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MATERIALS by DESIGN

The IMS Associates Program Newsletter

VOLUME 16, ISSUE 1

AUGUST 2011

A Better Way to Photo Gray

From UConn Today, By: Christine Buckley, CLAS Today; for the complete article visit <http://today.uconn.edu/blog/2011/07/a-better-way-to-photo-gray/>

Ever looked wistfully at those photo gray sunglasses and wished they would turn some other fun color? Like, say, yellow? Or UConn blue? Well the technology is now here, thanks to Greg Sotzing, professor of chemistry in the College of Liberal Arts and Sciences and a member of UConn's Polymer Program (and member of IMS, ed.). Not only have he and his colleagues perfected a method for creating quick-changing, variable colors in films and displays, such as sunglasses,

they've made them less expensive and less wasteful to manufacture than any previous method. And aside from creating vanity glasses, the technology is in high demand from the U.S. military.

"This is the next big thing for transition lenses," Sotzing says. The typical material behind a transition lens is what's called a photochromic film, or a sheet of polymers that change color when light hits them. Sotzing's new technology does things slightly differently – his electrochromic lenses are controlled by an electric current passing through them when triggered by a stimulus, such as light.



Gregory Sotzing,
Professor of Chemistry

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Plans to Build Tech-Park At UConn Announced

From UConn Today, to view the article online visit <http://today.uconn.edu/blog/2011/04/plans-to-build-tech-park-at-uconn-announced/>

Senate President Donald E. Williams Jr., joined by state lawmakers, industry leaders, and University officials, announced plans to build a multi-million dollar technology park on the University of Connecticut campus. The landmark proposal includes \$18 million in state bond funding for the design, site development, and infrastructure improvements necessary to create the tech-park. Also included in the plan is \$2.5

million to create the Innovation Partners Eminent Faculty Program, which is designed to attract some the nation's top scholars and scientists, and to leverage millions of dollars in federal and private investment.

The tech-park will eventually include multiple buildings – many of which could be privately funded – and will house large, flexible-use laboratories containing specialized equipment for collaborative research. The complex, to be located in the North Campus, will provide

space for business incubators and individual companies. "The potential for Connecticut is outstanding. The state's location – between Boston and New York – is a significant asset," said Williams (D-Brooklyn). "A research and technology center in Storrs will provide companies with easy access to world-class metropolitan areas, specialized R&D equipment, and a highly skilled workforce. The net outcome will be more private sector jobs for Connecticut, increased research and development, and greater

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A Better Way to Photo Gray

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In November 2010, partially based on work supported by the Center for Science and Technology Commercialization's Prototype Fund, the UConn R&D Corp. started a company, called Alphachromics Inc., with Sotzing and colleague Michael Invernale, now a post-doctoral researcher at MIT, as founders. The University has a patent pending for this new technology, which is currently under option to the company. Alphachromics is also testing applications of these polymer

systems for energy-saving windows and custom fabrics.

Sotzing and Alphachromics are currently in talks with sunglass manufacturers, and Sotzing says the world of Hollywood could have a market for this technology. He describes applications he calls "freaky," including colors that move back and forth across the glasses, evoking styles like those sported by Lady Gaga.

But he stresses that the best thing about this technology is the creation of business in Connecticut. Although the

glasses may not be made here, because the technology will be licensed to out-of-state manufacturers, he hopes Alphachromics will continue to expand in Connecticut. "We don't make the sunglasses," he says. "We make the formulation of what goes inside them."

The findings were published July 7 in the *Journal of Materials Chemistry*. Sotzing's collaborators on the paper are Invernale and Ph.D. students Yujie Ding, Donna Mamangun, and Amrita Kumar.

Plans to Build Tech-Park At UConn Announced

(Continued from page 1)

opportunities for students and faculty."

Seen to its completion, a technology park, anchored by an Innovation Partnership building has the potential to add hundreds of jobs for eastern Connecticut residents and to attract research divisions from some of the largest and most innovative companies in the world."

Howard Orr of KTI said, "Today's announcement is welcome news for KTI. It will give us access to unique equipment within the Innovation Partnership Building that we simply can't afford on our own. These will include state-of-the-art lithography and thin film deposition equipment, surface analysis tools, and advanced microscopy for materials processing and analysis. We'll be able to work closely with UConn researchers and students, and to exchange ideas with other manufacturers to improve our products. This center will contribute to our bottom line, provide a distinct learning core where students can gain practical skills, and help Connecticut strengthen its critical manufacturing sector for the challenges that lie ahead."



A press conference held at Gampel Pavilion to announce a proposed technology park. Right to left, Senate President Donald Williams, President Philip Austin, Mun Y. Choi, dean of the School of Engineering, Catherine Smith, commissioner of the Department of Economic and Community Development, Rep. Greg Haddad, Sen. Gary Lebeau, Sen. Beth Bye, Mike Brown, vice president at UTC Power, and Howard Orr, president of KTI Inc.

Photo by Peter Morenus

Jackie Garofano A 2011 Connecticut Woman Of Innovation

From the School of Engineering emagination. For the complete article visit <http://news.engr.uconn.edu/jackie-garofano-a-2011-connecticut-woman-of-innovation.php>



Jackie places a 3mm TEM grid on a sample holder. In the inset, she can be seen viewing the sample.

Photos by Christopher LaRosa

Doctoral candidate Jacquelynn McGuinness Garofano was selected one of just 10 Connecticut Technology Council 2011 Women of Innovation award recipients feted during a gala event on March 31, 2011.

Jackie, who is pursuing her Ph.D. in Materials Science & Engineering (MSE), was presented the Collegian Innovation and Leadership award, which recognizes exceptional academic achievement or inventiveness in technology, science or engineering.

After earning her B.S. in Physics at SCSU, Jackie was interested in pursuing graduate studies but sought a more applications-oriented degree program. During her years at SCSU, she was introduced to electron microscopy techniques and to materials science, an area that neatly bridges fundamental nanoscale science and practical applications. She enrolled in UConn's graduate program in MSE under the guidance of Dr. Aindow and has benefitted from the impressive array of microscopy and characterization equipment housed in the Institute of Materials Science at UConn.

Jackie's doctoral research involves advanced materials characterization of the microstructural changes that unfold within a new nanocomposite fabricated to display certain optical properties sought by the military.

Jackie's role as an outreach educator with the Yale Center for Research on Interface Structures and Phenomena (CRISP) program arose from her years at SCSU, where Dr. Broadbridge had advised Jackie's honors thesis. When the CRISP Education and Outreach Coordinator position opened up in

2009, Dr. Broadbridge encouraged Jackie to apply. She was offered the job and began working at CRISP part-time while continuing to pursue her Ph.D. part time here at UConn.

At CRISP, she organizes professional development workshops for educators, coordinates the NSF-sponsored Research Experiences for Undergraduates (REU) summer program, and assists with the program website. The CRISP "Making Stuff" campaign is particularly popular. She also organizes outreach activities targeting primarily underserved students in the New Haven schools.

Jackie has been involved in various Laser Camps at Three Rivers Community College, including a junior version for middle school students.

At UConn, where Jackie has been actively involved in the Materials Research Society and Materials Advantage organizations, she has received numerous honors, among them the Outstanding Woman Scholar Academic Achievement Award (2009), presented by UConn's Graduate School, the MSE program's Outstanding Graduate Student award (2010) and induction into UConn's Alpha Sigma Mu honor society (2010).

Dr. Aindow is deeply proud of Jackie's academic accomplishments and expects she will continue to contribute enormously to the unfolding field of MSE in the years ahead. He remarked, "Jackie is Connecticut born, bred and educated; she is a wonderful example of what can be achieved when we retain the best students within the state and provide them with the opportunities to achieve their full potential."

Jackie was thrilled to receive a job offer from the United Technologies Research Center (UTRC) as a Materials Scientist in the Measurement Science group; she will start her new position in September 2011.



Jackie Garofano, doctoral student and Mark Aindow, Professor, Chemical, Materials, & Biomolecular Engineering at the University of Connecticut

Short Course: Mechanical Behavior of Materials

By Rhonda Ward, IMS



The IMS Associates Program welcomed 27 registrants from nine companies for our May Short Course, "Mechanical Behavior of Materials", taught by Rainer Hebert, Ph.D. (CMBE and member of IMS). The participants ranged from engineers to group managers, many of whom were attracted by the hands-on lab activities and demonstrations.

common strengthening methods and the role of defects. In addition, the course analyzed how the fundamentals of material behavior correlate with tensile, fatigue, hardness and creep testing.

Response was positive with excellent feedback on the instructor's presentation and especially the hands-on activities, which most participants felt strengthened the knowledge they gained from the course.

We are currently accepting registrations for our next Short Course, "Plastics Failure Analysis", which will run September 21 – 22, and be taught by Dr. Myer Ezrin, a leading specialist in the field. See the next article for more information.

The two-day workshop, which ran May 24-25, explored elastic and plastic behavior, fracture, fatigue,

Upcoming Short Course: Plastics Failure Analysis

Dr. Ezrin's studies in polymers started at Yale University where he obtained his Ph.D. in 1954. His entire career of 55 years has been in polymers & plastics—29 in industry and 26 in academia. His industry positions were at DuPont, Monsanto & Springborn Laboratories (a consulting company). At the University of Connecticut - Institute of Materials Science, 1980—2006, he was Director of an industry support program in materials. He specialized in plastics analysis & failure analysis. Since retiring he continues to be active in consulting and writing. A revised and expanded version of his well-known 1996 book, "Plastics Failure Guide—Cause and Prevention", is in preparation. He has testified as an expert witness on product liability and patent infringement litigation in the United States, Canada & England. In 1983 he co-authored "Plastics Analysis Guide". In 1999 he was elected Fellow of the Society of Plastics Engineers. In June 2010 he gave short courses on Plastics Failure Analysis in Bangkok, Thailand & Kuala Lumpur, Malaysia.

This two-day workshop takes some of the mystery out of why plastics fail by demonstrating the role of the major factors that govern failure or success: material, design, processing and service conditions. The course bridges the gap between theoretical and basic aspects of polymers and failures in practice. Prevention is emphasized throughout. Case studies of wide-ranging types of failure of different plastics and applications illustrate the underlying principles.

Product performance can be improved by knowing the principles involved and appropriate methods of failure analysis.

Topics to be covered include:

- The many types & causes of failure
- Major factors in plastics failure or success.
- Fundamental materials variables affecting processing, product performance or failure

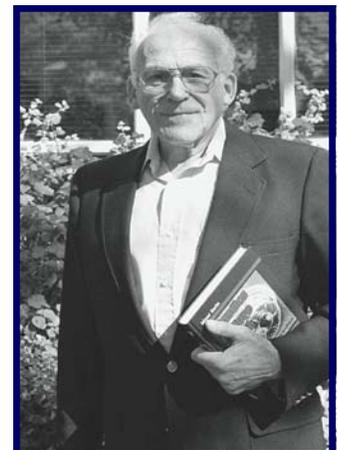
- Fundamental aspects of design
- Fundamental aspects of processing
- Service condition types of stresses
- Analytical and physical methods of failure analysis
- Quality control – preventive failure analysis
- Legal aspects of product liability and failure
- Failure of composites
- Plastic pipes and fittings in water and gas delivery & distribution systems
- Medical applications
- Electrical and electronic applications
- Adhesion failure of plastics
- Failure of human biopolymers
- Environmental, recycling & health aspects of plastics failure

For more information contact Mark Dudley (860-486-2256, mdudley@ims.uconn.edu). To register,

please visit:

http://www.ims.uconn.edu/associate/a_events.html

Registration is limited and closes September 9, 2011.



Myer Ezrin, Ph.D.
Director (retired) of the IMS Associates Program
Institute of Materials Science
University of Connecticut

New Faculty Member: Dr. Anson Ma

This fall IMS welcomes a new faculty member to the Polymer Program, Dr. Anson Ma.

Dr. Ma, received his PhD from the University of Cambridge (UK) in 2009 under the supervision of Prof. Malcolm Mackley. His PhD work focused on the experimental studies and numerical modeling of the complex flow behavior of carbon nanotube (CNT) suspensions. He published a book chapter and seven first author journal articles during his three years at Cambridge. He then joined the Pasquali research group as a postdoctoral research associate, and is actively engaged in the development of continuous, scalable spinning technology for the production of Armchair Quantum Wire (AQW). This is a strong, continuous wire of perfectly aligned, all-metallic, single-walled carbon nanotubes (SWNTs) with optimum inter-nanotube contacts

for electrical conductivity.

Anson is the founding president of the Carbon Nanotube Club (currently with 400 members worldwide) and the founding chairman of the annual Cambridge CNT symposium. He was also an honorary scholar of the Cambridge Overseas Trust and the recipient of a number of scholarships including the Croucher Foundation Scholarship (Hong Kong) which supported his doctoral studies at Cambridge. In October 2009, Anson was selected as the Evans Attwell-Welch Fellow of the Smalley Institute, which is a two-year fellowship. In June 2010, he was awarded one of the Prize Winning Paper Awards from the Journal of Nanoengineering and Nanosystems (Journal) for "A review of the microstructure and rheology of carbon nanotube suspensions."

Dr. Ma is particularly interested in the following areas: Phase Behavior and Rheology of Fluids Containing Nanoparticles; Nanoparticle-stabilized Foams and Emulsions for Enhanced Oil Recovery Applications; and Polymer Nanocomposites for Aerospace and Energy Applications.



Anson Ma, Ph.D.
Polymer Program/IMS

CPTV Films In Dr. Parnas' Biodiesel Lab

Dr. Parnas, a professor in the Chemical, Materials & Biomolecular Engineering Department (CMBE) and the Institute of Materials Science (IMS) at UConn, has championed biofuels as a green energy source for years.

From the School of Engineering imagination. For the complete article visit

<http://news.engr.uconn.edu/cptv-films-in-dr-parnas-biodiesel-lab.php>

Dr. Richard Parnas, director of the University's Biofuel Consortium, hosted a film crew from Connecticut Public Television (CPTV) in April. The CPTV crew interviewed Dr. Parnas and filmed the production of biodiesel from waste vegetable oil as part of a segment on green technologies aired during the summer. It's just one of many recent "tech props" Dr. Parnas has received for his innovative biofuels

research.

Dr. Parnas, a professor in the Chemical, Materials & Biomolecular Engineering Department (CMBE) and the Institute of Materials Science (IMS) at UConn, has championed biofuels as a green energy source for years. Biofuels are extremely attractive as an alternative transportation fuel because they produce very little in the way of ozone-depleting emissions, in contrast with fossil fuels.

Within the warren of intercon-

nected spaces that make up his basement laboratory in the Engineering II building on the main Storrs campus, Dr. Parnas has spent four years improving upon a basic biodiesel reactor design with the objectives of increasing production capacity and enhancing efficiency. The lab features two reactors: the oldest, smaller of the two units is used in the ongoing waste cooking oil-to-biodiesel production operation; the second, which features unique design enhancements

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CPTV Films In Dr. Parnas' Biodiesel Lab

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Professor Richard Parnas makes adjustments to the biodiesel reactor.

Image provided by University Communications

developed by Dr. Parnas, is used for research and testing.

Dr. Parnas and two partners, Fred Robson and Rich Madrak, recently formed a startup company called RPM Sustain-

able Technologies. It will commercially market a novel, patented reactor system designed by Dr. Parnas, which features a number of unique process improvements over the traditional reactor design and reduces production costs. The partners have commissioned an industrial equipment manufacturer to build the systems, which will be scaled-up versions capable of serving communities and processing between 250,000 and 5 million gallons of biodiesel yearly. The first unit will be delivered this summer to UConn.

Dr. Parnas is also collaborating with Dr. Ranjan Srivastava, a colleague in CMBE, on the development of biobutanol as

an alternative to gasoline. The project is in its earliest stages and entails more fundamental research. Whatever the outcome, in the years ahead it is clear that biofuels and biodiesel will gain even greater importance as the nation looks for ways to reduce its reliance on diminishing fossil fuel reserves.

CMOC Best Paper Award Recipients

Well-deserved congratulations to Claire Weiss, Bilge Senturk and Chitra Subramanian, each recipients of the "Best Poster Paper Award" at the 2011 Connecticut Symposium on Microelectronics and Optoelectronics (CMOC) held at Yale University.

Claire Weiss (CMBE, Ph.D. student) - **"Influence of the Precursor Solution Mobility on the Dielectric Response of Chemical Solution Deposited Strontium Titanate Thin Films on Si"** with M.W. Cole of the US Army Research Lab and Pamir Alpay

Bilge Senturk (CMBE, Ph.D. student) - **"Base Metal Alloys with Self-healing Native Oxides for Electrical Contact Materials"** with J.V. Mantese of UTRC, Yong Liu, Pamir Alpay and Mark Aindow

Chitra Subramanian (Polymer, Ph.D. student) - **"Nanofiber Based Composite Structures for PEM Fuel Cells"** with Robert Weiss and Montgomery Shaw

Numerous other UConn/CMBE graduate students presented oral and poster papers and did a great job in representing our programs.

Congratulations to all!

Materials Focus Gives Katie Czaja The Advantage

From the School of Engineering imagination; By Nick Gagliardi; for the complete article visit: <http://news.engr.uconn.edu/materials-focus-gives-katie-czaja-the-advantage.php>



For some students, the impending date of graduation means inevitably facing an unstable job market and an uncertain economy. Kathryn “Katie” Czaja, however, is an exception. Currently a senior in the Materials Science & Engineering (MSE) program, she will be graduating in May and eagerly awaits her full-time position with Pratt & Whitney, offered to her at the start of the year.

Katie’s outstanding record of academic achievement, research and service will be honored on May 6th when she will be recognized as the School of Engineering’s 2011 Outstanding Senior Woman Scholar. The Outstanding Senior Women Academic Achievement Awards are presented annually

by the Provost’s Office, the Alumni Association, and the Women’s Center.

From an early age, engineering resonated with Katie, and she excelled in her math and science courses throughout high school. Appreciative of “hands-on” learning as a practical application of science, Katie continually nurtured this intuitive spark throughout her college career. While some undergraduates might feel burdened already by the weight of demanding coursework, Katie elected to add laboratory research projects to her educational portfolio at UConn. “Working in the lab is a great way to mix up the curriculum,” said Katie. “It diversifies the learning experience, and truly makes it fun.”

Under the thoughtful guidance of MSE associate professor (and IMS member, ed.) Bryan Huey, Katie is using atomic force microscopy (AFM) to analyze the domain switching rates of PZT (lead zirconate titanate), a piezoelectric material. These materials, which are typically ceramic crystals, produce electricity under pressure.

She has also been actively involved with student outreach activities at the university, namely through her association with the UConn Material Advantage (UCMA) student chapter. Secretary of the UCMA in her sophomore year, she quickly advanced to chapter President during her junior and senior years. With fellow members of the UCMA, Katie has assisted with demonstrations and tours of the engineering facilities during campus open house events and served as a materials science ambassador during visits to K-12

schools throughout Connecticut. She also attended the international meetings of Materials Science & Technology (MS&T) Conference twice. Through her active involvement with UCMA, Katie was chosen as one of three students to serve a one-year term as a member of the Board of Trustees for ASM International, The Materials Information Society.

Having made the Dean’s List every semester at UConn, Katie’s academic success is evident. She is a member of the UConn chapters of the Alpha Sigma Mu, Omega Chi Epsilon, and Tau Beta Pi honor societies, as well as a merited member of the UConn Honors Program. “Attending UConn has prepared me well for life after graduation,” said Katie. “I’ve had a great time here; I wish I could stay.”

Materials Research Society Student Chapter

From the CoMBinE Newsletter; for the complete article visit:

http://www.cmbe.engr.uconn.edu/pdf_combine_newsletter/combine_spring_summer2011.pdf



Casting station at UConn's 2010 Hartford ASM Materials Camp

The Materials Research Society (MRS) UConn student chapter is a great resource for graduate students in the materials science program, as well as various related disciplines. With membership comes access to numerous journal databases and monthly publications pertaining to current developments in the materials science field. Additionally, the MRS allows for many valuable networking opportunities. The

most important networking event is the MRS Fall meeting in Boston. Members from the UConn student chapter regularly attend this annual meeting and present their research in the form of short talks and posters. Each year, prior to the conference, the UConn student chapter holds a meeting dedicated to helping students practice their presentations. The students present their research to an audience of their peers and receive important feedback on how to improve their presentation. Prepared members go into the conference more confident and effective in presenting their material.

In addition to this important fall event, the MRS Chapter, in conjunction with the undergraduate group UConn Materials Advantage, arranges a trip to visit the Brookhaven National Laboratory in New York. The purpose of this is to provide graduate and undergraduate students with the opportunity to see what working in a national lab is like and have a chance to network with

the researchers at the facility.

In addition to providing professional and networking opportunity, The MRS chapter at UConn is involved in outreach activities. Getting young minds interested in the field of science and engineering is important for recruiting future materials scientists. UConn MRS members regularly assist in putting on the annual ASM Materials Camp hosted by the Hartford Chapter of ASM International. The camp is a one-day program intended to encourage and excite younger people into pursuing careers in materials science, engineering and related disciplines.

Finally, the MRS student chapter is a social organization for students. The group enjoys regular social gatherings such as international potluck lunches, summer softball and cookouts. UConn students also organize a bowling night at the fall MRS conference, where students can relax and enjoy themselves after a long day of oral presentations and poster sessions.

IMS Associates Program Annual Meeting

The IMS Associates Program annual meeting was held on Thursday May 18th. Over 70 representatives of IMS and industry were in attendance. Several faculty members presented brief overviews of their research. Presentation titles and authors were as follows:

Mu-Ping Nieh, Associate Professor, Chemical Engineering, **Self-Assembled Nano-Liposomal Imaging Probe Carriers**

George Rossetti, Associate Professor, Materials Science and Engineering, CMBE, **Ferroelectric Solid Solutions: Thermodynamics, Microstructure and Electromechanical Properties**

Puxian Gao, Assistant Professor, Materials Science and Engineering, CMBE, **Multi-Functional Composite Nanostructures for Energy, Environmental and Biomedical Applications**

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IMS Associates Program Annual Meeting

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Harold Brody, Distinguished Professor, Materials Science and Engineering, CMBE, **Application of Quantitative Quality Criteria for Computer Aided Design in Materials Processing and Capstone Design Project**

Rainer Hebert, Assistant Professor, Materials Science and Engineering, CMBE, **New Materials Concepts for Blast- and Fire- Protection of Infrastructure**

Mark Aindow, Professor, Materials Science and Engineering, CMBE, **Base Metal Alloys with Self-Healing Native Conductive Oxides: A New Paradigm for Electrical Contacts**

Department Seminars

All fall seminar schedules have not been finalized at the time of this writing. Seminar schedules will be available near the beginning of the semester and can be found on the department web sites (www.ims.uconn.edu/polymer and www.engr.uconn.edu/cmbe). This information will be updated as additional seminars are added. Abstracts of seminars are usually available about a week in advance. We can also put you in touch with the faculty member sponsoring the seminar to learn more about the specific seminar of interest. We suggest you call before attending to be sure the seminar has not been canceled due to illness or weather.

The Polymer Program Seminar schedule follows:

POLYMER SEMINARS Fall Semester 2011

- September 9 **“Wrinkles and Folds Enhance Light Harvesting Efficiency and Increase Mechanical Flexibility of Polymer Solar Cells”**
Prof. Yueh-Lin (Lynn) Loo, Princeton University
- September 16 **“Nanoscale Systems Assembled with DNA: From Principles to Materials”**
Dr. Oleg Gang, Brookhaven National Laboratory
- September 23 **“Hot Melt Extrusion—A Novel Method for Drug Manufacturing”**
Prof. Peng Wang, University of Rhode Island
- October 7 **“Functional Materials by Magnetic Field Directed Self-Assembly of Soft Mesophases”**
Prof. Chinedum Osuji, Yale University
- October 21 **“From Imperfection to Perfection in Soft Materials Self-Assembly”**
Prof. Mahesh Mahanthappa, University of Wisconsin
- October 27 **“Dynamics of Hydrophobically Modified Hydrogels”**
(Thursday) **Prof. Robert Weiss**, University of Akron
- November 4 **“Coiled Coils—More Than an Oligomerization Motif”**
Prof. Joerg Stetefeld, University of Manitoba, Canada
- November 11 **“Polymers and Ionic Liquids, Four Short Stories: Solutions, Gels, Proteins, and Imaging”**
Prof. David Hoagland, University of Massachusetts, Amherst
- November 18 **“Multicompartment/Multicomponent Micelles with Block Copolymer Blending through Kinetic Control of Solution Assembly”**
Prof Darrin Pochan, University of Delaware

All seminars are held on Fridays at 1:30 PM in IMS Room 20, unless otherwise noted. For more information, please contact YH Chudy at yhchudy@ims.uconn.edu, (860) 486-3582 or visit www.ims.uconn.edu/polymer.

With a theme of
 “Imagination in
 Play,” CIC is the
 oldest
 continuously
 running children’s
 invention
 convention in the
 nation

May 14: Showtime for Young Inventors

From the School of Engineering
 emagination; for the complete article
 visit: <http://news.engr.uconn.edu/may-14-showtime-for-young-inventors.php>

On Saturday, May 14, 2011, UConn welcomed more than 650 young inventors who aspire to be the next Thomas Edison (lightbulb) or Mary Anderson (windshield wipers). Students in grades K-8 showcased their novel inventions during the state-wide, 28th annual Connecticut Invention Convention (CIC) at Gampel Pavilion in Storrs.

With a theme of “Imagination in Play,” CIC is the oldest continuously running children’s invention convention in the nation, in which young inventors exhibit their practical solutions to everyday problems. Their solutions demonstrate both impressive ingenuity and infectious enthusiasm.

The seeds for CIC are sown in the fall, when teachers across the state gather for all day training

and invention experiences. Then elementary and middle school teachers at more than 100 participating schools across the state ask their students to identify a vexing problem they encounter regularly. The children then consider possible solutions, select one and refine it into a working prototype. Nearly 10,000 Connecticut students are involved in the program and showcase their inventions at local level contests for the opportunity to represent their school at the state convention. Students who proceed to the state-wide convention in Storrs are afforded the opportunity to share their prototype before teams of judges from industry, education and government.

The Connecticut Invention Convention is a 501(c)(3) nonprofit program underwritten by grants and in-kind support from community, educational institutions, businesses and charitable organizations, including the UConn School

of Engineering, Alstom Power, the Annie E. Casey Foundation, Bank of America, Boehringer-Ingelheim Carres Foundation, Bristol-Myers Squibb, Cantor Colburn LLP, CASE, Comcast, Connecticut Light & Power, Connecticut Center for Advanced Technology, CT Space Grant College Consortium, Dominion Nuclear Connecticut, DST Output, GE Energy Industrial Solutions, General Dynamics Electric Boat, [Institute of Materials Science/ UConn](#), Liberty Bank Foundation, Lincoln Financial Foundation, Loureiro Engineering Associates, mBLAST.com, MIT Club of Hartford, K-12 Initiative, Microsoft, Pitney Bowes Inc., People’s United Community Foundation, Stanley Black & Decker, UConn School of Business, United Technologies, Vteams, and the Xerox Foundation.

For more information on the Connecticut Invention Convention, visit www.CTInventionConvention.org.

Employment Web Page

The Institute of Materials Science has a web page to help match students with potential employers. The IMS Employment Center can be accessed from the IMS home page www.ims.uconn.edu/ and clicking on Outreach.

The initial job page has brief information concerning each position and a link for more details. Please forward any open position announcements you wish to post to Rhonda Ward (rhonda.ward@ims.uconn.edu).

We have several positions on the website now; with your help we can continue to build this database of information, which benefits both students and employers.

Toxic and Bio-Contaminated Samples

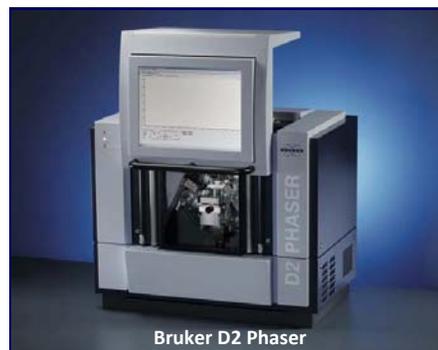
On a small number of occasions, member companies have sent us toxic samples for examination. IMS is not set up to handle such materials. We operate in a very open environment with multiple users and shared laboratory facilities. We cannot accept toxic materials, materials that present biological hazards or similar materials such as drugs that require very specialized handling. If we do receive such a sample we must return them (and may need your assistance to do so, as shipping these materials can be time consuming and expensive). We cannot dispose of these types of material at UConn when they are created by external sources.

New Instrumentation

Bruker D2 Phaser

IMS has recently installed a Bruker D2 Phaser one-dimensional x-ray diffraction instrument.

Quoting the Bruker D2 Phaser Manual: The D2 PHASER is a desktop X-ray diffractometer which has the analytical performance and functions of a large instrument, but which is easy to transport and opens up the whole world of powder diffraction without a lot of infrastructure.



Bruker D2 Phaser

ALV Static/Dynamic Light Scattering Multi-Detector Instrument



The ALV/CGS 3MD (with eight detectors) static/dynamic light scattering

The ALV / CGS-3 MD Compact Goniometer is a self-contained system with 22 mW He-Ne Laser (wavelength, $\lambda = 632.8$ nm), ALV-proprietary optical fiber based detector, avalanche photo diode (APD)-based multiple photon detectors, ALV/LSE-5003 Electronics and ALV-5000/EPP Correlator. Due to its extremely compact size and small weight, it can be placed onto a "normal" table without the need of an additional breadboard or optical table. The current instrument has four, but can be further expanded to eight, mounted APD-detectors. This feature allows the users to perform simultaneous static light scattering (SLS) & dynamic light scattering (DLS) measurements. Therefore, both radius of gyration (R_G) and hydrodynamic radius (R_H) can be obtained in the same experimental time frame, providing a possibility to resolve the morphology of nano-scale aggregates (e.g., spheres, cylinders, disks etc.). Due to the high efficiency of APD, the data can be collected as fast as 1—3 seconds, enabling many fast-kinetics studies in solutions. The instrument is ideal for probing nano-structures of particles in dilute solutions

as well as attaining information of aggregation number (e.g., molecular weight) and interparticle interaction (e.g., second virial coefficient). The probing ranges of the DLS (i.e., R_H) and SLS (i.e., R_G) are around 1—1000 nm and 30—1000 nm, respectively. The instrument also has a temperature-controlled sample environment (in the range between 0 and 60 °C). To ensure the best quality of the data, the tested samples should be transparent and not have fluorescence emission or absorb light at $\lambda = 632.8$ nm. The instrument is located in the new laboratory of [Dr. Mu-Ping Nieh](#).

Mid-Length Projects (MLP) Program

The Institute of Materials Science (IMS) announces the continuation of a program that addresses seed research/development projects of an intermediate length. This program is designed to encourage university/industry collaboration on projects that are too extensive for the existing Associates Program yet smaller than full-blown university research projects. Typical student/post-doc supporting research projects at IMS (and most of UConn and other institutions) last for some number of years. Industry often has exploratory projects of intermediate length between these extremes, projects that may require several months to a year of full time effort. Through the Mid-Length Projects (MLP) Program IMS will assist industry in matching the available resources of IMS to those required for the project of interest.

For more information or to discuss specific projects please contact Ed Kurz (860) 486-4186, ekurz@mail.ims.uconn.edu or Harris Marcus (860) 486-4623, hmarcus@mail.ims.uconn.edu.

Sample Preparation

In many projects that the Associates Program deals with, such as adhesion and coatings, surface analysis techniques are extremely important. The techniques used for such analysis, particularly GC/MS, Auger electron spectroscopy (AES) and x-ray photoelectron spectroscopy (XPS) are extremely sensitive to small amounts of material on the surface. It is important to make efforts not to contaminate these surfaces during sample preparation, collection and shipment. **Shipment in common plastic bags should be avoided!** Common plastic bags typically contain significant amounts of additives used to prevent the plastics from adhering to themselves and other materials. These additives will migrate to the sample during shipment and at best make interpretation difficult and sometimes impossible. It is much better to ship such samples in common kitchen aluminum foil (not industrial aluminum foil which is often coated with an oil or other release agent). Samples can also be shipped in glass containers with aluminum foil over the opening under the cap.

Alternatively, special polyester bags that do not contain such additives can be purchased. One source of such bags is the Kapak Corporation (now Ampac). Typical price is about \$200 per thousand depending on the exact size. Be sure to specify non-contaminating/non-plasticized material.



Highlights from the IMS Annual Picnic

IMS Associates Program

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Visit us on the web at:

www.ims.uconn.edu/associate/associates



Images courtesy of Jack Gromek.

Fall Semester Starts

Fall semester classes start August 29, 2011. Some courses that may be of interest include the following.

MSE 5301	Thermodynamics of Materials	H. Brody
MSE 5334	Struct. & Defects in Materials	G. Rossetti
MSE5322	Materials Characterization	D. Snow
CHEM-5380	Polymer Synthesis	D. Adamson
CHEM-5381	Polymer Physical Chemistry	T. Seery
CHEM-5382	Polymer Characterization I	Y. Lin
CHEM-5351	Polymer Physics	A. Dobrynin

