

Center for Optoelectronics and Optical Communications
Publications, Patents and Grants
2007 –2008

Books and Book Chapters

- Lasers in Dermatology*, ed. Nouri K. Springer, (In press) Chapter: Laser/light applications in Urology, NM Fried, BR Matlaga, ch 41
- Biomedical Nanostructures*, ed. Wiley, Hoboken, NJ 2008, K. E. Gonsalves, C. R. Halberstadt, C. T. Laurensin, Lakshmi S. Nair

Journals and Conference Publications

- V.N. Astratov, Introduction to the Focus Issue of Optics Express on Physics and Applications of Microresonators, *Opt. Express* 15, 17171 (2007).
- K.R. Hiremath, V.N. Astratov, Perturbations of Whispering Gallery Modes by Nanoparticles Embedded in Microcavities, *Opt. Express* 16, 5421-5426 (2008).
- V.N. Astratov, S.P. Ashili, Percolation of Light through Whispering Gallery Modes in 3D Lattices of Coupled Microspheres, Focus Issue on Physics and Applications of Microresonators, *Opt. Express* 15, 17351-17361 (2007).
- V.N. Astratov, S. Yang, S. Lam, B.D. Jones, D. Sanvitto, D.M. Whittaker, A.M. Fox, M.S. Skolnick, A. Tahraoui, P.W. Fry, M. Hopkinson, *Appl. Phys. Lett.* 91, 071115 (2007).
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- R.C. Rumpf, M.A. Fiddy, M.E. Testorf, "Design of generalized invisible scatterers", *Optics Express*, Vol. 15, Issue 8, pp. 4735-4744, 2007.
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- P. Srinivasan, Z. Roth, E.G. Johnson, "Fabrication of variable effective refractive index artificial media", Proceedings of SPIE -- Volume 6883, Advanced Fabrication Technologies for Micro/Nano Optics and Photonics, Thomas J. Suleski, Winston V. Schoenfeld, Jian J. Wang, Editors, 68830J (2008).
- K. Acharya and M. Y. A. Raja, "SRS Crosstalk mitigation in WDM-PON using Quadrature Amplitude Modulation", HONET 2007 Proc IEEE ComSoc Xplore
- F. Khan, R. Muzaffar, S. M. H. Zaidi, M. Y. A. Raja, NUST Hybrid (WDM/TDM) EPON based Access Network with Triple Play Support", HONET 2007 Proc IEEE ComSoc Xplore
- M. H. Raza, S.M. H. Zaidi, K. Zaidi, M. Ramzan, S. Abidi, M. Y. A. Raja, "Bi-directional Radio-over-Fiber (RoF) Architecture based on Up- and Down-Conversion", HONET 2007 Proc IEEE ComSoc Xplore
- M.L. Barkman, B. Dutterer, M.A. Davies, T.J. Suleski, "Free-form machining for micro-imaging systems," in *Advanced Fabrication Technologies for Micro/Nano-Optics & Photonics*, Proc. SPIE 6883, 688315 (2008).
- T.J. Suleski, *Advanced Fabrication Technologies for Micro/Nano-Optics & Photonics*, with J. Wang and W. Schoenfeld, Proceedings of SPIE (Bellingham, WA), Vol. 6883 (2008).
- M.L. Barkman, B. Dutterer, M.A. Davies, T.J. Suleski*, "Free-form machining for micro-imaging systems," in *Advanced Fabrication Technologies for Micro/Nano-Optics & Photonics*, Proc. SPIE 6883, San Jose, CA, January 22, 2008.
- K. N. Walker, R. K. Tyson, "An all-optical image sharpness sensor for propagation and imaging." *Proc. SPIE* 6878, 2008

Conference Presentations

- K. Daneshvar, "Application of metallic quantum dots in ultra-short pulse high current switching, CAR & FOF 07, 23rd ISPE International Conference on CAD/CAM, Robotics and Factories of the Future, 16-18 August 2007, Universidad Militar Nueva Granada, Bogota, Columbia.
- K. Daneshvar, Los avances tecnologicos recientes y su impacto en la produccion industrial, Tecnologia E Innovacion, Seminario International Tecnologia E Innovacion, Bogota, Colombia, 10 de Abril de 2008.
- T. Cassen, K. R. Subramanian, J. Alexander, D. Linderman, and A. Nasipuri, "A visual learning engine for interactive generation of instructional materials," 12th Annual Conference on Innovation and Technology in Computer Science Education, 25-27 June, 2007, Dundee, Scotland.
- H. Alasti, W. R. Armstrong, and A. Nasipuri, "Performance of a robust filter-based approach for contour detection in wireless sensor networks," presented at the 16th IEEE International Conference on Computer Communications and Networks, Honolulu, Hawaii, August 2007.

- E. Stokes, Invited talk on "Semiconductor quantum dots in optoelectronic devices" at the annual UNC Charlotte Optics Symposium in November 2007.
- R. Tsu, Plenary speaker at the 6th International Conference on Low Dimensional Structures and Devices, LSD-2007, San Andrea Island, April 15-20, 2007.
- V.N. Astratov, Gordon-type Workshop on Physics of Microresonators, Charlotte, June 6-9, 2007 "Optical Transport Phenomena in Coupled Spherical Cavities"
- V.N. Astratov, Talk: CLEO/QELS 2007, Baltimore, May 6-11, 2007 "Percolation of Light in 3D Lattices of Coupled Microspheres" (with S.P. Ashili)
- V.N. Astratov, International Conference ICTON 2007 Special session on *Microresonators and Photonic Molecules: trapping, harnessing and releasing light*, Rome, Italy, July 1-5, 2007
- V.N. Astratov, "High-Quality-Factor Whispering Gallery Modes in Semiconductor Microcavity Pillars with Circular and Elliptical Cross Section" (with S. Yang, S. Lam, B.D. Jones, D. Sanvitto, , D.M. Whittaker, A.M. Fox, and M.S. Skolnick, A. Tahraoui, P.W. Fry, and M. Hopkinson)
- V.N. Astratov, Invited Seminar: European Laboratory for Nonlinear Spectroscopy (LENZ), Florence, July 5, 2007, host: M. Gurioli "Optical Transport Phenomena in Coupled Spherical Cavities".
- V.N. Astratov, CBES Research Poster Interchange, UNCC, March 27, 2008, host: Robin Coger "Optical Microprobe with Subwavelength Resolution for Biomedical Applications" (with S. Yang).
- D. Purcell, A. Davies, F. Farahi, "Measuring the Geometry of a Micro-lens array Using an Index Matching Liquids," Department of Applied Physics and Photonics at the Vrije Universiteit Brussel (TONA-VUB), Brussels, Belgium, May 2007.
- A. Davies, "Optics Metrology Research at UNC Charlotte," Invited Talk, University of Bremen, Bremen, Germany, December 2007.
- A. Davies, "Optics Metrology Research at UNC Charlotte," Invited Talk, Physikalisch-Technische Bundesanstalt (PTB), Germany National Metrology Lab, Braunschweig, Germany, December 2007.
- M. Mayeh, F. Farahi, "Laser Beam Combining For High-Power, Broadband Sources, Using Two-Step Refractive Grating" CLEO/QELS 2007, Baltimore, May 6-11, 2007.
- F. Farahi, "Fabrication and metrology of micro- and nano-optics" Conference Proceedings, p.66190E, 3rd European Workshop on Optical Fiber Sensors, Napoli, Italy, July 4-6, 2007.
- O. Frazao, J. Viegas, P. Caldas, F.M. Araujo, L.A. Ferreira, J.L. Santos, and F. Farahi, "In-fiber Mach-Zehnder configuration based on fiber multimode interference structure combined with a long period grating" Conference Proceedings, p. 66192H, 3rd European Workshop on Optical Fiber Sensors, Napoli, Italy, July 4-6, 2007.
- P.A. Jorge, A. J. Silva, R. Benrashid, J.L. Santos, and F. Farahi, "Simultaneous determination of oxygen and temperature using quantum dots and ruthenium complex" Conference Proceedings, p. 66191Y, 3rd European Workshop on Optical Fiber Sensors, Napoli, Italy, July 4-6, 2007.
- M. Mayeh, J. Viegas, P. Marques, J.L. Santos, and F. Farahi, "Design and optimization of slotted multimode interference devices for chemical and biochemical sensing" Conference Proceedings, p. 66191O, 3rd European Workshop on Optical Fiber Sensors, Napoli, Italy, July 4-6, 2007.
- M. E. Testorf, M. A. Fiddy, "Linear spectral estimation and the design of superresolution filters", *Frontiers in Optics Technical Digest, FthV4*, 2007.
- S. Chitchian, M. A. Fiddy, N. M. Fried, "Image processing for use in optical coherence tomography of the cavernous nerves in the prostate", *Engineering in Urology Society Meeting*, May 2008.
- N.J. Scott, S.R. Trammell, P. Wittmann, A. Behrens, A. Tchapyjnikov, K. Levin, D. Tran, N.M. Fried,

Erbium:YAG laser emulsification of grade 4+ porcine and human cataracts using a germanium oxide fiber probe. OSA BIOMED. In press.

- G. Gbur, "*Optical and coherence vortices and their relationships*," seminar at Vrije Universiteit, September 2007.
- G. Gbur, "*Optical and coherence vortices and their relationships*," Correlation Optics 2007, Chernivtsi, Ukraine, September 2007 (invited).
- G. Gbur, R.K. Tyson, "*Vortex beam propagation through atmospheric turbulence and topological charge conservation*," 2007 OSA Annual Meeting in San Jose, CA.
- G. Gbur, "*Vortex beam propagation through atmospheric turbulence and topological charge conservation*," AFOSR EM Workshop, San Antonio, TX 2008.
- G. Gbur, "*Vortex beam propagation through atmospheric turbulence and topological charge conservation*," Photonics West 2008.
- G. Gbur, "*Partially coherent and vortex beam propagation through atmospheric turbulence*," TCATS meeting, Dayton, OH, March 2008.
- G. Gbur, "*From Nonradiating Sources to Optical Cloaks: A Short History of the Physics of Invisibility*," colloquium at the University of Miami, April 2008.
- M. Tang, H. Zhang, T. Her, "Observation of self-assembled periodic nano-structures induced by femtosecond laser in both ablation and deposition regimes," Photonic West proceeding 2007.
- M. Tang, H. Zhang, T. Her, "Substrate Study of Tungsten Nano-gratings Deposited by a Single Femtosecond Laser Beam," CLEO proceeding 2008
- A. Mehta, E.G. Johnson, "*Double Cladding Optical Fiber Laser Externally Locked with Guided Mode Resonance Filter*," Frontiers in Optics, OSA, (2007).
- J.D. Brown, E.G. Johnson, "*Micro-Cavity Resonator Optimization Using Particle Swarm Optimization*," in Integrated Photonics and Nano-Photonics Research and Applications (IPNRA), ITuF6 (2007).
- J. O'Daniel*, O. Smolski, P. Srinivasan, E.G. Johnson, "*Multi-bounce Dual Grating Reflector for Internal Wavelength Locking of Laser Diodes*," in Integrated Photonics and Nanophotonics Research and Applications (IPNRA), IMA3 (2007).
- D. Wu, W. Mohammed, P. Srinivasan, E. Johnson, L. Quan, P. W. Smith, "*Multi-fiber-channel ultrafast all optical switch utilizing 2D Fresnel lens array*," CLEO May 2007.
- E.G. Johnson* "*Hot Topics in Information Science*" OSA Leadership Conference Washington DC.
- E.G. Johnson* "*Hot Topics in Information Science*" Frontiers in Optics, OSA Annual Meeting
- E.G. Johnson* "*Nano-Photonic Device Design and Integration*," NSF ECCS Division
- P. Moyer, Organized session on *Microfabrication and Microprocessing* at National Academy of Engineering and Alexander von Humboldt's German-American Frontiers of Engineering (GAFOE) Symposium (Irvine, CA, April 25-27, 2008).
- K. Acharya and M. Y. A. Raja, "Stimulated Raman Scattering Impairments in WDM-PON", Proc. FTTH Council Annual Conf.-Expo, Orlando Fl., Sept. 30-Oct. 04, 2007
- M. Khizar, K. Acharya, and M. Y. A. Raja, "Thermal Stability of Reflection Multilayers on p-AlGaIn/GaN Contact of Deep-UV Light Emitting Diodes", OSA-IPRINA, Salt Lake City, Utah, USA July, 2007
- G. Venus, J. O'Daniel, V. Smirnov, V. Smolski, O. Smolski, E. Johnson, L. Glebov "Single-Transverse-Mode Grating-Coupled Surface Emitting Volume Bragg Laser" oral presentation at 20th Solid State Diode Laser Technology Review, Los Angeles, CA, June 2007.

- M. L. Barkman, B. S. Dutterer, T. J. Suleski, M. A. Davies*, "Ultra-Precision Machining of a Milli-scale Germanium Optics Array," CIRP Scientific and Technical Committee on Precision (STC-P), Paris France, Jan. 21, 2008.
- R. K. Tyson, M. Scipioni, "Generation of optical vortex beams with a deformable mirror and propagation through atmospheric turbulence," Invited Talk, National University of Ireland, Galway, March 2008.
- B.T. Donovan-Merkert, R.P. Cope, Electrochemically-promoted catalytic asymmetric hydrogenation of prochiral olefins using Rh(DuPHOS). *Abstracts of Papers*, 233rd ACS National Meeting, Chicago, IL, March 25-29, 2007, INOR-613.
- B.T. Donovan-Merkert, Electrochemistry in Asymmetric Catalysis: Zapping our Way to Enantiomeric Purity" 2007 Gordon Research Conference on Organometallic Chemistry, July 8-13 2007, Salve Regina University, Newport, RI.
- B.T. Donovan-Merkert, O.R. Tarkington, A.P. Brooks, Z. Abou Chakra, M. Schwarz, Electrochemically-induced reactions of pybox compounds of Rh and Ir. *Abstracts of Papers*, 234th ACS National Meeting, Boston, MA, August 19-23, 2007. INOR-901.
- B.T. Donovan-Merkert, R.P. Cope, Mechanistic investigation of electrochemically-promoted catalytic asymmetric hydrogenation. *Abstracts of Papers*, 234th ACS National Meeting, Boston, MA, August 19-23, 2007. INOR-898.
- M. Etzkorn, M.D. Brooker, D.T. Nguyen, S.C. Hill, D.S. Jones, Molecular Clips with Fluoroarene Pincers. 18th Winter Fluorine Conference, St. Petersburg, FL; January, 2007.
- M. Etzkorn, D.T. Nguyen, S.C. Hill, D.S. Jones, Fluoroclips – Molecular Tweezers with Fluoroarene Pincers. 40th National Organic Symposium, Duke University, Durham, NC; June, 2007.
- M. Etzkorn, M.D. Brooker, D.T. Nguyen, Fluorotweezers with Quinoxaline Pincers: Syntheses, Structures and Host-Guest Chemistry. 234th American Chemical Society Meeting, Boston, MA, August 19-23, 2007.
- M. Etzkorn, D. T. Nguyen, M.D. Brooker, Fluoroclips – Syntheses, Structures and Host-Guest Chemistry. 15th European Symposium on Fluorine Chemistry, Prague, Czech Republic, July 14-19, 2007.
- P.S. Williams, D.J. Au, H.C. Karanikas, M. Etzkorn, Molecular Tweezers – From Simple Building Blocks to Functional Materials. University of South Carolina Research Fair, Columbia, SC, October 6, 2007.
- W. Yueh, J.M. Roberts, C.L. Henderson, C.T. Lee, M. Wang, K.E. Gonsalves, The effect of direct photoacid generator incorporation into the polymer main chain on reactive ion etch resistance of 193 nm and EUV chemically amplified resists. 33rd International Conference on Micro- and Nano-Engineering (MNE); 2007, Copenhagen, Denmark.
- C.T. Lee, C.L. Henderson, M. Wang, W. Yueh, K.E. Gonsalves, J.M. Roberts, Effects of PAG incorporation into polymer main chain on chemically amplified resist behavior and lithographic performance. 51st International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN) 2007, Denver, CO.
- M. Wang, K.E. Gonsalves, C.T. Lee, C.L. Henderson, W. Yueh, J.M. Roberts, Novel Anionic Photoacid Generator (PAGs) Monomers and Photoresist Polymers for sub-50 nm Patterning by EUV and Electron Beam Lithography. SPIE 2007, San Jose, CA.
- C.T. Lee, N.D. Jarnagin, M. Wang, K.E. Gonsalves, J.M. Roberts, W. Yueh, C.L. Henderson, Photoacid generation efficiency and line edge roughness of novel polymer-bound PAG 193 nm and EUV photoresists. SPIE 2007 in San Jose, CA.
- A.H. Ringwood, S. Khambhammettu, D. Carroll, N. Levi, N.; Gonsalves, K.E. Bivalve mollusks as valuable models for characterizing nanoparticle toxicity. Society of Toxicology – Annual Meeting, Charlotte, NC, March 2007.
- R. Pillai, K.E. Gonsalves, M.M. Rabinovich, M.C. Hudson, S. Somayaji, Nanoparticles for Delivery of Antibiotics I & II. Nanotechnology in Biology and Medicine Conference; Charlotte, NC, November 2007

- D. Alyounes, K.E. Gonsalves, C. Yengo, Q. Lu, T. Doran, Developments of Polymeric Micro/nanostructures for Gene Delivery *MRS San Francisco*, April 2007.
- M.M. Rabinovich, K.E. Gonsalves, S. Somayaji, R. Pillai, M.C. Hudson, J.K. Ellington, M. Bosse, J. Horton, Active Polymer Nanoparticles : Delivery of Antibiotics. *MRS San Francisco*, April 2007.
- Ashish; J.K. Krueger, Understanding proteins and their complexes using small angle X-ray/neutron scattering. *Abstracts of Papers*, 234th ACS National Meeting, Boston, MA, United States, August 19-23, 2007.
- R.G. Freemantle, S.O. Obare, New Approach for Size- and Shape-Controlled Fabrication of Ruthenium Nanoparticles. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- C. De, S.O. Obare, One-Step Photochemical Synthetic Procedure toward Monodisperse Metal Nanoparticles. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- P.M. Cox, C.G.E. Ciptadjaya, M. James, S.O. Obare, Rational Organization of Nanoscale Catalysts for Hydrogen Production. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- R.G. Freemantle, I. Lissette L.I. Lozano-Lewis, D. Rabinovich, S.O. Obare, Size- and Shape-Controlled Fabrication of Palladium Nanoparticles Using Novel Organometallic Precursors. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- M. Liu, R.G. Freemantle, S.O. Obare, Electrochemical Characterization of Catalytic Metal Nanoparticles. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- K. Mukhopadhyay, S.O. Obare, New Ligands for Size-Control of Magnetic Nanoparticles. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- C. De, G. Anderson, D.H. Murray, S.O. Obare, Selective Colorimetric and Electrochemical Detection of Organophosphorus Pesticides. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- W. Guo, S.O. Obare, Tuning the Properties of Organic Molecules for Small Molecule Activation. *South East Regional Meeting of the American Chemical Society*, Greenville, SC. October 2007.
- M. Liu, R.G. Freemantle, S.O. Obare, Monodisperse 1-2 nm Metallic Nanoclusters: Synthesis and Electrochemical Properties. *Electrochemical Society Conference*, Washington, D. C. October 2007.
- W. Guo, S.O. Obare, Nanoscale multi-electron transfer catalysts for organophosphorus pesticide degradation. *234th American Chemical Society National Meeting*, Boston, MA. August 2007.
- Y. Moazzami, J.L. Brown, C.A. Ogle, Design and Synthesis of Analogues of α -2,3,4-Trimethoxyphenyl- β -Acetamido Naphthalene. *59th Southeast Regional Meeting of the American Chemical Society*, Greenville, SC, October 24-27, 2007.
- D.C. Dorton, M. Murphy, C.A. Ogle, Rapid Injection NMR: Characterization of the π -Complexes in the Conjugate Addition Reaction. *59th Southeast Regional Meeting of the American Chemical Society*, Greenville, SC, October 24-27, 2007.
- A.J. Fowler, C.A. Ogle, J.P. Snyder, A. Alcaraz, Design Synthesis and Biological Evaluation of Biomimetic Analogues of Colchicine: 1-(2,3,4-Trimethoxyphenyl)-2 -Acetamido Naphthalene. *59th Southeast Regional Meeting of the American Chemical Society*, Greenville, SC, October 24-27, 2007.
- S.K. Cope, M.D. Murphy, S.H. Bertz, C.A. Ogle, Rapid injection NMR: Observation and characterization of Cu (III) intermediates in the reaction of lithium dimethylcuprate with alkyl iodides. *233rd ACS National Meeting*, Chicago, IL, March 25-29, 2007.
- C.A. Ogle, Rapid Injection NMR: The First Observation and Preparation of the Elusive Copper(III) Intermediates in Organocuprate Chemistry. *8th International Symposium on Carbanion Chemistry (ISCC-8)*, Madison, Wisconsin June 6-10, 2007.

- J.C. Poler, Binding of Rigid Dendrimers to Carbon Nanotubes: Pursuing a 3D Nanomanufacturing strategy. *North Carolina Agricultural & Technical State University, 1st Annual Chemical Sciences Symposium – Nanoscience Session*, February 23, 2007.
- A. Giordano, J.C. Poler, Binding of charged supramolecular complexes to Carbon Nanotubes. *North Carolina Agricultural & Technical State University, 1st annual Chemical Sciences Symposium - Nanoscience session*, February 23rd 2007
- R. Phillips, J.C. Poler, Synthesis of Enantiomeric Ruthenium (II) trisphenanthroline Complexes. *North Carolina Agricultural & Technical State University, 1st annual Chemical Sciences Symposium - Nanoscience session*, February 23rd 2007
- S. Kobayashi, J.C. Poler, Modifications of morphology and charge state to rigid supramolecular coagulants. *North Carolina Agricultural & Technical State University, 1st annual Chemical Sciences Symposium - Nanoscience session*, February 23rd 2007
- H. Chaturvedi, J.C. Poler, Probing electronic properties of functionalized carbon nanotubes through field effect transistor response. *North Carolina Agricultural & Technical State University, 1st annual Chemical Sciences Symposium - Nanoscience session*, February 23rd 2007
- T.J. Younts, J.C. Poler, Ruthenium Coordination Chemistry: Synthetic Strategies for Developing Supramolecular Structures Mechanically Bound to Single Walled Carbon Nanotubes. *North Carolina Agricultural & Technical State University, 1st annual Chemical Sciences Symposium - Nanoscience session*, February 23rd 2007
- S. Kobayashi, J.C. Poler, Synthesis and properties of rigid dendritic coagulants: Morphology and charge state effects on carbon nanotube interactions. *Abstracts of Papers, 234th ACS National Meeting*, Boston, MA, United States, August 19-23, 2007 2007, INOR-250.
- A. Giordano, J.C. Poler, Critical coagulation concentrations for SWCNTs in non-aqueous solvent. *Abstracts of Papers, 234th ACS National Meeting*, Boston, MA, August 19-23, 2007. COLL-248.
- C. H. Harsh J.C. Poler, Novel Optoelectronic Transport Studies of Supramolecular Nanotube Assemblies. *Materials Research Society Symposium II*, Boston MA, November 29th 2007.
- T.A. Schmedake, A.M. Jakob, R.B. Soriano, Tuning the Optical Properties of Sub-Micron Colloidal Silica Spheres. *Abstracts of Papers, 59th Southeast Regional Meeting of the American Chemical Society*, Greenville, SC, October 2007, GEN-169.
- R.B. Soriano, E. Kpatcha, A.M. Jakob, T.A. Schmedake, Luminescent Colloidal Silica. *Abstracts of Papers, 233rd ACS National Meeting*, Chicago, IL, March 25-29, 2007, INOR-360.
- T.A. Schmedake, R.B. Soriano, A.M. Jakob, Monodisperse, Mesoporous Silica Spheres as a Sensor Substrate. *Abstracts of Papers, 233rd ACS National Meeting*, Chicago, IL, March 25-29, 2007, INOR-114.
- P.S. Williams, D.J. Au, H.C. Karanikas, M.Etz Korn, Molecular Tweezers – From Simple Building Blocks to Functional Materials. *Research in the Capital*, Raleigh, NC, April 17, 2007.
- B.T. Brown, A Palladium-Mediated Rearrangement of Substituted Cyclopropylimines: A Novel Approach to 3-Substituted Pyrroles. *Winthrop University*, March 7, 2007.
- B.T. Donovan-Merkert, Catalytic asymmetric hydrogenation using electrochemical methods: Adding one electron at a time. *East Carolina University*, January 27, 2007.
- B.T. Donovan-Merkert, Catalytic asymmetric hydrogenation using electrochemical methods: Adding one electron at a time. *Colorado State University*, April 24, 2007.
- M. Etzkorn, Fluoroclips – Syntheses, Structures and Host-Guest Chemistry. *University of Cologne, Germany*, July 27, 2007.
- M. Etzkorn, Fluorinated Molecular Tweezers with a Twist. *University of Southern California, Los Angeles, CA*, October 4, 2007.

- K.E. Gonsalves, Polymer Micro/nanostructures for Medical Applications”, Carolina Center of Cancer Nanotechnology Excellence (C-CCNE), UNC-Chapel Hill, May 2007.
- J.K. Krueger, Research Seminar presentation on Small-angle scattering in Biology for the Biology Colloquium, Biology Department UNC Charlotte. Oct. 22, 2007.
- S.O. Obare, Tailored Nanomaterials for Optical Sensing and Catalytic Applications. Bowling Green State University, December 2007.
- S.O. Obare, Rationally Organized Nanoscale Materials for Solar Energy Conversion. Universidade Federal de São Carlos, São Carlos, Brazil, August 2007.
- C. Ogle, Rapid Injection NMR: The First Observation and Preparation of the Elusive Copper(III) Intermediates in Organocuprate Chemistry UNC Wilmington September 28, 2007
- Z. Abou Chakra, O. Tarkington, A. Brooks, B.T. Donovan-Merkert, Electron-transfer reactions of a Rh(pybox) complex. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- M. Schwarz, O. Tarkington, B.T. Donovan-Merkert, Synthesis and characterization of Ir(pybox)Cl₃. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- H. Karanikas, D. Au, P. Williams, M. Etzkorn, Molecular Pincers: From Simple Building Blocks to Functional Materials. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- S. Cope, D. Dorton, C.A. Ogle, Rapid-Injection NMR studies of Organocuprate Reactions. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- R. Phillips, J.C. Poler, Enantiomeric characterization of Ruthenium(II) tris(diimine) oligomers. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- A. Giordano, J.C. Poler, Critical Coagulations Concentrations for Carbon Nanotubes in Non-aqueous Solvent. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- T.J. Younts, J.C. Poler, Ruthenium Supramolecular Organometallic Chemistry: Rigid, Electrically Coupled, Stereospecific Systems and their Implications for Carbon Nanotube Self Assembly. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- S.S. Subaran, J.C. Poler, Dispersion Limit of CNT in Hydrated DMF. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- L. Roberts, J.C. Poler, Resistivity of Thin Single Walled Carbon Nanotube Films. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- J. Shah, C. Jordan, Making Little Ones out of Big Ones: Cutting Single Walled Carbon Nanotubes via Oxidation and Ultrasonication. *14th Annual Undergraduate Research Conference*, UNC Charlotte, April 20, 2007.
- H. Chaturvedi, J.C. Poler, Aggregation and Binding Studies of Photosensitive Ruthenium Complexes to Single Walled Carbon Nanotubes. *7th Annual Graduate Research Conference*, UNC Charlotte, March 31, 2007.
- S. Kobayashi, J.C. Poler, Modifications of Morphology and Charge State to Ruthenium Complexes. *7th Annual Graduate Research Conference*, UNC Charlotte, March 31, 2007.
- R. Cope, B.T. Donovan-Merkert. Electrochemically-promoted Catalytic Asymmetric Hydrogenation using [Rh(DuPHOS)COD]Otf as the Chiral Catalyst. *7th Annual Graduate Research Conference*, UNC Charlotte, March 21, 2007.
- M. Hurckes, B.T. Donovan-Merkert, Synthesis and Electrochemistry Studies of RhDIOP. *7th Annual Graduate Research Conference*, UNC Charlotte, March 21, 2007.
- S. Iyer, T.A. Schmedake, III-Nitride Quantum Dots. *7th Annual Graduate Research Conference*, UNC Charlotte, March 21, 2007.

- S. Shelton, B.T. Cooper, Charge Ladder Measurements of Protein Charge and Size under Simulated Intracellular Conditions. *7th Annual Graduate Research Conference*, UNC Charlotte, March 21, 2007 (poster).
- R.B. Soriano, T.A. Schmedake, Luminescent Colloidal Silica. *7th Annual Graduate Research Conference*, UNC Charlotte, March 21, 2007 (poster).
- S.S. Amin, S-Y Li, J.R. Roth, T.T. *Xu, Alkaline-Earth Metal Hexaboride One-Dimensional (1D) Nanostructures: Synthesis and Characterization, oral presentation in *TMS annual meeting*, Mar. 9-13, 2008, New Orleans, USA.
- S.S. *Amin, S-Y Li, J.R. Roth, T.T. Xu, "Synthesis and characterization of alkaline-earth metal hexaboride one-dimensional (1D) nanostructures", poster presentation in *MRS fall meeting*, Nov. 26 – 30, 2007, Boston, USA.
- Y. *Maksymiv, T.T. Xu, Q.M. Wei, S. Smith, "Design and instrumentation of a micro-compression apparatus in a scanning electron microscope", poster presentation in *MRS fall meeting*, Nov. 26 – 30, 2007, Boston, USA.
- X. *Wu, T.T. Xu, "Young's modulus measurement of boron nanowires with frequency-modulation atomic force microscopy", poster presentation in *MRS fall meeting*, Nov. 26 – 30, 2007, Boston, USA.

Grants Awarded July 06 – June 08

JAMES OLIVER	Biology	
THOMAS SCHMEDAKE	Chemistry	
Dot Metrics Technologies		\$28,066
Ultraviolet Germicidal Optical Flow Cell		
KENNETH GONSALVES	Chemistry	
MICHAEL HUDSON	Biology	
Carolinas Healthcare System		\$27,000
Utilizing nanospheres to transport antibiotics		
KENNETH GONSALVES	Chemistry	
Rohm & Haas		\$78,650
Prototype Resists for Nanolithography		
KENNETH GONSALVES	Chemistry	
Intel Corp		\$109,662
Kinetics & Diffusion Studies in Polymer-bound PAG Resists for EUVL		
KENNETH GONSALVES	Chemistry	
Indo-US Science & Technology Forum		\$3,300
Exploratory visit to establish new collaborations between UNC Charlotte and NCL Pune India		
KENNETH GONSALVES	Chemistry	
CHRISTOPHER YENGO	Biology	
Carolinas Medical Ctr		\$55,500
Developing Amphiphilic Polymers As Gene Delivery Vehicles for Muscular Dystrophy		
SHERINE OBARE	Chemistry	
NSF		\$143,168
CAREER: Rationally Assembled Nanoparticles for Multi-Electron Transfer Processes		
JORDAN POLER	Chemistry	
American Chemical Society/Petroleum Research Fund		\$90,000
Synthesis of Novel Metallodendrimers for Electron Transfer Processes at Nanoscale Interfaces		
JORDAN POLER	Chemistry	
American Chemical Society/Petroleum Research Fund		\$5,000
Synthesis of Novel Metallodendrimers for Electron Transfer Processes at Nanoscale Interfaces		
THOMAS SCHMEDAKE	Chemistry	
Research Corp		\$35,300
Development Of Nanoscale Optical Materials		
WEI CAI	Mathematics and Statistics	
Dept of Energy		\$181,681
Algorithms for Nonlinear Maxwell Equations in Nonhomogeneous Media and Photonic Resonant Waveguides with Coupled Microspheres		

WEI CAI Mathematics and Statistics
DOD/Army/Army Research Office \$85,712
Multi-scale and Multi-physics Numerical Methods For Modeling Transport in
Mesoscopic Systems

WEI CAI Mathematics and Statistics
NSF \$22,152
Numerical Methods for Maxwell Equations in Dispersive and Lossy
Inhomogeneous Media

WEI CAI Mathematics and Statistics
NSF \$70,000
Collaborative Research: Numerical Computations of Parasitic Parameters
with Spectral Stochastic Collocation Method for VLSI Technology

MICHAEL KLIBANOV Mathematics and Statistics
DOD/Army/Army Research Office \$98,873
Globally Convergent Numerical Methods for Coefficient Inverse Problems

MICHAEL KLIBANOV Mathematics and Statistics
University of Texas at Arlington \$16,716
Computational Optical Tomography for Anty-stroke Therapy

MICHAEL KLIBANOV Mathematics and Statistics
DOD/Army/Army Research Office \$46,874
Globally Convergent Numerical Methods for Coefficient Inverse Problems

MICHAEL KLIBANOV Mathematics and Statistics
University of Texas at Arlington \$24,693
Computational Optical Tomography for Anty-stroke Therapy

STANISLAV MOLCHANOV Mathematics and Statistics
BORIS VAINBERG Mathematics and Statistics
NSF \$55,123
Wave Propagation And Scattering In Networks Of Thin Waveguides

VASILY ASTRATOV Physics and Optical Science
WEI CAI Mathematics and Statistics
MOHAMMED-ALI HASAN Electrical & Computer Engineering
DOD/Army/Army Research Office \$65,000
Optical Circuits Based on Coupling Between Whispering Gallery Modes in
Dielectric Microresonators

ANGELA DAVIES Physics and Optical Science
NSF \$28,000
IREE: Advancing Metrology for Micro-Optics Manufacturing Through an
International Collaboration with the VrijeUniversiteit Brussels. A CAREER
supplement.

MICHAEL FIDDY Physics and Optical Science
MICHAEL FIDDY Electrical & Computer Engineering
UNC Office of the President \$68,000
North Carolina Photonics Initiative Phase II

MICHAEL FIDDY Physics and Optical Science
MICHAEL FIDDY Electrical & Computer Engineering
UNC Chapel Hill \$240,667
UNC Chapel Hill/ UNC Charlotte University Collaborative Initiative in
Biomedical Imaging to Study Complex Diseases

MICHAEL FIDDY Physics and Optical Science
MICHAEL FIDDY Electrical & Computer Engineering
UNC Office of the President \$25,000
North Carolina Photonics Initiative Phase II

MICHAEL FIDDY Physics and Optical Science
TOM SULESKI Physics and Optical Science
Duke University \$95,575
Compressive Optical MONTAGE Photography Initiative

MICHAEL FIDDY Physics and Optical Science
MICHAEL FIDDY Electrical & Computer Engineering
UNC Office of the President \$6,200
North Carolina Photonics Initiative Phase II

MICHAEL FIDDY Physics and Optical Science
MICHAEL FIDDY Electrical & Computer Engineering
Battelle Memorial Institute \$13,737
TCN 07057 Novel Light Sources, Chemical and Biological Detection and
Remote Sensing and Communications Technology - Challenges and Prospects

MICHAEL FIDDY Physics and Optical Science
MICHAEL FIDDY Electrical & Computer Engineering
UNC General Administration \$15,000
Carolinas Photonics Consortium

MICHAEL FIDDY Physics and Optical Science
MICHAEL FIDDY Electrical & Computer Engineering
Western Carolina University \$10,000
Sub-wavelength Optical Scalpel

NATHANIEL FRIED Physics and Optical Science
Infrared Fiber Systems \$101,719
Oxide glass fiber optimized for short pulse IR lasers

NATHANIEL FRIED Physics and Optical Science
Infrared Fiber Systems \$23,400
Oxide glass fiber optimized for short pulse IR lasers

NATHANIEL FRIED Physics and Optical Science
DOD/Army/Medical Res &Matl Command \$459,556
Novel Optical Methods for Identification, Imaging, and Preservation of the
Cavernous Nerves Responsible for Penile Erections during Prostate Cancer
Surgery

GREGORY GBUR	Physics and Optical Science	
Dept of Energy		\$54,000
A study of plasmonic enhanced transmission effects in nano-optics		
GREGORY GBUR	Physics and Optical Science	
DOD/Air Force/Office of Scientific Research		\$37,398
Developing 'superbeams' for improved propagation through turbulence		
GREGORY GBUR	Physics and Optical Science	
Dept of Energy		\$54,000
A study of plasmonic enhanced transmission effects in nano-optics		
GREGORY GBUR	Physics and Optical Science	
DOD/Air Force/Office of Scientific Research		\$63,789
Generation and Use of 'Superbeams' in Turbulence and Scattering Applications		
TSING-HUA HER	Physics and Optical Science	
NSF		\$105,462
Femtosecond-laser-induced Self-assembly of Nanograting on Nanowires: An Enabling Technique for Nanowire-based Active Nanophotonics		
ERIC JOHNSON	Physics and Optical Science	
ERIC JOHNSON	Electrical & Computer Engineering	
Lockheed Martin Corp		\$22,000
Hybrid Micro-optical Concentrator for IR Detectors		
ERIC JOHNSON	Physics and Optical Science	
ERIC JOHNSON	Electrical & Computer Engineering	
Lockheed Martin Corp		\$10,000
Phase I: Computer Generated Holograms		
ERIC JOHNSON	Physics and Optical Science	
ERIC JOHNSON	Electrical & Computer Engineering	
Lockheed Martin Corp		\$50,000
Phase II: Nano-Patterning		
ERIC JOHNSON	Physics and Optical Science	
ERIC JOHNSON	Electrical & Computer Engineering	
NSF		\$308,168
Three Dimensional Nano-Optical Elements (3DNOES)		
ERIC JOHNSON	Physics and Optical Science	
ERIC JOHNSON	Electrical & Computer Engineering	
DOD/Defense Advanced Research Projects Agency		\$25,000
Phase Locked Surface Emitting Laser Demonstration		
ERIC JOHNSON	Physics and Optical Science	
ERIC JOHNSON	Electrical & Computer Engineering	
TOM SULESKI	Physics and Optical Science	
Lockheed Martin Corp		\$37,980
LacosteMicroprism Array		

ERIC JOHNSON Physics and Optical Science
ERIC JOHNSON Electrical & Computer Engineering
NSF \$153,638
Intergovernmental Personnel Act

ERIC JOHNSON Physics and Optical Science
ERIC JOHNSON Electrical & Computer Engineering
OLEG SMOLSKI Physics and Optical Science
DOD/Navy/Office of Naval Research \$99,789
Compact Semiconductor Blue Light Optical Sources

ERIC JOHNSON Physics and Optical Science
ERIC JOHNSON Electrical & Computer Engineering
TOM SULESKI Physics and Optical Science
DOD/Air Force/Air Force Research \$182,000
Laboratory
3D Dielectric Meta-Optics for Next-Generation Laser Systems

M YASIN RAJA Physics and Optical Science
NSF \$34,980
High-capacity Optical Networking Symposium (HONET 2006)

M YASIN RAJA Physics and Optical Science
NSF \$45,000
High-capacity Optical Networks & Enabling Technologies' Symposium
(HONET'2007)

ROBERT TYSON Physics and Optical Science
Block MEMS LLC \$34,999
Image Sharpness Sensor Modeling, Experiment, and Integration Support

ERIC JOHNSON Electrical & Computer Engineering
ERIC JOHNSON Physics and Optical Science
Lockheed Martin Corp \$15,000
Nano-Patterned Conductive Coatings for Imaging Optics

EDWARD STOKES Electrical & Computer Engineering
Dot Metrics Technologies \$53,051
Integration of Langmuir-Blodgett Quantum dot Films Into Optoelectronic
Device Heterostructures

EDWARD STOKES Electrical & Computer Engineering
Dot Metrics Technologies \$6,720
SBIR Phase 1: Ultraviolet Germicidal Optical Flow Cell

RAPHAEL TSU Electrical & Computer Engineering
KASRA DANESHVAR Electrical & Computer Engineering
MOHAMMED-ALI HASAN Electrical & Computer Engineering
JOHN HUDAK Electrical & Computer Engineering
Northrop Grumman Corp \$1,371,150
Superlattice - Phase III UNC Charlotte Support

RAPHAEL TSU Electrical & Computer Engineering
MOHAMMED-ALI HASAN Electrical & Computer Engineering
JOHN HUDAK Electrical & Computer Engineering
Northrop Grumman Corp \$176,061

Large Area SiC for High Power High Temperature Electronics

BRIGID MULLANY Mechanical Engineering & Engineering Science
NSF \$128,884
GOALI: Exploring the potential of fluorescent materials to detect subsurface damage (SSD) and plastic deformation induced by polishing processes.

BRIGID MULLANY Mechanical Engineering & Engineering Science
NSF \$6,000
REU Supplement Request: GOALI: Exploring the Potential of Fluorescent Materials to Detect Subsurface Damage (SSD) and Plastic Deformation Induced by Polishing Processes

TERRY XU Mechanical Engineering & Engineering Science
NSF \$400,000
CAREER: Boron-based One-dimensional Nanostructures for Thermoelectric Energy Conversion

TERRY XU Mechanical Engineering & Engineering Science
American Chemical Society/Petroleum Research Fund \$8,000
Novel Boron-based Nanomaterials for Thermoelectric Energy Conversion

MICHAEL FIDDY Physics and Optical Science
NSF \$7,500
Computational Imaging and Superresolution Workshop

TSING-HUA HER Physics and Optical Science
DOD/Defense Advanced Research Projects Agency \$178,767
Gain-Guiding in Photonic Bandgap Fibers: A New Platform for Ultra High-Power Lasers and Amplifiers

STANISLAV MOLCHANOV Mathematics and Statistics
BORIS VAINBERG Mathematics and Statistics
NSF \$68,074
Wave Propagation And Scattering In Networks

Patents/Inventions

INVENTION DISCLOSURES

- V. Astratov**; Circuits of Heterogeneously Integrated Microspheres
- V. Astratov**; Optical Microprobe with Subwavelength Resolution
- K. Daneshvar, T. Weldon**; Photonic Lamp
- F. Farahi**; Beam Combiner
- M. Fiddy**; Superresolving Optical Scalpel
- M. Fiddy**; Wireless Signal Enhancer
- K. Gonsalves**; Utilizing Nanoparticles to Deliver Drugs Incapable of Penetrating Eukaryotic Cells to the Intracellular Environment
- K. Gonsalves**; Local Antibiotic Delivery Systems for the Prevention and Treatment of Soft Tissue and Bone Infection
- K. Gonsalves**; Novel Targeted Drug Delivery System
- K. Gonsalves**; High Refractive Index Nanocomposite Photoresists for 193 NM Lithography
- K. Gonsalves**; Advanced Polymer Resists for EUV Nanolithography
- M-A. Hasan**; Glucose Sensor
- T. Her**; Tungsten Nanostructures
- T. Her**; Gain-Guiding in Photonic Bandgap Fibers: A New Platform for Ultra High-Power Lasers and Amplifiers
- R. Hocken**; Dynamic Metrology of Large Machine Tools
- J. Hudak, R. Tsu**; Room Temperature Deposition of an Epitaxial Barrier Layer for Silicon Quantum Devices and Nano-Mosfet
- E. Johnson, O. Smolski**; Wavelength Locked Laser Including Integrated Wavelength Selecting Total Internal Reflection (TIR) Structure
- E. Johnson, O. Smolski**; Hybrid MOPA Having Narrowband Oscillator and Amplifier With Integrated Optical Coupling
- E. Johnson**; Method of Fabricating Arbitrarily Chirped Planar Waveguide Structures
- E. Johnson, T. Suleski, M. Davies**; Integrated Imaging System, Technique and Associated Methods
- T. Mostafavi**; Computer Automated Identification of Tumor Cells Based on Morphology
- B. Mullany**; A Method to Quantify and Characterize Lapping, Polishing and Buffing Media and Lapping, Polishing and Buffing Tools and Machines
- C. Ogle**; A Convenient Base Free Conversion of Fats and Oils into Long Chain Fatty Acid Esters of a Unique Composition Suitable for Bio-Diesel
- Y. Raja**; High-Power Interconnected Micro-Emitter Array Flip-Chip Light Emitting Devices (LEDs and Lasers)
- T. Schmedake**; Chemically Modified Mesoporous Opals Synthesis and Applications

E. Stokes; Method and Apparatus for Monitoring of Real-Time DNA Hybridization

R. Tyson; Optical Vortex Charge Sensor

PATENTS

R. Hocken, S.T. Smith; A Resonating Contact Probe with a Virtual Probe Tip, 7,278,297

S.T. Smith; Method of Positioning a Platform Relative to a Fixed Frame and a Small Scale Positioning Device, 7,308,747

PATENT APPLICATIONS

V. Astratov; Optical Microprobe with Subwavelength Resolution, 61/023,231

M. Davies, T. Suleski, E. Johnson; Integrated Imaging System, Technique and Associated Methods, 61/059,858

M. Fiddy; Wireless Signal Enhancer, 61/079,523

K. Gonsalves; Advanced Polymer Resists for EUV Nanolithography, 61/060,166

K. Gonsalves; High Refractive Index Nanocomposite Photoresists for 193 NM Lithography, 61/038,827

K. Gonsalves; High Refractive Index Nanocomposite Photoliths for 193 NM Lithography, 60/978,500

K. Gonsalves; Novel Targeted Drug Delivery System, 61/031,183

K. Gonsalves; Therapeutic Nanoparticles, 61/031,168

T. Her; Gain-Guiding in Photonic Bandgap Fibers: A New Platform for Ultra High-Power Lasers and Amplifiers, 61/019,680

T. Her; Tungsten Nanostructures, 60/990,131

R. Hocken; Dynamic Metrology of Large Machine Tools, 61/048,372

B. Mullany; A Method to Quantify and Characterize Lapping, Polishing and Buffing Mediums and Lapping, Polishing and Buffing Tools and Machines, 61/059,060

C. Ogle; Culticine-Synthesized, 61/045,993

T. Schmedake; Chemically Modified Mesoporous Opals Synthesis and Applications, 60/950,887

E. Stokes; Bacteria Disinfection Unit, 61/014,103

E. Stokes; Method and Apparatus for Monitoring of Real-Time DNA Hybridization, 61/077,635

R. Tyson; Optical Vortex Charge Sensor, 61/020,252