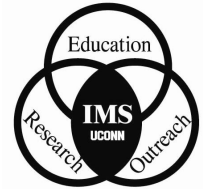




# University of Connecticut Institute of Materials Science



## IMS Associates Program Newsletter

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January 8, 2001

### New Faculty

Pamir Alpay will join the Metallurgy and Materials Engineering Department this spring as an Assistant Professor. Dr. Alpay received his Ph.D. from the Department of Materials and Nuclear Engineering at the University of Maryland in 1999. His work is mainly concentrated on electronic and smart materials. His

research interests are thermodynamics and kinetics of phase transformations in ferroelectric, ferromagnetic and superconductor thin films; multilayer heterostructures and the effect of internal stresses on the structural and physical properties of functional oxides.

### IMS Short Courses

IMS Associates Program will offer two short courses in the summer of 2001. The exact dates are still to be determined. Cost per registrant will be about \$500. Associates Program members will receive one free registration per course. Watch your mail for additional details.

#### Response Surface Methodology (continuation of Introduction to the Design of Experiments)

After having found out which parameters or factors are important to a process, it is still necessary to determine their optimal settings. To attack this problem, we will begin with fractional factorial designs and then move to Rotatable designs. These designs give equal information in all directions on the surface. To minimize the number of experimental runs, blocking and sequential designs will be considered. Designs that

answer questions, such as, are more experiments necessary, in which direction is the optimum, are we near the optimum, and what does the response surface look like will be introduced. Questions of stability of response based on Taguchi philosophy are also studied. For processes already in use, we will look at the method of Evolutionary Operation which encourages continuous improvement. The instructor will be Uwe Koehn, Emeritus Professor of Statistics, who also taught the introductory course.

#### Plastics Failure

This course is designed to take some of the mystery out of why plastics fail by demonstrating the role of the major factors that determine if there will be failure or success: material, design, processing and the effect of service condi-

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tions. The course bridges the gap between theoretical and basic aspects of polymers and the failure of plastics formulations in commercial and industrial practice. Failure prevention is emphasized throughout the course. Case studies of wide-ranging types of failure of

different materials and applications illustrate underlying principles. The instructor will be Dr. Myer Ezrin, author of the book "Plastics Failure Guide: Cause and Prevention", which will be used in the course.

## Short Course Registrations

In the past a small number of people have registered for short courses through the Associates Program and not attended. The Associates Program must still pay full price in this situation. Please note that participant substitutions can be made at any time and registration

can usually be canceled at minimal cost until the day before the course. We understand that occasionally plans must change but request your assistance when such changes occur.

## Associates Program Annual Meeting

The Associates Program Annual Meeting is scheduled for Wednesday May 23, 2001. Please save the day.

Watch your mail for additional details.

## Special Symposium

A special symposium, in memory of Professor Julian Johnson, will be held on Monday, May 14, 2001. The speakers will include his former students and col-

leagues. The symposium program will be available in February 2001. Refer to page 8 for information about Professor Johnson.

## Papadimitrakopoulos New Associate Director of IMS

Effective October 1, 2000 Fotios Papadimitrakopoulos, Associate Professor of Chemistry, was appointed Associate Director of IMS to fill the vacancy created by Jim Bell's retirement (see IMS Associates Program Newsletter Vol. 4, No. 2, August 2000). Papadimitrakopoulos graduated in 1987 from the University of Athens, Greece with a B.S. in Chemistry. He received his M.S. and Ph.D. from the Polymer Science and Engineering Department of the University of Massachusetts specializing in liquid-crystal polyurethane elastomers.

From 1992 to 1994 he held a post-doctoral appointment at Bell Laboratories in Murray Hill, New Jersey where he worked on the failure mechanisms of p-phenylene-vinylene based light emitting diodes. In 1994 he joined the faculty of the Polymer Program. He has established a diverse research program that spans organic light emitting diodes, semiconductor nanoparticles, photonic crystals, carbon nanotube actuators and biosensors.

## Sung Receives Distinguished Alumni Award

In June 2000 Sooky Sung, Polymer Program Director and Professor of Chemistry, received the Distinguished Alumni Award from the Engineering College of Seoul University. The award was for her outstanding contri-

butions in the area of polymer physical chemistry by development and application of innovative spectroscopic techniques.

## Weiss Recipient of Society of Plastics Engineers Award

Robert Weiss, A.T. DiBenedetto Distinguished Professor of Chemical Engineering, was named the recipient of the 2000 SPE Education Award. The award was presented at the Society's 58<sup>th</sup> Annual Technical Con-

ference in May 2000. The award is granted in recognition of outstanding contributions to education in the field of polymer science and engineering.

## Shaw Elected Fellow of the Society of Plastics Engineers

Montgomery Shaw, Distinguished Professor of Chemical Engineering, was elected Fellow of the Society for his contributions in the field of plastics engineering.

Out of 30,000 members only 169 have been elected to this prestigious status since it was established in 1984.

## Huang Presents Keynote Address

Sam Huang, Professor of Chemistry, presented the keynote address on "Biodegradable Polymers – Design, Synthesis and Application" at the First International

Polymer Modification, Degradation and Stability Conference held in Palermo, Italy, September 2-7, 2000.

## Corporate Contributions

Over the past few months several major corporate gifts to the University of Connecticut have been announced. The GE Fund, GE Capital and GE Industrial Systems have pledged \$11 million dollars over the next five years to help catalyze UConn's emergence as an education leader in e-business and e-engineering and to bolster the University's diversity program. The gift will support the Schools of Engineering and Business and the Neag School of Education. For complete details see <http://vm.uconn.edu/~advance/00112001.htm>.

Other corporate gifts recently announced include gifts from Aetna which pledged \$2.7 million matched by \$1.3 million for a total of \$4 million and a pledge of \$4 million from United Technologies with a match of \$2 million for a total of \$6 million. See news reports on these gifts at <http://vm.uconn.edu/~advance/00051502.htm> (Aetna) and <http://vm.uconn.edu/~advance/00092501.htm> (United Technologies).

## IMS Expansion — Construction Continues

Construction continues on the project that includes an expansion to the IMS to be located on the plaza of the Gant complex. 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 has been 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 state-of-the-art transmission electron microscopy, 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.

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## Spring Semester Starts

Spring semester 2001 classes start Wednesday, January 24, 2001. Some courses that may be of interest include the following.

CHEM-385	Polymer Reactions	S. Huang
CHEM-384	Polymer Characterization II	C. Sung
CHEG-352	Polymer Properties	M. Shaw
CHEG-320-15	Multi-phase Materials	R. Weiss
MCB-313	Structure and Function of Biological Macromolecules	J. Knox
MMAT-323	Electron Microscopy	M. Aindow
MMAT-303	Diffusion in Solids	J. Morral
MMAT-343	Corrosion	N. Greene
MMAT-317	Electronic Structure of Materials	J. Galligan
MMAT-305	Transformation in Alloys	P. Clapp

Some courses require pre-approval of the instructor. For further information please call Ed Kurz.

## Department Seminars

The seminar schedules have not been finalized at this time. This information will be available on the World Wide Web at <http://www.ims.uconn.edu/assoc/>. 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 also suggest you call before attending to be sure the seminar has not been canceled due to illness or weather.

## Staff Enrichment

IMS and the Associates Program make continuous efforts to incorporate new and upgraded instrumentation into our research, education and outreach efforts. In addition to constant improvements in instrumentation, the ability of the staff to most effectively utilize the various techniques is also continuously renewed. To this end IMS Associates Program personnel have attended various conferences and short courses over the past six months. Amanda Zepke attended the Eastern Analytical Society Symposium and Exposition held in Atlantic City in October. She attended a full day seminar on advanced infrared microscopy and a

two-day short course on the fundamentals of bench-top GC/MS. Gary Lavigne attended the Federation of Analytical Chemistry & Spectroscopy Societies Annual Conference in Nashville, Tennessee September 24 - 28 where he took a short course on Analytical Raman Spectroscopy. In August, Ed Kurz attended the ACS National Conference in Washington, DC focusing on the capabilities of atomic force microscopy. This month Mark Dudley will attend a 3-day hands-on atomic force microscopy course sponsored by ThermoMicroscopes.

## 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, 203-786-5037 (fax), [jcrane@connstep.org](mailto:jcrane@connstep.org); Dr. Harris L. Marcus, IMS, UConn, 860-486-4623, 860-486-4745 (fax), [hmarcus@mail.ims.uconn.edu](mailto:hmarcus@mail.ims.uconn.edu); or Dr. Martin Blackburn, IMS, UConn, 860-486-6832, 860-486-4745 (fax), [blackbur@mail.ims.uconn.edu](mailto:blackbur@mail.ims.uconn.edu).

## Process Control Short Courses for Techs, Scientists, Engineers and Practitioners

**Practical Process Control: March 20 & 21, 2001 and July 17 & 18, 2001**

**Advanced Practical Control: May 8 & 9, 2001**

These courses teach you new skills and proven methods you can use on the job to improve profitability and safety in your plant. They are a unique training experience that addresses the real needs of industry personnel working in a broad range of production, lab and pilot-plant operations. The courses use a "case studies" approach to teach you about the control of parameters such as temperature, pressure, flow, composition and level where the example processes have streams comprised of gases, liquids, slurries and melts.

For more information, visit <http://www.controlstation.com/course.html> or contact:

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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.

## Fundamentals of Aging and Failure – Polymers, Metals and Dielectrics

The Electrical Insulation Research Center (EIRC) held a full day workshop December 11, 2000. The subject event was "Fundamentals of Aging and Failure – Polymers, Metals and Dielectrics." Professor Arthur McEvily spoke on metals, Professor Steve Boggs, EIRC Director, spoke on dielectrics, and Dr. Myer Ezrin, IMS Associates Program Director, spoke on polymers. Among the attendees were ten people from seven As-

sociates Program member companies. EIRC serves major utilities and manufacturers of electrical insulation. Among the utilities represented were ConEd of New York, Northeast Utilities, New York State Electric and Gas Corporation, N-STAR Electric, Orange and Rockland Utilities, Potomac Electric Power Company, Public Service Company of New Hampshire and United Illuminating Company.

## Testing and Evaluation of Plastics

Myer Ezrin spoke about plastics failure at a short course on Testing and Evaluation of Plastics in Pittsfield, Massachusetts, October 12, 2000, sponsored by the Society of Manufacturing Engineers. The lecture

was also given at IMS as a Special Seminar on November 30. Twelve people from eight Associates Program companies attended.

## Society of Plastics Engineers Tours

Society of Plastics Engineers - Western New England Section tours of Loctite and of International Fuel Cells were opened up to Associates Program members.

Three members attended the Loctite tour and five attended the International Fuel Cells tour.

## Plastics Failure Guide – Cause and Prevention

A limited number of copies of the book "Plastics Failure Guide – Cause and Prevention," are available at a special price. This book by M. Ezrin normally sells for \$130. Dr. Ezrin has eight copies available at a special price of \$95, which he acquired with the author's discount. Unsold copies will be returned to the publisher

by the end of January 2001. Anyone interested in purchasing a book at the special \$95 price should send a check, payable to the University of Connecticut, to Nancy Borman, IMS, tel. 860-486-3242, fax 860-486-4745, email: [nancy.borman@uconn.edu](mailto:nancy.borman@uconn.edu). Upon request, the author will sign the book.

## 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 price is about \$200 per thousand depending on the exact size. Be sure to specify non-contaminating/non-plasticized material.

## **IMS Associates Program**

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## **Julian F. Johnson**

It is our sad responsibility to report the death of Julian F. Johnson at the age of 76 in Las Vegas, Nevada on June 24, 2000. Johnson was Professor Emeritus of Chemistry at the University of Connecticut. He received his B.S. from the College of Wooster (Ohio) in 1943 before entering the Navy, where he was engineering officer aboard several destroyers in both the Atlantic and Pacific campaigns of World War II. He then earned a Ph.D. in chemistry at Brown University and spent the next 18 years at the Chevron Research Company. Johnson joined the Chemistry Department and the Institute of Materials Science in 1968 and became Associate Director of IMS in 1971. He retired in 1989 as Professor of Chemistry, after having mentored 30 Doctoral students and a dozen Masters students, and produced over 300 publications. He lectured widely, was a visiting scientist at both IBM and Avery International and won many awards including the ACS National Award in Chromatography and Electrophoresis. He will best be remembered for his almost uncanny ability to lead young scientists into independent activity, many times of an extraordinary level of accomplishment, and for his acumen and energy in fostering the development of the Polymer Science Program and the Institute of Materials Science at the University of Connecticut.