

VITA

Phone: (865) 235-6402

Ali Passian

Research staff ISML/M SSE Oak Ridge National Laboratory 1 Bethel Valley Road Oak Ridge, TN 37831-6123 passianan@ornl.gov	Adjunct Professor Department of Physics University of Tennessee 401 Nielsen Physics Bldg. Knoxville, TN 37996-1200 passian@utk.edu	Joint Faculty Appointment Department of Chemical and Biomolecular Engineering University of Tennessee Knoxville, TN 37996-2200 passian@utk.edu
---	--	--

Education

Ph.D. August 2000	Physics, University of Tennessee (UTK), Knoxville <u>Dissertation title:</u> " <i>Collective Electronic Effects in Scanning Probe Microscopy</i> " Advisor: Prof. Thomas L. Ferrell at Oak Ridge National Laboratory (ORNL)
M.S. January 1993	Physics, Royal Institute of Technology (RIT) - Stockholm, Sweden <u>Thesis title:</u> " <i>A Spectroscopic Study of Wall Conditioning on ALCATOR C-MOD Tokamak</i> " Advisors: Prof. Elisabeth R. Källne at RIT and Dr. Earl S. Marmar at Massachusetts Institute of Technology (MIT)

Professional Positions and Affiliations

2007 – Present	Research and Development Staff, Imaging, Signals, and Machine learning group, Measurement Science and Systems Engineering Division (2010 - Present); Research and Development Staff, Nanoscale science and devices group, Biosciences Division, Oak Ridge National Laboratory (2007-2010).
2012 – Present	Joint Faculty Associate Professor, Department of Chemical and Biomolecular Engineering, UTK.
2010 – Present	Visiting Professor, Ecole Centrale Marseille, Pôle de l'Etoile, MARSEILLE Cedex, France; and Institut Fresnel UMR 6133 - Université Aix-Marseille, Av. Escadrille Normandie 13397 MARSEILLE Cedex 20, France
2010 – 2012	Member of the International Advisory Board, Multifrequency AFM Conference, Madrid, Spain
2006 – Present	Adjunct Professor, Department of Physics, University of Tennessee (UTK), Knoxville, USA
2002 – 2006	Joint research associate in experimental physics, Photometrics group & Nanoscale science and devices group, Oak Ridge National Laboratory (ORNL), Oak Ridge, TN, USA
2000 – 2002	Research Associate, Photometrics group, Oak Ridge National Laboratory (ORNL), Oak Ridge, TN, USA
1997 – 2000	Graduate Research Assistantship, Oak Ridge National Laboratory (ORNL), Oak Ridge, TN, USA
1995 – 2000	Research and Teaching Assistant, Department of Physics and Astronomy, University of Tennessee (UTK), Knoxville

Summer 1994	Graduate Research Assistant, Institute of Resonance Ionization Spectroscopy (IRIS) University of Tennessee, Knoxville
1993 – 1994	Research and Development Engineer, Department of Physics, Stockholm University (SU), Stockholm, Sweden
1992 – 1993	Researcher, Manne Siegbahn Institute for Atomic Physics (MSI), Stockholm, Sweden
1991 – 1992	Research assistant, Plasma Science and Fusion Center, Massachusetts Institute of Technology (MIT), Cambridge, MA, USA

Refereed publications (over 70)

Published

2012

- A. Passian and Thomas Thundat, "The abilities of instabilities," **Nature** **487**, 440–441 (2012).
- R. H. Farahi, A. Passian, L. Tetard, T. Thundat, "Critical issues in sensor science to aid food and water safety," **ACS Nano** **6(6)**, 4548–4556 (2012).
- R. H. Farahi, A. Passian, L. Tetard, T. Thundat, "Pump-probe photothermal spectroscopy using quantum cascade lasers," **J. Physics D**, **45**, 125101 (2012).
- A. L. Lereu, A. Passian, R. H. Farahi, L. Abel-Tiberini, L. Tetard, T. Thundat, "Spectroscopy and imaging of arrays of nanorods toward nanopolarimetry", **Nanotechnology** **23**, 045701 (2012).
- A. L. Lereu, A. Passian, Ph. Dumas, "Near field optical microscopy: a brief review," **International Journal Of Nanotechnology** **9(3)**, 488-501 (2012).
- N. Bonod, A. Bouhelier, A. F. Koenderink, and A. Passian, "Optical Antennas" **International Journal of Optics, Volume 2012** (2012), doi:10.1155/2012/365109.
- L. Tetard, A. Passian, R. H. Farahi, B. H. Voy, T. Thundat, "Applications of Subsurface Microscopy," in Nanotoxicity: Methods and Protocols, Edited by Joshua Reineke, Series: **Methods in Molecular Biology**, Vol. 926, 2012 (ISBN 978-1-62703-001-4).

2011

- L. Tetard, A. Passian, R. H. Farahi, B. H. Davison, S. Jung, A. J. Ragaukas, A. L. Lereu, T. Thundat, "Nanometrology of delignified Populus using mode synthesizing atomic force microscopy", **Nanotechnology** **22(46)**, 465702 (2011).
- A. Passian, S. Koucheckian, S. Yakubovich, "Index integral representations for connection between cartesian, cylindrical, and spheroidal systems," **Integral Transforms and Special Functions** **22(8)**, 549-560 (2011).
- L. Tetard, A. Passian, R. H. Farahi, S. Eslami, N. Jalili, T. Thundat, "Virtual Resonance and Frequency Difference Generation by van der Waals Interaction," **Phys. Rev. Lett.** **106(18)**, 180801 (2011).
- L. Tetard, A. Passian, R. H. Farahi, B. H. Davison, A. L. Lereu, T. Thundat, "Optical and plasmonic spectroscopy with cantilever shaped materials", **J. Physics D** **44(44)**, 445102 (2011).
- D. Brissinger, A. L. Lereu, L. Salomon, T. Charvolin, B. Cluzel, C. Dumas, A. Passian, F. de Fornel, "Discontinuity induced angular distribution of photon plasmon coupling," **Optics Express**, **19(18)**, 17750-17757 (2011).
- L. Tetard, A. Passian, R. H. Farahi, B. H. Davison, T. Thundat, "Optomechanical spectroscopy with broadband interferometric and quantum cascade laser sources," **Optics Letters** **36(16)**, 3251-3253 (2011).

2010

- S. Kim, D. Yi, **A. Passian**, and T. Thundat, "Observation of an anomalous mass effect in microcantilever-based biosensing caused by adsorbed DNA," **Appl. Phys. Lett.** **96**, 153703 (2010).
- L. Tetard, **A. Passian**, T. Thundat, "New modes for subsurface atomic force microscopy through nanomechanical coupling," **Nature Nanotechnology** **5**, 105 (2010).
- **A. Passian**, S. Kouchejian, S. Yakubovich, and T. Thundat, "Properties of Index Transforms in Modeling of Nanostructures and Plasmonic Systems," **Journal of Mathematical Physics** **51**, 023518 (2010).
- L. Tetard, **A. Passian**, R. H. Farahi, U. C. Kalluri, B. H. Davison, and T. Thundat, "Spectroscopy and atomic force microscopy of biomass," **Ultramicroscopy** doi:10.1016/j.ultramic.2010.02.035 (2010).
- S. Eslami, N. Jalili, **A. Passian**, L. Tetard, T. Thundat, "Nonlinear interaction force analysis of microcantilevers utilized in atomic force microscopy," **ASME, Dynam Syst & Control Div, PTS A AND B** **781-788** (2010).
- L. Tetard, **A. Passian**, R. H. Farahi, and T. Thundat, "Atomic force microscopy of silica nanoparticles and carbon nanohorns in macrophages and red blood cells," **Ultramicroscopy** doi:10.1016/j.ultramic.2010.02.015 (2010).

2009

- R. H. Farahi, **A. Passian**, Y. K. Jones, L. Tetard, A. L. Lereu, and T. G. Thundat, "Laser reflectometry of submegahertz liquid meniscus ringing," **Opt. Lett.** **34**, 3148-3150 (2009).
- **A. Passian**, H. Simpson, S. Kouchejian, S. B. Yakubovic, On the orthogonality of the MacDonald's functions, **Journal of Mathematical Analysis and Applications** **360**(2), 380-390 (2009).

2008

- L. Tetard, **A. Passian**, R. M. Lynch, B. H. Voy, G. Shekhawat, V. P. Dravid, T. Thundat, "Elastic phase response of silica nanoparticles buried in soft matter," **Appl. Phys. Lett.** **93**, 133113 (2008).
- L. Tetard, **A. Passian**, K. T. Venmar, R. M. Lynch, B. H. Voy, G. Shekhawat, V. P. Dravid, T. Thundat, "Imaging nanoparticels in cells by nanomechanical holography", **Nature Nanotechnology** **3**, 501 (2008).
- A. L. Lereu, G. Sanchez-Mosteiro, P. Ghenuche, **A. Passian**, R. Quidant, M. Garcia-Parajo, N. F. van Hulst, "Probing the local field of nanoantennas using single particle luminescence," **Journal of Physics: CS** **100**, 052038 (2008).
- A. L. Lereu, **A. Passian**, R. H. Farahi, N. F. van Hulst, T. L. Ferrell, T. Thundat, "Thermoplasmonic shift and dispersion in thin metal films," **J. Vac. Sci. Technol. A** **26**, 836 (2008).
- R. Desikan, L. Tetard, R. Datar, **A. Passian**, T. Thundat, "Nanomechanical Methods to Study Single Cells," in "Accessing Uncultivated Microorganisms," **ASM, ISBN: 1555814069** (2008).
- E. Finot, **A. Passian**, T. Thundat, "Measurement of mechanical properties of cantilever shaped materials," **Sensors** **8**, 3497 (2008).

2007

- **A. Passian**, A. L. Lereu, D. Yi, S. Barhen, T. Thundat, "Stochastic excitation and delayed oscillation of a micro-oscillator," **Phys. Rev. B** **75**, 233403 (2007); **Virtual Journal of Nanoscale Science & Technology** **15** (25) (2007).
- **A. Passian**, A. L. Lereu, R. H. Farahi, T. L. Ferrell, and T. Thundat, "Thermoplasmonics in thin solid films," in **Trends in Thin Solid Films Research, NOVA, ISBN: 1-60021-455-X** (2007).
- D. Yi, **A. Passian**, T. Thundat, "An experimental investigation of analog delay

- generation for dynamic control of microsensors," **Ultramicroscopy 107, 1020 (2007)**.
- P. G. Evans, **A. Passian**, T. L. Ferrell, "A spectroscopic investigation of the shape dependency of gold nano-particles grown on roughened surfaces," **Ultramicroscopy 107, 1012 (2007)**.
- 2006**
- A. L. Lereu, **A. Passian**, R. H. Farahi, S. Zahrai, and T. Thundat, "Plasmonic Marangoni Forces," **J. Eur. Opt. Soc. Rapid publications 1, 06030 (2006)**.
- **A. Passian**, V. Protopopescu, and T. Thundat, "Fluctuation and dissipation of a stochastic micro-oscillator under delayed feedback," **J. Appl. Phys. 100, 114314 (2006)**.
- **A. Passian**, S. Zahrai, A. L. Lereu, R. H. Farahi, T. L. Ferrell, and T. Thundat, "Nonradiative surface plasmon assisted microscale Marangoni forces," **Phys. Rev. E 73, 066311 (2006)**.
- **A. Passian**, A. L. Lereu, R. H. Ritchie, F. Meriaudeau, T. Thundat, and T. L. Ferrell, "Surface plasmon assisted thermal coupling of multiple photon energies," **Thin Solid Films 497, 315 (2006)**.
- R. H. Farahi, **A. Passian**, S. Zahrai, A. L. Lereu, T. L. Ferrell, and T. Thundat, "Microscale Marangoni actuation: All-optical and all-electrical methods," **Ultramicroscopy 106(8-9), 815 (2006)**.
- A. Wig, E. T. Arakawa, **A. Passian**, T. L. Ferrell and T. Thundat, "Photothermal spectroscopy of Bacillus anthracis and Bacillus cereus with microcantilevers," **Sensors and Actuators B 114(1), 206 (2006)**.
- 2005**
- **A. Passian**, A. L. Lereu, A. Wig, F. Meriaudeau, T. Thundat, and T. L. Ferrell, "Imaging standing surface plasmon by photon tunneling," **Phys. Rev. B 71 (12), 165418-1 (2005)**.
- **A. Passian**, R. H. Ritchie, A. L. Lereu, T. Thundat, and T. L. Ferrell, "Curvature effects in surface plasmon dispersion and coupling," **Phys. Rev. B 71 (7), 115425 (2005)**.
- A. L. Lereu, **A. Passian**, J-P. Goudonnet, T. Thundat, and T. L. Ferrell "Optical modulation processes in thin films based on thermal effects of surface plasmons," **Appl. Phys. Lett. 86, 154101 (2005)**.
- **A. Passian**, A. L. Lereu, E. T. Arakawa, A. Wig, T. Thundat, and T. L. Ferrell, "Modulation of multiple photon energies by use of surface plasmons," **Optics Letters 30 (1), 41 (2005)**.
- R. H. Farahi, **A. Passian**, T. L. Ferrell, and T. Thundat, "Marangoni forces created by surface plasmon decay," **Optics Letters 30 (6), 616 (2005)**.
- 2004**
- **A. Passian**, A. Wig, A. L. Lereu, P. G. Evans, F. Meriaudeau, T. Thundat, and T. L. Ferrell, "Probing large area surface plasmon interference in thin metal films using photon scanning tunneling microscopy," **Ultramicroscopy 100 (3-4), 429-436 (2004)**.
- A. L. Lereu, **A. Passian**, T. L. Ferrell, and T. Thundat, "Effect of thermal variations on the Knudsen forces in the transitional regime," **Appl. Phys. Lett. 84 (6), 1013-1015 (2004); Virtual Journal of Nanoscale Science & Technology 9 (6) (2004)**.
- A. Wig, **A. Passian**, E. T. Arakawa, T. L. Ferrell, and T. Thundat, "Optical thin-film interference effects in microcantilevers," **J. Appl. Phys. 95 (3), 1162-1165 (2004); Virtual Journal of Nanoscale Science & Technology 9 (4) (2004)**.
- **A. Passian**, A. L. Lereu, E. T. Arakawa, R. H. Ritchie, T. Thundat, and T. L. Ferrell, "Opto-electronic versus electro-optic modulation," **Appl. Phys. Lett. 85 (14), 2703-2705 (2004)**.

- A. Passian, A. Wig, A. L. Lereu, F. Meriaudeau, T. Thundat, and T. L. Ferrell, "Plasmon coupling via photon tunneling," *Appl. Phys. Lett.* **85** (16), 3420-3422 (2004).
- R. H. Farahi, A. Passian, T. L. Ferrell, and T. Thundat, "Microfluidic manipulation via Marangoni forces," *Appl. Phys. Lett.* **85** (18), 4237-4239 (2004); *Virtual Journal of Nanoscale Science & Technology* **10** (20) (2004).
- N. Muñoz Aguirre, A. Passian, L. Martínez Pérez, E. López-Sandoval, C. Vázquez-López, J. L. Jimenez Perez, and T. L. Ferrell, "The use of the surface plasmons resonance sensor in the study of the influence of "allotropic" cells on water," *Sensors and Actuators B* **99**, 149-155 (2004).

2003

- A. Passian, P. G. Evans, V. K. Varma, T. L. Ferrell, and T. Thundat, "Piezoresistive detection of acoustic waves," *Rev. Sci. Instrum.* **74** (2), 1031-1035 (2003).
- A. Passian, G. Muralidharan, A. Mehta, H. Simpson, T. L. Ferrell, and T. Thundat, "Manipulation of microcantilever oscillations," *Ultramicroscopy* **97** (1-4), 391-399 (2003).
- A. Passian, R. J. Warmack, A. Wig, R. H. Farahi, F. Meriaudeau, T. L. Ferrell, and T. Thundat, "Observation of Knudsen effect with microcantilevers," *Ultramicroscopy* **97** (1-4), 401-406 (2003).
- A. Passian, R. J. Warmack, T. L. Ferrell, and T. Thundat, "Thermal transpiration at microscale: A Crookes cantilever," *Phys. Rev. Lett.* **90** (12), 124503 (2003).

2002

- A. Passian, A. Wig, F. Meriaudeau, T. Thundat and T. L. Ferrell, "Potential distribution and field intensity for a hyperboloidal probe in a uniform field," *J. Vac. Sci. Technol B* **20** (1), 76-80 (2002).
- A. Passian, G. Muralidharan, S. Kouchejian, A. Mehta, S. Cherian, T. L. Ferrell, and T. Thundat, "Dynamics of self-driven microcantilevers," *J. Appl. Phys.* **91** (7), 4693-4700 (2002); *Virtual Journal of Nanoscale Science & Technology* **5** (14), (2002).
- A. Mehta, G. Muralidharan, A. Passian, S. Cherian, T. L. Ferrell and T. Thundat, "A self-locking technique with fast response and high sensitivity for micro-cantilever based sensing of analytes," *Mat. Res. Soc. Symp. Proc.* **723**, O6.7.1-O6.7.6 (2002).
- A. Passian, A. Wig, F. Meriaudeau, T. L. Ferrell, and T. Thundat, "Knudsen forces on microcantilevers," *J. Appl. Phys.* **92** (10), 6326-6333 (2002).

2001

- F. Meriaudeau, A. Wig, A. Passian, J-P. Lauret, T. L. Ferrell, "Multiple gold island layers on a fiber core: a promising sensing device," *Opt. Eng.* **40** (5), 658-660 (2001).
- F. Meriaudeau, T. L. Ferrell, E. T. Arakawa, A. Wig, A. Passian, T. Thundat, W. J. Shen, S. Patel, F. B. Kraemer, "Study of different hormone-sensitive Lipase concentrations using a surface plasmon resonance sensor," *Sensors and Actuators B* **73**, 192-198 (2001).
- T. L. Ferrell, C. L. Britton, W. L. Bryan, L. G. Clonts, M. S. Emery, M. N. Ericson, F. Meriaudeau, G. W. Morrison, A. Passian, S. F. Smith, T. D. Threatt, G. W. Turner, and A. L. Wintenberg, "Telesensor integrated circuits," *World J. Surgery*, DOI: 10.1007/s00268-001-0126-0, Société Internationale de Chirurgie, "Information Age Technologies for the Surgeon," (2001).
- A. Passian, A. Wig, F. Meriaudeau, M. Buncick, T. Thundat and T. L. Ferrell, "Electrostatic force density for a scanned probe above a charged surface," *J. Appl. Phys.* **90** (2), 1011-1016 (2001).

2000

- A. Wig, F. Meriaudeau, **A. Passian**, J-P. Goudonnet, and T. L. Ferrell, "Spectroscopy with the Photon Scanning Tunneling Microscope," **Microscopy Today** **00** (3) (2000).
- F. Meriaudeau, A. Wig, **A. Passian**, T. R. Downey, M. Buncick, and T. L. Ferrell, "Gold island fiber optic sensor for refractive indexes sensing," **Sensors and Actuators B** **69** (1-2), 51-57 (2000).

1999

- F. Meriaudeau, T. R. Downey, **A. Passian**, A. Wig, M. Buncick and T. L. Ferrell, "Fiber optic sensor based on gold island plasmon resonance," **Sensors and Actuators B** **54** (1-2), 106-117 (1999).
- T. R. Downey, F. Meriaudeau, **A. Passian**, A. Wig, T. L. Ferrell, "Guided propagating in a step index, multi-mode fiber: effects of index difference variation on allowable TM propagation constants," **Optics and Laser Technology** **31** (4), 273-277 (1999).
- T. L. Ferrell, F. Meriaudeau, **A. Passian**, J-P. Goudonnet, and A. Wig, "Imaging with the Photon Scanning Tunneling Microscope," **Microscopy Today** **99** (3), (1999).

1998

- F. Meriaudeau, T. R. Downey, **A. Passian**, A. Wig, and T. L. Ferrell, "Environmental effects on surface plasmon spectra in gold island films potential for sensing applications," **Applied Optics** **37** (34), 8030-8037 (1998).
- F. Meriaudeau, T. R. Downey, **A. Passian**, P.I. Oden, A. Wig, P. B. Crilly and T. L. Ferrell, "Thin metal island plasmon sensor," **SPIE** **3491**, 328-333 (1998).
- J. C. De Priest, F. Meriaudeau, P. I. Oden, T. R. Downey, **A. Passian**, A. Wig and T. L. Ferrell, "Chemically sensitive surface plasmon devices employing a self-assembled composite monolayer film," **SPIE** **3491**, 772-776 (1998).
- F. Meriaudeau, T. R. Downey, **A. Passian**, A. Wig, S. Mangeant, P. B. Crilly, T. L. Ferrell, "Development of a fiber optics sensor based on gold island plasmon resonance," **SPIE** **3491**, 1179-1184 (1998).
- T. L. Ferrell, P. B. Crilly, S. F. Smith, A. L. Wintenberg, C. L. Britton, G. W. Morrison, N. M. Ericson, D. Hedden, D. Bouldin, **A. Passian**, T. R. Downey, A. Wig and F. Meriaudeau, "Medical telesensors," **SPIE** **3253**, 193-198 (1998).

1994

- L. Broström, S. Mannervik, **A. Passian**, and G. Sundström, "Investigation of some transitions and lifetimes in XeII," **Phys. Rev. A** **49** (5), 3333-3337 (1994).

Proceedings and Presentation**2012**

- **A. Passian**, "Surface Modes of Nanostructures and Probes and their Applications In the Sub-Micron Realm," Department of Chemical and Biomolecular Engineering, Graduate Seminar, 2012.
- **A. Passian**, "How can physical sciences help cancer research?" MSE-UTK Freshmen Seminar 2012.

2011

- **A. Passian**, "Thermoplasmonics: From Basics to Applications," Invited lecture at the Summer School On Plasmonics 2: Porquerolles Island, Côte d'Azur, France, October 3-7, 2011.
- **A. Passian**, "Mode Synthesizing Atomic Force Microscopy of Intracellular nanoparticles," Invited presentation at the Workshop on Understanding the Organization of the Intracellular Region, The University of Memphis, Memphis, Tennessee, June 23-24, 2011.
- **A. Passian**, "Mechanical and Optical Probe-based Imaging and Sensing: A Bridge to the Nanoworld," Oak Ridge Institute for Continued Learning (ORICL), Roane State Community College, Oak Ridge, Tennessee, February 16, 2011.

2010

- S. Eslami, N. Jalili, **A. Passian**, L. Tetard, T. Thundat, "Nonlinear Interaction Force Analysis Of Microcantilevers Utilized In Atomic Force Microscopy," Proceedings Of The Asme Dynamic Systems And Control Conference, PTS A AND B, 781-788, 2010.
- A. L. Lereu, Ph. Dumas, M. F. Garcia-Parajo, **A. Passian**, R. H. Farahi, L. Tétard, N. F. van Hulst, "Evolution Of Near Field Optical Microscopy," Future of Instrumentation International Workshop Instruments, Sensors and Measurements for a Sustainable Future, Oak Ridge National Laboratory, Oak Ridge, Tennessee, November 8-10, 2010.
- **A. Passian**, L. Tetard, R. H. Farahi, B. H. Davison, A. L. Lereu, T. Thundat, S. Gleason, K. Tobin, "Trends In High Spatial High Spectral Resolution Material Characterization," Future of Instrumentation International Workshop Instruments, Sensors and Measurements for a Sustainable Future, Oak Ridge National Laboratory, Oak Ridge, Tennessee, November 8-10, 2010.
- **A. Passian**, "Surface Modes and Probes in nanoscale characterization" Invited presentation, Institut Fresnel UMR 6133 - Université Aix-Marseille, Av. Escadrille Normandie 13397 MARSEILLE Cedex 20, France, 2010.
- **A. Passian**, "Mechanical and Optical Probes in Imaging and Sensing: A Bridge to the Nanoworld" Invited presentation at the Georgia BioBusiness Center symposium, University of Georgia, March 12, 2010.
- **A. Passian**, "Surface modes of nanostructures and probes and their applications in the submicron realm," Invited presentation at Birk Nanotechnology Center, Purdue University, March 26, 2010.
- L. Tetard, **A. Passian**, T. Thundat, "Underlying physical principles of subsurface force microscopy," Meeting of The American Physical Society, Portland, March 10, 2010.
- L. Tetard, **A. Passian**, R. H. Farahi, and T. Thundat, "Spectroscopy with microcantilevers," 7th International Workshop on Nanomechanical Cantilever Sensors, Banff, Canada, May 26-28, 2010.
- D. Brissinger, A. L. Lereu, L. Salomon, B. Cluzel, T. Charvolin, C. Dumas, **A. Passian**, and F. de Fornel, "A study of the angular distribution of the surface plasmon excitation induced by a metal/glass discontinuity," The 12th International Scanning Probe Microscopy Conference Sapporo, Japan, May 10-12, 2010.
- R. H. Farahi, **A. Passian**, A. L. Lereu, L. Tetard, T. L. Ferrell, T. Thundat, Nanoparticle thermoplasmonic modulation," The 12th International Scanning Probe Microscopy Conference Sapporo, Japan, May 10-12, 2010.
- A. L. Lereu, **A. Passian**, R. H. Farahi, Ph. Dumas, L. Tetard, and T. Thundat, "Nearfield excitation and polarization dependence of single nanorods," The 12th International Scanning Probe Microscopy Conference Sapporo, Japan, May 10-12, 2010.
- L. Tetard, **A. Passian**, R. H. Farahi, A. Lereu, T. Thundat, "Fourier transform infrared spectroscopy using mechanical oscillators," The 12th International Scanning Probe Microscopy Conference Sapporo, Japan, May 10-12, 2010.
- L. Tetard, **A. Passian**, R. H. Farahi, A. Lereu, T. Thundat, "Mode synthesizing atomic force microscopy of plant cells," The 12th International Scanning Probe Microscopy Conference Sapporo, Japan, May 10-12, 2010.

2009

- S. Eslami, N. Jalili, **A. Passian**, L. Tetard and T. Thundat, "Nonlinear interaction force analysis of microcantilevers utilized in atomic force microscopy," The 2nd Annual Dynamic Systems and Control Conference, October 12-14, 2009, Hollywood, CA, USA, ASME Dynamic Systems and Control.
- **A. Passian**, L. Tetard, and T. Thundat, "On the mechanism of subsurface force microscopy," Invited presentation at the 2nd Multifrequency AFM Conference, Madrid, Spain, June 15-16th, 2009.
- E. Lesniewska, **A. Passian**, T. Tetard, T. Thundat, "Investigation of living cells by near-field ultrasound holography," presented at the 11th International Scanning Probe Microscopy Conference (ISPM), Madrid, Spain, June 17-19th, 2009.
- L. Tetard, **A. Passian**, R. Fairbank, R. H. Farahi, and T. Thundat, "Characterization of biomass at the nanoscale," presented at the 11th International Scanning Probe Microscopy Conference (ISPM), Madrid, Spain, June 17-19th, 2009.
- L. Tetard, **A. Passian**, R. H. Farahi, and T. Thundat, "Scanning probe microscopy of nanoparticles in biological cells," presented at the 11th International Scanning Probe Microscopy Conference (ISPM), Madrid, Spain, June 17-19th, 2009.
- L. Lereu, **A. Passian**, R. H. Farahi, and T. Thundat "Plasmon-induced thermal modulation in thin films" NANOMETTA 2009, Seefeld, Autriche, January 5-8, 2009.

2008

- R. H. Farahi, **A. Passian**, A. L. Lereu, T. Thundat, "Nanoparticle thermoplasmonic modulation," AVS 55th International Symposium, Boston, Massachusetts, October 2008.
- R. Desikan, Rangaprasad D., **A. Passian**, R. H. Datar, T. Thundat, "Effect of Fluid Flow on the Sensitivity of Microcantilever Sensors" AVS 55th International Symposium, Boston, Massachusetts, October 2008.
- R. H. Farahi, **A. Passian**, A. L. Lereu, T. Thundat, "Nanoparticle thermoplasmonic modulation," AVS 55th International Symposium, Boston, Massachusetts, October 2008.
- **A. Passian**, A. L. Lereu, T. Thundat, "Geometric optimization of light-actuated radiometric microcantilevers" International Workshop on Nanomechanical Cantilever Sensors, Mainz, Germany, May 19-21, 2008.
- E. Finot, A. Krause, V. Rouger, C. Finot, **A. Passian**, M.-H Nadal, T. Thundat, "The surface stress as a link between the bending and the frequency response of microcantilevers," International Workshop on Nanomechanical Cantilever Sensors, Mainz, Germany, May 19-21, 2008.

2007

- R. Datar, **A. Passian**, R. Desikan, and T. Thundat, "Microcantilever biosensors," The 6th Annual IEEE Conference on Sensors, IEEE SENSORS, October 28 - 31, 2007.
- **A. Passian**, A. L. Lereu, R. H. Farahi, N. F. van Hulst, T. Thundat, "Thermoplasmonic Processes in Continuous and Nanostructured Metallic Thin Films," AVS 54th International Symposium & Exhibition, Seattle, Washington, October 14-19, 2007.
- **A. Passian**, T. Thundat, G. M. Brown, "Receptor-free nanomechanical sensing," Novel Sensors for Use in Radiological and Harsh Environments, Analytical Chemistry in Nuclear Technology, 234th ACS National Meeting, Boston, MA, August 19-23, 2007.
- R. M. Lynch, B. H. Voy, D. F. Glass, S. Mahurin, B. Zhao, L. Tetard, **A. Passian**, K. T. Venmar, T. Thundat, and M.-D. Cheng, "In-Vivo Exposure Characterization and Visualization of SWNH Aggregates," the 3rd International Symposium on "Nanotechnology, Occupational and Environmental Health," Taipei, Taiwan, Aug. 29-Sept. 1, 2007.

- A. L. Lereu, P. Ghenuche, G. Sanchez-Mosteiro, **A. Passian**, J. P. Hoogenboom, R. Quidant, and N. F. van Hulst, "Probing local field at individual metallic antennas by near-field microscopy and single particle luminescence," International Conference on Nano Science and Technology, Stockholm, Sweden, July 02-06, 2007.
- A. L. Lereu, **A. Passian**, R. H. Farahi, T. G. Thundat, and N. F. van Hulst, "Optical antennas and near field," Colloquium presented at the Oak Ridge National laboratory, Oak Ridge Tennessee, USA, January 18, 2007.

2006

- A. L. Lereu, **A. Passian**, R. H. Farahi, S. Zahrai, and T. Thundat, "Plasmonic Marangoni manipulations at the microscale," The European Optical Society Annual Meeting (TOM 3: Nanophotonics, Metamaterials and Optical Microcavities), Paris, France, October 16-19, 2006.
- **A. Passian**, P. G. Evans, and T. L. Ferrell, "Nanoparticle growth and spectroscopy on roughened surfaces" presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Montpellier, France, June 3-6, 2006.
- **A. Passian**, D. Yi, and T. Thundat, "Dynamics of microsensors," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Montpellier, France, June 3-6, 2006.
- A. L. Lereu, **A. Passian**, J. P. Goudonnet, and N. F. van Hulst, "Surface Plasmons Assisted Thermal Couplings," The European Optical Society: EOS Topical Meeting on Molecular Plasmonic Devices, Engelberg, Switzerland, April 27-29, 2006.
- A. L. Lereu, **A. Passian**, S. Zahrai, and N. F. van Hulst, "Surface Plasmons Based Thermo-optic Couplings," Colloquium presented at the Royal Institute of Technology, Stockholm, Sweden, April 07, 2006.
- A. L. Lereu, **A. Passian**, S. Zahrai, and N. F. van Hulst, "All-optical Modulation Processes Employing Surface Plasmons," Colloquium presented at ABB Sweden, Västerås, Sweden, April 05, 2006.

2005

- **A. Passian**, "Thermal phenomena at small scale: friendly or hostile? Can they be both?" Colloquium presentation, Institute de Ciencies Fotoniques, Barcelona, Spain, September 14, 2005.
- **A. Passian**, S. Zahrai, A. L. Lereu, R. H. Farahi, T. L. Ferrell, and T. Thundat, "Microscale Marangoni actuation via nonradiative surface plasmon decay," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Cancun, Mexico, June 5-8, 2005.
- D. Yi, **A. Passian**, A. L. Lereu, and T. Thundat, "An experimental investigation of analog delay generation for dynamic control of microcantilevers," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Cancun, Mexico, June 5-8, 2005.
- A. L. Lereu, **A. Passian**, S. Zahrai, T. L. Ferrell, and T. Thundat, "All-optical modulation processes in thin metal films using thermo-plasmonics," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Cancun, Mexico, June 5-8, 2005.
- **A. Passian**, "Surface modes and their applications in the submicron realm," Colloquium presentation, University of South Alabama, Mobile, February 24, 2005.
- A. L. Lereu, **A. Passian**, T. Thundat, J. P. Goudonnet, T. L. Ferrell, "Modulation processes employing nonradiative surface plasmon decay," Colloquium presentation, University of Twente, Netherland, April 05, 2005.

2004

- **A. Passian**, A. L. Lereu, S. Zahrai, T. L. Ferrell, and T. Thundat, "Thermal forces at the microscale," presented at the Université de Bourgogne, Dijon, France, September 15, 2004.

- A. Passian, A. L. Lereu, S. Zahrai, T. L. Ferrell, and T. Thundat, "An investigation of the microscale radiometric forces," presented at the Royal Institute of Technology, Stockholm, Sweden, September 21, 2004.

2003

- A. Passian, A. Wig, A. L. Lereu, F. Meriaudeau, T. Thundat, and T. L. Ferrell, "Plasmon interference," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Oxford, U.K., May 23-26, 2003.
- F. Tian, J. H. Pei, A. Passian, G. M. Brown, and T. Thundat, "Detection of Cu²⁺ with electrochemically-controlled microcantilever sensors," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Oxford, U.K., May 23-26, 2003.
- A. Wig, A. Passian, E. T. Arakawa, T. L. Ferrell, and T. Thundat, "Interference effects in optically activated microcantilevers," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Oxford, U.K., May 23-26, 2003.
- A. Passian, A. L. Lereu, T. L. Ferrell, and T. Thundat, "Near field surface plasmons interference," presented at the Université de Bourgogne, Dijon, France, September 12, 2003.
- A. Passian, A. L. Lereu, T. L. Ferrell, and T. Thundat, "An investigation of Knudsen effect with microcantilever," presented at the International micro and nanotechnology meeting (Rencontres internationales des micro et nanotechnologies, MINATEC 2003), Grenoble (Alpes congrès), France, September 22-26, 2003.

2002

- A. Passian, R. J. Warmack, A. Wig, F. Meriaudeau, T. L. Ferrell, and T. Thundat, "Observation of Knudsen effect with microcantilevers," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Las Vegas, Nevada, May 28, 2002.
- A. Passian, G. Muralidharan, A. Mehta, T. L. Ferrell, and T. Thundat, "Manipulation of microcantilever oscillations," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Las Vegas, Nevada, May 26-29, 2002.
- A. Wig, A. Passian, T. L. Ferrell, and T. Thundat, "Optical activation of microcantilevers with applications for coatingless chemical detection," presented at the Scanning Probe Microscopy Sensors and Nanostructures Conference, Las Vegas, Nevada, May 26-29, 2002.
- A. Mehta, G. Muralidharan, A. Passian, S. Cherian, T. L. Ferrell and T. Thundat, "A self-locking technique with fast response and high sensitivity for micro-cantilever based sensing of analytes," presented at the Material Research Society spring meeting, March 2002.
- N. M. Aguirre, A. Passian, A. Wig, T. L. Ferrell, "Measurements of the dielectric function of allotropic water using absorption spectra of gold (Au) islands at the surface plasmon resonance," CSI 2002 9th International Meeting on Chemical Sensors Boston, USA, July 7-10, 2002.
- N. M. Aguirre, A. Passian, A. Wig, L. Martinez Perez, T. L. Ferrell, "Room temperature gas response of evaporated SnO₂ thin films using total internal reflection," CSI 2002 9th International Meeting on Chemical Sensors Boston, USA, July 7-10, 2002.

2000

- F. Meriaudeau, A. Wig, A. Passian, T. R. Downey, M. Buncick, and T. L. Ferrell, "Gold island fiber optic sensor," (tentative number 3860-27) The American Diabetes Association, 60th Scientific Sessions, 2000.

1999

- T. L. Ferrell, C. L. Britton, W. L. Bryan, L. G. Clonts, M. S. Emery, N. M. Ericson, F. Meriaudeau, G. W. Morrison, **A. Passian**, S. F. Smith, T. D. Threatt, G. W. Turner, and, A. L. Wintenberg, "Telesensors integrated circuits," Proc.Nat. Inst. Health Conf. On Microdevices in Medicine (Cambridge Healthcare Institute, Newton Upper Falls, MA) (San Jose, CA), April 19-21, 1999.
- F. Meriaudeau, A. Wig, **A. Passian**, T. R. Downey, M. Buncick, and T. L. Ferrell, "Gold island fiber optic sensor," SPIE International Symposium on Environmental and Industrial Sensing, Vol. 3860, p214-23, September 1999.

1998

- T. R. Downey, F. Meriaudeau, **A. Passian**, A. Wig, P. B. Crilly and T. L. Ferrell, "Development of a fiber optic sensor based on gold island surface plasmon resonance," Oral presentation at IEEE/SPIE/OSA 1998 International Conference on Applications of Photonic Technology (ICAPT'98), Ottawa, Canada (ICAPT98T219); Proc. SPIE. Vol. 3491, July 30, 1998.
- F. Meriaudeau, T. R. Downey, **A. Passian**, P.I. Oden, A. Wig, P. B. Crilly and T. L. Ferrell, "Thin metal island plasmon sensor," Oral presentation at ICAPT'98, (ICAPT98T206); Proc. SPIE Vol. 3491, July 29, 1998.
- J. C. De Priest, F. Meriaudeau, P. I. Oden, T. R. Downey, **A. Passian**, A. Wig and T. L. Ferrell, "Chemically sensitive surface plasmon devices employing a self-assembled composite monolayer film," Oral presentation at ICAPT'98, (ICAPT98T217); Proc. SPIE Vol. 3491, July 28, 1998.
- T. L. Ferrell, P. B. Crilly, S. F. Smith, A. L. Wintenberg, C. L. Britton, G. W. Morrison, N. M. Ericson, D. Hedden, D. Bouldin, **A. Passian**, T. R. Downey, A. Wig and F. Meriaudeau, "Medical telesensors," Oral presentation at SPIE Photonics West, BiOS'98, Proc. SPIE Vol. 3253, January 1998.
- F. Meriaudeau, T. R. Downey, **A. Passian**, A. Wig, S. Mangeant, P. B. Crilly, T. L. Ferrell, "Development of a fiber optics sensor based on gold island plasmon resonance," #ICAPT98T219 (1998).

Selected Patents and Inventions

- **A. Passian**, T. Thundat, R. H. Farahi, "Microscale fluid transport using optically controlled marangoni effects," US 2009/0020426 A1, **Patent Issued**.
- **A. Passian**, L. Tetard, T. Thundat, B. Davison, "Scanning nearfield acoustic photothermal spectroscopy (SNAPS)," **patent pending**.
- **A. Passian**, L. Tetard, T. Thundat, "Mode synthesizing atomic force microscopy (MSAFM) and Mode synthesizing sensing (MSS)," **Patent pending**.
- **A. Passian**, T. Thundat, A nanoelectromechanical platform for sensor dynamics using memory effects, DOE Invention disclosure, 2006.
- **A. Passian**, T. Thundat, Methods and Apparatus for Intracellular Fluid Delivery, DOE Invention disclosure, 2009.
- **A. Passian**, T. Thundat, A plasmonic pump for integrated applications, DOE Invention disclosure, 2008.
- **A. Passian**, T. L. Ferrell, T. Thundat, A Tunable Plasmonic Photon Energy Converter for Electric Power Generation, DOE Invention disclosure, 2009.
- **A. Passian**, T. Thundat, "Electric Power Generation by Piezoelectric Conversion and Thermoacoustic Action," DOE Invention disclosure, 2011.

Teaching/Research Advising and Mentoring Experience

1996 – present

Supervising/mentoring students from the following selected institutions:

- UTK, Department of Physics
- Université de Bourgogne, Dijon, France, Département de Physique
- Ecole Supérieure d' optique, Orsay cedex, France
- Denison University
- Cornell University
- Eastern Illinois University
- Virginia Polytechnic Institute and State University
- Tennessee Technological University
- Polytechnic University of Puerto Rico, San Juan, Puerto Rico
- Alcorn State University
- Maryville College
- Purdue University
- Northern Arizona University

1996 – 1999 Teaching Assistant, University of Tennessee (UTK), Knoxville

1989 – 1994 Teaching and undergraduate tutoring, Royal Institute of Technology (RIT) and Department of Physics, Stockholm University (SU), Stockholm, Sweden

Selected advised/mentored students and faculty:

- **2002-2005**
Aude Lereu, Université de Bourgogne. PhD dissertation topic: Couplages Assistes par Plasmons de Surface
- **2002-2007**
Philip Evans, UTK, Department of Physics. PhD dissertation topic: Surface Plasmon Enhanced Heating of Gold Nanoparticles: A Plasmonic Optical Switch
- **2006-2010**
Laurene tetard, UTK, Department of Physics. PhD dissertation topic: Surface and Subsurface Physical and Chemical Characterization of Materials at the Nanoscale
- **2008 Summer**
Department of Energy (DOE), Office of Science, Faculty and Student Teams (FaST) Program
(Institution: Polytechnic University of Puerto Rico, San Juan, PR)
 - Alejandro Suarez (Professor)
Project: The Measurement of Knudsen Forces on Microcantilevers
 - Marissa Morales (Student)
Project: Characterization of Platinum Nanoelectrodes with Atomic Force Microscopy and Conductivity Measurements
 - Raquelmar Rodriguez (Student)
Project: The Measurement of Knudsen Forces on Microcantilevers
 - Jimmy Zahra (Student)
Project: Detection Of Explosive By Photothermal Deflection Spectroscopy
- **2009 Summer**
Department of Energy (DOE), Office of Science, Faculty and Student Teams (FaST) Program
(Institution: Alcorn State University, Mississippi)
 - Yolanda Jones (Professor)

-
- Project: Multiphysics sensors
 - Shonique Adams (Student)
 - Project: Quartz crystal microbalance sensors
 - Anthony McCarthy (Student)
 - Project: Quartz crystal microbalance sensors

➤ **2011 Summer**

Department of Energy (DOE), Office of Science, Faculty and Student Teams (FaST) Program

(Institution: Polytechnic University of Puerto Rico, San Juan, PR)

- Viktor Zaharov (Professor)
- Project: Laser spectroscopy
- Daniel Webster (Student)
- Project: Compound detection using a Standoff Photothermal Infrared Spectroscopy Technique
- Julio Irizarry Benejam (Student)
- Project: Open Architecture Reflective Spectroscopy

➤ **2011 Summer**

Summer Research Fellowship Program for Outstanding Physics Majors

(University of Tennessee, Department of Physics, Knoxville, TN)

- Caleb Redding
- Project: Confocal and nearfield spectroscopy with Nearfield Scanning Optical Microscope (NSOM)
- Steven Crawford
- Project: Confocal and nearfield spectroscopy with Nearfield Scanning Optical Microscope (NSOM)
- Lisa Agle
- Project: Broadband photothermal standoff spectroscopy

➤ **2012 Summer**

Department of Energy (DOE), Office of Science, Faculty and Student Teams (FaST) Program

(Institution: Polytechnic University of Puerto Rico, San Juan, PR)

- Viktor Zaharov (Professor)
- Project: Statistical analysis of spectroscopic data

Other advised/mentored students and postdocs:

- Ghaneshwar Gautam, UTK (2012 Research project: Interferometry and Nearfield microscopy)
- Marouane Salhi, UTK (2012 Research project: Plasmonics)
- Benjamin Thiesing, Northern Arizona University (2012 University Sponsored Internship, Research project: High resolution holography)
- Patrick Snyder, Eastern Illinois University (2012 Science Undergraduate Laboratory Internship, SULI, Research project: Nanomechanical frequency mixing and coupling)
- Katherine Nadler, Maryville College (2010 Department of Homeland Security (DHS) Internship, Research project: Detection of vaporized explosive molecules)
- Adam Krause, UTK (2009, Research project: Dynamics of MEMS microoscillators)
- Jeremy Nabeth, Purdue University (2008 University Sponsored Internship, Research project: Knudsen forces at the microscale)

- Rachel Fairbank, Cornell University (2008 Science Undergraduate Laboratory Internship, SULI, Research project: Atomic Force Microscopy)
 - Jessica White, University of Tennessee (2007, Research project: Spectroscopy)
 - Natasha Strande, Denison University (2007 Science Undergraduate Laboratory Internship, SULI, Research project: Biosensing of DNA hybridization using MEMS microoscillators)
 - Hari Krishna, Virginia Polytechnic Institute and State University (2007 Science Undergraduate Laboratory Internship, SULI, Research project: Dynamics of frequency shift Atomic Force Microscopy)
 - Dechang Yi, Tennessee Technological University (2007 ORAU Postdoctorate, Research project: Delay stochastic oscillations and coupling in microoscillators)
 - Katherine Venmar, Denison University (2006 Science Undergraduate Laboratory Internship, SULI, Research project: Atomic Force Microscopy)
 - Vanessa Chauveau, Université de Bourgogne (2006 ORNL Sponsored Internship, Research project: Nearfield Scanning Optical Microscopy)
 - Eric Hawk, University of Tennessee, Memphis (2004, Research topic: Delayed self-excitation of micro-oscillators)

Selected funded projects

- “Development of an Integrated Sensor System for Real-time Monitoring of Metabolites of Organophosphorus Chemical Warfare Agents, Pesticides, and E. coli in Food and Water”
DHS (Passian, co-PI)
Total Award: \$325K Period: 2007-2008.
 - “An All-Optical Plasmonic Pump for Integrated Applications”
DOE LDRD (Passian, PI)
Total Award: \$180K Period: 2008-2009
 - “A Nonlinear Plasmonic Nano-Circuit for Data Communications”
DOE LDRD (Passian, PI)
Total Award: \$180K Period: 10/01/09 - 3/31/11
 - “Microcantilever-based sulfur compound detection in breath”
Colgate-Palmolive (Passian, co-PI)
Total Award: \$100K Period: 01/01/10 – 11/30/10
 - “Mode synthesizing atomic force microscopy and sensing”
DOE Maturation Fund (Passian, PI)
Total Award: \$65K Period: 01/01/10 – 11/30/11
 - “Standoff Detection and Imaging of Chemicals”
DOE LDRD (Passian, PI)
Total Award: \$ 325K Period: 10/01/10 - 09/30/11
 - “Nanoscale molecular characterization and Imaging of biomass”
DOE BESC (Passian, Characterization team co-PI)
Award: \$220K Period: 09/30/11 - 09/31/12
 - “Physical Science Oncology Data Coordinating Center”

NIH-NCI (Passian, PI)
Total Award: \$1M Period: 04/01/12 - 04/01/15

Selected collaborations

- ❑ Prof. Said Zahrai: Department of Mechanics, The Royal Institute of Technology (RIT), Stockholm, Sweden,
Email: said.zahrai@se.abb.com
- ❑ Prof. Jean-Pierre Goudonnet: Département de Physique, Laboratoire d' optique submicronique, Université de Bourgogne, 21011 Dijon, France,
Email: Jean-Pierre.Goudonnet@u-bourgogne.fr
- ❑ Prof. Henry Simpson: Department of mathematics, UTK, Knoxville, USA,
Email: hsimpson@math.utk.edu
- ❑ Dr. Fabrice Meriaudeau: Institut Universitaire de Technologie du Creusot, Université de Bourgogne, 71200 Le Creusot, France,
Email: fabrice@iutlecreusot.u-bourgogne.fr
- ❑ Prof. Sherwin Kouchekian: Department of mathematics and statistics, University of South Florida, FL, USA,
Email: sherwin@jaguar1.usouthal.edu
- ❑ Prof. Eric Finot: Département de Physique, Laboratoire d' optique submicronique, Université de Bourgogne, 21011 Dijon, France,
Email: efinot@u-bourgogne.fr
- ❑ Dr. Aude Lereu: Equipe Couches Minces Optiques (RCMO), Institut Fresnel UMR 6133 - Université Aix-Marseille, Av. Escadrille Normandie 13397 Marseille Cedex 20, France,
Email: aude.lereu@fresnel.fr
- ❑ Prof. Ram Datar: Department of Pathology, University of Miami, Leonard M. Miller School of Medicine
Email: RDatar@med.miami.edu

Software and programming experience

Fortran, Pascal, C, C++, IDL, SIMULA, Labview, MATLAB, MAPLE, COMSOL, FlexPDE, MATHCAD, Igor, Origin, Tex, Latex

Languages

English, Swedish, Persian, basic French, and elementary German

Professional Activities, Honors, Awards

- Proposal reviewing: National Science Foundation (NSF), National Health Institute (NIH), Department of Energy (DOE), Laboratory Directed Research and Development (LDRD)
- Selected journal refereeing: Nature Nanotechnology, Physical Review Letters, Physical Review B, Physical Review E, Ultramicroscopy, J. MEMS, Optics Letters, Optical Engineering, Review of Scientific Instruments, Solid-State Electronics, J. Appl. Phys., and Appl. Phys. Lett., Optics Express, etc.

- Member of APS; American Physics Society;
- Member of Sigma Pi Sigma, National Physics Honor Society, Chapter at the University of Tennessee, Knoxville;
- 2007 FLC Southeast Region Awards RePAS: Reverse Photo-Acoustic Spectroscopy;
- 2010 R&D 100 award for the development of Mode synthesizing atomic force microscopy.