Alfred University School of Engineering

AU Engineering News

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Inside this issue ...

RFSUNY and AU Sign Technology Marketing Agreement

A technology marketing agreement was signed October 9, 2003, between the Research Foundation of the State University of New York (RFSUNY) and the New York State College of Ceramics at Alfred University.

Under this agreement, assistance will include pursuing patent applications as well as licensing agreements with industry once a patent is granted. The NYS College of Ceramics has an over-100 year history of collaboration with industry both within New York State and nationally, as part of its mission to help the US ceramic industry be competitive in the global marketplace.

Dr. Guven Yalcintas (left), Vice President for Technology Transfer, SUNYRF; and Dr. David Szczerbacki (right), AU Provost and Vice President of Statutory Affairs, sign the new RFSUNY/NYSCC technology marketing agreement October 9, 2003, at AU's Susan Howell Hall.

David Earl

Earl appointed new CEER director

Dr. David Earl, assistant professor of ceramic engineering and materials science, has been appointed director of the Alfred University Center for Environmental and Energy Research (CEER).

"Dr. Earl brings to the position a wealth of experience in managing, as well as conducting, research," said Dr. Alastair N. Cormack, interim dean of the School of Engineering.

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Jones and LaCourse Honored for Research Excellence

Dr. Linda Jones, professor of ceramic engineering and science, and Dr. Bill LaCourse, Kruson distinguished professor of glass science, each received the SUNY Chancellor's Research Recognition Award at a dinner honoring researchers in Humanities, Arts and Social Sciences, Science, Medicine and Engineering that took place on October 20, 2003, at the State University Plaza in Albany.

Jones and LaCourse were among the 58 men and women honored represent 24 SUNY campuses including university centers and doctoral granting institutions, university colleges and technology colleges. The honorees' research spans 21 disciplines ranging from chemistry, medicine, and materials science to music education, literary criticism and political science. "These award-winning faculty members have contributed to the dramatic growth in the importance and volume

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CACT External Advisory Board Meeting

The CACT advisory board at its October 9, 2003, meeting pictured with CACT* and SoE faculty and staff. Front row (L-R): V. Amarakoon* G. Yalcintas, P. Boymel, L. Rickard, L. Pennisi*, A.N. Cormack**, R. Chand, C. Rodd*, R. Gundakaram*, X. Wang**. Back row (L-R): F. Calnan, W. Rheinhart, S. Burr, J. Capurso, R. Locker, A. Pasto, H. Stevens* and S. Arrasmith* .**

The Center for Advanced Ceramic Technology (CACT) External Advisory Board met for its semi-annual meeting on October 9, 2003, in conjunction with the McMahon Award lecture.

Despite recent economic challenges, CACT has maintained its near $2.5M research volume and company-customer base through programs instituted for small-to-medium sized companies: short-term proprietary projects, the CACT Affiliates program, the CACT Associates program involving industry internships and longer-term graduate student research projects.

Leveraging state agency (NYSTAR, NYSERDA) and federal agency (NSF, DOE, DOD) funding, CACT provides valuable access to cost-effective and reliable research resources - a benefit to both the company and the New York economy through improved growth and profits.

Dr. Vasantha Amarakoon, CACT director, opened the meeting with an overview of recent CACT funding and accomplishments. The CACT strives to establish research connections between companies and faculty members having common interests and research goals.

Dr. Alastair Cormack, Interim Dean of the AU School of Engineering and Director of AU's Graduate School, presented the new opportunities represented by the School of Engineering, bringing together AU's private sector electrical and mechanical engineering departments with the state-funded ceramic engineering, glass engineering science, biomedical engineering and materials science and engineering programs. His remarks were amplified by Dr. Doreen Edwards, SoE Graduate Program Director, while specific initiatives in biomedical materials were discussed by Dr. Subrata Saha, professor of biomaterials.

The next meeting of the EAB will be April 8, 2004, in conjunction with the annual S.R. Scholes Sr. Lecture.

Updated CACT CD-ROM coming soon
Reserve your free copy today!

The interactive compact disk describes the facilities of the AU School of Engineering and the services for industry available through the CACT.

The CD includes:

- **An intro to faculty and CACT personnel**
- **A virtual tour of the research facilities**
- **Illustrated guide to research equipment**
- **CACT membership and technology transfer options**

To get your free copy contact

Diane Vossler or Licio Pennisi at the NYS Center for Advanced Ceramic Technology
2 Pine Street
Alfred, NY 14802

CEER Director

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CEER has received more than $4 million in funding from the Environmental Protection Agency. The multi-disciplinary AU research center draws upon faculty expertise in mechanical, electrical and ceramic engineering, materials science, chemistry, economics and environmental science. Faculty and students work with industrial sponsors as well as state and federal sponsors on research and educational projects to promote technology that results in environmental and energy sustainability.

Earl remarked, "Alfred University clearly has unique, specialized talent in areas that facilitate the development of advanced energy technology and systems for materials recycling. Many members of our faculty are world renowned in their areas of expertise. This distinctive talent base will support the strategic plan under development to ensure the long-term growth of CEER and the resulting positive impact on society".

Earl is a 1985 graduate of Alfred University with a BS in ceramic engineering. He earned his master's and PhD degrees, both in materials science and engineering, from the University of Florida. Prior to joining Alfred University in 1999, Earl worked in industry for fifteen years, including positions of Director of Research and Operations Manager, where he was responsible for annual manufacturing budgets of up to $24 million. Prior to this appointment, Earl served as director of quality assurance for CEER.

Twice in the past three years, Earl has been awarded the John Marquis Memorial Award from the American Ceramic Society's Materials and Whiteware Division for a published research paper "of the greatest value to the members and to the industry."

Center for Glass Research Report

The CGR, Glass Manufacturing Industry Council (GMIC) and the DOE Industrial Technologies Program partner to Benefit the Glass Industry


Tom Seward

The NSF Industry-University Center for Glass Research (CGR) is in its fifth year as an Associate Member of the Glass Manufacturing Industry Council (GMIC). GMIC, a trade association of the US glass industry, includes representatives of all four glass manufacturing sectors: flat, container, fiber and specialty.

The CGR and the GMIC each receive funding from the US Department of Energy Industrial Technologies Program with a goal of making the US glass industry more energy efficient. Between January 1997 and December 2002, CGR received over $1.5 million of DOE funds to develop a glass melt properties data base useful for modeling glass melting process for increased efficiency. Publication of that work is under way.

Dr. Thomas Seward, CGR director and professor of glass science, is serving on the GMIC Next Generation Melting Systems task force to help that group identify and introduce revolutionary new technologies for glass manufacturing and also to participate in the annual GMIC-DOE glass project reviews. During the past year Seward helped organize CGR-GMIC jointly sponsored events, including an international workshop on "Strategies for Keeping Glass Viable in the 21st Century" (Rochester, NY, July 2003) and a symposium on "Adding Value to Glass" (Corning, NY, October 2003).

CGR Semiannual Research Meeting: January 2004

The NSF Industry-University Center for Glass Research (held its semiannual research meeting January 22-23, 2004, in Cocoa Beach, Florida. Thirteen member companies, the National Science Foundation, and the DOE Industrial Technology Program were represented.

The poster session featured ongoing CGR research projects as well as other current glass research from Alfred University, Pennsylvania State University, and University of Missouri-Rolla. Poster contest winners were grad students Nathan Lower (UMR), 1st place, and Bryan Wheaton (AU), 2nd place.

CGR director Dr. Tom Seward presented his annual report, speaking on the “state of the CGR” and future directions. Site directors Dr. Carlo Pantano, PSU distinguished professor of materials science and engineering, and Dr. Jeffrey Smith, UMR associate professor of ceramic engineering, presented their plans for securing NSF renewal of their CGR sites for Glass Surfaces and Interfaces Research, and Refractories Research.

The Liaison Board voted to fund two new research projects, one focusing on characterization of glass surfaces, the other on the effects of glass processing on strength. These projects will address the primary research focus areas of the CGR: Surfaces, Interfaces and Coatings; and Quality, Defects and Strength.

The **GlassResearcher** Editorial Advisory Board met to plan upcoming issues. The next issue will appear in the April 2004 American Ceramic Society Bulletin.

CACT Welcomes New Affiliates

The NYS Center for Advanced Ceramic Technology has reached new affiliate agreements with seven companies. The CACT Industrial Affiliates Program opens the doors of the Center for Advanced Ceramic Technology to ceramic companies interested in academic research and services. Affiliate members are generally linked to a faculty and/or CACT staff member with appropriate expertise who is available for technical consultations and to coordinate analytical testing services. Companies from small to large benefit from cost-effective services to help with product testing, characterization and quality assurance or production trouble shooting.

Federal Mogul Corporation is a global supplier of automotive components, sub-systems, modules and systems serving the world's original equipment manufacturers and the aftermarket. **Dr. Walter Schulze**, professor of ceramic and electrical engineering, is working with their Toledo, Ohio, Technical Support Center on studies directed toward next-generation production methods for their Champion Spark Plug division.


Walt Shulze

Nuvana Medical, **TMJ Implants** and **Instron Corporation** will be assisted in research by **Dr. Subrata Saha,** professor of biomaterials, on biomedical devices, materials and testing. Nuvana Medical (Mrytle Beach, SC), a start-up company, is looking to the CACT and Saha for device prototype development and biomechanical testing of a new biomechanical device.


Subrata Saha

TMJ Implants (Golden, CO), is a global leader in cutting-edge technology with established orthopedic materials for temporomandibular joint prosthesis. TMJ

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BioNY organizer hopes to establish meeting series

Dr. Subrata Saha, professor of biomaterials and organizer of the Conference "Biomedical Engineering in NY "(BioNY, October 2003) brought together over 100 researchers, students, and clinicians. NYS academe, industry and government were represented. Saha and meeting attendees are hoping that this is only the first of a regular series of meetings. A discussion of the formation of a Bioengineering Alliance of New York began at this meeting and is continuing.

The successful meeting was supported by SUNY's "Conversations in the Disciplines" program, AU, the Whitaker Foundation, and corporate sponsors, Ivoclar-Vivadent, Inc; TMJ Implants, and Zimmer, Inc; and was attended by Dr. Russell Bessette, executive director of the NYS Office of Science, Technology and Academic Research (NYSTAR).

Dr. Vasantha Amarakoon, CACT director; Dr. Russell Bessette, executive director of the NYS Office of Science, Technology and Academic Research Dr. Subrata Saha and Dr. Pamela Saha celebrate a successful first BioNY conference.

New CACT Affiliates

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has entered into a long-term affiliate agreement that will in part support the Robert W. Christensen Biomaterials Laboratory, dedicated on June 9, 2003, in AU School of Engineering's Binns-Merrill Hall.

Licio Pennisi

Instron Corporation (Canton, MA) is working with Saha and his students to develop new grip designs for soft tissue characterization, with a view to expand their current market in biological and soft materials testing.

Dante LLC, the first overseas company to come to the Ceramics Corridor Innovation Center in Alfred, is moving here from Australia to have access to state-of-the-art research and development facilities. **Dr. Licio Pennisi**, CACT Assistant Director, will coordinate analytical services and provide consulting to help further develop their proprietary large-slab ceramic technology.

American Technical Coatings, Inc. (Rocky River, OH), manufactures easily moldable advanced ceramics and high temperature coatings for applications in industries such as aerospace and defense, aviation, automotive, foundry and others. **Dr. David Earl**, assistant professor of ceramic engineering and materials Science, will assist the company in problem solving related to the development of new heat-resistant materials.

David Earl

CACT Affiliate Steuben Tile readies new plant

CACT Affiliate Steuben Tile has completed construction on its new 45,000 square foot facility in the Shawmutt Industrial Park, Hornell, NY. With the installation of the mixing equipment this month, production testing is due to start. Steuben Tile's decision to establish its US manufacturing facility in Hornell was due both to excellent funding opportunities through the Hornell IDA and close access to the problem-solving capabilities of the CACT.

Steuben Tile will manufacture exquisite decorative tile from its Hornell, NY, facility. The company partners with other small factories located in Europe and South America to bring together a collection of unique designs, colors and textures harvested from Tuscany to the Andes, to be delivered throughout the US from its multiple warehouses.

Steuben Tile's main kiln, a custom Siti kiln for continuous firing. Raw Materials batching and mixing facility recently also installed.

Using the most modern Italian firing technology, color matching, and versatile clay forming technology, Steuben plans to match field tile manufactured in its Hornell, NY plant with handpainted tile produced abroad. The result - the styles of Limoge, Delft, Mexico, Italy and England on a white clay body, made in the USA to ASTM standards and a delight to both the eye and the pocketbook.

NCM9 posts complete conference information

Alastair Cormack, NCM9 organizer.

9th International Conference on the Structure of Non-Crystalline Materials, July 11-15, 2004
Radisson Hotel, Corning, NY

The conference website, **ncm9@alfred.edu**, has been recently updated to give complete information for conference participants:

- Abstract Submission
- Conference Registration
- Conference Hotel Reservation

The Conference venue is the Radisson Hotel, 125 Denison Parkway East, Corning, New York, 14830-4166.

Area attractions include the Corning Museum of Glass, Rockwell Museum of Western Art, Corning's Historic Market Street, the National Soaring Museum, Watkins Glen's State Park and International Racetrack, shopping, theaters and award-winning wineries.

NCM9 continues the tradition established in Cambridge, UK in 1976 and the most recently held meetings in Sardinia, Italy (1997) and Aberystwyth, Wales in 2000. The meeting is devoted to discussion of the structure of non-crystalline materials, particularly glasses, but encompasses any non-periodic system. Current interests include both short and medium range structure and the experimental techniques available to probe them.

Abstracts are requested by **March 15, 2004**, and may be submitted online from the website or mailed to Marlene Wightman, NYSCC at Alfred University, 2 Pine Street, Alfred, NY 14802. Registration may also be completed online or via a printable registration form available from the website.

Update: 7th International Conference on Advances in Fusion and Processing of Glass

Conference Proceedings scheduled for Spring 2004 release.

The proceeding of the 7th International Conference on Advances in Fusion and Processing of Glass (Rochester, NY, 2003) will be published as "Advances in Fusion and Processing of Glass III, Ceramics Transactions Volume 141," by the American Ceramic Society, Westerville, OH. The volume is planned for a release date coinciding with the Annual Meeting of the American Ceramic Society, April 18-21, 2004, Indianapolis, IN.

Two previous conferences in this series were also published by the American Ceramic Society as Ceramics Transactions Volume 29 (New Orleans, 1992) and Volume 82 (Toronto, 1997). The eighth conference in the series will be held in Germany in 2006.

Faculty News and Notes

Alix Clare

Dr. Alexis Clare, professor of glass science, was recently appointed to the coordinating technical committee of the International Commission on Glass. Clare will be starting a new technical committee on glasses for medicine and biotechnology for that Society. Clare will also be presenting graduate seminars at Ohio State University on February 6, 2004, and at the University of Illinois on March 13, 2004.

Dr. Wallace B. Leigh, professor of electrical engineering, gave the paper "Single stage Data converter design using a block autorouter" at the Third Annual Microelectronics Design Conference, Columbia University, NYC, January, 2004. Co-authors were students Wei Liu and Zain Horning. Leigh will present "USE OF A BLOCK AUTOROUTER AND CELL LIBRARY FOR ANALOG CMOS," also co-authored with Liu, at the upcoming ISVLSI conference in Orlando in March.

Dr. Ravi Gundakaram, CACT research scientist, presented "The Role of Interfaces on Dopant Incorporation in Electronic Ceramics" at the International Conference on Materials for Advanced Technologies (ICMAT 2003) in Singapore, December, 7-12, 2003. Co-authors were Daniel Dunn and Dr. Vasantha Amarakoon, but the work incorporated contributions from Dr. Steven Arrasmith, Mr. Hamilton Black, Mr. Edward Bongio, Dr. Doreen Edwards and Dr. Walter Schulze.

Faculty Research Round-Up

Earl, Refractron strive to save energy in processing


David Earl

Dr. David Earl, assistant professor of ceramic engineering and materials science, is working with Refractron Technologies Corp. (Newark, NY and the Alfred CCIC) on a NYSERDA-sponsored project to reduce firing process energy requirements for industrial ceramics. Energy savings of over 44 million cubic feet of natural gas per year are expected through the success of this work.

Refractron Technologies Corp. is a leader in advanced engineered ceramics. Products include both controlled porosity and densely structured ceramics. Established in 1984 as a manufacturer of controlled porosity ceramic products, Refractron acquired a leader in dense structural zirconia and alumina - Xylon Ceramcs of Alfred, NY - in 2002; moving its R&D center to the Alfred CCIC to take full advantage of proximity to the NYS College of Ceramics.

AU research team works toward car of tomorrow


Jinghong Fan

Dr. Jinghong Fan, professor of mechanical engineering, is overseeing research on the cyclic creep of lightweight magnesium alloy components as part of a two projects totaling over five-year, $321K, program funded through The US Auvtomotive Materials Project (USAMP)/United States Council for Automotive Research (USCAR) program. USAMP partners include USCAR, a consortium of the three major US automotive manufacturers, research teams at AU, Georgia Tech and the University of Windsor (Canada); Lawrence Livermore, Oak Ridge and Sandia National Labs; and 30 alloy manufacturers.

The goal of the $10M USAMP program is to conduct joint research to further the development of lightweight magnesium alloy materials for improved automotive fuel economy. Fan and his team have developed new test methods and test assemblies with wide application in designing reliable bolt systems.

Fan has been a member of the mechanical engineering faculty since 2000 and is a active researcher in modeling complex multi-scale system behaviors.

Giesche funded by Xerox Foundation


Herbert Giesche

Dr. Herbert Giesche, associate professor of ceramic engineering, has received a $20K unrestricted grant from the Xerox Foundation in support of joint research on characterization of granular material with a particular view to measurement of parameters needed for particle simulations. Giesche has been a member of the ceramic engineering and materials science faculty since 1994 and is the director of the NSF-funded Powder/Porosity Characterization Laboratory.

Misture and Varshneya receive major DOE grant for novel glass research


Scott Misture


Arun Varshneya


Matt Hall

Dr. Scott Misture, associate professor of materials science, and **Dr. Arun Varshneya**, professor of glass science and engineering, have been awarded a 20-month $460K project by the Department of Energy (DOE) National Energy Technology Laboratory, to develop new high temperature glass and glass-derivative sealing materials. The work is to improve the fundamental understanding of these materials and to then demonstrate energy efficiency benefits when these materials are used in fuel cells and lamps. The research is joint with GE Global Research, Niskayuna, NY, recipient of over $300K funding for their portion of the work.

The team will investigate the compositional space in the RE_2O_3-Al_2O_3-MO_2-$MOSiO_2$ (RE= rare earth; M= metal) system for the development of higher Tg glass and glass-derivative sealing materials. A systematic approach will be taken for developing these classes of materials and potentially new processes. Misture will serve as AU project manager. He and postdoctoral associate Mick Dolan (not pictured) will focus on questions of high temperature diffraction characterization and phase equilibria. Varshneya and postdoctoral associate Alex Fluegel will investigate glass melting and thermophysical properties of glasses and glass-ceramics, while **Dr. Matt Hall**, assistant professor of biomaterials and glass science, and his advisee Brian Harper, MS student, will study non-conventional synthesis of glasses and glass-ceramics for the project.

At GE, Sylvia DeCarr (BS CE '86, MS CerSci '88) and Steve Bancheri will employ its Six Sigma methodology, which is a system-level approach for designing quality into new products as they are being developed. It is an effective method for identifying those key material parameters that have a significant impact on seal functional performance. The overall result of the program is a class of sealing materials that are suitable for use in planar solid oxide fuel cells and high intensity discharge lamps, with an improved fundamental understanding of the transfer functions between glass or glass-derivative microstructure, bulk seal material properties, and functional performance.

Jones, LaCourse honored

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of research being conducted on SUNY campuses – research leading to scientific breakthroughs that will prevent or heal medical disorders and ailments, protect the environment, create new pharmaceuticals and help us understand the origins of the universe," said Chancellor King.

Linda Jones

Linda E. Jones has been a member of the ceramic engineering and materials science faculty at AU since 1991. Jones' principal research areas are novel forms of carbon, including carbon oxidation and diamond oxidation; high-temperature solid gas reactions; environmental impacts of ceramic and glass manufacturing; structural composite materials and fibers; and the role of microstructure, physical properties, and chemistry on oxidation and mechanical behavior. Current research areas include investigation of BC_3 structure, the development of ceramic polymer precursors for the continuous manufacture of ceramic matrix composites with research partners the U.S. Air Force Office of Scientific Research and G.E. – Knolls Atomic Power Laboratory, respectively.

Jones has also worked as a propellant chemist in industry. The work in her laboratory on high temperature oxidation and degradation has been extended to the measurement of environmental effluents produced via manufacturing processes, including the manufacturing of glass. Ongoing research involves the measurement and quantification of air toxins and the use of different materials in the remediation and capture of toxins associated with the manufacturing process. Jones has been recognized repeatedly for excellence in teaching, receiving the NYSCC John F. McMahon Excellence in Teaching Award in 1994, 2001 and 2003 and the Kruson Teaching Excellence Award in Ceramic Engineering in 1994, as well as the Ruth Berger Rubenstein Memorial Award for Teaching (2000) from AU. In 1999, she received a State University of New York Chancellor's Award for Excellence in Teaching. Jones has repeatedly served as advisor to Alfred University's Team CERAMICS in development of experimental programs for inclusion in NASA's Reduced Gravity Student Flight Opportunities Program. Advising a team is a multiyear commitment; AU's teams have been selected twice in what is fairly stiff competition for a limited number of flights. "…. [A] reflection of the quality of the students and the quality of their science," said Jones, but also a reflection of the quality of their advisor!

Jones was the American Carbon Society's 1996 Griffin Lecturer. She serves as advisor to American Carbon Society and is a member of the American Ceramic Society and the Society of Women Engineers. A 1980 graduate of Mary Washington College with a B.S. in chemistry, Jones earned an M.S. in 1984 and a Ph.D. in 1987 from The Pennsylvania State University.

Bill LaCourse

William C. LaCourse, the Kruson Distinguished Professor of Glass Science at Alfred University, joined the faculty of the NYS College of Ceramics in 1970. An internationally known glass scientist, LaCourse has published more than 100 papers regarding glass and ceramics and has several patents ranging from asbestos replacements for brake drums, to microwave strengthening of glass, and use of glass fibers designed as bone patches in orthopedic surgery that dissolve harmlessly into the body after a bone has healed. LaCourse is a core faculty member of both the Biomedical Materials Engineering Science and Glass Engineering Science programs within AU's School of Engineering. His current research interests include ion-exchange strengthening of float glass, bio-active and resorbable materials, chalcogenide and fiber optic glasses, and scratch resistance of glasses and coatings.

LaCourse's research interests extend to all facets of glass technology, art and history. With colleague and glass artist Steve Edwards, he has developed the professional short course "Glass Science for the Glass and Ceramic Artist ," specifically for glass artists who wish to understand the behavior of glass from a more scientific viewpoint, and is co-author of a new book, "Glass Science for the Glass Artist" to be published soon. He also lectures on the interrelationships of historical glass art and the development of glass science.

LaCourse is widely respected by industry for his research innovation and is a past director of the NSF Industry-University Center for Glass Research. An innovative and creative entrepreneur, he is vice-president of Saxon Glass Technologies (with Dr. Arun Varshneya, president), for the application of glass strengthening innovations, and has also founded Santanoni Glass and Ceramics, a technical and artistic collaboration.

LaCourse is a fellow of the American Ceramic Society and member of the National Institute of Ceramic Engineers, the Ceramic Education Council and the Society of Glass Technology. He is a highly respected teacher, receiving the SUNY Chancellor's Award for Excellence in Teaching, AU's Kruson Faculty Award and the AU Excellence in Teaching Award. In addition, LaCourse is a talented musician and the announcer for AU home football and basketball games.

A graduate of SUNY at Stony Brook (a BS in engineering science in 1966 and MS in materials science in 1967), LaCourse received his PhD in materials science from Rensselaer Polytechnic Institute in 1969. He was named a National Research Foundation Research Fellow in 1970.

AU School of Engineering Short Course Offerings for 2004

For those interested in increasing their expertise in the field of ceramics and glasses, or those just being introduced, Short Courses are a good option. Designed for professionals in the ceramics and glass industry, these intensive courses offer a chance to update your knowledge of the field in a short period of time.

In order for engineers, technologists and managers to keep up with the swift changes in the field, they must be lifelong learners. In addition to the scheduled courses, a new course can be designed to meet your company's needs. For more complete listings and course fees, go to the Short Courses website or contact Marlene Wightman, **wightman@alfred.**edu, for more information. Currently scheduled courses include:

- Introduction to Photonics
- Thin Films
- Glass: Its Production and Properties
- Firing of Ceramics: Kilns and Furnaces, Equipment Controls, Firing Profiles
- Glass Science for the Glass and Ceramic Artist
- Lasers: Past, Present and Future
- Introduction to Verilog HDL and FPGA Synthesis
- Introduction to Ceramics for Plant Personnel and Non-Technical Personnel
- Introduction to Biomaterials
- Technology and Applications of Optical Sensors
- Statistical Methods for Industrial Problem Solving
- Introduction to Ceramic Processing
- Fracture Analysis of Glasses and Ceramics

NICE offers short courses at ACerS Annual Meeting

The National Institute of Ceramic Engineers is offering five 1-day short courses for professional advancement on Sunday April 18, 2004 at the American Ceramic Society's annual meeting in Indianapolis, IN. All courses are $495.00 each

- Glass Science for Glass Artists – Dr. William Carty, Alfred University
- Ceramic Science for Ceramic Artists – Dr. Matthew Hall, Alfred University
- Introduction to Photonics Technology – Dr. Alexis G. Clare, Alfred University
- Primer on Statistical Methods for Industrial Problem Solving - Dr. David Earl, Alfred University

Deadline for registration is March 29, 2004. Course and registration information can be found at the NICE website, or by contacting Marlene Wightman, Director, Continuing Education/Industrial Outreach, Alfred University, 2 Pine Street, Alfred NY, 14802-1296. NICE 2004 short courses are coordinated by the Alfred University's School of Engineering Office of Continuing Education as a service to the ceramic engineering profession.

AU Engineering News is an abbreviated version of our on-line newsletter. For Complete news and updates, go to **http://engineering.alfred.edu/newsletters/soe**

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