



November 2007

MDITR, Department of Chemistry, Box 351700, University of Washington, Seattle, WA 98195

Forum on Organic Optoelectronics & Devices (F.O.O.D.) by Natalie Doss (GPAC Member)

The Forum on Organic Optoelectronics & Devices is a multi-campus monthly STC MDITR seminar series hosted by the **Graduate Student and Postdoctoral Advisory Council (GPAC)** at Georgia Tech. The University of Washington, the University of Arizona and Norfolk State University are all able to participate in the seminar via video conferencing.

The goal of the seminar is to provide students with an increased awareness of STC research and to encourage collaborative efforts across multiple disciplines and campuses. Each seminar focuses on a specific STC thrust and project area. A brief overview of the thrust and project area is given by an STC project leader. This is followed by two student presentations regarding their STC research concentrating on project background, goals and progress to help other students understand how the work fits into the STC thrust and project. To learn more about the STC thrusts and projects, see the Research and Technology Development Framework at www.stc-mditr.org/research.

Presentations are followed by a short question and answer session, which allows students from multiple disciplines and campuses to interact with one another, encouraging collaboration within the STC.

Past Presentations:

September 12, 2007 – Thrust 1, Project 2.1 (Dr. Joseph Perry), presenters:

- Sarah Chi – Polymer-Based π^3 Materials for Photonic Applications
- Jon Matchak – Cyanine Dyes for π^3 Materials

October 17, 2007 – Thrust 2, Project 4.2 (Dr. Bernard Kippelen), presenters:

- William Potscavage – Organic Solar Cells: Basic Concepts & Current Research
- Namsu Kim – Thin Film Encapsulation for OLED (Fabrication, Test, Simulation)

★ UPCOMING PRESENTATIONS ★

Future Seminars: 11/28/07, 1/23/08, 3/19/08, 4/23/08 from 12-1pm Eastern Time.

If you are interested in presenting your work at a F.O.O.D. seminar, please contact natalie.doss@gatech.edu.

Broadcasting the F.O.O.D. seminars is being done in an effort to build more community among CMDITR students at our various sites. Sharing information about each other's research promotes collaboration opportunities. Soon UW and U of A students will also begin broadcasting their research presentations. In the picture shown here, U of A students are discussing a GA Tech F.O.O.D. seminar presented through a video conference that also included UW and Norfolk State University (NSU).



A STUDENT REVIEW of the Molecular Photonics 2007 Conference

by Jianyuan Sun and Rahul Bhure, Norfolk State University

After a long travel by air, land, and sea, the new Ph.D. in Materials Science and Engineering students arrived at the beautiful San Juan Island in Washington State. It was late August, and we had traveled far, from the east coast to the west coast, to attend the 2007 International Conference on Molecular Photonics at Friday Harbor Labs (FHL). It was an important event for us as it was the event marking the establishment of the new graduate program at Norfolk State University. As for us, graduate students in CMDITR / Norfolk State University, it was a unique opportunity to network with the leaders in the field.

- Dr. Alex Scherer (Caltech) - "Lithographic Device scaling";
- Dr. Younan Xia (University of Washington) - "Gold Nanostructures in Biomedicine"; and
- Dr. Peter Gunter (Swiss Federal Institute of Technology) - "Electro-optical Micro-Ring Resonators".

It was beneficial that the lectures were all held in one main hall, such that attendees would not miss any lectures they were interested in. It indeed benefited students to have an overview of the advanced development of the field when doing research.



The conference was well organized and researchers from prestigious universities around the world presented outstanding lectures and led us into the exciting world of optoelectronics.

"Besides the lectures, we also talked with students from other universities about various topics in the field of molecular photonics during the poster session ... Now that we are aware of other groups' current research progress, we are able to choose interesting research topics, and perform experiments more effectively."

NSU group on the ferry to FHL

We found the following speakers particularly inspiring:

- Dr. Alan Heeger (University of California Santa Barbara), 2000 Nobel Prize winner in Chemistry, and one of the scientists who first investigated conductive polymers - "Light emitting FETs";
- Dr. Larry Dalton (University of Washington), prestigious pacemaker in optoelectronics field, "Recent advances on photonic technology";
- Dr. Yasuhiro Koike (Keio University, Japan), leading photonics polymer scientist in Japan - "Photonics polymer in Broadband";
- Dr. Paras Prasad (State University of New York at Buffalo) - "Nanoprobes for Biophotonics";

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One of the Research Labs at FHL

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"We discussed the current research related issues like new experimental techniques being used in different labs, research publications. We shared new ideas and talked about possible collaborations, future career prospects, and had fun during the same time."

On the third day of the conference, we had the opportunity to tour the facilities of the Friday Harbor Laboratories (FHL). This internationally renowned marine science laboratory houses research labs along the sea-side with students working day and night.

We also participated in an impressive boat trip around San Juan Island. During the tour of San Juan



Island, we also had a wonderful marine animal "class" on the boat. The captain caught hundreds of fish from the sea and introduced us to various species in detail: name, behavior, etc. We

came to know how colorful and dramatic marine science actually is!

The time at the conference went by fast. Before returning to Norfolk, we had a nice time in Seattle. We thank Dr. Suely Black and Dr. Carl Bonner for organizing the travel, and taking great care of us during the trip. We also acknowledge the Title III grant to NSU for partial travel support. Finally, we truly appreciate the invitation and support by Dr. Alvin Kwiram and the NSF Science and Technology Center on Materials and Devices for Information Technology Research. We look forward

to the next conference, hoping that we will be able to bring our own research to share.



In the lab of Dr. Sveta Maslakova

CMDITR Partner News: New Mexico Highlands University, Norfolk State University and the University of Arizona

CMDITR welcomes New Mexico Highlands University (NMHU) as a new subcontracting partner in Year 6. NMHU's PI, Tanya Timofeeva, has been active with CMDITR for many years as the STC's liaison with the Alliance for Non-Linear Optics (ANLO), an organization funded by NASA involving NASA researchers plus scientists and students from a half-dozen minority universities and colleges. This year, CMDITR will help support graduate PhD student Tiffany Kinnibrugh who will take classes to fulfill PhD requirements at New Mexico Tech and will do her research project with Tanya Timofeeva at NMHU.

Two returning CMDITR subcontracting partners have new leadership in Year 6: Nasser Peyghambarian at the University of Arizona and Suely Black at Norfolk State University. CMDITR welcomes Nasser's and Suely's leadership, and thanks Neal Armstrong (Arizona) and Carl Bonner (Norfolk State) for their previous years of service as PIs.



New Mexico Highlands University

Nanophotonics for Breakfast

by Rad Roberts

In early 2007, Dr. Alvin Kwiram and other ISTC members formed the Nanophotonics Steering Committee, joining forces with leaders from Northwest business, venture capital, entrepreneurial, and economic development communities. This group is exploring the possibility of establishing a nanophotonics industry cluster in the Pacific Northwest.

A series of public lectures, Nanophotonics for Breakfast, was launched in October to inform individuals in the Pacific Northwest about commercial opportunities emerging from dramatic advances in molecular photonics. The series kick-off featured Dr.

Paul Burrows of the Pacific Northwest National Laboratory and two local industry representatives who talked about the potential economic, environmental, and technical impact organic light emitting diodes (OLEDs) may have on the world of lighting and digital displays. Over 120 people attended, including a mix of industry, civic, and academic leaders and other professionals. Each of the remaining five events will address a different photonics application area: biophotonics, sensors, telecommunications, computing, and photovoltaics. The series has received over \$10,000 in sponsorship from eight institutions and one company, which helps fund the events and covers travel costs for leading scientists and industry experts who give presentations.



In addition to the lecture series, the Nanophotonics Steering Committee is working to develop ways to help early-stage photonics start-up companies identify the capital, financial, and technical resources necessary

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Molecular Photonics 2007 Conference:

Interaction of Light with Nanostructured Materials

by Alvin Kwiram

By all accounts, the Molecular Photonics Conference at Friday Harbor Labs was a great success. The survey results reflected great enthusiasm for both the science presented and for the venue. Most of the respondents indicated that they would definitely plan to come to the next conference in a few years.

Roughly 85 people were in attendance, a slight reduction - due to medical and other last minute emergencies - from the 90 who had signed up. There were 27 invited speakers and about the same number of posters. Also participating in the conference was the entire entering class of graduate students in Materials Science from Norfolk State University. The 12 doctoral students were accompanied by two faculty members, Suely Black and Carl Bonner. The students seemed to enjoy the experience thoroughly even though at times the material was a bit daunting in its complexity. Nevertheless, it allowed the students to see first hand how a scientific conference works and to gain some insight into the exciting and dynamic character of the field they are about to devote themselves to.

Many of the papers and posters presented at the conference will eventually be submitted to a special Festschrift issue of the Journal of Physical Chemistry in honor of Larry Dalton. The deadline for papers will be late December. Former students, colleagues and collaborators of Professor Dalton are invited to submit a manuscript to the Journal.

One of the highlights of the Conference was an outing on the *Centennial*, the Friday Harbor Laboratories research vessel. Two excursions of about 25 people each were treated to a "bottom dredge" in which creatures from the seafloor were brought on deck through a dredging process. Star fish 18 inches in diameter, small sharks, sea urchins, crabs, shrimp and a whole array of marine creatures fascinated all who were on board. No whales were seen!

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...Nanophotonics for Breakfast Continued from page 4

to succeed. Dr. Kwiram recognizes the challenges of starting an industry cluster, but he remains optimistic, "With a little luck and a lot of hard work, maybe the Pacific Northwest will emerge as a 'nano-Silicon Valley' of photonics," he said. This may sound ambitious, but Dr. Kwiram has been down this path before. In the early 1990s, he chaired a steering committee whose goal was to establish a biotechnology industry cluster in the Pacific Northwest. A key early milestone was the recruitment of Dr. Leroy Hood to UW from CalTech. Over the past fifteen years, Hood has been involved in more than a dozen biotechnology start-ups in the Northwest, and the local biotechnology community has mushroomed.

In a moment of déjà vu earlier this year, Kwiram and the Nanophotonics Steering Committee succeeded in helping to recruit Dr. Michael Hochberg to UW from CalTech. Hochberg is a nanophotonics device wizard, who started one company as an undergraduate at Caltech and expects to be involved in many more startups during his career at UW. Despite his youth, he is already one of the most prolific inventors of the STC (see article on page 3). If Hochberg, Kwiram, and other STC members are successful, one day the Pacific Northwest may emerge as a vibrant hub in the growing field of photonics.

Mark Your Calendars for the February 2008 Retreat

by Jeanne Small

The 2008 CMDITR Annual Retreat will be held **February 19-21 in Atlanta, Georgia**, hosted by Georgia Tech. Preceding the Retreat will be the annual Industrial Affiliates Program EXPO, to be held on Monday, February 18, 2008.

During the Retreat, members will have 2 1/2 days to share data, meet colleagues, learn from professional development workshops and explore ideas important to NSF and our Science and Technology Center. Listening to feedback from the 2007 event, we are planning on having not one but two long, spacious poster sessions and increased student-centered workshops and meetings.

Please mark your calendars now and register online by logging into the STC Members Only website.

Stay tuned for information on travel planning.



Dinner at 2007 retreat

...Molecular Photonics 2007 Conference continued from page 4

The unique feature of this conference was the location. Most participants were on site the entire time and this afforded plenty of opportunity to discuss science outside the formal conference sessions. It created an atmosphere of camaraderie that cannot be achieved in a large hotel in a major city. And of course, the setting in the San Juan Islands was spectacular.

The plan is to mount another conference on this general topic in 2-3 years at the same site.



Neal Armstrong
sorting through
sea creatures

STC Directors Meeting

by Jeanne Small and Leyla Conrad

The annual STC Directors Meeting was held in Sacramento, CA September 17-18, 2007. This meeting brings together key representatives of all active NSF Science and Technology Centers for presentations, discussions and a chance to meet with NSF Program Officers. This year's meeting was hosted by the Center for Biophotonics Science and Technology (CBST), headquartered at the University of California Davis Medical Center in Sacramento. CMDITR Director Larry Dalton, Co-Director Phil Reid, Managing Director Jeanne Small and Education Director Leyla Conrad all attended.

Bringing together people from new and old STCs is a primary goal of the STC Directors Meeting. NSF funds STCs for a maximum of 10 years, with an extensive review at the end of the first five years before renewal for the last five years. CMDITR and five other STCs in the "Class of 2002" (with funding starting in 2002) came to the meeting with the relief of having been renewed, but with questions on what to expect in the last five years. Helping to answer these questions were representatives from several of the Class of 2000 STCs, two years further along than CMDITR. Listening intently to all of the conversations were the representatives of the newest STCs, those in the Classes of 2005 and 2006.

This event was Managing Director Jeanne Small's first STC Directors Meeting, and she learned a lot from the presentations and discussions.

STCs focus on many different topical areas; for example the STC SAHRA promotes sustainable

"It was fun to meet other Managing Directors, and learn from them how they handle STC issues like keeping up the web site and trying to create a sense of community among members spread out over many campuses," Jeanne reported. In many areas, CMDITR appears to be doing very well.

management of water resources in semi-arid regions, while the STC CReSIS's goal is the remote sensing of ice sheets. For this reason, different management methods are called for in different STCs. "The diversity of the STCs means that there are no real 'best practices' that can be defined for all STCs. Instead, we're all using our skills and creativity to figure out what's best for our organizations," Jeanne Small said.

Participants were able to tour the CBST labs and educational facilities at UC Davis and break for dinner in "Old Sacramento," a re-creation of the town of Sacramento at the time of the California Gold Rush.

Education and diversity were the topics addressed by CMDITR's Education Director, Leyla Conrad, at the meeting during the half day Education and Diversity session held on September 17th. The agenda consisted of four topical sessions: (1) regional versus national focus, (2) diversity, (3) integrating research and knowledge transfer with education, and (4) sustaining education beyond year 10. In each session, two experienced Education Directors gave a 10 minute presentation followed by a 15 minute lively discussion. The CMDITR Education Director Leyla Conrad presented how CMDITR integrated research and knowledge transfer into the center's education programs, shared challenges and successes in each activity, and discussed unique approaches to successfully integrate the programs.



Profile of Michael Hochberg ... Our Newest Faculty Member

Michael Hochberg has recently joined the faculty of the University of Washington, in Electrical Engineering. Hochberg is a graduate of the California Institute of Technology (BS 2002 Physics, MS 2005 Applied Physics, PhD 2006 Applied Physics), where he was a member of Professor Axel Scherer's Nanofabrication Group since his freshman year. During the year between undergraduate and graduate school, he was one of the co-founders at Luxtera (www.luxtera.com). In 2007,



his doctoral thesis won Caltech's Demetriades-Tsafka Prize for the best thesis by a graduating Ph.D. student in the field of Nanotechnology. His work in silicon-polymer hybrid photonics was funded by the STC, so he's not a stranger to many members of the Center.

Hochberg's Nanophotonics group will be a member of the STC, as well as the Institute of Advanced Materials and Technology at UW, and will focus on pursuing applications of nonlinear optics in silicon waveguides and resonators. He is currently recruiting graduate students and postdoctoral scholars, and is extremely pleased to report that his long-time collaborator from Caltech (and Luxtera co-founder), Dr. Thomas Baehr-Jones, will be joining him in Seattle early next year.

CMDITR Welcomes Wendy Star Smith

Wendy Star Smith joined the CMDITR in September 2007, joining Alex Kardasheva in the University of Washington office handling the STC's fiscal operations. Wendy returned to the University of Washington after working at Northwestern University as a Research Administrator for three years total in Preventive Medicine and in Biomedical Engineering. Wendy worked at the University of New Orleans for two years, before Hurricane Katrina hit the region. Prior to coming to the University of Washington, Wendy worked in the private sector for 20 years, in mainly accounting and managerial positions.

Wendy completed her BA in Business at UW Tacoma in 1996; then after a few years reprieve, completed her MBA at the University of New Orleans in 2006. She is glad to be back in the Northwest, with her family. Wendy and her

husband enjoy hiking and taking nature photos. This year they will have a new hobby: their first grandchild is due in February 2008.



LIGHT WORKS

November 2007

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Leyla Conrad, and Jianyuan Sun and Rahul Bhure.

Photography: CMDITR staff and students

LIGHT WORKS

November 2007

REFLECT ON IT...

★ SAVE THE DATE ★

- 11/28/07 - 12-1pm EST - F.O.O.D. Seminar
- 12/15/07 - Retreat Registration Deadline
- 1/23/08 - 12-1pm EST - F.O.O.D. Seminar
- 2/18/08 - IAP Expo - Atlanta, GA
- 2/19-2/21/08 - Annual Retreat - Atlanta, GA
- 3/19/08 - 12-1pm EDT - F.O.O.D. Seminar
- 4/23/08 - 12-1pm EDT - F.O.O.D. Seminar

REMINDER: Completion of the **Responsible Conduct of Research Modules is an NSF requirement for all participants of this center.** This includes all STC MDITR staff, students, and faculty. If you have not yet completed the modules and certification process, please login to the Center's web site at www.stc-mditr.org and click on RCR Tutorials on the left.

Send Us Your News!

Share your news and successes with fellow CMDITR collaborators. Please send news flashes, information and feedback to kimberly@optics.arizona.edu