



University of Connecticut Institute of Materials Science



IMS Associates Program Newsletter

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Weiss Selected for University's Highest Honor

Five faculty who have achieved exceptional distinction in scholarship, teaching and service have been named Board of Trustees Distinguished Professors, the highest academic title for a member of the UConn faculty. Robert Weiss, Professor of Chemical Engineering and Director of the Polymer Program, was honored for his work centering on ionomers, liquid crystal polymers and polymer blends. He is the author of 15 patents and more than 300 research

papers, book chapters and conference papers. More information regarding Dr. Weiss's research interests can be found at <http://www.ims.uconn.edu/polymer/faculty/weiss.htm>.

Others honored included Gary English, Professor of Dramatic Arts; Deborah Fein, Professor of Psychology; Debra Kendall, Professor of Molecular and Cell Biology and Philip Marcus, also Professor of Molecular and Cell Biology.

Homeland Security Conference at UConn

ICATHS (International Conference on Advanced Technology for Homeland Security) 2003 will be the premier Homeland Security Conference of 2003, featuring a diverse agenda anchored by technologies for Homeland Security as well as the politics and policies of Homeland Security. ICATHS will include nationally recognized experts in technology and policy and will be amenable to scientists, managers and policy makers/implementers alike. With its speaker roster by invitation only, coming from high levels of government, industry, academia and national laboratories, ICATHS promises to be a seminal

event in Homeland Security.

ICATHS 2003 will take place September 25 – 26, 2003 on the Storrs campus of the University of Connecticut. See <http://www.engr.uconn.edu/icaths/> for additional details.

Please note that the Associates Program only offers financial assistance with registration to short courses, conferences and symposia sponsored by the IMS and does not offer assistance to those presented by other departments as is this conference.

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Nanotechnology in Connecticut Symposium

There will be an all day symposium on Nanotechnology in Connecticut held at Jorgenson Auditorium, University of Connecticut, Storrs campus on Tuesday, October 16, 2003 from 8:30 a.m. to 7:00 p.m. Please

reserve the date to participate in how nanotechnology will be addressed for the Connecticut economy. Additional details will follow.

Focus on Research

In each issue of this newsletter we profile one of the active research areas at IMS. In this issue we focus on the research being led by Gregory Sotzing, Assistant Professor of Chemistry. Professor Gregory Sotzing is primarily interested in the fields of intrinsically conductive polymers, heterocyclic synthesis, polymer synthesis, electrochemistry, and device fabrication. These areas are split into the following categories.

Optically Transparent Conductive Polymers: The goal of this program is to produce water soluble and water dispersible conductive polymers that are projected to replace indium doped tin oxide as a transparent conductor in display applications. The polymers that we synthesize are highly novel in that they are not linear but branched, exhibit high transparency in the conductive state throughout the visible region with conductivities approaching 150 S/cm. The Sotzing group is investigating many other heterocyclic structures to further increase optical transparency and electrical conductivity. In addition to novel polymers, the Sotzing group has extensively explored the commercially available poly(3,4-ethylenedioxythiophene)-poly(styrene sulfonate) [tradename Baytron-P].

Low Band Gap Conjugated Polymers: The polymers that we prepare from thieno[3,4-b]thiophene have band gaps as low as 0.85 eV. These polymers, in addition to being easily p-doped, are easily n-doped. As such, we are utilizing our materials in applications such as type III supercapacitors. We are also utilizing these polymers as long wavelength dyes ($\lambda_{max} > 700 \text{ nm}$).

Electrochromic Devices/Windows: Electrochromics are sought after for displays, windows, and glasses. An electrochromic is a material that is able to switch between the bleached and colored states upon application of a current or voltage. For displays, they offer a

cheap alternative to LED technology. For windows, they have the ability to have tunable dimming allowing for variation in optical light and infrared to pass and thereby will allow for shade and energy conservation for buildings. For personal glasses, they offer eye protection from the sun. The competing technology is photochromics. Electrochromics, in comparison, have the ability to have a tuned colored or bleached state via use of a variable resistor and can be operated using a compact lithium 3V battery.

Sensors: Currently, Professor Sotzing has projects ongoing with the Electronic Nose and Electronic Tongue. These technologies are based upon an array of chemiresistor sensors that utilize pattern recognition in order to identify volatile organic compounds. The Sotzing group is primarily interested in the construction of novel sensor formats that address food analysis and the detection of explosives and chemical warfare agents.

Nanotechnology: Professor Sotzing has invented a process called oxidative solid-state crosslinking as a means to produce intrinsically conductive and conjugated polymers. This process has increased the yield of electropolymerization from ~10% to ~100%. The advantages to utilizing this technique are that smooth films can be cast using traditional methods and can later be patterned via an applied potential to produce conductive polymer. The Sotzing group has already demonstrated the ability to pattern at sub-second speeds and the ability to direct write sub-micron lines using the electrochemical atomic force microscope (e-AFM) at speeds of $>10,000 \text{ nm/s}$.

Additional information and selected publications can be found at: <http://www.ims.uconn.edu/polymer/faculty/sotzing.htm>.

Members Corner

In each newsletter we present short descriptions of one or two of our member companies. In this issue we focus on General Cable. We thank Geoffrey Wilson of General Cable for this contribution.

General Cable (NYSE: BGC) headquartered in Highland Heights, Kentucky, is a leader in the development, design, manufacture, marketing and distribution of copper, aluminum and fiber optic wire and cable products for the communications, energy, industrial and specialty markets. The Company offers competitive strengths in such areas as breadth of product line, brand recognition, distribution and logistics, service and operating efficiency. Communications wire and cable products transmit low-voltage signals for voice, data, video and control applications. Energy cables include low-, medium- and high-voltage power distribution and power transmission products. The Industrial and Specialty segment is comprised of application-specific cables for uses such as electrical power generation (traditional fuels, alternative and renewable sources, and distributed generation), the oil, gas and petrochemical industries, mining, industrial automation, marine, military and aerospace applications, power applications in the telecommunications industry, and other key industrial segments. Visit our website at www.Generalcable.com.

General Cable Corp. has been a charter member with the Institute for nearly 30 years. This long-term relationship has proven so fruitful in many ways. From assistance in resolving manufacturing problems to ma-

terials analysis as well as field problems with end customers. Some examples come to mind where the Institute has provided assistance:

- Oxidative induction time (OIT) analysis on certain materials in order to determine the impact processing has on antioxidant levels.
- Head space GC/Mass Spec analysis on blistered areas on a neoprene jacket revealed that the blistering was due to herbicides/pesticides being sprayed onto the cable in an agricultural field. Essentially proved that there was nothing wrong with the cable.
- Use of the Institutes heavy duty tensile testing equipment with the customer present helped us gain approval at a key account.
- XPS analysis on a discolored colored jacket revealed the presence of sulfur. Proved that the cv lines where the cable was processed contained residual sulfur from previous runs. Once the lines were cleaned, there was no further discoloration.

The list goes on. It simply shows that the Institute with its vast instrumental capabilities, coupled with an outstanding interdisciplinary faculty is an outstanding asset for any organization. We are fortunate to be a member of the Associates Program at the Institute of Materials Science.

ASM/TMS Student Chapter

The UConn student chapter of ASM/TMS is a very active one and has received many awards due to their motivation and determination to reach as many people as possible about the exciting future of materials. Our chapter has focused on outreach to younger students for many years. The driving force behind our outreach efforts is the realization that many students entering college have very little understanding about the various fields of engineering (let alone Materials Engineering).

Our goal is to highlight the exciting future of Materials Engineering for middle school and high school students as well as their teachers. To accomplish this goal, we have traditionally performed countless outreach activities.

To learn more about this chapter's activities see: <http://www.ims.uconn.edu/%7Easmtms/>.

Associates Program Annual Meeting

The Associates Program annual meeting was held on Wednesday May 28, 2003. Over fifty representatives from member companies joined IMS faculty, staff and students for the day's events. Titles and authors of presentations at the event follow.

Patent Infringement and Product Liability Litigation Involving Chemicals and Plastics

Myer Ezrin, Director of the IMS Associates Program

Metallic Glasses - Half Full or Half Empty?

Martin Blackburn, Research Professor, Department of Metallurgy and Materials Engineering

Melting, Casting, and Solidification R&D Capabilities in IMS

Harold Brody, Distinguished Professor, Department of Metallurgy and Materials Engineering

Nanostructure and Morphology in Polymeric Materials

Lei Zhu, Assistant Professor, Department of Chemical Engineering

The Connecticut Industrial Efficiency Partnership: Leveraging Resources

Jack Crane, Consulting Engineer, CONNSTEP

Nano-101: Since When is Smaller Better?

Patrick Mather, Assistant Professor, Department of Chemical Engineering

Process Control Short Course

Practical Process Control: November 5 & 6, 2003

This course begins with a firm foundation in the important fundamentals of PID (Proportional, Integral, Derivative) control. We then move on to explore some of the advanced classical methods and techniques popular in current industrial practice. For all topics, you will gain hands-on experience in tuning controllers and testing algorithm performance. 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.

Some of the companies who have had attendees at our courses include: Genzyme, Wyeth-Ayerst, Eli Lilly, Searle, Boehringer-Ingelheim, Schering-Plough, Bayer, Chiron, Aventis, Sepracor GE Fanuc, Honeywell, International Paper, Rexam, Haverhill, Sara Lee, DiGiorno, Ocean Spray, Gerber, Nestle, Kraft, National Starch, Air Products, Dow, Kerite, Owens Corning, Solutia, PPG, Akzo Nobel, Uniroyal, Dupont, BP Amoco, AlliedSignal, Loctite, Hamilton Sundstrand, Praxair, Ensign-Bickford, Monsanto, Rogers, Cytex, Pratt & Whitney, Westinghouse, ABB Combustion Engineering, Fuel

Cell Energy, Delphi Automotive, UTC Fuel Cells, Kimberly-Clark, Proctor & Gamble, Estee Lauder, Colgate Palmolive, Cuno, Warner-Lambert, Pitney Bowes and Benjamin Moore.

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 presented by other departments as is this course.

Biology/Physics Building Dedicated

The newly completed Biology/Physics Building was dedicated on Friday May 9, 2003 with a ceremony and symposium entitled "Brave New World: Biology in the 21st Century." The building houses offices and labs for the faculty in the Department of Molecular and Cell Biology; greenhouses, more than 125,000 biological

specimens including birds, fish, mammals, parasites and vascular plants. The building also houses laboratories and a laser facility for the Department of Physics and a new electron microscope facility. The building connects to IMS on the ground floor of the Gant Science Complex.

Fall Semester Starts

Fall semester 2003 classes start Monday, August 25, 2003. Some courses that may be of interest include the following.

CHEM-380	Polymer Synthesis	A. Asanedi
CHEM-381	Polymer Physical Chemistry	M. Utz/A. Dobrynin
CHEM-382	Polymer Characterization I	C. Sung
CHEG-351	Polymer Physics	R. A. Weiss
CHEG-355	Morphology	L. Zhu
PHYS-363	Dielectric Materials	S. Boggs
MMAT 307	Solidification of Metals and Alloys	H. Brody
MMAT-320	Welding	T. Kattamis
MMAT 323	Transmission Electron Microscopy	M. Aindow
MMAT-343	Corrosion	N. Greene

Some courses require pre-approval of the instructor. For further information please contact the instructor

Department Seminars

A preliminary fall semester seminar schedule for the Polymer Program is shown on page 11. We will send the finalized schedules for the Metallurgy and Materials Engineering Department and the Polymer Program to our members. This information, and the seminar schedules for most departments, will also be available on the World Wide Web. 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.

Regional Technology Alliance Meeting

The regional technology meeting was held at the Institute of Materials Science on February 25, 2003. An overview of IMS was presented by Harris Marcus. Lab tours of ceramics processing, solid freeform fabrication, SEM and TEM, X-ray diffraction and crystallography of proteins and enzymes, polymer rheology, electronic noses, surface analysis and IR-Raman and GC-MS were offered. A poster session was also presented as part of this meeting. Titles and authors follow.

	Author	Title
	Metallurgy & Materials Engineering (1-8)	
	Advisor: Mark Aindow	
1	Horspool, David	Characterization of Nanostructured Materials by Transmission Electron Microscopy
	Advisor: Mark Aindow and Martin Blackburn	
2	Vasiliev, Alexandre	Microstructural Development in Advanced Aerospace Alloys
	Advisor: S. Pamir Alpay	
3	Ban, Zhigang	Thermodynamic Analysis of the Hysteresis Offset in Polarization Graded Ferroelectric Materials
	Advisor: Harris Marcus	
4	Crocker, James	Selective Area Laser Deposition Vapor Infiltration (SALDVI) of Silicon Carbide Matrix Composites for Solid Freeform Fabrication
	Advisor: John Morral	
5	Li, Yali	A Local Equilibrium Model for Designing Oxidation Resistant Alloys
	Advisor: Nitin Padture	
6	Wu, Jie	New Low-Thermal-Conductivity Rare Earth Zirconates for Thermal Barrier Coating Applications
	Advisor: Leon Shaw	
7	Luo, Hong and Villegas, Juan	Processing and Properties of Nanomaterials
	Advisor: Mei Wei	
8	Qu, Haibo and Kothapalli, Chandrasekhar R.	Biomaterials for Hard Tissue Replacement
	Connecticut Global Fuel Cell Center (9)	
	Advisor: Nigel Sammes	
9	Du, Yanhai and England, Ray	Intermediate Temperature Solid Oxide Fuel Cells

Regional Technology Alliance Meeting (cont.)

	Author	Title
	Polymer Program (10-23)	
	Advisor: Patrick Mather	
10	Liu, Changdeng	Semicrystalline Shape Memory Polymers
11	Rousseau, Ingrid	Soft Actuators
	Advisor: Fotios Papadimitrakopoulos	
12	Chattopadhyay, Debjit	Length Fractionation and Organization of Solubilized Single-wall Carbon Nanotubes: A Step Closer to Nanotube Based Nanotechnology
13	Kim, Sejong	DNA Assisted Photonic Crystal Fabrication
14	Li, Rongfu	Probing the Structure-Property Relationship of CdSe Nanocrystal by Controllable Etching
	Advisor: Montgomery T. Shaw	
15	Gupton, Jonathan (w/ Weiss)	Miscibility and Conductivity of the SPS/PEO Blend System
16	Liu, Zhizhong	Rheology of SPE/Squalene Solution
	Advisor: Gregory A. Sotzing	
17	Jang, Sung-Yeon and Marquez, Manuel	Patterning Polynorbonylenes with Conducting Polymers Utilizing Oxidative Solid-state Crosslinking
18	Lee, Byoungchul	Aqueous Phase Polymerization of Thieno [3,4-b] Thiophene
19	Seshadri, Venkataramanan	Ion-Transport Behavior of Polymers and Copolymers Containing Thieno [3,4-b] Thiophene
	Advisor: Chong S. P. Sung	
20	Kim, MinSun	Intrinsic UV Reflection and Fluorescence Studies for Water Sorption in Polycarbonate, Polyurethane and Poly (ethylene terephthalate) Films
	Advisor: Robert A. Weiss	
21	Chun, YongSung	Sulfonated Poly(ether ketone ketone) Membrane for Fuel Cell Application
22	Tian, Jun	Microstructure of Hydrophobically Modified Alkyl Acrylamide Polymers
23	Wang, Yanbing	Preparation of Conductive Foams and Their Application as Chemical Sensors

Recent Publications of the Faculty of the Department of Metallurgy and Materials Engineering

Mark Aindow

"A Transmission Electron Microscope Study of Microstructural Development in Magnetron Sputtered MoSi₂ Thin Films," (with X.Y. Wang and I.T.H. Chang), *Intermetallics*, Vol. 10, pp. 829, 2002.

"Magnesium Manganese Oxide Nanoribbons: Synthesis, Characterization and Catalytic Applications," (with J. Liu, J. Cai, Y.C. Son, Q. Gao, S.L. Suib), *Journal of Physical Chemistry B*, Vol. 106, pp. 9761, 2002.

"Nucleation of the C40 to C11_b Transformation in Magnetron-Sputtered MoSi₂ Thin Films," (with X.Y. Wang and I. T.H. Chang), *Philosophical Magazine Letters*, Vol. 82, pp. 687, 2002.

"Measurement of Epitaxial Misorientations and Related Effects in Thin Films of YBa₂Cu₃O₇-TM Grown on Nominally (001)MgO Substrates by Pulsed Laser Deposition," (with D.J. Norris), *Thin Solid Films*, Vol. 423, pp. 33, 2003.

"Effects of Zn Coating on the Microstructure and Magnetic Properties of Nd-Fe-B Magnets," (with Y. Hu, I.P. Jones and I.R. Harris), *Journal of Alloys and Compounds*, Vol. 351, pp. 299, 2003.

"Zn Diffusion Induced Precipitation along Grain Boundaries in Zn-coated NdFeB Magnets," (with Y. Hu, I.P. Jones and I.R. Harris), *Journal of Magnetism and Magnetic Materials*, Vol. 261, pp. 13, 2003.

"Effect of Self-Accommodation on α/α Boundary Populations in Pure Titanium," (with S. Wang and M. Starink), *Acta Materialia*, Vol. 51, pp. 2485, 2003.

"Formation of a Cu/-Al₂O₃ Self-Assembled Nanocomposite," (with T. Bhatia and N.P. Padture), *Philosophical Magazine Letters*, Vol. 83, pp. 135, 2003.

S. Pamir Alpay

"Stress Induced Polarization-Graded Ferroelectrics," (with J. V. Mantese, N. W. Schubring, A. L. Micheli, M. P. Thompson, R. Naik, G. W. Auner, I. B. Misirlioglu), *Applied Physics Letters*, Vol. 81, pp. 1068, 2002.

"Dependence of the Pyroelectric Response on Internal Stresses in Ferroelectric Thin Films," (with Z.G. Ban), *Applied Physics Letters*, Vol. 82, pp. 3499, 2003.

"Fundamentals of Graded Ferroic Materials and Devices," (with Z.G. Ban and J.V. Mantese) *Physical Review B*, Vol. 67, pp. 184104, 2003.

"Thermodynamic Analysis of Temperature-Graded Ferroelectrics," (with Z.G. Ban and J.V. Mantese), *Applied Physics Letters*, Vol. 82, pp. 1269, 2003.

"Optimization of the Tunability of Barium Strontium Titanate Films via Epitaxial Stresses," (with Z.G. Ban), *Journal of Applied Physics*, Vol. 93, pp. 504, 2003.

Maurice Gell

"Microstructure Development of Al₂O₃-13wt.%TiO₂ Plasma Sprayed Coatings Derived from Nanocrystalline Powders," (with D. Goberman, Y. Sohn, L.L. Shaw, and E.H. Jordan), *Acta Materialia*, Vol. 50, pp. 1141, 2002.

"Mechanisms Of Ceramic Coating Deposition In Solution Precursor Plasma Spray," (with T. Bhatia, A. Ozturk, L. Xie, E.H. Jordan, B. Cetegen, X. Ma and N.P. Padture), *Journal of Materials Research*, Vol. 17, pp. 2363, 2002.

"Low Thermal Conductivity Rare-Earth Zirconates for Potential Thermal-Barrier-Coatings Applications," (with J. Wu, X. Wei, N.P. Padture, P.G. Klemens, M. Gell, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of the American Ceramic Society*, Vol. 85, pp. 3031, 2002.

"Thermal Conductivity of Ceramics in the ZrO₂-GdO_{1.5} System," (with J. Wu, N.P. Padture, P.G. Klemens, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of Materials Research*, Vol. 17, pp. 3193, 2002.

"Plasma Spray Forming of Nanostructured Composite Coatings," (with E.H. Jordan X. L. Jiang and L.L. Shaw), *Journal of Materials & Technology*, Vol. 18, pp. 287-288, 2002.

"Thermal Cycling of EB-PVD/MCrAlY Thermal Barrier Coatings: II. Evolution of Photo Stimulated Luminescence," (with Y. H. Sohn, K. Vaidyanathan, M. Ronski and E.H. Jordan), *Surface Coating and Technology*, Vol. 146-147, pp. 102, 2002.

"NDE Assessment of TBCs: An Interim Report Of A Photo-Stimulated Luminescence 'Round Robin' Test," (with J. A. Nychka, D.R. Clarke, S. Sridharan, E.H. Jordan, M.J. Lance, C.J. Chunnillall, I.M. Smith, S.R.J. Saunders, R. Pillan, B. Sergo, A. Selcuk, A. Atkinson, K.S. Murphy), *Surface and Coatings Technology*, Vol. 163-164, pp. 87, 2003.

"Failure Modes in Plasma-Sprayed Thermal Barrier Coatings," (with K. W. Schlichting, N.P. Padture, and E.H. Jordan), *Materials Science and Engineering A*, Vol. 342, pp. 120, 2003.

"Implementation of a Viscoplastic Model for a Plasma Sprayed Ceramic Thermal Barrier Coating," (with W. Xie, K. P. Walker and E.H. Jordan), *Journal of Engineering Materials and Technology*, Vol. 125, pp. 200, 2003.

"Indentation Fracture Behavior of Plasma Sprayed Nanostructured Alumina-13wt.% Titania Coatings," (with H. Luo, D. Goberman and L.L. Shaw), *Materials Science and Engineering A*, Vol. 346, pp. 237, 2003.

Harris L. Marcus

"Powder Effects in SiC Matrix Layered Structures Fabricated Using Selective Area Laser Deposition Vapor Infiltration (SALDVI)," (with J.E. Crocker and L.L. Shaw), *Journal of Materials Science*, Vol. 37, pp 1, 2002.

John E. Morral

"A Local Equilibrium Model for Internal Oxidation," (with Y. Li), *Acta Materialia*, Vol. 50, pp. 2683, 2002.

Nitin P. Padture

"Stepwise-Graded Si₃N₄-SiC Ceramics with Improved Wear Properties," (with S.C. Thompson, A. Pandit and S. Suresh), *Journal of the American Ceramic Society*, Vol. 85, pp. 2059, 2002.

"Mechanisms of Ceramic Coating Deposition in Solution-Precursor Plasma Spray," (with T. Bhatia, A. Ozturk, L. Xie, E.H. Jordan, B.M. Cetegen, M. Gell and X. Ma) *Journal of Materials Research*, Vol. 17, pp. 2363, 2002.

"Low Thermal Conductivity Rare-Earth Zirconates for Possible Thermal-Barrier Coatings Application," (with J. Wu, X. Wei, P.G. Klemens, M. Gell, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of the American Ceramic Society*, Vol. 85, pp. 3031, 2002.

"Thermal Conductivity of Ceramics in the ZrO₂-GdO_{1.5} System," (with J. Wu, P.G. Klemens, M. Gell, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of Materials Research*, Vol. 17, pp. 3193, 2002.

"Failure Modes in Plasma-Sprayed Thermal Barrier Coatings," (with K.W. Schlichting, E.H. Jordan and M. Gell), *Materials Science and Engineering A*, Vol. 342, pp. 120, 2003.

"Formation of a 'Self-Assembled' Cu/Al₂O₃ Nanocomposite," (with T. Bhatia and M. Aindow), *Philosophical Magazine Letters*, Vol. 83, pp. 135, 2003.

"Improved Interfacial Mechanical Properties of Al₂O₃-13wt%TiO₂ Plasma-Sprayed Coatings Derived from Nanocrystalline Powders," (with P. Bansal and A.L. Vasiliev), *Acta Materialia*, Vol. 51, pp. 2959, 2003.

"Graded Ceramics for Improved Contact-Damage Resistance," *Materials Science Forum*, Vol. 423-425, pp. 125, 2003.

Leon L. Shaw

"Microstructure Development of Al₂O₃-13wt.%TiO₂ Plasma Sprayed Coatings Derived from Nanocrystalline Powders," (with D. Goberman, M. Gell, Y. Sohn and E.H. Jordan), *Acta Materialia*, Vol. 50, pp. 1141, 2002.

"Plasma Spray Forming of Nanostructured Composite Coatings," (with E.H. Jordan X. L. Jiang and L.L. Shaw), *Journal of Materials & Technology*, Vol. 18, pp. 287-288, 2002.

"Distortion Minimization of Laser Processed Components through Control of Laser Scanning Patterns," (with K. Dai), *Rapid Prototyping Journal*, Vol. 8, pp. 270, 2002.

"Synthesis and Processing of Nanostructured WC-Co Materials," (with Z.G. Ban), *Journal of Materials Science*, Vol. 37, pp. 3397, 2002.

"Synthesis of Nanostructured Silicon Carbide through Integrated Mechanical and Thermal Activation Process," (with R.M. Ren and Z.G. Yang), *Journal of the American Ceramic Society*, Vol. 85, pp. 819, 2002.

"Thermal Stability of Nanostructured Al₉₃Fe₃Cr₂Ti₂ Alloys Prepared via Mechanical Alloying," (with J. Villegas, H. Luo and D. Miracle), *Acta Materialia*, Vol. 51, pp. 2647, 2003.

"Effects of Process Control Agents on Mechanical Alloying of Nanostructured Aluminum Alloys," (with M. Zawrah,

Recent Publications of the Faculty of the Department of Metallurgy and Materials Engineering (cont.)

J. Villegas, H. Luo and D. Miracle), *Metallurgical and Materials Transactions*, Vol. 34A, pp. 159, 2003.

"Indentation Fracture Behavior of Plasma Sprayed Nanostructured Alumina-13wt.% Titania Coatings," (with H. Luo, D. Goberman and M. Gell), *Materials Science and Engineering A*, Vol. 346, pp. 237, 2003.

"Characterization of Thermally Sprayed Nanostructured WC-Co Coatings Derived from Nanocrystalline WC-18wt % Co Powders," (with Z.G. Ban), *Journal of Thermal Spray Technology*, Vol. 12, pp. 112, 2003.

Mei Wei

"Synthesis and Characterisation of Hydroxyapatite, Fluoride-Substituted Hydroxyapatite and Fluorapatite", (with T. Bostrom, L. Grøndahl and J.H. Evans), *Journal of Materials Science: Materials in Medicine*, Vol. 14, pp. 311, 2003.

UConn's Famous Ice Cream Now in Stores

No longer do you have to travel to Storrs to enjoy UConn ice cream! In July UConn Huskies Dairy Bar Ice Cream made its debut in supermarkets and other retail outlets throughout the state and region. Sold in half-gallon oval tubs, it comes in eight flavors with

names such as Midnight Madness, Scholar Chip and 4.0 Chocolate. Royalties stemming from its sales will directly benefit academic programs in the College of Agriculture and Natural Resources.

(Preliminary Program)

POLYMER SCIENCE SEMINARS Fall Semester 2003

- September 19** **"Electrostatically-Generated Nanofibers and Nanocomposites"**
Frank K. Ko, Drexel University
- September 26** **"Supramolecular Polymerization: A Route to Responsive Materials"**
Stuart Rowan, Case Western Reserve University
- October 10?** **"Mechanical and Functional Properties of Polymer -based Nanocomposites"**
Thomas Tsakalokos, Rutgers
- October 24** **"Biocompatible Polymers for Drug Transport"**
Kathryn Urich, Rutgers, The State University of New Jersey
- November 7** **"Biomaterials ??..."**
Russell J. Composto, University of Pennsylvania
- November 14** **"Tissue Engineering Strategies for Nerve Repair-Polymeric Processing, Scaffolds, Axonal Guidance"**
Molly Shoichet, University of Toronto
- November 21** **"Synthesis and Rearrangement of Block Copolymer Brushes"**
William J. Brittain, University of Akron

All seminars are on Fridays at 11:00 AM in IMS Room 20, unless noted otherwise.

Coffee will be served at 10:45 AM outside the seminar room.

For more information, please contact YoungHee Chudy at [ychudy@ims.uconn.edu](mailto:ychedy@ims.uconn.edu), (860) 486-3582 or visit www.ims.uconn.edu on the Web.

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Department of Metallurgy and Materials Engineering Annual Report

The Department of Metallurgy and Materials Engineering has completed its annual report. A summary can be found at: <http://www.ims.uconn.edu/metal/Announce/UConnMMATAnnRep02-031>.

IMS Short Courses

This summer the IMS Associates Program offered two short courses; **Materials Protection** presented by Dr. Greene and **Joining of Metals and Ceramics** presented by Dr. Kattamis.

We plan to present at least one short course next summer. Tentatively we plan to offer Plastics Failure with Dr. Ezrin. Associates Program member companies will receive one complimentary registration. We would appreciate any input from you regarding this course and suggestions for future short courses.

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.

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.