersive Femtosecond Degenerate Four Wave Mixing (DFWM)", Adv. Mater **10** (1998) 338.
45. W. Schrof, S. Rozouvan, T. Hartmann, V. Belov, H. Möhwald, **E. Van Keuren**, "Nonlinear Optical Properties of Novel Low Band Gap Polythiophenes", J. Opt. Soc. Am. B **15** (1998) 889.
46. **E. Van Keuren**, V. Belov, W. Schrof, E. Mayer, S. Rozouvan, H. Saitoh, T. Hartmann, H. Möhwald, "Third Order Nonlinear Optical Properties of Novel Polythiophene Derivatives", Mol. Cryst. Liq. Cryst. **294** (1997) 287.
47. S. Yamada, **E. Van Keuren**, H. Matsuda, T. Kamata, T. Fukaya, F. Mizukami, E. Smith, A. Kar, B. Wherret, "Nonlinear refractive indices of one-dimensional metal complexes by Z-scan method" Mol. Cryst. Liq. Cryst. **295** (1997) 1.
48. H. Matsuda, S. Yamada, **E. Van Keuren**, H. Katagi, H. Kasai, S. Okada, H. Oikawa, H. Nakanishi, E. Smith, A. Kar, B. Wherret, "Nonlinear refractive indices of polydiacetylene microcrystals", SPIE Proc. **2998** (1997) 241.

49. **E. Van Keuren**, H. Matsuda, T. Kamata, T. Fukaya, F. Mizukami, “Third-order nonlinear optical properties of one-dimensional metal complexes by the pump-probe method”, Synthetic Metals **86** (1997) 2149.
50. H. Matsuda, S., Shimada, H. Takeda, A. Masaki, **E. Van Keuren**, S. Yamada, K. Hayamizu, F. Nakanishi, S. Okada, H. Nakanishi, “Synthesis and Nonlinear Optical Properties of a New Polydiacetylene Derivative having Sulfur Atom Directly Bound to the Main Chain”, Synth. Met. **84** (1997) 909.
51. **E. Van Keuren**, H. Matsuda, T. Kamata, T. Fukaya, F. Mizukami, “Third-order nonlinear optical properties of one-dimensional metal complexes by the pump-probe method”, Nonlinear Optics **15** (1996) 279
52. N. Tamaoki, **E. Van Keuren**, H. Matsuda, K. Hasegawa, T. Yamaoka, "Photoreversible optical nonlinearities of polymeric films containing spiropyran with long alkyl chains", Appl. Phys. Lett. **69** (1996) 1188.
53. Y. Sonoda, Y. Suzuki, **E. Van Keuren**, H. Matsuda, "Preparation and nonlinear optical properties of poly(2,5-diheptyl-1,4-phenylenehexa-1,3,5-trienylene)", Macromol. **29**(1) (1996) 288-293.
54. H. Matsuda, **E. Van Keuren**, A. Masaki, K. Yase, A. Mito, C. Takahashi, H. Kasai, H. Kamatani, S. Okada, H. Nakanishi, "Nonlinear optical properties of J-aggregated merocyanine dye microcrystals in polymer microcrystals", Nonlinear optics **10** (1995) 123.
55. **E. Van Keuren**, H. Wiese, D. Horn, "Fiber optic diffusing wave spectroscopy on concentrated dispersions of large polymer latex spheres", Ber. Bunsenges. Phys. Chem. **98**(2) (1994) 269.
56. **E. Van Keuren**, H. Wiese, D. Horn, "Fiber-optic quasielastic light scattering in concentrated dispersions: angular dependent measurements of singly scattered light", Langmuir **9** (1993) 2883.
57. **E. Van Keuren**, H. Wiese, D. Horn, "Diffusing wave spectroscopy in concentrated latex dispersions: an investigation using single mode fibers", Colloids and Surfaces a: Physiochemical and Engineering Aspects **77** (1993) 29.
58. **E. Van Keuren**, S. Charap, A. Bortz, "Effect of orienting fields on agglomeration in dilute dispersions of magnetic fine particles", IEEE Trans Mag. **27** (1991) 3700.

Non-peer-reviewed conference proceedings and other publications

1. **Edward Van Keuren**, Maki Nishida, Sarah Stoll, Julie Mertzman “Multifunctional nanoparticles for cancer diagnosis and treatment” Proceedings of the Multifunctional Nanoscale Materials for the 21st Century (MNM21) April 2009.
2. M. Drees, R. Ross, C. Cardona, **E. Van Keuren**, D. Guldi, B.C. Holloway, “Endohedral Metallofullerenes as Improved Acceptor Materials for Organic Solar Cells”, Proceedings of the American Vacuum Society meeting – October 2008.
3. Q. Zhang, C. Ma and **E. Van Keuren**, “Confinement analysis in symmetric and asymmetric nanoscale slab slot waveguides,” in Coherent Optical Technologies and Applications/Integrated Photonics and Nanophotonics Research and Applications/Quantum Entanglement and Decoherence: 3rd International Conference on Quantum Information/Slow and Fast Light on CD-ROM (The Optical Society, Washington, DC, 2008), IWH1.
4. **金子祐司, 島田悟, 木村龍実, 松田宏雄, 角館洋三, 横井裕之, 小野寺恒信, 笠井均, 岡田修司, 及川英俊, 中西八郎, Edward Van Keuren, “**有機ナノ結晶分散系の外場配向制御

と光学特性”*化学系学協会東北大会*,秋田,(2006.9.22-2006.9.24) {Kaneko Y., Shimada, S., Kimura, T., Matsuda H., Kakudate, Y., Yokoi, H. Onodera, T., Kasai H., Okada, S. Oikawa H., Nakanishi H., **Van Keuren, E**. “External orientation control and optical properties of organic nano- crystal dispersed systems“ Chemical society northeast conference, Akita, (2006.9.22-2006.9.24)}

5. A. Leeds, **E. Van Keuren**, T. Schneider, J. Currie, M. Durst, M. Paranjape, “Single Mask Integration of Micro-Fluidic and Micro-Optical Elements” Proc. Eurosensors XVII, 2003, 33-36.
6. **E. Van Keuren**, “Organic photonic materials” IEEE-LEOS Newsletter, August 2003, http://www.ieee.org/organizations/pubs/newsletters/leos/aug03/university.html
7. A.J. Nijdam, **E. Van Keuren**, M Paranjape, "Application of wet-chemical etching of silicon in the fabrication of a novel optical switch" proceedings of the third workshop on physical chemistry of wet etching of silicon (PCWES-3), Nara, Japan, June 5 and 6, 2002.
8. **E. Van Keuren**, T. Wakebe, R. Andreaus, V. Belov, D. Horn, H. Möhwald, A. Niedermeier, S. Rozouvan, W. Schrof, “Organic Conjugated Polymer Films for Nonlinear Optics” Proceedings of the Sixth Symposium on Non-Linear Photonics Materials (Industrial Science and Technology Frontier Program) March 1999.
9. **E. Van Keuren**, T. Wakebe, H. Möhwald, S. Rozouvan, W. Schrof, V. Belov, “Polythiophene Derivatives for Third Order Nonlinear Optics”, Sen’i Gakkai Symposia Preprints 1998(S) (Proceedings of the 13th Miyazaki International Symposium on Optical and Electronic Properties of Organic Materials) June, 1998
10. **E. Van Keuren**, V. Belov, W. Schrof, E. Mayer, S. Rozouvan, H. Saitoh, T. Hartmann, H. Möhwald, “Novel Polythiophene Derivatives for Nonlinear Optics”, Proceedings of the Fifth Symposium on Non-Linear Photonics Materials (Industrial Science and Technology Frontier Program) November 1996, 103.
11. S. Yamada, **E. Van Keuren**, H. Matsuda, H. Katagi, H. Kasai, H. Oikawa, H. Nakanishi, E. Smith, A. Kar, B. Wherret, Polym. Prep. Japan **45** (1996) 2054
12. H. Matsuda, **E. Van Keuren**, S. Shimada, H. Takeda, F. Nakanishi, S. Okada, H. Nakanishi, Polym. Prep. Japan **44** (1995) 1961.

Conference presentations and invited talks

1. Invited talk at the sixth Mid Atlantic Soft Matter workshop “Solution Self-Assembly of Nanoparticles”, Georgetown University, June 2010.
2. Invited talk at the Multifunctional Nanoscale Materials for the 21st Century (MNM21) conference “Multifunctional nanoparticles for cancer diagnosis and treatment” March 2009
3. American Physical Society March 2009 meeting (Pittsburgh): one contributed talk (Synthesis of composite polymer nanoparticles), one invited talk on the Georgetown Industrial Leadership in Physics program
4. Invited talk at the Symposium on Organic Micro- and Nano-Crystals, “Organic nanoparticles for medical applications” Sendai University, August 2008.
5. Contributed talk and poster at the joint Georgetown/Fudan University workshop, summer 2008, Shanghai, China.
6. Invited talk at Luna Innovations Nanoworks, Danville VA, "Synthesis and Characterization of Organic Nanoparticles" Dec., 2006.

7. Contributed poster presentation at the SPIE Optics East meeting, “A multimode thermo-optic beam steering switch" October 2006.
8. "Raman Correlation Spectroscopy" E. Van Keuren and M. Nishida, oral presentation at the American Physical Society meeting, March 2006, Baltimore, MD.
9. "Synthesis of organic nanoparticles", invited talk at Cornell University, March 9th, 2005.
10. "Nucleation of organic nanoparticles", invited talk at McDaniel College, Westminster, Md, October 14th, 2005.
11. “Development of a 2d MEMS separations chip” *Invited Oral Presentation*, Georgetown Biology department, January, 2005.
12. “Nucleation of organic nanoparticles” *Invited Oral Presentation*, October, 2004, McDaniel College, Westminster, MD.
13. “Synthesis and optical characterization of organic nanoparticles” *Invited Oral Presentation* at NIST Polymers division, March, 2004.
14. “Nanoscience at Georgetown” *Oral Presentation* at the Northern Virginia Tech Council nanotech committee meeting March, 2004.
15. “Polymer nanoparticles synthesized with solvent shifting” *Invited Oral Presentation* at Particles 2003 conference, Toronto, Canada, August 2003.
16. “Spectroscopic characterization of particle nucleation”, *Poster Presentation* at Particles 2003 conference, Toronto, Canada, August 2003.
17. “Peer learning in introductory mechanics”, *Oral Presentation* at CNDLS Innovations day, November, 2003.
18. “Self-assembly and growth of organic molecular nanocrystals” *Invited Oral Presentation* at the at the University of Maryland Baltimore County, Department of Physics, Sept. 26, 2001
19. “Nucleation and growth of organic molecular nanocrystals” *Oral Presentation* at the Particles 2001 conference, Orlando, Florida February, 2001.
20. “Kinetics of the growth of anthracene nanoparticles” *Oral Presentation* at the Materials Research Society meeting, Boston, November, 20
21. “Three Dimensional Thermal Effects in MEMS Devices” *Oral Presentation* at the Materials Research Society meeting, Boston, November 20
22. “Fiber optic light scattering methods” *Invited Oral Presentation* at the NIST Workshop on Nanopowder characterization, Gaithersburg, MD, Oct. 4-5, 2001
23. “Third Order Nonlinear Optics of Organic Materials” Howard University, Department of Physics, *Invited Oral Presentation*, March 2000
24. “Organic Conjugated Polymer Films for Nonlinear Optics” *Invited Oral Presentation* at the Sixth Symposium on Non-Linear Photonics Materials (Industrial Science and Technology Frontier Program) March 1999.
25. “Numerical Modeling of Saturation Effects in Nonlinear Optical Transmission and Refraction”, *Poster Presentation* at the Fourth International Conference on Organic Nonlinear Optical Materials, Chitose, Japan, October, 1998.
26. “Polythiophene Derivatives for Third Order Nonlinear Optics”, *Invited Oral Presentation* at Sen’i Gakkai Symposia, 13th Miyazaki International Symposium on Optical and Electronic Properties of Organic Materials) June, 1998.
27. “Novel Polythiophene Derivatives for Nonlinear Optics”, *Invited Oral Presentation* at the Fifth Symposium on Non-Linear Photonics Materials (Industrial Science and Technology Frontier Program) November 1996.

28. "Nonlinear Optical Properties of a Novel Polythiophene Derivative Copolymer Determined by Third Harmonic Generation, Degenerate Four-Wave Mixing and Z-scan", *Invited Oral Presentation* at the 8th International Conference on Unconventional Photoactive Systems, Nara, Japan, August, 1997.
29. "Third order nonlinear optical properties of one-dimensional electron systems: polydiacetylenes and metal complexes" (in Japanese) *Poster Presentation* at the Japan Society of Applied Physics meeting, Sapporo, Japan, March, 1995.
30. "Excite-probe measurements of polydiacetylene single crystals thin films" (in Japanese) *Poster Presentation* at the Japan Polymer Society meeting, Tokyo, November, 1994.
31. "Third order nonlinear optical properties of novel polythiophene derivatives", *Poster Presentation* at the Japan Society of Applied Physics meeting, Fukuoka, Japan, June 1996.
32. "Third-order nonlinear optical properties of one-dimensional metal complexes by the pump-probe method" *Poster Presentation* at the International Conference on Synthetic Metals '96, Snowbird, Utah, July, 1996.
33. "Third order nonlinear optical properties of novel polythiophene derivatives" *Poster Presentation* at the Asian Symposium on Organic Molecular Films, Tsukuba, Japan, October, 1996.
34. "Pump probe measurements of the nonlinear optical properties of metal complexes and polydiacetylenes" *Poster Presentation* at the National Institute of Materials and Chemical Research Annual Symposium, November, 1995.
35. "Third-order nonlinear optical properties of one-dimensional metal complexes by the pump-probe method" *Poster Presentation* at the Second International Conference on Organic Nonlinear Optics (ICONO 2), Kusatsu, Japan, July, 1995
36. "Excite probe measurements of single crystal polydiacetylene thin films", *Poster Presentation* at the National Institute of Materials and Chemical Research Annual Symposium, November, 1994.
37. "Development of fiber optic dynamic light scattering methods" *Oral Presentation* at an internal colloquium (in German) BASF AG, Germany, March 1992.
38. "Fiber optic diffusing wave spectroscopy" *Oral Presentation* at an internal colloquium, BASF AG, Germany, August 1992.
39. "Light scattering studies of magnetic particle dispersion" *Oral Presentation* at an internal colloquium (in German), BASF AG, November 1990.

Other (non research) talks

1. American Physical Society March 2009 meeting (Pittsburgh): invited talk on the Georgetown Industrial Leadership in Physics program
2. Invited presentation on the Georgetown Industrial Leadership in Physics program at the APS/AIP Graduate education conference, Greenbelt, MD, Jan/Feb 2008
3. AIP Corporate Associates meeting, June 2010, invited talk on the Georgetown Industrial Leadership in Physics program

Patents

1. V. Belov, H. Möhwald, E. Mayer, W. Schrof, E. Van Keuren, Substituted polythiophenes as materials with nonlinear optical properties
2. V. Belov, H. Möhwald, S. Rozouvan, W. Schrof, E. Van Keuren, Substituierte Polyselenophene als Materialien mit nichtlinear optischen Eigenschaften

3. E. Van Keuren, C. Ma, Direct coupling of optical slot waveguide to another optical waveguide, filed January 5, 2009, and assigned U.S. Serial Number 61/142,603

Teaching

1999/2000

Fall: Lab instructor for Mechanics (Phys-105, 4 credits, 17 students)
Lab instructor for Relativity and Quantum Physics (Phys-211, 4 credits, 17 students)

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 11 students)
Independent research (Phys-300, 1 student)

2000/2001

Fall: Lecturer for Mechanics (Phys-105, 4 credits, 19 students),
Lab instructor for Relativity and Quantum, Physics (Phys-211, 4 credits, 19 students),
Independent research (Phys-300, 3 students)

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 10 students),
Lab instructor for Electricity and Magnetism (Phys-214, 4 credits, 11 students),
Independent research/tutorial physics (Phys-300, Phys-301, 2 students)

2001/2002

Fall: Lecturer for Mechanics (Phys-105, 4 credits, 22 students)
Advanced Characterization Methods (Phys-502, 1.5 credits, 5 students)

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 4 students)
Optical Properties of Materials (Phys-512, 1.5 credits, 3 students)

2002/2003

Fall: (Junior faculty research fellowship)
Independent research (Phys-300, 2 students)
Lab rotation (Phys-535, 1 credit, 2 students)

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 6 students)
Independent research (Phys-300, 1 student).

2003/2004

Fall: Mechanics (Phys-105, 4 credits, 16 students)
Advanced Characterization Methods (Phys-502, 2 credits, 7 students)
Independent research (Phys-300, 2 students)
Lab rotation (Phys-535, 1 credit, 3 students).

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 14 students)
Independent research (Phys-300, 1 student).

2004/2005

Fall: Mechanics (Phys-105, 4 credits, 21 students)
Advanced Characterization Methods (Phys-502, 2 credits, 5 students)
Independent research (Phys-300, 4 students)
Lab rotation (Phys-535, 1 credit, 5 students).

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 11 students)
Independent research (Phys-300, 5 student).

2005/2006

Fall: One semester sabbatical leave (no formal courses taught)

Independent research (Phys-300, 2 students)
Lab rotation (Phys-535, 1 credit, 3 students).

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 6 students)
Special Topics course: Nanoparticles in medicine (Phys-260, 2 students)
Independent research (Phys-300, 3 students).
Lab rotation (Phys-535, 1 credit, 1 student).

2006/2007

Fall: Lab instructor for Relativity and Quantum, Physics (Phys-211, 4 credits, 14 students)
Advanced Characterization Methods (Phys-502, 2 credits, 4 students)
Independent research (Phys-300, 4 students)
Lab rotation (Phys-535, 1 credit, 5 students).

Spring: Electrodynamics and Optics (Phys-234, 4 credits, 9 students)
Independent research (Phys-300, 3 students).
Lab rotation (Phys-535, 1 credit, 2 students).

2007/2008

Fall: Mechanics (Phys-105, 4 credits, 23 students)
Independent research (Phys-300, 4 students)

Spring: Independent research (Phys-300, 5 students).

2008/2009

Fall: Methods of Experimental Physics (Phys-215, 3 credits, 16 students)
Independent research (Phys-300, 2 students)

Spring: Independent research (Phys-300, 2 students).

2009/2010

Fall: Methods of Experimental Physics (Phys-215, 3 credits, 9 students)
Independent research (Phys-300, 4 students)

Spring: Independent research (Phys-300, 6 students).
Electrodynamics and Optics - lab only (Phys-234, 4 credits, 12 students)

2010/2011

Fall: Electrodynamics and Optics - (Phys-234, 4 credits, 2 students)
Lab instructor for Relativity and Quantum, Physics (Phys-153, 4 credits, 19 students)
Independent research (Phys-300, 2 students)

Spring: Independent research (Phys-300, 2 students).

Teaching highlights and educational activities

- Research mentor for twelve graduate, forty seven undergraduate and seven high school students in research projects since fall 1999.
- Recipient of a Faculty Innovation Grant from the Georgetown Undergraduate Learning Initiative entitled "Gateways to Research: Lab Redesign in Second Year Physics Courses", $16,000 + $8,000 match from department.
- Using video-taped “Think-alouds” to identify and understand student misconceptions in experimental labs.

- Working with the Georgetown University Center for New Designs in Learning and Scholarship (CNDLS) on the development of an online text/reference book for undergraduate optics., currently on BlackBoard.
- Participant in the CNDLS Teaching and Learning with Technology Summer Institute (TLTSI) in 2002, 2003, 2004, 2005, 2006, 2007.
- Participated in year-long CNLDS workshop " The Faculty Colloquium on New Learning Environments" 2001/2002
- Presented "*Peer Instruction and ConcepTests in Introductory Physics"* at Innovations day, November 2003.
- Awarded CNDLS Teaching, Learning, and Technology (TLT) Fellowships for 2004/2005.
- Initiated new methods in Mechanics (Phys-105) and Electrodynamics and Optics (Phys-234) including JiTT (Just in Time Teaching) and new optics labs.
- Developed two new graduate courses: "Advanced Characterization Methods" (Phys-502) and "Optical Properties of Materials" (Phys-512).
- Active in undergraduate and graduate recruitment for the physics department (phone calls, lab tours, arranging visits).
- Active in undergraduate and graduate advising for physics majors.

Awards and honors

- Oak Ridge Associated Universities Ralph Powe Junior Faculty Enhancement award, 2000.
- Listed in Who's Who in Plastics and Polymers, March, 2000.
- Recipient of 2004 National Science Foundation Early Career Development Award.
- Recipient of 2004 Teaching and Learning with Technology fellowship.
- Winner of 2008/2009 Georgetown Dean's teaching award

Service

Department

- Department colloquium committee, 1999/2000 to 2002/03.
- Co-director of Industrial Leadership in Physics program, 2000/01 and summer 2003 to June 2007, member of graduate program planning committee since Fall, 1999.
- Department Chair, July 2007-present.
- Recruitment (phone calls/lab tours) of prospective undergraduate students (1999-present).
- Recruitment of prospective graduate students (2000-present).
- Over eighty recommendation letters for current and former students for fellowships, graduate school and employment.
- Letters of recommendation for several former GU colleagues (over fifty letters total).
- Numerous security clearance interviews for former students.
- Undergraduate student advising: adviser for 11 students since 1999.
- PhD Thesis committee for 14 Physics graduate students

Faculty of science

- Member of Ph.D. committee for Mahy El-Kouedi, Dept. of Chemistry, advisor Colby Foss, graduated 2001.
- Member of Ph.D. committee for M. Crina Frincu, Dept. of Chemistry, advisor Jen Swift, graduated 2005.
- Member of Ph.D. committee for Rupa Hiremath, Dept. of Chemistry, advisor Jen Swift, graduated 2006.
- Member of Ph.D. thesis committee for Shujang Yang, Dept. of Chemistry, advisor Miklos Kertesz., graduated 2007.
- Member of Ph.D. thesis committee for Julie Mertzman, Dept. of Chemistry, advisor Sarah Stoll., graduated 2008.
- Founding member of Georgetown Materials, Instrumentation and Nanotechnology Initiative (GeMINI) www.physics.georgetown.edu/~vankeu/Gemini/main.htm

University

- College Executive council, 2000/01, 2001/02 and 2002/03
- Exec council parliamentarian 2000/2001, 2001/2002
- Member of college subcommittee to review changes to Strategic Plan (2 meetings) April 2002
- John Carroll scholars mentor 1999/2000
- Transfer admissions committee 2007
- Reviewed GU applicants for Goldwater fellowship
- Photo for cover of graduate school catalog (2002-present)
- Public relations video for Georgetown University (2004)
- Science Academic and Program Planning Committee (May 2005 – present)
- Middle states acreditation steering committee (Spring 2010 – present)

Professional service

- Reviewer for the Journal of Chemical Physics, the American Chemical Society Symposium series "The Chemistry of Chirality", Optics Communications, the Journal of the American Chemical Society, Polymer Bulletin, Biomacromolecules, American Journal of Physics, Biomedical Microdevices, Crystal Growth and Design, Journal of Photochemistry and Photobiology, Japanese Journal of Applied Physics
- Reviewed E. Hecht's "Optics"3rd edition textbook for Addison Wesley Longman, 2000
- Proposal reviewer for the National Science Foundation CRIF (Chemistry Research Instrumentation and Facilities) program (2000), the Canadian National Science and Engineering Research Council (2001), the NSF Division of Chemistry (2003), and panel Reviewer for the NSF SBIR program (2002) and the NSF Nanomanufacturing program (2010).
- Referee for 2000, 2006 and 2010 Junior Science and Humanities Symposium (high school)
- Member of Ph.D. thesis defense committee for Edward Dowdye, Howard University Dept of Physics, 2000; Ogungbemi Kayode Cornelius, Howard University Dept of Physics, 2010; Tariq Aziz , Howard University Dept of Physics, expected thesis defense 2011.

- Provided characterization assistance for 4Wave, Sterling, VA, for their thin film optical filters (2001).
- Consulted for Optical Air Data Systems, Manassas, VA on the propagation of high powered pulses in doped optical fibers (2003).
- Member of the Northern Virginia Technology Council (NVTC)
- Active in the NVTC Nanotechnology and Workforce committees
- Chair of NVTC Nanotechnology subcommittee on academic research
- Discussion leader at the 2004 NVTC Executive forum on industrial/academic partnerships.
- Member of the Nanotechnology committee of the Joint Committee on Technology and Science (JCOTS) advising the Virginia State Legislature on science policy related to nanotechnology, 2005/2006.
- Member of the Chesapeake Nanotechnology Initiative (CNI)

Other

- Member SPIE, American Physical Society, American Chemical Society, Materials Research Society.
- Fluent in German, conversational Japanese.
- Dual U.S./ Irish citizenship.
- 2^{nd} dan (2^{nd} degree black belt) in Isshinryu karate
- CCD teacher, St. Veronica parish, Herndon, VA
- Coach, Capital girls Lego League elementary school robotics team (2008 regional champions)