The Center for Optical Materials Science and Engineering Technologies (COMSET)

-- Year 13 State of the Center Report --

The Center for Optical Materials Science and Engineering Technologies (COMSET) is an interdisciplinary research unit of the College of Engineering and Science at Clemson University (Clemson, SC, USA). COMSET provides an organized framework with significant centralized infrastructure for faculty to collaborate in developing advanced materials and structures that exhibit a value-added interaction with light.

Today, Friday, April 12, 2013, COMSET celebrates its thirteenth birthday (!!!). Please find below a brief summary of notable accomplishments over the past year.

Research Funding and Scholarly Productivity:
- COMSET-affiliated programs generated over 9% of all of Clemson’s research for FY12; including new (FY12) awards, the total value of COMSET awards is now $56,892,224. This was generated by 150 different grants/contracts, which averages to one new grant/contract per month for 13 years.
- There is over $20,000,000 in pending grants presently under consideration by sponsors.
- Since our founding in 2000, COMSET has published 567 peer-reviewed journal articles (as of 4/10/13), which have been cited 5388 times.
- COMSET published 111 peer-reviewed journal articles last year (CY12) representing 10.4% of Clemson’s peer-reviewed journal productivity.
- COMSET journal articles were cited 1249 times last year (CY12) representing over 7% of Clemson’s journal citations (this is an under-estimate given tracking methods).
- A chart of the growth in COMSET publications and citations is provided below and a list of publications is available through the COMSET website: [http://www.clemson.edu/centers-institutes/comset/publications/](http://www.clemson.edu/centers-institutes/comset/publications/)

Industry Partners and Supporters:
- COMSET instituted an Industry Partners / Affiliates Program whereby selected companies have the opportunity intimately connect with our faculty and students, learning about new research and interacting with our best and brightest.
- In particular, we wish to thank the following donors for their gifts: OFS Laboratories, Nufern, Verrillon, Northrop Grumman Corporation, Corning Incorporated, Miltec, Inc., and the Blandford family.
Faculty Recognitions and Awards:

- **Roger Stolen** was formally inducted into the **National Academy of Engineering** for “contributions to fiber nonlinear optics and invention of polarization preserving fiber.”
- **Eric Johnson** was invested as the PalmettoNet Endowed Chair in Optoelectronics. This Endowed Chair is supported by a $4M endowment funded by Comporium and PalmettoNet with matching funds from the State of South Carolina.
- **Marek Urban** joined Clemson in the Fall 2012 as the **Sirrine Endowed Chair in Advanced Fiber Based Materials** (Department of Materials Science and Engineering and COMSET). Prior to Clemson, Marek was a professor at the University of Southern Mississippi (USM), School of Polymers and High Performance Materials, where he directed the National Science Foundation funded Materials Research Science and Engineering Center (MRSEC) focused on response-driven polymeric films. He also served on the NSF Executive Committee for MRSECs in US. This Endowed Chair is supported by a $4M endowment funded in large part by the **Sirrine Foundation**.
- **Apparao Rao** was elevated to the rank of **Fellow** of the **American Association for the Advancement of Science** (AAAS) for “contributions to carbon science, particularly fullerenes and carbon nanotubes through synthesis and Raman spectroscopy, and elucidating their structure-application and fundamental properties.”
- **John Ballato** was appointed as a member of the National Photonics Initiative (NPI), subcommittee on “Optics in Energy.” The NPI is the tactical implementation effort of the National Academy recent report on “Optics and Photonics, Essential Technologies for Our Nation”.
- **Jeff Anker** was awarded the National Science Foundation CAREER award.
- COMSET faculty were awarded an **NSF Research Experiences for Undergraduates program** focused on “Solid-State Devices for Electronics, Photonics, and Magnetics Technology.”
- **Liang Dong**, **John Ballato**, and **Eric Johnson** were awarded three new high energy laser programs; see: [http://www.clemson.edu/ces/departments/ece/about/news_stories/LaserContracts.html](http://www.clemson.edu/ces/departments/ece/about/news_stories/LaserContracts.html)
- The Clemson University **Student Chapter of the International Society of Optical Engineering** (SPIE) was approved by the Society with 16 inaugural student members.
- Clemson’s research magazine, **Glimpse**, published a feature article on COMSET and its history: [http://www.clemson.edu/glimpse/?p=1163](http://www.clemson.edu/glimpse/?p=1163)

Highly Cited/Downloaded Papers

- **Kostya Kornev’s** paper “Plasmon enhanced direct and inverse Faraday effects in non-magnetic nanocomposites” was cited as one of the most highly down-loaded materials papers published in the Journal of the Optical Society of America.
- An article co-authored by **John Ballato**, published in the Nov. 1 issue of Optical Materials Express, was highlighted in the OSA’s Spotlight on Optics, which feature articles nominated by The Optical Society's (OSA) Topical and Associate Editors.
- **Jeff Anker’s** work published in ACS Nano and entitled "Monitoring pH-Triggered Drug Release from Radioluminescent Nanocapsules with X-Ray Excited Optical Luminescence" was highlighted on the January 23rd ACS Nano podcast.
- The “Specialty Optical Fiber” special issue of the OSA journal, Optical Materials Express, edited by **John Ballato** has been noted as the most down-loaded set of papers from that journal for 2012.
- **John Ballato’s** paper, “Sapphire-Derived All-Glass Optical Fibers” [Nature Photonics 6, 627-633 (2012)] was highlighted in Optics and Photonics News’ Optics in 2012 which “highlights the most exciting peer-reviewed optics research to have emerged over the past 12 months.”

Journal Covers: 8 COMSET papers were selected this year to be featured on the covers of the journals in which they were published.
- **Apparao Rao’s** article entitled “Reexamination of Infrared Spectra of Bi Nanorods: L-T transition or Extrinsic Phases” appeared on the cover of the Nano.
• Bruce Gao’s article entitled “Myosin filament assembly onto myofibrils in live neonatal cardiomyocytes observed by TPEF-SHG microscopy” appeared on the cover of The Journal Cardiovascular Research and was selected as the editor’s choice.

• Pu-Chun Ke’s recent review article entitled “Exploiting the physicochemical properties of dendritic polymers for environmental and biological applications” was noted as one of the "Most Read Article" and appeared on the cover of Physical Chemistry Chemical Physics.

• Apparao Rao’s article entitled “Multifunctional Polymer-Coated Carbon Nanotubes for Safe Drug Delivery” appeared on the cover of the journal Particle.

• Steve Foulger’s article entitled “Rapid and Continuous Hydrodynamically Controlled Fabrication of Biohybrid Microfibers” appeared on the cover of the journal Advanced Functional Materials.

• Jian Luo’s review article entitled “Developing Interfacial Phase Diagrams for Applications in Activated Sintering and Beyond: Current Status and Future Directions” appeared on the cover of the Journal of the American Ceramic Society.

Student and Alumni News

• Michael Daniel, a PhD graduate from Steve Foulger’s group, received a National Research Council (NRC) post-doctoral fellow position at the Naval Research Laboratories (NRL).

• Priyanka Bhattacharya, a PhD student of Pu-Chun Ke won the much coveted Linus Pauling Distinguished Postdoctoral Fellowship with the Pacific Northwestern National Labs (PNNL). As most know, Linus Pauling was a chemist won Nobel prize twice, each time as the sole winner. Priyanka was one of the first COMSET fellows at Clemson.

• Brynna Laughlin, a second-year PhD student working under the direction of Rhett Smith (Chem) won an NSF Graduate Fellowship.

• Aaron Pung, a PhD student of Eric Johnson (ECE), received a fellowship from the Directed Energy Professional Society (DEPS) for his dissertation topic entitled “Meta-Optics for High Power Lasers.”

• COMSET alumnus, Jeff DiMaio (BS ’01; PhD ’04 with John Ballato), now COO of COMSET spin-off company Tetramer Technologies, received one of the inaugural “Roaring 10” awards sponsored by the Clemson University Young Alumni Council, recognizing ten young alumni for their impacts in business, leadership, community, educational, and/or philanthropic endeavors.

Looking Ahead to Next Year

• Continued Growth!

• If all goes according to plan, COMSET hopes to hire between 3 – 6 new faculty based on on-going searches and a Clemson strategic cluster hire initiative.

• Present searches include the Samuel Lewis Bell Distinguished Professorship (optoelectronics, lasers, semiconductor optical devices, integrated optics, or fiber optics; jointly between ECE and COMSET) and the Sirrine Endowed Chair in Optical Fiber (fiber optic materials and/or structures; jointly between MSE and COMSET)