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René López

Associate Professor
343 Chapman Hall, CB#3255

Department of Physics and Astronomy
& Institute for Advanced Materials, Nanoscience and Technology

University of North Carolina at Chapel Hill, Chapel Hill, NC, 27599,
Phone: (919) 962-7216, Email: rln@physics.unc.edu

EDUCATION

VANDERBILT UNIVERSITY, Nashville, TN.
PhD in Physics, August 1998 – May 2002. GPA: 3.96/4.0

VANDERBILT UNIVERSITY, Nashville, TN.
MS in Physics, August 1998 – May 2000

CENTER OF INVESTIGATION AND ADVANCED STUDIES (CINVESTAV)
Partial credit- MS in sciences, Mexico City. April 1997 – July 1998. GPA: 4.0/4.0

MONTERREY INSTITUTE OF TECHNOLOGY AND SUPERIOR STUDIES (ITESM)
BS in Industrial Physics and Engineering, Monterrey, MEX, August 1992-December 1996. GPA: 98/100
Minors in Electrical Engineering, Optics and Robotics.

PROFESSIONAL EXPERIENCE

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Associate Professor July 2012 – present
Assistant Professor July 2006-July 2012

VANDERBILT UNIVERSITY
Research Assistant Professor November 2004-June 2006
Postdoctoral Associate, June 2002 – November 2004

OAK RIGE NATIONAL LABORATORY (ORNL)
Research assistant, February 2000 – April 2002.

VANDERBILT UNIVERSITY
Research Assistant, July 1999 – January 2000

MATSUSHITA ELECTRIC COMPANY (PANASONIC), Tijuana, Mexico
Control Engineer, January 1997- March 1997

LABORATORY FOR THE DEVELOPMENT OF ELECTRONIC INDUSTRIES, Monterrey, Mexico.
Project Engineer, August 1995 – January 1997

HONORS

- DOE Office of Science Early Career award 2011
- Junior Faculty Development award 2008

- ORNL Wigner Fellowship 2006 (Decline ORNL position to take UNC tenure track professorship)
- Outstanding Student Research, presentation in Washington, DOE nanomeeting 2002.
- Southern University Association Scholarship to perform summer work at ORNL, 2000
- 1st Place, best grade average, Monterrey Institute of Technology, class 1996
- Monterrey's Institute of Technology, Excellency Scholarship award (full tuition covered)
- 1st Place academic Performance, ITESM High school Campus Chiapas, class 1993
- 3rd Place National Mathematical Olympics (Mexico), 1992
- 1st Place Mathematical Olympics Chiapas province (Mexico), 1992

BIBLIOGRAPHY

BOOK CHAPTER

- A. Meldrum, **R. Lopez**, R.H. Magruder, L.A. Boatner, and C.W. White. ***Structure and Properties of Nanoparticles Formed by Ion Implantation*** *pp.255-281* in *Materials Science with Ion Beams* (Topics in Applied Physics 116) edited by H. Bernas, Springer-Verlag (2009).

REFEREED ARTICLES IN JOURNALS

- Ok, Myoung-Ryul; Ghosh, Rudresh; Brennaman, M.; **Lopez, Rene**; Meyer, Thomas; Samulski, Edward "*Surface Patterning of Mesoporous Niobium Oxide Films for Solar Energy Conversion*", **ACS applied Materials and Interfaces,** (2013)

- Christin Lundgren, Kathleen Melde, Joan Redwing, **Rene Lopez**, "FDTD modeling of solar energy absorption in silicon branched nanowires", **Optics Express.** Vol.21,No.S3, pp. A392–A400 (2013) DOI:10.1364/OE.21.000392

- Leila Alibabaei , Hanlin Luo , Ralph L. House , Paul G. Hoertz , **Rene Lopez** and Thomas J. Meyer "Applications of metal oxide materials in dye sensitized photoelectrosynthesis cells for making solar fuels: let the molecules do the work", **J. Mater. Chem.** A, 2013, 4133-4145 Advance Article DOI: 10.1039/C2TA00935H

- Mukti Aryal, Doo-Hyun Ko, John R. Tumbleston, Abay Gadisa, Edward T. Samulski, and **Rene Lopez** "*Large area nanofabrication of butterfly wing's three dimensional ultrastructures"* **Journal of vacuum Science and Technology B 30**, 061802 (2012)

- Yingchi Liu, Christoph Kirsh, Abay Gadisa, Mukti Aryal, Sorin Mitran, Edward T. Samulski, and **Rene Lopez** "*Effects of nano-patterned versus simple flat active layers in upright organic photovoltaic devices*" **Journal of Physics D: Applied Physics 46** 024008 (2012) doi:10.1088/0022-3727/46/2/024008

- Rudresh Ghosh, Yukihiro Hara, Leila Alibabaei, Kenneth Hanson, Sylvie Rangan, Robert Bartynski, Thomas J. Meyer and **Rene Lopez** "*Increasing photocurrents in dye sensitized solar cells with tantalum doped titanium oxide photoanodes obtained by laser ablation*" **ACS Applied Materials and Interfaces 4** (9), pp 4566–4570 (2012) DOI: 10.1021/am300938g

- Abay Gadisa, Yingchi Liu, Edward T. Samulski, and **Rene Lopez** "*Role of Thin n-Type Metal-Oxide Interlayers in Inverted Organic Solar Cells*" **ACS Applied Materials and Interfaces 4**(8):3846-3851 (2012)

- Kenneth Hanson, M. Kyle Brennaman, Akitaka Ito, Hanlin Luo, Wenjing Song, Kelsey A. Parker, Rudresh Ghosh, Michael R. Norris, Christopher R. K. Glasson, Javier J. Concepcion, **Rene Lopez**, and

Thomas J. Meyer "*Structure–Property Relationships in Phosphonate-Derivatized, Ru^{II} Polypyridyl Dyes on Metal Oxide Surfaces in an Aqueous Environment*", **J. Phys. Chem. C**, **116** (28), pp 14837–14847 (2012) DOI: 10.1021/jp304088d

- D. Brosnan, R. Ghosh, L.E. McNeil, **Rene Lopez**, "Influence of ionic pretreatment on the performance of solid electrolyte dye-sensitized solar cells" **Solar Energy**, **89**:9, 2312–2317 (2012).

- Abay Gadisa, Yingchi Liu, Edward T. Samulski, **Rene Lopez**, "*Minimizing interfacial losses in inverted organic solar cells comprising Al-doped ZnO*" **Applied Physics Letters, 100**, 253903, 4 pages, (2012) http://dx.doi.org/10.1063/1.4729861

- Abay Gadisa, Doo-Hyun Ko, John Tumbleston, **Rene Lopez**, Edward T. Samulski, "*The role of solvent and morphology on miscibility of amethanofullerene and poly(3-hexylthiophene*)" **Thin Solid Films, Vol. 520**, Issue 16, Pages 5466–5471, (2012)

- Kristen D. Alexander, Shunping Zhang,Angela High-Walker, Hongxing Xu, and **Rene Lopez**. "Relationship between Length and Surface-Enhanced Raman Spectroscopy Signal Strength in Metal Nanoparticle Chains: Ideal Models versus Nanofabrication" **Journal of Nanotechnology**, vol. 2012, Article ID 840245, 7 pages, (2012). doi:10.1155/2012/840245.

- John R. Tumbleston, Yingchi Liu, Edward T. Samulski, and **Rene Lopez** "Interplay Between Bimolecular Recombination and Carrier Transport Distances in Bulk Heterojunction Organic Solar". **Advanced Energy Materials, vol.2**, issue 4, pages 477-486, (2012)

- B. Wu, A. Zimmers, H. Aubin, R. Ghosh, Y. Liu and **R. Lopez**. "Electric-field-driven phase transition in vanadium dioxide", **PRB rapid communications 84**, 241410-1/241410-4, (2011).

- Rudresh Ghosh, Kyle Brennaman, Tim Uher, Myoung-Ryul Ok, Edward T. Samulski, Laurie E. McNeil, Thomas J. Meyer, **Rene Lopez** "Nanoforest Nb_2O_5 Photoanodes for Dye sensitized Solar Cells by Pulsed Laser Deposition" **ACS Applied Materials and Interfaces 3**, 3929–3935, (2011) (doi: 10.1021/am200805x)

- Doo-Hyun Ko , John R. Tumbleston, Abay Gadisa, Mukti Aryala,, Yingchi Liu, **Rene Lopez**, and Edward T. Samulski*, "*Light-trapping nano-structures in organic photovoltaic cells*" **J. Mater. Chem., 21 (41),** 16293 - 16303 (2011) (**DOI:** 10.1039/C1JM12300A)

- Emily Ray, **Rene Lopez**. "Numerical design and experimental realization of a metallo-dielectric metamaterial with the broadband coupling of propagating waves into plasmon modes in the visible range", **J. Optical Society of America B**, vol. 28, No. 7 1778-1781 (2011)

- Doo-Hyun Ko, John R. Tumbleston, Kevin J. Henderson, Larken E. Euliss, Joseph M. DeSimone, **Rene Lopez**, and Edward T. Samulski, "Biomimetic microlens array with antireflective "moth-eye" surface" **Soft-Matter 7**,6404-6407 (2011) DOI: 10.1039/C1SM05302G

- A. Pashkin, C. KÄubler, H. Ehrke, **R. Lopez**, A. Halabica, R. F. Haglund, Jr., R. Huber, and A. Leitenstorfer," Ultrafast Insulator-Metal Phase Transition in VO_2 Studied by multi-THz Spectroscopy", **PRB 83**, 195120/1-195120/9, (2011), DOI: 10.1103/PhysRevB.83.195120

- Yingchi Liu, Hubert Turley, John R. Tumbleston, Edward Samulski and **Rene Lopez**, Minority carrier transport length of electrodeposited Cu_2O in ZnO/Cu_2O heterojunction solar cells, **Applied Physics Letters 98** 162105/1-162105-3 (2011)

- Doo-Hyun Ko, John R. Tumbleston, Walter Schenck, **Rene Lopez**, Edward T. Samulski,"Photonic Crystal Geometry for Organic Polymer:Fullerene Standard and Inverted Solar Cells" ***J. Phys. Chem. C***, 115 (10), pp 4247–4254 (2011)

- John R. Tumbleston, Doo-Hyun Ko, Edward T. Samulski, **Rene Lopez**, "*Analyzing local exciton generation profiles as a means to extract transport lengths in organic solar cells*" **PRB 82,** 205325/1-205325/10 (2010)

- Kristen D. Alexander, Kwan Skinner, Shunping Zhang, Hong Wei, and **Rene Lopez** "*Tunable SERS In Gold Nanorod Dimers Through Strain Control On An Elastomeric Substrate*" **Nanoletters 10** (11), 4488–4493, (2010) DOI**:** 10.1021/nl1023172

- Doo-Hyun Ko, John Tumbleston, Myuong-Ryul Ok, Honggu Chun, **Rene Lopez**, Edward Samulski *"Suppression of Bimolecular Recombination by UV-sensitive Electron Transport Layers in Organic Solar Cells*", **Journal of Applied Physics 108**, 083101/1-083101/6 (2010)

- John Tumbleston, Doo-Hyun Ko, Edward Samulski, **Rene Lopez**, "Non-ideal parasitic resistance effects in Bulk Heterojunction Organic Solar Cells", **Journal of Applied Physics 108**, 084514/1-084513/8 (2010)

- R. Gosh, M. Baker, **R. Lopez**, "Optical properties and aging of gasochromic WO_3 thin films", **Thin Solid Films** vol. **518**, issue 8, 2247-2249 (2010)

- Stuart S. Williams, Scott Retterer, **Rene Lopez**, Ricardo Ruiz, Edward T. Samulski and Joseph M. DeSimone, "*High-Resolution PFPE-based Molding Techniques for Nanofabrication of High-Pattern Density, Sub-20 nm Features: A Fundamental Materials Approach*", **Nanoletters 10** (4), pp 1421–1428 (2009)

- K. D. Alexander, M. J. Hampton, S. Zhang, A. Dhawan, H. Xu and **R. Lopez** "*A High Throughput Method For Controlled Hot Spot Fabrication in SERS-Active Dimer Arrays*" **Journal of Raman Spectroscopy 40**, 2171–2175 (2009)

- E. A. Ray, M . J. Hampton and **R. Lopez**, "*Simple demonstration of visible evanescent wave enhancement with far-field detection*" **Optics Letters 34**, 2048-2050 (2009).

- Doo-Hyun Ko, John R. Tumbleston, Lei Zhanga, Stuart Williams, Joe DeSimone, **Rene Lopez**, Edward T. Samulski, "*Photonic crystal morphology for organic solar cells*" **Nanoletters 9** 2742-2746 (2009). Abstract also in Nature Photonic Literature hightlights: http://www.nature.com/nphoton/journal/v3/n8/full/nphoton.2009.128.html

- J.R. Tumbleston, D-H.Ko, E. T. Samulski and **R. Lopez**, " *Absorption and quasiguided mode analysis of organic solar cells with photonic crystal photoactive layers*" **Optics Express 17**, 7670-7681 (2009)

- E. Donev**, R. Lopez**, L. C. Feldman, R. F. Haglund "Confocal Raman Microscopy across the Metal-Insulator Transition of Single Vanadium Dioxide Nanoparticles" **Nanoletters 9**, 702-706 (2009)

- J. R. Tumbleston, D.-H. Ko, E. T. Samulski, and **R. Lopez**, "*Electro-photonic enhancement of bulk heterojunction organic solar cells through photonic crystal photoactive layer*" **Appl. Phys. Lett. 94**, 043305-1/ 043305-3 (2009)

- A. Leitenstorfer, C. Kübler, **R. Lopez**, A. Halabica, R. F. Haglund, and R. Huber, "*Ultrafast insulator-metal transition in VO2: interplay between coherent lattice motion and electronic correlations*", **Phys. stat. sol.** (c) **6**, No. 1, 149–151 (2009).

- E. U. Donev, J. Y. Suh, **R. Lopez**, L. C. Feldman, and R. F. Haglund Jr., "*Using a Semiconductor-to-Metal Transition to Control Optical Transmission through Subwavelength Hole Arrays*," **Advances in OptoElectronics,** vol. 2008, Article ID 739135, 10 pages, 2008. doi:10.1155/2008/739135

- C. Klubler, H. Ehrke, R. Huber, **R. Lopez**, R. Haglund Jr. *Coherent structural dynamics and electronic correlations during an ultrafast insulator-to-metal phase transition in VO_2.* **Phys. Rev. Lett. 99,** 116401-1/116401-4(2007) Also selected for the September 24, 2007 issue of the Virtual Journal of Nanoscale Science and Technology.

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- M.D. McMahon, D. Ferrara, C.T. Bowie, **R. Lopez** and R.F. Haglund Jr. *Second harmonic generation from resonantly excited arrays of gold nanoparticles*, **Appl. Phys. B. 87**, 259-265 (2007) http://www.springerlink.com/content/m4t21451m867rx16/

- P. U. Jepsen, B. M. Fischer, A. Thoman, H. Helm, J. Y. Suh, **R. Lopez** and R. F. Haglund, Jr. *Metal-insulator phase transition in a VO2 thin film observed with terahertz spectroscopy*, **Physical Review B 74**, 205103 (2006)

- J. Y. Suh, E. U. Donev, **R. Lopez**, L. C. Feldman and R. F. Haglund, Jr., *Modulated optical transmission through subwavelength metal-VO_2 hole arrays*, **Appl. Phys. Lett. 88**, 133115-1/133115-3 (2006). Also selected for the April 10, 2006 issue of Virtual Journal of Nanoscale Science & Technology. http://www.vjnano.org

- E. U. Donev, J. Y. Suh, F. Villegas, **R. Lopez**, L. C. Feldman, and R. F. Haglund Jr., "Optical properties of subwavelength hole arrays in vanadium dioxide thin films, **Phys. Rev. B rapid communications 73**, 201401-1/201401-4 (2006). Also selected for the June 5, 2006 issue of Virtual Journal of Nanoscale Science & Technology. http://www.vjnano.org

- M. D. McMahon, **R. Lopez**, R. F. Haglund, Jr. *Second-Harmonic Generation from Arrays of Symmetric Gold Nanoparticles*, **Phys. Rev. B rapid communications 73,** 041401(R)/1-041401(R)/4 (2006). Also selected for the January 23, 2006 issue of Virtual Journal of Nanoscale Science & Technology. http://www.vjnano.org

- J. Rozen, **R. Lopez**, L. C. Feldman, R. F. Haglund, Two-dimensional current percolation in nanocrystalline vanadium dioxide thin films, **Appl. Phys. Lett. 88**, 081902-1/081902-3 (2006)

- M. D. McMahon, **R. Lopez**, H. M. Meyer III, L. C. Feldman, R. F. Haglund, Jr. *Rapid Tarnishing of Silver Nanoparticles in Ambient Laboratory Air*, **Applied Physics B 80**, 915-921 (2005)

- M. Rini, A. Cavalleri, **R. Lopez**, L. A. Boatner, R. F. Haglund jr. T. E. Haynes, L. C. Feldman, R. W. Schoenlein. *Photoinduced Phase transition in VO_2 Nanocrystals: Ultrafast Control of the Surface Plasmon Resonance*, **Optics Letters 30,** 558-561 (2005)

- **R. Lopez**, L. C. Feldman, R. F. Haglund, Jr*. Size dependent optical properties of VO_2 nanoparticles in ordered arrays.* ***Phys. Rev. Lett***. **29**, 177403-1/ 177403-4 (2004). Also selected for the Issue 18. V. 10 of the *Virtual Journal of Nanoscale Science and Technology*. http://www.vjnano.org

- **R. Lopez**, R. F. Haglund, Jr., L. C. Feldman, T. E. Haynes, L. A. Boatner, *Optical nonlinearities in VO_2 nanoparticles and thin films,* **Appl. Phys. Lett. 85**, 5191-5193 (2004). Also selected for the January 2005 Issue of the *Virtual Journal of Ultrafast Science*. http://www.vjultrafast.org

- **R. Lopez**, T. E. Haynes, L. A. Boatner, L. C. Feldman and R. F. Haglund Jr. *Switchable reflectivity on Silicon from composite VO_2-SiO_2 protecting layer.* **Appl. Phys. Lett. 85**, 1410-1412 (2004)

- J. Y. Suh, **R. Lopez**, L. C. Feldman, R. F. Haglund, Jr. *Semiconductor to metal phase transition in the nucleation and growth of VO_2 nanoparticles and thin films*, **J. Appl. Phys**. **96**, 1209-1213 (2004).

- L. C. Feldman, G. Lupke, N. H. Tolk, **R. Lopez**, R. F. Haglund Jr., T. E. Haynes, L. A. Boatner, Particle-solid interactions and 21st century materials science. **Nucl. Inst. and Met. Phys. Research B. 212**, 1-7 (2003).

- **R. Lopez,** L. A. Boatner, T. E. Haynes, L. C. Feldman and R. F. Haglund Jr., *Synthesis and characterization of size-controlled vanadium dioxide nanocrystal in a fused silica matrix*. **J. Appl. Phys**. **92**, 4031-4036 (2002).

- **R. Lopez,** T. E. Haynes, L. A. Boatner, L. C. Feldman and R. F. Haglund Jr., *Temperature-controlled surface plasmon resonance in VO_2 nanorods.* **Optics lett. 27,** 1327-1330 (2002).

- **R. Lopez,** T. E. Haynes, L. A. Boatner, L. C. Feldman and R. F. Haglund Jr., *Size effects in the structural phase transition of VO_2 nanoparticles.* **Phys. Rev. B**. **65**, 224113-1/224113-5 (2002).

- **R. Lopez**, R. Ruiz, R.F. Haglund Jr., L.C. Feldman*, Pulsed laser deposition of conductive metallo-dielectric optical filters.* **Appl. Phys. A 74**, 307-310 (2002).

- **R. Lopez**, L. A. Boatner, T. E. Haynes, R. F. Haglund Jr. and L. C. Feldman*, Enhanced hysteresis in the semiconductor-to-metal phase transition of VO_2 precipitates formed in SiO_2 by ion implantation.* **Appl. Phys. Lett. 79**, 3161-3163 (2001).

REFEREED ARTICLES IN PROCEEDINGS

- Rudresh Ghosh, M. Kyle Brennaman, Javier J. Concepcion, Kenneth Hanson, Amar S. Kumbhar, Thomas J. Meyer, and **René Lopez**, "Efficient high surface area vertically aligned metal oxide nanostructures for dye-sensitized photoanodes by pulsed laser deposition", Proc. SPIE 8109, 81090U (2011); doi:10.1117/12.893073

- J. R. Tumbleston, D.-H. Ko, E. T. Samulski, and **R. Lopez**, "Electro-Optical Model of Photonic Crystal Bulk Heterojunction Organic Solar Cells", Proc. of the 2009 joint annual conference of the national society of black physicst and national society of Hispanic physicists. AIP Conference Proceedings **1280,** 121-129, **ISBN 978-0-7354-0830-2,**(2010)

- John R. Tumbleston, Doo-Hyun Ko, **Rene Lopez**, and Edward T. Samulski, *Characterizing enhanced performance of nanopatterned bulk heterojunction organic photovoltaics* Proc. SPIE, Vol. 7047, 70470S (2008); DOI:10.1117/12.794823

- **Rene Lopez**, Richard F. Haglund, Jr., Leonard C. Feldman, Lynn A. Boatner, and Tony E. Haynes *Optical nonlinearities and the ultrafast phase transition of VO_2 nanoparticles and thin films*. Proceedings SPIE **Vol. 6118**, 61180O-1/61180O-8 (2006)

- Matthew D. McMahon, Christopher T. Bowie, **René Lopez**, Leonard C. Feldman, and Richard F. Haglund Jr. *Second harmonic generation from centrosymmetric arrays of gold nanoparticles*. Proceedings SPIE **Vol. 6106**, 61061N-1/61061N-6 (2006)

- **R. Lopez** , L. C. Feldman, R. F. Haglund, Jr *Fabricating arrays of vanadium dioxide nanodisks by FIB lithography and PLD* ***Proceedings of SPIE - The International Society for Optical Engineering - Photon Processing in Microelectronics and Photonics III***, **5339**, 601-610 (2004).

- M. Rini, A. Cavalleri, **R. Lopez**, L. A. Boatner, R. F. Haglund jr. T. E. Haynes, L. C. Feldman, R. W. Schoenlein. Photoinduced *Ultrafast control of a surface plasmon resonance via the insulator to metal phase transition in VO_2 nanoparticles.* **Proceedings of 14th International Conference on ultrafast phenomena,** 792-794 (2004)

- **R. Lopez** , R. F. Haglund, Jr. *Ion beam lithography and fabrication ordered arrays of VO_2 nanoparticles,* **Mat. Res. Soc. Symp. Proc**. **820,** R1.5.1-1/ R1.5.1-6 (2004)

- A.B. Hmelo, M.D. McMahon, **R. Lopez**, R.H. Magruder III, R.A. Weller, R.F. Haglund Jr. and L.C. Feldman, "*Fabrication of Metallic Nanocrystal Arrays for Nanoscale Nonlinear Optics*", Ceramic Nanomaterials and Nanotechnology II, **Ceramic Transactions V. 148**, American Ceramic Society, 61-68, (2003).

- M. D. MacMahon, A. B. Hmelo, **R. Lopez**, W. T. Ryle, Allen T. Newton, Richard F. Haglund, L. C. Feldman, R. A. Weller, R. H. Magruder III. *Fabrication of ordered Metallic nanocluster arrays using focused ion beam.* **Mat. Res. Soc. Symp. Proc. 739**, 53-57 (2003).

- García-Llamas R, Gaspar-Armenta JA, Ramos-Mendieta F, **López R.**, Haglund Jr. RF and Ruiz R: *Injection of light into a planar dielectric wave guide of metallic walls*. **Proceedings of SPIE. 4439**: 88-94 (2001)

ORAL PRESENTATIONS & INVITED TALKS

- Invited participant: Scilog meeting on Energy conversion, Sponsor by the Research Corporation and the NSF, October 9-12,, 2012, Tucson, Arizona

- Invited Talk: AIP-ICTP INDUSTRIAL PHYSICS FORUM 2012* (16-20 April 2012 - ICTP, Trieste, Italy

- Invited talk: MRS 2011 Fall Meeting as part of the Symposium "Photonic and Plasmonic Materials for Enhanced Photovoltaic Performance". The meeting will be held between November 28th and December 2nd 2011 in Boston, USA.

- Invited talk: "Photonic structure and transport in polymer solar cells" Photonics Colloquium at Duke University, Nov.1st, 2011, North Carolina

- Invited talk: "Pulse laser deposition of high surface area photoanode materials" to be presented in the SESAPS meeting, October 20, 2011,Virginia.

- Invited talk: "Photonic nanostructure for polymer solar cells" to be presented in the SESAPS meeting, October 22, 2011,Virginia.

- Invited participant: Scilog meeting on Energy conversion, Sponsor by the Research Corporation and the NSF, Oct.11-14, 2011, Tucson, Arizona

- Invited talk: "High Surface Area vertically aligned metal oxide nanostructures for dye-sensitized photoanodes by pulse laser deposition". Materials for Solar energy conversion symposium, American Chemical Society meeting, Denver, Colorado, August 29, 2011

- Invited talk: 3rd annual 2011 Hybrid and Organic Photovoltaics Valencia, Spain 16-19th May 2011

- Invited talk: Seminar at Department of Materials Science and Engineering, Rutgers University, April 7, 2011
- Invited talk: "Photonic crystals in polymer solar cells" American Physics Society Annual March meeting, March 21, 2011, Dallas, Texas

- Invited talk: "Pulse laser growth of photoanodes from dye sensitized solar cells" American Physics Society Annual March meeting, March 22, 2011, Dallas, Texas

- Invited talk: North Carolina State University physics colloquium , Nov. 22, 2010

- Invited talk: Joint seminar School of Nanoscience and Nanoengineering, North Carolina A&T State University and The University of North Carolina at Greensboro Nov. 19, 2010

- Invited talk: North Carolina State University physics colloquium , Nov. 22, 2010, Raleigh NC

- Invited talk: Simple Demonstration of visible evanescent wave enhancement with far-field detection. Optical Society of America Annual meeting "Frontiers in Optics 2010", October 26-28, 2010, Rochester, NY

- Invited talk: Controlled formation of SERS hot spots in gold nanoclusters. Federation of Analytical Chemistry and Spectroscopy Societies (FACSS **37th** annual meeting) October 20 2010, Raleigh, NC

- Invited participant: Scilog meeting on photovoltaic conversion, Sponsor by the Research Corporation and the NSF, Oct.13-15, 2010, Tucson, Arizona

- Invited talk: Organic Photonic solar cells. Colloquium at the University of Wake Forest. April 22 2010, Winston-Salem, NC, USA

- Invited talk: Integrated Electro-Photonic Development of Polymer Solar Cells. Third-Generation Solar Technologies Multidisciplinary Workshop: Synergistic Chemistry-Materials-Mathematical Sciences Approaches to Addressing Solar Energy Problems, Spring MRS meeting April 5-9, 2010. San Francisco, CA, USA

- Invited talk: Electro-photonic enhancement of bulk heterojunction organic solar cells through photonic crystal photoactive layer. Nanomaterials Simposium SACNAS Conference, Oct 15-18, 2009. Dallas, TX, USA

- Invited talk: Bio-inspired Phototonic solar cells. American black and Hispanic Physics meeting. February 13-15, 2009, Nashville, TN, USA

- Invited talk: Electro-photonic enhancement of bulk heterojunction organic solar cells through photonic crystal photoactive layer. Securing Our Energy Future: Next Generation Photovoltaics and Solar Fuels January 15-17, 2009, UNC Chapel Hill, NC, USA

- Invited talk: Electro-photonic enhancement of bulk heterojunction organic solar cells through photonic crystal photoactive layer. SESAPS Meeting, Oct. 30-Nov. 1 2008, Raleigh, NC, USA

- Invited talk: Organic Photonic solar cells. Colloquium at the University of North Carolina, Charlotte. 8 February 2008, Charlotte, NC, USA

- Invited talk: Photonic structures with chromogenic materials. Photonics Conference, University of Sonora, October 23th, 2007, Hermosillo Sonora, MEXICO.

- Invited talk: Photonic properties of thermochromic oxides. Colloquium at the University of North Carolina, Wilmington. 24 August 2007 Wilmington NC, USA

- Invited talk: Nanoscale Thermochromic oxides. Palo Alto Xerox Research Park, 12 July 2007, San Jose CA, USA

- *Optical diffraction in ordered VO_2 nanoparticle arrays.* 2006 APS March meeting Focus session in Nanoscale Physics and Phase Transitions. 13-17 March 2006, Baltimore, MD USA

- Invited paper *Optical nonlinearities and the ultrafast phase transition of VO_2 nanoparticles.* SPIE Photonic West'06 International Symposium on "Ultrafast Phenomena in Semiconductors and Nanostructures X, 21-26 January 2006, San Jose, California USA

- *Nanostructured VO_2 particle arrays as active elements of photonic devices*. 12th International Workshop on Oxide Electronics, October 2-5, 2005, Cape Cod, MA.

- Invited paper *Size-dependent optical properties of VO_2 nanoparticle arrays. NIRT Structure of nanocrystals workshop, December 5-8, 2004*, Tempe, AZ.

- *The optical resonances of VO_2 nanoparticles in ordered arrays.* Spring Meeting, Materials Research Society (MRS), April 13, 2004, San Francisco, CA.

- Invited paper *Metal semiconductor phase transition in nanoscale vanadium dioxide precipitates formed in silica and sapphire by ion implantation.* International workshop on interactions between nanostructures and particle beams (MRS), March 11-13, 2004, Shanghai Institute of Applied Physics, Shanghai, CHINA.

- Invited paper *Metal semiconductor phase transition in nanoscale vanadium dioxide precipitates formed in silica by ion implantation.* Spring Meeting, Materials Research Society (MRS), April 21-25, 2003, San Francisco, CA.

- Invited paper *Metal semiconductor phase transition in nanoscale vanadium dioxide precipitates formed in silica and sapphire by ion implantation.* Conference on Accelerators Applications in Research and Industry (CARRI), November 12-16, 2002, U. of North Texas, Denton, TX.

- Invited paper *Metal semiconductor phase transition in nanoscale vanadium dioxide precipitates formed in silica by ion implantation*. Ion Beam Materials Modification (IBMM) conference, September 1-6, 2002, Kobe, JAPAN.

- Invited paper *Nanoscale features of the VO_2 phase transition*. Gordon conference on Point and Line defects in semiconductors, July 7-12, 2002, Colby Sawyer College, New London, NH.

- *Optical properties of the semiconductor/metal phase transition in VO_2-precipitate SiO_2-host nanocomposites.*104th Annual Meeting American Ceramic Society, April 28-May 1, 2002, St. Louis, MO.

- *Metal-semiconductor phase transition in nanoscale vanadium dioxide precipitates formed in silica by ion implantation*. March Meeting American Physics Society, March 17-22, 2002, Indianapolis IN.

- *Metal-semiconductor phase transition in nanoscale vanadium dioxide precipitates formed in silica and sapphire by ion implantation.* Fall meeting Materials Research Society, November 26-30, 2001, Boston, MS.

- *Effects of the structural phase transition on the optical response of vanadium dioxide nanocrystals.* Meeting of the Nanoscale consortium, October 25-27, 2001, Baltimore MD.

TEACHING ACTIVITIES

Teaching at UNC

- ELECTROMAGNETISM AND OPTICS (PHYS117), FALL 2012, 45 students (evaluation: 3.5/5-4.0/5)
- ELECTROMAGNETIC THEORY I (PHYS 312), SPRING 2012, 13 students (4/5)
- ELECTROMAGNETIC THEORY I (PHYS 211/311), FALL 2011, 25 students (~ 4/5)
- INTRO MATERIALS SCIENCE (APPL150), SPRING 2011, 43 students (evaluation: 3.5/5-4.5/5)
- ELECTROMAGNETIC THEORY I (PHYS 211/311), FALL 2010, 35 students (evaluation: 4.4/5-4.5/5)
- ELECTROMAGNETISM AND OPTICS (PHYS117), SPRING 2010, 65 students (evaluation: 3.9/5-4.1/5)

- SOLID STATE I (1/4 of the teaching load) (PHYS871), Fall 2009, 7 students (No teaching evaluation was conducted on my part of this class)
- ELECTROMAGNETISM AND OPTICS (PHYS117), FALL 2009, 60 students (evaluation: 3.5/5-3.9/5)
- ELECTROMAGNETISM AND OPTICS (PHYS117), SPRING 2009, 55 students, (evaluation: 4.0/5-4.1/5)
- INTRO MATERIALS SCIENCE (APPL150), SPRING 2008, 39 students (evaluation: 3.8/5-4.0/5)
- MODES OF INQUIRY (SPCL390), FALL 2007, 12 students (no teaching evaluation was conducted)
- STRUCTURES AND PROPERTIES OF SOLIDS (MTSC615), FALL 2007, 8 students (evaluation: 3.9/5-4.1/5)
- INTRO MATERIALS SCIENCE (APPL150), SPRING 2007, 28 Students,(evaluation: 4.3/5-4.4/5)
- STRUCTURES AND PROPERTIES OF SOLIDS (MTSC615), FALL 2006, 7 students (no teaching evaluation was conducted)

Teaching elsewhere

- GENERAL PHYSICS II (PHYS117B), Summer 2006, 30 students at Vanderbilt University (Nashville, TN)
- PHYSICS MATTERS, Spring 2005, 20 Students at Belmont University (Nashville TN)

Graduate students supervised

- Emily Ray, Physics Ph.D. (May 2012) "*Enhanced electromagnetic fields via surface plasmon coupling in patterned metallic nanostructures*" she went to a postdoctoral appointment at IBM, Yorktown.

- Rudresh Ghosh, Physics Ph.D. (May 2012) "*Metal Oxide Thin Film Growth by Laser Ablation and Its Applications in High Surface Area Photoanodes*" Currently posdoc at UT-Austin, TX.

- Kristen Alexander, Physics Ph.D. (May 2011),"*Fundamentals and technology of surface-enhanced Raman spectroscopy through the fabrication and manipulation of plasmonic gold metal nanoparticle dimers*" postdoctoral position at Notre dame University.

- John Tumbleston, Physics Ph.D. (May 2011), "*Photonics and Transport in Bulk Heterojunction Organic Solar Cells*" he went to a postdoctoral position at NC state University.

- Matt Baker, Materials Program, Materials M.S. (Spring 2008), "*Optical properties and aging of gasochromic WO_3 thin films*", he went to US Navy submarine school

Posdoctoral scholars supervised

- Mukti Aryal, (Fall 2009- Fall 2010), he went to work for private sector at Rodlith, Inc. In San Francisco.

Current research team

- Timothy Gaverty, 2nd year Materials Program, Ph.D sudent

- Cary Tippens, 2nd year Materials Program, Ph.D. student
- Yingchi Liu, 5th year Physics Program, Ph.D. student, MS spring 2011
- Yukihiro Hara, full time posdoc joined group Nov. 2011
- Eugene Donev, full time posdoc joined group Sept. 2012
- Abay Dinku, ½ posdoc shared with Prof. Ed Samulski (Chemistry), joined group Nov. 2009
- Leila Alibabei, ½ posdoc shared with Prof. Thomas Meyer (Chemistry), joined on sept.8, 2011
- Kristina Vrouwenvelder, Travis Hairfield, Jordan Stronman, undergraduate students working with the group in the current academic year 2012-2013