# University of Connecticut
## Institute of Materials Science

# IMS Associates Program Newsletter

Vol. 5, No. 2 August 14, 2001


## New Electron Optics Facilities in IMS

The electron-optics facilities in the IMS Microscopy Laboratory will be enhanced by the addition of three major instruments this summer. Two of these instruments are state-of-the-art microscopes funded by the National Science Foundation through the award of a Major Research Instrumentation Grant, led by Dr. Mark Aindow, with matching funds from the University. These are:

- JEOL 2011 FasTEM - A fully automated digital 200kV high-resolution transmission electron microscope with x-ray and electron spectrometers and energy-filtered imaging.
- JEOL 6335-F SEM - A high-resolution cold field-emission-gun scanning electron microscope with secondary and back-scattered electron detectors.

The third instrument is a "pre-enjoyed" Cameca Camebax electron probe microanalyzer, which has kindly been donated by Pratt and Whitney Aircraft.

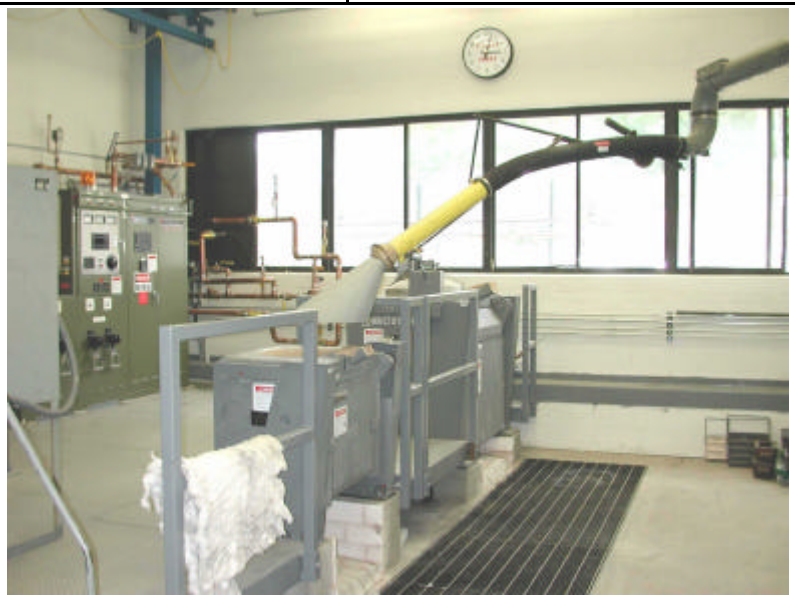
New sample preparation equipment has also been added including a Fischione Plasma Cleaner and Gatan Duomill. The facility has also upgraded the energy dispersive spectroscopy software on both its existing Amray 1000 and Philips EM420 with the installation of the Quest EDS system.

As this article is being written (early August 2001) the Quest EDS upgrade, Gatan Duomill and Fischione Plasma cleaner have been installed and are working; the Cameca electron microprobe and the JEOL 6335-F field emission SEM are being installed; and it is expected that the JEOL 2011 TEM will be installed later this month. It is anticipated that all new electron microscopy instrumentation will be operational during the next semester.

## IMS Melting, Casting, and Solidification Research Laboratory

The Institute of Materials Science has renovated and significantly expanded alloy melting, casting, and solidification research and development facilities. A modern induction power supply (175 KW, tunable from 1 – 3 KHz) has been installed in IMS 15. The power supply, furnished by Inductotherm Corporation, can be used to melt in a vacuum induction melting furnace (17 lb nickel base superalloy capacity) or three air melt induction furnaces: a # 1,000 hydraulic tilt, a # 300 hydraulic tilt, a # 40 bilge type push out furnace. The # 1,000 tilt furnace can melt, quickly and cleanly, up to 1000 lbs of steel or 400 pounds of aluminum alloy. The induction furnace complements a gas/forced air crucible furnace previously used for melting non-ferrous alloys. The melting, casting, and

**Inside this issue:**



solidification laboratory is supporting the research projects of Professors John Morral, Theo Kattamis, and Harold Brody. It is available to members of the IMS Associates programs for specialized R&D, prototype and pilot scale projects. Ideas are solicited for cooperative R&D projects that will benefit foundries, casters, casting supply houses, and users of precision and engineered castings.

The scale of the melting furnaces is unusual for a United States research university. This scale makes the facility ideal for pilot scale and prototype work with industry. However, the facility was designed with research objectives in mind. For example, in a current project, sponsored by the Center for Heat Treating Excellence (an industry-university consortium), Professors Morral and Brody along with their graduate students are studying the evolution of microstructure and the development of mechanical properties during the heat treatment of Al-Si-Cu alloy automotive castings. Several test castings can be poured from the same melt, each having the same chemistry, gas content, and melt treatment. Then the only variables in each set of test castings are how they are processed after casting. Other projects in progress or planned will look at hot tearing in castings; the use of applied electromagnetic fields to control the casting process and as-cast quality and microstructure; and the interaction of fluid flow and thermal parameters to control microstructure. All projects combine experiment and computer simulation. Industry partners will commercialize software developed under these projects.

## New Faculty

This fall the Polymer Program welcomes three new faculty members. Richard Parnas will join as Associate Professor of Chemical Engineering; Alex Asandai as Assistant Professor of Chemistry; and Andrei Dobrynin as Assistant Professor of Physics. A brief introduction to each follows.

**Richard Parnas** has had a 10 year career with the US Government at the National Institute of Standards & Technology near Washington, DC. While at NIST, he headed the Polymer Composites Group and introduced a new imaging technology, Optical Coherence Tomography, to the materials science community. Before joining the Polymer Program, he is spending a year at the Katholieke Universiteit - Leuven, Belgium, working with the composites group of Prof. Ignaas Verpoest on 3-D structure determination of complex reinforcement architectures. Recently, Richard and collaborators John vanZanten (NC State) and Joseph Lenhart (NIST), successfully measured the glass transition temperature of a buried polymeric interface of submicron dimensions.

**Alex Asandei** obtained his Ph.D. from Case Western Reserve University in Cleveland, Ohio in 1998. His graduate work centered on the design, synthesis and characterization of liquid crystalline assemblies with complex cyclic architecture. After a brief industrial assignment on novel waterborne polyurethane adhesives with Ashland Chemical in Columbus, Ohio, he moved to the University of Pennsylvania in Philadelphia, Pennsylvania, where he developed the aqueous, room temperature living radical polymerization of vinyl chloride. Alex is a co-author on over 25 articles and 7 patents.

**Andrei Dobrynin** holds a Ph.D. in Chemical Physics from the Moscow Institute of Physics and Technology and was a Research Associate at the University of North Carolina at Chapel Hill before accepting the position in the Polymer Program. He has also worked in Paris and for Eastman Kodak in Rochester, New York. His research interests include soft-condensed matter physics and self-assembly of polymer systems at surfaces and interfaces.

## Patent Issued for Synthesis of Nanocarbides

Dr. Leon L. Shaw, Associate Professor of Metallurgy and Materials Engineering, was recently awarded a U.S. patent for his method to synthesize low cost nanostructured carbide powders. The patent, entitled "Sinterable Carbides From Oxides Using High Energy Milling," was awarded by the U.S. Patent & Trademark Office in April 2001. The method entails the mechanical activation of reactants at ambient temperature, followed by high temperature chemical reactions to form nanocarbides. Because of the mechanical activation at ambient temperature, the reactivity of reactants is raised substantially and thus the temperature and time of the chemical reactions are dramatically reduced, leading to low cost nanostructured carbides.

The effectiveness of this novel method is not limited to making nanocarbides. By controlling the atmosphere during the mechanical activation and chemical reaction, nanostructured nitrides such as TiN, CrN and $Si_3N_4$ have also been demonstrated. Most recently, nanocomposites containing metal component(s) such as WC/Co cermets have also been manufactured through this method.

The method is readily scaleable and cost effective. It has abilities to produce nanostructured carbide, nitride and their composite powders in tonnage quantities. Costs of nano-carbide, nitride and their composite powders are even lower than that of the corresponding conventional coarse-grained powders. Currently, the sintering behavior of nanocarbides and WC/Co cermets as well as mechanical properties of the resulting bulk materials are being investigated. Several companies have already expressed interest in commercializing the method once superior properties are demonstrated.

## Suib Selected Distinguished Professor

The Board of Trustees recently selected Steven L. Suib, Professor of Chemistry at the University of Connecticut, as a Distinguished Professor. Suib is an international leader in the field of zeolite synthesis. The research he conducts involves collaborative efforts with people in industry and academia. Since the early 1980's, Suib has worked with more than two dozen Fortune 100 companies and prominent organizations including DuPont, Rubican, Fujitsu, Shell, United Technologies, Duracell, Texaco and A.D. Little. He points with considerable pride to University research that has led to the synthesis of a new class of porous materials which are now being used in the auto, chemical and battery industries. The complete article can be found in the summer 2001 issue of *UConn Traditions.*

## A Practical New-Old Molecular Weight Method

We are now operational with melt index/melt flow rate (MI/MFR) testing of polymers/plastics. It is a simple, well-known melt viscosity method that relates to molecular weight. The melt flow rate, expressed as grams/10 minutes, is inversely proportional to molecular weight. Because melt viscosity is a function of the 3.4 power of molecular weight (above 20,000), the method is a sensitive method for detecting small changes in MW that may be within experimental error by solution viscosity or GPC (gel permeation chromatography). Another advantage is that samples don't have to be dissolved in a solvent, which often precludes doing GPC. A major use of MI/MFR is to monitor changes of MW due to processing, regrind, etc. The method is a "poor man's" melt viscosity test. If one needs to characterize melt viscosity as a function of temperature and shear rate for processing purposes, the melt rheometer is available in the Rheology Lab, under the direction of Prof. Monty Shaw.

## IMS Expansion-Construction Completion

Construction of the expansion to the IMS, located on the plaza of the Gant complex, is expected to be complete this month with occupation beginning this month also. Present plans include a dedication ceremony later this month (watch your mail for details). The present building for the IMS was completed in the early 1970s. Since that time our growth has led to building rooms in the halls, converting three of the four seminar/class rooms into offices or laboratories, and serious overcrowding in the laboratories. IMS is very pleased that support from UConn 2000 was made available for construction of a 15,000 sq. ft. addition.

Funds are badly needed to equip this new space and to upgrade outdated laboratory equipment in our existing space. This is truly a "once in 30 years" opportunity. Approximately $5M is needed. The new building and associated update of research equipment at IMS will be very important in projects that are of interest to IMS Associates Program member companies. Examples include small spot x-ray photoelectron spectroscopy and time of flight SIMS facilities. Each of these equipment groupings costs in excess of $500,000. Several items will be available only at UConn in this region. As with all IMS facilities, they will be available to all Associates Program member companies.

We respectfully request that member companies and friends consider, as partners and close collaborators, a one-time gift for the re-equipping of the Institute. This new equipment will help IMS, which already has an excellent reputation, step forward as a national leader.

In our 30 year history IMS has not made such an appeal. This is truly a special time when we need to advance our mutual interests through this equipment and facilities.

For further information please contact:
Harris L. Marcus
Director, Institute of Materials Science
Tel. 860-486-4623
Fax 860-486-4745
Email: hmarcus@mail.ims.uconn.edu

## Fall Semester Starts

Fall semester 2001 classes start Wednesday, August 29, 2001. Some courses that may be of interest include the following.

| | | |
|---|---|---|
| CHEM-380 | Polymer Synthesis | G. Sotzing |
| CHEM-381 | Polymer Physical Chemistry | T. Seery |
| CHEM-382 | Polymer Characterization 1 | F. Papadimitrakopoulos |
| CHEG-351 | Polymer Physics | P. Mather |
| CHEM-394-1 | Biomedical Polymers | S. Huang |
| CHEM-394-2 | Spectroscopy | C. Sung |
| MMAT-320-1 | Physical Ceramics | T. Kattamis |
| MMAT-320-2 | Metallurgy of Welding | T. Kattamis |
| MMAT-322 | Materials Characterization | M. Aindow |
| MMAT-343 | Corrosion | N. Greene |
| MMAT-311 | Mechanical Properties of Materials | N. Padture |
| MMAT-301 | Thermodynamics of Materials | J. Morral |
| MMAT-307 | Solidification | H. Brody |

Some courses require pre-approval of the instructor. For further information please call Ed Kurz. Courses such as Biomedical Polymers, Spectroscopy and Solidification are not offered every year. Anyone interested should take advantage of their availability at this time.

## Symposium in Memory of Professor Julian Johnson

The one-day symposium "Contemporary Topics in Polymer Science for the 21st Century" was held at IMS on May 15, 2001 in memory of Julian Johnson. Professor Johnson was Associate Director of IMS and a major contributor to polymer research. He retired in 1989. The list of speakers is on page 10. A student poster session was held in conjunction with this event. Titles, authors and advisors for these posters are on pages 11-12.

## Undergraduate Program on Materials

The Department of Metallurgy and Materials Engineering is beginning the second year of their new undergraduate program, now offering courses at both the freshman and sophomore levels. Two years from now a full four-year curriculum will be available and the first class of seniors will graduate. Graduates will have a broad background in materials, including metals, ceramics, polymers and composites.

Although enrollment is currently low, it should rise as a result of Prof. Leon Shaw's active recruiting program. Major challenges are to inform students about opportunities in Materials Science and Engineering and about the outstanding program at the University of Connecticut. Students in the program will benefit from attending the top public university in New England as well as the only public university offering a degree in Materials Engineering. Because it is the only public university with such a degree, students from all states in New England can attend UConn at nearly in-state tuition rates. For more information about the program please visit the metallurgy web site at http://www.ims.uconn.edu/metal/ or contact the Department Head, John Morral, at (860)486-4620.

## New Members

Two companies have joined the Associates Program over the last year. TyCom Laboratories, a spin-off from Lucent Technologies, is the most recent. Tycom specializes in undersea fiber-optic communication cables and is located in Eatontown, New Jersey.

C&M Corporation of Wauregan, Connecticut also joined in the last year. C&M specializes in electrical cables.

There are now 34 member companies in the Associates Program. A list of present members and area of specialization is on pages 14-15.

## Department Seminars

The seminar schedule for the Polymer Program is on page 13. Seminar schedules for other departments have not been finalized at this time. This information will be available on the World Wide Web at http://www.ims.uconn.edu/. 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.

# IMS Short Courses

This summer the IMS Associates Program offered two short courses; *Polymer Failure: Cause and Prevention* with Myer Ezrin (Director of the IMS Associates Program) and *Advanced Design of Experiments* with Uwe Koehn (Emeritus Professor of Statistics, University of Connecticut). Both courses were well attended and received.

We will offer two courses next summer. We are considering the courses described below. Cost per registrant will probably be about $500. Associates Program members will receive one complimentary registration per course. I would appreciate your comments and suggestions regarding these or other possible courses.

## Corrosion

Corrosion refers to the interaction of a material with its environment. This interaction is usually a chemical reaction which is influenced by physical and environmental factors. Corrosion removes metal from component surfaces, reducing their cross section, and may lead to mechanical failure. Since all man made structures are exposed to some type of environment, corrosion resistance is an important part of materials selection.

Virtually everyone is familiar with the rusting of steel. However there are many other forms of attack. Some are very difficult to detect and control and can lead to catastrophic failures. The aims of this course are to: 1) understand the nature of the corrosion process; 2) develop the ability to recognize the various types of corrosion; and 3) learn how to select appropriate preventive measures. The emphasis in this course is on applying basic concepts to solve problems. Numerous unusual, funny and tragic case histories are discussed to illustrate this approach.

## Failure Analysis of Metals and Ceramics

This course will help participants understand how failures can occur and teach you how to use failure analysis as a diagnostic tool within a manufacturing organization. You will also learn how to determine the nature and cause of failures that result from the manufacturing process or service practices. Mastering these techniques will help create guidelines for corrective measures that can eliminate recurrence of failures as well as establishing preventive measures to catch other potential failures.

The course includes review of failures that occur frequently, including fractures caused by overloads, fatigue, stress corrosion and other conditions. The specialized equipment needed to carry out failure analysis, including scanning electron microscopy, will also be discussed.

Throughout the course, the principles involved in failure analysis will be demonstrated by the use of case studies largely based on the instructor's experience. Students will also be encouraged to present and discuss examples of metal failures they have encountered.

## An Overview of Surface Analytical Techniques

This course will review the fundamentals of the most common surface analytical techniques including SEM/EDX/WDX, AES, XPS, SIMS, AFM/SPM, RBS and TEM. The experienced professional will gain breadth of knowledge in techniques complementary to their core skills, while those new to surface analysis will obtain a good survey of the capabilities and application of these techniques. With the knowledge gained from this seminar, participants will be able to make informed decisions about which technique to use, thereby increasing the efficiency of and reducing the cost of analytical services. Case studies of wide-ranging applications will be presented.

## Chemical Engineering Short Course -- Practical Process Control

Professor Doug Cooper of the Chemical Engineering Department will be offering a two-day short course entitled "Practical Process Control" on October 16 and 17. The course begins by laying a firm foundation in the important fundamentals of PID control. It then moves on to explore some of the advanced classical methods and techniques popular in current industrial practice. The course is designed for a mixed audience including those who have had some training in the past and seek a refresher course, and those who have not had much formal training but desire to learn more. There is little math presented because the focus is on how to use methods rather than how to derive them. More information can be found at http://www.engr.uconn.edu/control/course.html. Please note that the Associates Program only offers financial assistance with registration to short courses sponsored by the IMS and does not offer assistance to those offered by other departments.

## Clapp Retires

Professor Philip C. Clapp retired from the Department of Metallurgy and Materials engineering on June 1, 2001 after twenty-three years on the faculty. Phil received a B.Sc. in Engineering Physics in 1957 from Queens University, Canada and a Ph.D. in Physics from M.I.T. in 1963. He worked at Ledgemont Laboratory (the basic research lab of Kennecott Copper Corp.) in Lexington, Massachusetts until 1977, rising to the position of Head of the Physics and Metallurgy Group there. After one year as a Visiting Professor of Materials Science at M.I.T., he came to UConn as Head of the Metallurgy Department in 1978. He founded the Center for Materials Simulation at UConn in 1990, and was its director. In 1983 he was a Visiting Professor at Jiaotong University, Shanghai, China and in 1985-86, Professeur Associe at the Institut National des Sciences Appliquees (INSA), Lyon, France. His honors include election to the Connecticut Academy of Science & Engineering in 1990; Senior Fulbright Research Scholar (1992-93); Senior Visiting Lecturer, Academia Sinica, Shenyang, China (1992, 1996); Visiting Professor and recipient of the University Medal of the Technical University, Kosice, Czechoslovakia (1993); Honorary Professor of Yunnan University, Kun Ming, China (1996); and Fellow of ASM International. His research interests over the years spanned the topics of Alloy Theory, Order-Disorder Transformations, Displacive Transformations, Ductility of Metals, Fracture in Materials, Sintering Processes and, in general, Computer Simulation of Materials. He authored or co-author of over 100 journal articles and monographs on these subjects and was one of the most distinguished members of the IMS. Phil now lives in Boston where he plans to have a new career writing fiction.

## Saxton Retires

Tom Saxton, Executive Assistant, IMS, retired effective June 1, 2001. Tom provided exceptional service to IMS for the past 20 years. We thank him for his ability to handle the many details that are necessary to keep IMS running smoothly and for his willingness to perform many extra tasks and most recently his efforts associated with the IMS expansion. We wish him great success and happiness in his retirement.

Tom's responsibilities have been separated into two positions, Assistant Finance Director of IMS and Executive Assistant 1 of IMS. Debra O'Brien has accepted the Assistant Finance Director of IMS position and Deborah Perko has accepted the Executive Assistant 1 of IMS position. We are very fortunate in the willingness of these long-term outstanding members of the IMS staff to serve in these vital IMS positions and look forward to working with them and to their serving the IMS as a whole.

## Associates Program Annual Meeting

The Associates Program annual meeting was held on Wednesday May 23. Forty-three representatives from member companies attended the day's events. Titles and authors of the day's presentations follow.

**Sampling Techniques and Devices for FT/IR, Raman, and GC/MS**
Gary Lavigne, Research Assistant, IMS

**Polymer Characterization via Thermal Analysis**
Laura Pinatti, Research Assistant, IMS

**Molecular Weight Determination for Industrial Applications**
Mark Dudley, Research Assistant, IMS

**Using Optical and Scanning Electron Microscopy For Industrial Applications**
Mary Anton, Academic Assistant, IMS

**New Electron Optics Facilities in the IMS**
Mark Aindow, Associate Professor, University of Connecticut, Department of Metallurgy and Materials Engineering, Institute of Materials Science

**An Overview of Fundamental Properties of Ferroelectric Thin Films**
Pamir Alpay, Assistant Professor, University of Connecticut, Department of Metallurgy and Materials Engineering, Institute of Materials Science

**Status of the IMS Associates Program**
Myer Ezrin, Director, IMS Associates Program

**IMS: Where are we? Where are we going?**
Harris Marcus, Professor, Director of the Institute of Materials Science, University of Connecticut, Department of Metallurgy and Materials Engineering

## Case Studies of Failure of Polymeric Electrical Insulation

In May 2001, Dr. Myer Ezrin presented a paper at the Annual Technical Conference (ANTEC) of SPE (Society of Plastics Engineers), "Case Studies Of Failure Of Polymeric Electrical Insulation." Copies are available on request to Dr. Ezrin.

## Ken Gonsalves

Ken Gonsalves left the Polymer Program effective January 1, 2001 and is now a member of the faculty at the University of North Carolina. Ken joined the Chemistry Department and Polymer Program at UConn in the summer of 1990. We wish Ken well in his new position.

## 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 which do not contain such additives can be purchased. One source of such bags is the Kapak Corporation, 5305 Parkdale Drive, Minneapolis, MN 55416, 612/541-0730. Typical

## Cluster Power

The Connecticut Department of Economic and Community Development (DECD) has opted to use an industry cluster system for aiding strategic and tactical planning of economic development in Connecticut. The cluster concept utilizes the notion that a group of companies in a given industry or complex have certain mutual problems which, if defined, can be addressed more broadly for the industry rather than deal less effectively with the individual companies.

Connecticut DECD in concert with several ad hoc industrial and commercial committees has identified six industry clusters - Tourism, Financial Services, Manufacturing, High Technology, Telecommunications and Healthcare Services - that are being given focused attention in the coming months and years to address their concerns. The modus operandi has been to identify a host for each cluster, and for DECD to help in the early stages of administration and planning.

There is an effort underway to explore the value of a materials subcluster under a manufacturing or advanced technology cluster. The time is right for getting attention drawn to materials problems, issues, etc., in Connecticut through the cluster concept if enough common avenues can be found to link people and companies to qualify as a cluster. The Connecticut DECD has championed the cluster concept for state economic development.

For additional information please contact Jack Crane, CONN/STEP, (203) 786-5481, (860) 786-5037 (fax), jcrane@connstep.org; Dr. Harris L. Marcus, IMS, UConn, (860) 486-4623, (860) 486-4745 (fax), hmarcus@mail.ims.uconn.edu; or Dr. Martin Blackburn, IMS, UConn, (860) 486-6832, (860) 486-4745 (fax), blackbur@mail.ims.uconn.edu.

## A Symposium in Memory of Professor Julian Johnson
## "Contemporary Topics in Polymer Science for the 21st Century"
## Tuesday, May 15, 2001
## Symposium Organizers: S. J. Huang and R. A. Weiss

**Session Chair: L. V. Azaroff**

9:00 "Supramolecular Liquid Crystalline Polymers"
**A. C. Griffin** (University of Southern Mississippi)

9:30 "Living Radical Polymerization"
**B. C. Benicewicz** (Rensselaer Polytechnic Institute)

10:00 "Polymers to Proteomics - Inspirations from JFJ"
**W. F. Haddon** (USDA, Western Regional Research Center)

10:30 BREAK

11:00 "New Materials" Role in Semiconductor Advancements"
**C. R. Davis** (IBM, Microelectronics Division)

11:30 "Thirty Years of Polyolefins Research and Development"
**F. M. Mirabella** (Equistar Chemicals)

**Session Chair: E. M. Barrall**

1:30 "The Development of Infrared Microspectroscopy and its Application to Polymer Science"
**J. A. Reffner** (SensIR Technologies)

2:00 "Characterization of Molecular Weight Degradation of Polyamides by Gel Permeation Chromatography"
**A. R. Cooper** (Lockheed Martin Space Systems Company)

2:30 "Forensic Analysis of Polymeric Materials Using Vibrational Spectroscopy"
**E. G. Bartick** (FBI Academy)

3:00 BREAK

3:30 "Electrical Conduction in Polyolefins - A Review of Concepts and Mechanisms"
**D. H. Damon** (University of Connecticut)

4:00 "Organic Surfaces on Semiconductor MEMS: Air Bag Sensors to Game Controllers"
**J. R. Martin** (Analog Devices, Inc.)

4:30 "Investigation of Silicone Polymer Blends"
**M. A. Krenceski** (GE Silicones)

# Polymer Science Program
# 2001 Poster Session
# May 15-16, 2001

| | Author | Title |
|---|---|---|
| | **Advisor: S.J. Huang** | |
| 1 | Ramos, Monica | Hydrogels Derived From Poly(ethylene glycol), Polycaprolaetone, and Itaconic Anhyrdide |
| 2 | Smith, Dawn A. | Comb-shaped copolymer delivers Teflon-like surfaces |
| | **Advisor: P.T. Mather** | |
| 3 | Kim, G.M. | Nano-scale Deformation Processes in POSS Reinforced Thermosets |
| 4 | Lefaux, Christophe | Build-up of Polymeric Multilayered Films by Hydrogel "Stamping" |
| 5 | Liu, Changdeng | Novel Shape Memory Polymers |
| 6 | Qin, Haihu | Synthesis and Characterization of Liquid Crystaline Thermosets with Flexible Spacers |
| 7 | Rousseau, Ingrid | Curvature of Electroactive Hydrogels |
| 8 | Wu, Jian | Rheology and Morphology of Molecular Composites |
| | **Advisor: F. Papadimitrakopoulos** | |
| 9 | Mathai, Mathew | Controlled Hole Injection in Alq3 OLEDS using a doped polymer layer |
| 10 | Tipnis, Ritesh | Metal Organic Assemblies of 2,S-dihychony-1, 4-benzo-quirone |
| 11 | Lee, Jeunghoon | Light-Emitting Diode Based on Layer-by-layer Assembly of CdSe Nanocrystals |
| 12 | Mwaura, Jeremiah | Programmed Metallorganic Thin Film Assemblies for Electroluminescense Application |
| 13 | Galeska, Izabela | Poly(vinyl alcohol) Hydrogels for Implantable Sensors and Drug Delivery |
| 14 | Chattopadhyay, Debjit | Characterization of Electrochemical Actuators Based on Single Wall Carbon Nanotubes. |
| 15 | Yang, Baocheng | Photochemistry of 2-Amino Pyridinyl Urea |
| 16 | Chen, Changqing | Liquid State NMR Study of Alq3 |

## Polymer Science Program
## 2001 Poster Session (cont.)
## May 15-16, 2001

**Advisor: D.A. Scola**

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|---|---|---|
| 17 | Liu, Hongbo | Low Viscosity Phenylethynyl End-Capped Fluorinated Adhesives |
| 18 | Simone, Christopher | Low Viscosity Phenylethynyl End-Capped Fluorinated Polymides |

Advisor: M.T. Shaw

| | | |
|---|---|---|
| 19 | An, Yuxian | Syndiotactic Polystyrene Nanofibers produced by Electrospinning. |
| 20 | Cua, Edwin | Creeping Squeeze Flow and Interferometry for the Measurement of LVE Properties |
| 21 | Gupton, Jonathan | Polymer Blends as Proton Exchange Membranes for Fuel Cell Applications |
| 22 | Liu, Zhizhong | Natural vs. Artificial Aging of Polymers for Service in Nuclear Power Plants |
| 23 | Senador, Tony | Towards a Model for the Electrostatic Spinning Process |

**Advisor: G.A. Sotzing**

| | | |
|---|---|---|
| 24 | Lee, Kyunghoon | Poly(thiend[3,4-6] thiophene)- Synthesis and Electrochemical Characterization |
| 25 | Wang, Yangbing | Sensors Utilizing Intrinsically Conductive Polymer Impregnated Open Cell Foams |

**Advisor: M. Utz**

| | | |
|---|---|---|
| 26 | Rozman, Michael | Efficient Reconstruction of Multi-Phase ??Rorphologies from Correlation Functions |

**Advisor: R.A. Weiss**

| | | |
|---|---|---|
| 27 | Chun, YongSung | Physical Aging of Sulfonated EPDM Ionomer |
| 28 | Lee, Hyuk-soo | Nano-blend of TLCP and Sulfonated Polystyrene Ionomer |
| 29 | Tian, Jun | Rheology of Hydrophobically-Modified Alkyl Acrylamides |
| 30 | Wang, Yangbing | Electrical Nose |
| 31 | Wu, Qi | Compatibilization of PP/TLCP blends with Poly(Ethylene-Acrylic acid) inonomer. |
| 32 | Xu, Liang | Melt Crystallization of PC in PC/ZnSPS blend |

# POLYMER SCIENCE SEMINARS
# Fall Semester 2001

**September 7** **A Comparison of IR versus Raman Spectroscopy for the Forensic Analysis of Fiber Evidence**
*Dr. Edward G. Bartick*, FBI Academy

**September 14** **Protein based Three-Dimensional Memories and Hybrid Semiconductor Devices**
*Prof. Robert R. Birge*, University of Connecticut

**September 21** **Modification of Unsaturated Polymers**
*Prof. E. Bryan Coughlin*, University of Massachusetts, Amherst

**September 28** **Ultrasonic Nondestructive Evaluation of Bonded Assemblies and Spectroscopic Analysis of Morphology and Material Property Transformations**
*Dr. Gregory T. Schueneman*, Loctite Corporation

**November 2** **To be Determined**
*Prof. Kenneth J. Beers*, Massachusetts Institute of Technology

**November 9** **Entropic Barrier Theory of Polymer Translocation**
*Prof. Muruguppan Muthukumar*, University of Massachusetts, Amherst

**November 30** **Investigations of Complex Polymer Systems by Solid-State NMR**
*Prof. Klaus Schmidt-Rohr*, University of Iowa

All seminars are on Fridays at 11:00 AM in IMS Room 20.
Coffee will be served at 10:30 AM outside the seminar room.
For more information, please contact YH Chudy at (860) 486-3582, Fax: (860) 486-4745, E-mail: *ychudy@mail.ims.uconn.edu* or visit *www.ims.uconn.edu* on the Web.

# IMS Associates Program Members

**Aearo Company**
Southbridge, MA
Safety Products

**Ahlstrom Fiber Composites**
Windsor Locks, CT
Nonwoven Fabrics, Adhesives, Composites

**Anocoil Corporation**
Rockville, CT
Offset Printing

**Arch Chemicals, Inc.**
Cheshire, CT
Biocides, Microelectronic Materials

**Beekley Corporation**
Bristol, CT
Medical Radiation Markers; Luggage Tags

**C&M Corporation**
Wauregan, CT
Electrical Cables

**Crompton Corporation**
Middlebury, CT
Polymers and Polymer Additives

**DeMaria Electro Optics Systems**
Bloomfield, CT
Lasers

**Enthone, Inc.**
New Haven, CT
Chemicals for Electronics

**Exxon Mobil Chemical Company**
Baytown, TX
Polymers for Electrical Insulation

**Foster Corporation**
Dayville, CT
Plastics Compounding

**General Cable**
Willimantic, CT
Electrical Cables

**Gentex Optics, Inc.**
Dudley, MA
Prescription Plastic Eyeglass Lenses

**Genzyme Corporation**
Coventry, CT
Hospital Products

**Gerber Scientific**
South Windsor, CT
Optical and Printer Systems

**Haydon Switch & Instrument**
Waterbury, CT
Switches and Stepper Motors

**Jeneric/Pentron, Inc.**
Wallingford, CT
Dental Products

**Johnson & Johnson Medical, Inc.**
Southington, CT
Hospital Products

**K & M Electronics**
West Springfield, MA
Power Supplies and Electron Multipliers

**Kerite Company**
Seymour, CT
Electrical Cables

**Laticrete International, Inc.**
Bethany, CT
Ceramic Tile Adhesives

**Loctite Corporation**
Rocky Hill, CT
Adhesives

# IMS Associates Program Members
(continued)

**New Era Materials**
Pawcatuck, CT
Plastics Compounding

**Norton Company/Saint-Gobain**
Northboro, MA
Abrasive Products

**Okonite Company**
Paterson, NJ
Electrical Cables

**Olin Corporation**
New Haven, CT
Chemicals for Polymers and Other Applications

**Optimum Compound Design**
Glastonbury, CT
Consulting on Electrical Cables

**Oxford Polymers**
New Britain, CT
Engineering Thermoplastic Compounders

**Pfizer, Inc.**
Groton, CT
Pharmaceuticals

**Phonon Corporation**
Simsbury, CT
Acoustic Surface Wave Devices

**Rogers Corporation**
Rogers, CT
Polymer Products for Computers
and Other Applications

**S G Alternatives, L.L.C.**
East Hartford, CT
Coatings for Glass Processing

**Spellman High Voltage Electronics Corp.**
Hauppauge, NY
X-ray Equipment Power Supplies

**TyCom Ltd.**
Eatontown, NJ
Undersea Intercontinental Telecommunication Systems

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# IMS ASSOCIATES PROGRAM
## CONSULTING - EDUCATION - ACCESS TO FACILITIES - PROBLEM SOLVING

The purpose of the IMS Associates Program is to afford industrial firms direct and convenient access to an outstanding regional resource - The Institute of Materials Science. The collaboration between technical personnel in industry and the University's faculty and staff affords each better appreciation of the other's concerns. Member firms enjoy direct access to the individual expertise of over one hundred scientists engaged in a variety of materials-related and other programs at the University of Connecticut.

**Major program areas at the Institute include: Metallurgy** - materials selection, corrosion, computer simulation, solid free-form fabrication, thermal barrier coatings; **Polymers** - adhesion, blends, biodegradable polymers, composites, electrical insulation, recycling, biomaterials; **Ceramics** - nanophase materials, in-situ toughening; and **Advanced analytical methods and surface modification** for all materials. Institute members in other departments with expertise in many diverse areas are also available for consultation.

For a nominal annual fee, member firms find assistance with timely response to all requests in a number of ways such as: troubleshooting raw materials, product and process problems; brainstorming sessions on new or existing projects; failure analysis; analysis of unknown contaminants and products; feasibility studies prior to committing major funds; learn about current research in materials science and technology and in the science and engineering areas; and hands on experience with new instruments. Results may lead to sponsorship of more extensive projects with IMS.

An important benefit comes from the ongoing intimate awareness of the various activities at IMS. This includes accessibility to numerous workshops, lectures, and colloquia in various areas of materials science as well as copies of technical reports and other publications. Member firms receive free registration for various short courses offered by the IMS. Graduate students may be targeted as prospective employees on graduation.