Alfred University School of Engineering

AU Engineering News

Volume 7, number 1 September 2005

Also inside this issue ...

Celebrate the Inauguration of the Kazuo Inamori School of Engineering!

Alfred University will celebrate the renaming of its School of Engineering with a special symposium and dedication ceremony of the Kazuo Inamori School of Engineering on October 21, 2005. The School will be renamed in honor of Dr. Kazuo Inamori, the founder and chairman emeritus of Kyocera Corporation. Interested alumni and friends are invited to attend the afternoon's events.

In April 2005, the Kyocera Corporation (Kyoto, Japan) announced its $10M endowment of the Alfred University School of Engineering, recognizing AU's "tradition of instilling in its students a desire to contribute to society and mankind," as well as the key roles played by AU graduates in advanced materials engineering. The endowment income will allow the hiring of several new faculty and the creation of a fine ceramics/nanotechnology research center.

The special symposium will emphasize the technical areas of fine (or advanced technical)

Fast Facts Inamori Symposium and Dedication : October 21, 2005

- Symposium: 1:00 – 4:30 pm in the Nevins Theater of Powell Campus Center
- Dedication and reception:4:45 pm in front of Binns-Merrill Hall
- Contact Marlene Wightman (***wightman@alfred.edu***) to register
- Symposium information ***http://engineering.alfred.edu/outreach/conf***

CEER receives $750K in Federal research funding

The Center for Environmental and Energy Research (CEER) at Alfred University received good news on July 28th when Congress announced that the FY 2006 Interior and Environment Appropriations Bill included a $750,000 research grant to support its ongoing activities.

"The funds will be used to support innovative research on materials and methods for improving the environment," said Dr. David Earl, CEER Director. "CEER will continue to work closely with industry and AU's Center for Advanced Ceramic Technology to leverage funds and facilitate commercialization of promising new environmental technologies developed by faculty and graduate students. We are grateful to Randy Kuhl (U.S. Represen-

"When people see their gasoline prices rise, then they begin to understand what CEER does,"

Sen. Charles Schumer (D-NY)

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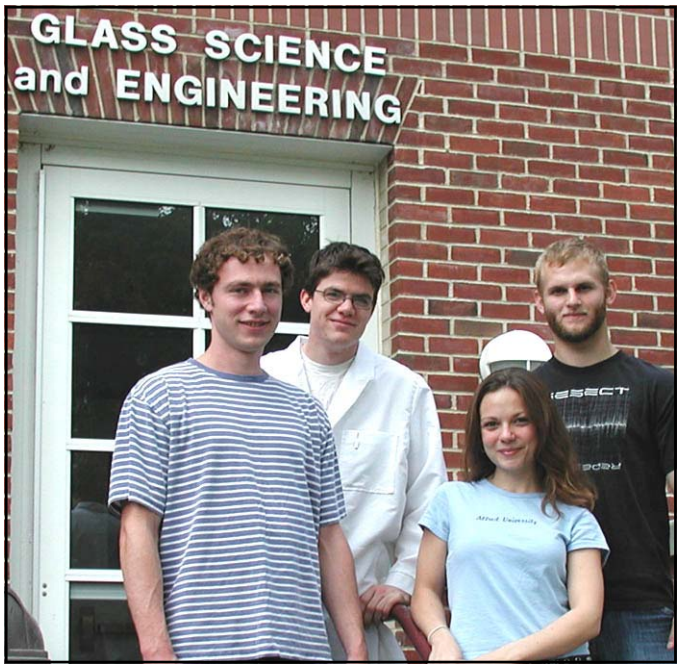
Graduate students win glass innovation awards

What new applications can you imagine for a stronger glass?

- What degree of improvement in systems performance might emerge?
- What about energy savings and environmental impact?
- How might your innovation change our lives?

The Glass Manufacturing Industry Council, the Glass & Optical Materials Division of the American Ceramic Society, the Center for Glass Research and the NSF-International Materials Institute on New Functionality in Glasses joined forces and asked these questions of the nation's materials science graduate students. Cash prizes totaling $5000 were offered. The nation-wide contest sparked renewed interest in achieving higher glass strengths and in how designing with stronger glass could impact the glass industry.

Alfred University's School of Engineering graduate students Harlan Brown-Shaklee (MSE) & Melodie Schmitt (GES) garnered the top $2000 award for their proposal "Strengthened Glass for Hybrid Wind-Solar Energy Systems." Graduate student Jake Amoroso (MSE) received the $500 third prize for his proposal "The Flywheel Energy Storage System." An Honorable Mention ($250) was garnered by Steve Florczyk (BMES), for "Photosynthetic Powered Glass Automobile."



Graduate student innovators in glass, from L-R: Steve Florczyk, Jake Amoroso, Melodie Schmitt and Harlan Brown-Shaklee

Brown-Shaklee and Schmitt propose to combine wind and solar power generation systems utilization of a stronger glass (3.5 GPa) to form the 20+meter blades; strengthened through the inclusion of spherical photovoltaic cells capable of collecting solar energy at any wind speed or direction and also adding mechanical rigidity to the glass blade walls to prevent torsion stress failures. Such blades would not only far out-perform current polyester/glass fiber laminate blades but could be achievable: nominal glass strengths of 0.15GPa are common today with strengthened glasses achieving over 1GPa in the laboratory.

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International Students in AU School of Engineering

The Alfred University School of Engineering is pleased to have the following exchange students from our Study Abroad partner institutions in Germany, England, Spain and France on campus for the 2005-2006 academic year.

Michael Beck, Christiane Eichenseer, and Josef Faltenbacher are from the Universität Erlangen-Nürnberg in Erlangen, Germany. The AU Study Abroad connection to Erlangen is our oldest, dating back to 1968.

Neha Sane is an engineer from the University of Sheffield, Sheffield, England. Lorena Garcia joins us from the Universitat Jaume I; Institute for Technical Ceramics, Castellon, Spain.

Geraldine Barguil, Cedric Patapy, Caroline Tabarino, and Gregoire Diehl are Ceramic Engineering students from

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From left to right – Neha Sane (Sheffield), Gregoire Diehl (Limoges), Caroline Tabarino (Limoges), Lorena Garcia (Castellon, Spain), Michael Beck (Erlangen), Geraldine Barguil (Limoges), Josef Faltenbacher (Erlangen), and Christiane Eichenseer (Erlangen). Missing from this picture is Cedric Patapy (Limoges).

Inamori symposium and dedication *(From p.1)*

ceramics research, bringing together noted researchers to lecture in the areas of fuel cells and energy systems, biomaterials, optical and electronic materials.

The symposium, from 1:00 – 4:30 pm in the Nevins Theater of Powell Campus Center, will feature keynote speaker Dr. Kazuo Inamori, (Kyocera Corporation, Kyoto, Japan). His remarks will be followed by technical lectures.

Scheduled speakers include Dr. Matthew Fronk (Chief Engineer, Fuel Systems, GM, Honeoye Falls, NY), on fuel cells; Dr. Cheryl Blanchard, (VP for Research and Clinical Affairs, Zimmer Holdings, Inc., Warsaw, IN) on biomaterials; Dr. Samuel Conzone (Director of Research & Development, Schott Nexterion AG, Duryea, PA) on optical materials;

Dr. Kazuo Inamori

and Dr. Robert Newnham (Alcoa Professor Emeritus of Solid State Science and former Associate Director of the Materials Research Laboratory, Pennsylvania State University, University Park, PA) on composite transducer arrays.

The dedication and reception will immediately follow the symposium in front of Binns-Merrill Hall at 4:45 pm.

A courtesy registration (no fee) is requested to enable best planning for the symposium and dedication reception. Interested attendees are asked to call or email Marlene Wightman, Director of Continuing Education and Outreach, at 607-871-2425 or *wightman@alfred.edu*. Updated symposium schedule and complete abstracts will be posted as available at h*ttp://engineering.alfred.edu/outreach/conf*.

Messing to give McMahon Lecture October 13

Dr. Gary Messing (AU BS CE '73) is the 2005 McMahon Award Lecturer, speaking on the topic "Manipulating Microstructures - A Path to Better Ceramics." His lecture will be presented at 11:20 am on October 13, 2005, in AU's Holmes Auditorium. The lecture is followed by a luncheon (reservation only).

The annual award, named in honor of NYSCC Dean John F. McMahon, recognizes Messing for outstanding achievement in the field of ceramic engineering.

Messing is the Distinguished Professor of Ceramic Science and Engineering and Head of the Department of Materials Science and Engineering at the Pennsylvania State University. Messing received his Ph.D. in Materials Science and Engineering at the University of Florida in 1977 and received their Distinguished Alumnus Award in 2002.

Widely recognized for advanced research in ceramic materials, he was recently (2003) recognized as one of the most "Highly Cited Researchers" in Materials, and was honored with the International Award of the European Ceramic Society for his international collaborations. In 2005, he received the Outstanding Educator Award of the Ceramic Education Council of ACerS. He currently serves as Chairman of the University Materials Council.

To register to attend the lecture or to make a luncheon reservation ($15.00/person) please contact Marlene Wightman, Director, Continuing Education/Industrial Outreach, Alfred University at 607-871-2425 or ***wightman@alfred.edu***.

Dr. Gary Messing

ABSTRACT: Microstructure is everything in materials because so many properties are profoundly affected by the balance of scale, morphology and porosity. Over the last thirty years investigators have shown the power of the property-microstructure relation that is so central to materials science, and especially important in ceramics.

In this presentation I will present a hierarchy of microstructure control resulting from our own work on structural, electronic and optical ceramics. Seeding, in which a site favorable for epitaxy is provided, will be shown to yield significant control of phase transformations and subsequently sintering to obtain unique materials. Using acicular and tabular seeds I will show how crystallographic orientation can be induced by templated grain growth (TGG) in piezoelectric ceramics like PMN-PT to yield properties near those of single crystals. The talk will conclude with a discussion about opportunities for growing single crystals from a dense polycrystalline ceramic using TGG.

In addition to the scientific presentation, I will also take a few moments to underscore how my experience at Alfred University helped to shape my career.

CEER research funding (from page 1)

tative, R-Hammondsport) for working hard to ensure CEER funding was included in the Appropriations Bill and to Charles Schumer (U.S. Senator, D-NY) for voting for the measure and visiting AU to present us with a check."

Schumer remarked, "When people see their gasoline prices rise, then they begin to understand what CEER does," calling Alfred University "one of the crown jewels of the Southern Tier." To date, noted Schumer, federal funds for CEER total $4.5 million.

CEER makes use of AU's expertise in ceramic/glass engineering, materials science, and other engineering and science fields to develop materials and processes for environmental sustainability. CEER's research focuses on materials and processes for clean, renewable energy and improvements in materials' efficiency, environmental impact and recycling. A total of 31 research projects funded by CEER have been completed since the Center's inception in September of 2000.

In addition to faculty grants, CEER awards summer research fellowships to a selected number of AU undergraduates each year.

AU president Charles Edmondson and David Earl, CEER director, accept the $750K check from Senator Charles Schumer (D-NY) for support of CEER's ongoing activities.

Current projects include the development of novel boron-rich carbon nanotubes for hydrogen storage (Dr. Linda Jones), a study of the interaction of sealing glasses with metallic interconnects in fuel cells (Dr. Scott Misture), and the development of glass microspheres for hydrogen storage and delivery via photo-enhanced diffusion (Drs. Jim Shelby and Matt Hall).

DOE recently approved $2.2 million in continued funding on Shelby and Hall's microsphere fabrication and development of the design parameters of a working hydrogen generator utilizing hydrogen-filled glass microspheres that are so small and uniform that they flow like water, yet are strong enough to withstand a force of about 10,000 pounds per square inch. The technology is highly promising for safe vehicle applications of hydrogen fuel.

CEER projects completed over the past two years include recycling of hazardous industrial glaze waste, polymer composites, and paper mill waste ash; studying the environmental impact of fuel cells; measuring hazardous emissions from glass manufacturing; and developing a better system for evaluating water quality. Complete information on these projects and information on continuing CEER activities can be found on their website ***http://ceer.alfred.edu***.

The "Alfred connection" in advanced materials research

The Alfred University Connection: A number of distinguished alumni, current faculty and former faculty of the New York State College of Ceramics at Alfred University were in attendance at the 50th ANNIVERARY CELEBRATION of the 46th Sagamore Army Materials Research Conference on Advances and Needs in Multi-Spectral Materials Technology on May 12-19, 2005 at Harbourtowne Golf Resort and Conference Center in St, Michaels, Maryland.

Left to Right: Dr. Vasantha Amarakoon (CACT), Mr. Gary DelRegno (CACT), Dr. Licio Pennisi (CACT), Dr. Gary Messing (Department Head, Penn. State) , Dr. William Rhodes (Rhodes Consulting), Dr. Marina Pascucci (CeraNova), and Dr. James McCauley (U.S. Army Research Laboratory).

CGR celebrates 20 years

On June 9, 2005, the members and guests of the NSF Industry-University Center for Glass Research met at Alfred University to celebrate twenty years' successful collaboration between industry, academe and government in basic research to serve the needs of the glass industry. The celebration included a full program of invited speakers followed by a reception and banquet.

Hel**mut Schaeffer**, HVG and DGG (ret), presented the keynote address, "Precompetitive glass research—New challenges within an increasingly global industry."

Other invited speakers included: **Herve Arribart** (Saint-Gobain Recherche), **Warren Wolf** (President, American Ceramic Society), **L. David Pye** (Alfred University, emerit.), **Himanshu Jain** (Lehigh University), and **Michael Greenman** and **John Brown** (both of the Glass Manufacturing Industry Council (GMIC)).

CGR was started in 1985, when a core group of glass industry representatives, realizing the need for a cooperative research center for glass science and engineering, formed the Center for Glass Excellence. The NYS College of Ceramics at Alfred University was selected to lead the research, following a national competition. In 1986, the CGR qualified for designation to the National Science Foundation Industry/University Cooperative Research Centers Program. CGR's mission is to advance the field of glass science and engineering through a research, education, and technology exchange driven by the cooperative efforts of academe, industry, and government.

CGR has grown to three specialized university sites: basic and advanced glass research (Alfred University), glass surfaces and interfaces (The Pennsylvania State University), and refractories for glassmaking (University of Missouri-Rolla). At each site, CGR conducts basic and pre-proprietary research projects that are selected and evaluated by the corporate sponsors and its research subcommittee, after extensive interaction with faculty research scientists.

In addition to research projects, CGR activities in service to the international glass community include publication of the technical review periodical, "The Glass Researcher: Bulletin of Glass Science and Engineering" (now published quarterly in the American Ceramic Society Bulletin) and sponsorship of the series of international glass conferences, "Advances in the Fusion and Processing of Glass."

CGR Faculty to develop distance learning for Glass Industry

The NSF Industry-University Center for Glass Research has received a two year $100,000 contract to develop distance learning courses for the glass industry from the Department of Energy at Oak Ridge.

The goal of the work is to develop a set of distance learning courses focused on specialized glass industry technical needs, industry best practices/operations, and state-of-the-art energy efficient technologies. Dr. Alexis Clare, professor of glass science, and other Alfred University SOE faculty members will develop and test at least four new courses during the contract period.

There are great economic pressures on the industry to improve the energy efficiency of the manufacturing process, decrease environmental impact, and improve competitiveness.

There are few schools offering the necessary courses, and those that do are not located nearby most of the American glass industry plants. The SOE faculty experience and expertise in delivering both short courses and distance learning courses will make it possible for course development, with timely and effective delivery of training and information, to meet the unique needs of the glass industry.

Courses to be developed include: A short course on technologies, best practices, and energy saving opportunities related to glass processing; two glass engineering science courses, or one glass engineering science course and one standard engineering course (mechanical or electrical) with significant energy savings related components; and an engineering short course (two and a half days to one week).

Clare has already visited John's Manville International, Golden, Colorado, to initiate a preliminary survey of the glass industry and supplier industries to determine needsand to compile the most-current energy-saving technologies and best practices.

Stevens appointed CGR Director

Dr. Harrie Stevens is back in the glass field as the Director of the Center for Glass Research, joining the Center in time to participate in the Center's Twentieth Anniversary Celebration, held in Alfred on June 8th and 9th. Past Center Directors, including Dave Pye, Bill LaCourse and Tom Seward, will be joining current and past members and research faculty for the celebration.

Dr. Harrie Stevens

Stevens (AU CE '65, Rutgers PhD Ceramics '69) is well known to many; his three careers have linked him with both glass and whitewares communities. Some of you might remember him as a professor of glass science in the NYS College of Ceramics – he served for 21 years as professor, associate dean and department head. A second career followed – 12 years at Corning Incorporated as an engineering research manager. Most recently, Stevens has served as Director of AU's Whiteware Research Center. Along the way, Stevens has also served as NICE president and as a member of the American Ceramic Society Board of Directors and has accepted many other professional service responsibilities.

Hall receives award

Dr. Matt Hall, assistant professor of biomaterials and glass science, was recently honored by the NYS College of Ceramics and Alfred University at AU's Honors Convocation, April 15, 2005, receiving this year's John F. McMahon Excellence in Teaching Award, the highest teaching award bestowed by the NYS College of Ceramics at Alfred University. The award is presented in memory of McMahon, a former dean and professor at the College.

Dr. Matt Hall

Hall was also honored for teaching excellence by Alfred University, being among 10 AU faculty members receiving the Joseph Kruson Trust Fund Award for Excellence in Teaching.Hall joined the School of Engineering faculty in 2003. He serves as faculty advisor to both Keramos and the Alfred Biomaterials Society.

The AU School of Engineering presents numerous short courses each year and can custom design a course for your needs.

Complete descriptions of Short Course offerings for 2005 are now posted on the web at **http://engineering.alfred.edu/cems/du/opat/shor/shor.html**. For further information or to check if a course is still open, contact Marlene Wightman, Director of Continuing Education, **wightman@alfred.edu**.

The AU School of Engineering and CGR faculty experience and expertise in short course development is well respected by industry. Here, Dr. Arun Varshneya, professor of glass science, presents the short course "Glass: Its production and properties" to a recent industrial audience.

New Faculty books on Glass

Dr. L. David Pye (Dean, NYSCC and professor of glass science, emeritus) is author of a new book "Properties of Glass Formation Melts." Pye co-edited the volume with Innocent Joseph, University Center for Glass, and Angelo Montenaro, University of Parma, Italy. The book is available from CRC Press. An announcement can be found in the American Ceramic Society Bulletin, Vol. 84, page 27 (July, 2005).

Dr. L. David Pye

Dr. Tom Seward

Dr. Tom Seward (professor of glass science) and Terese Vascott, Assistant Director, Center for Glass Research, have edited a new book, "High Temperature Glass Melt Property Database for Process Modeling," based on the DOE project glass melt properties database. Details can be found on the American Ceramic Society Web site, **www.acers.org**.

Faculty briefs

Graduate student Andrea L. Jaromin and **Dr. Doreen Edwards**, associate professor of materials science and engineering, report research finding in their paper, "Subsolidus Phase Relationships in the Ga_2O_3-Al_2O_3-TiO_2 System," soon to be published in the Journal of the American Ceramic Society. Edwards' group also presented two papers and a poster presentation at the recent American Ceramic Society annual meeting in Baltimore.

Dr. Doreen Edwards

Edwards, School of Engineering Graduate Program Director, gave "Director's Appreciation Awards" to two graduate students -- Nathan Empie and Gretchen Schwerzler. Empie is president of the AU MRS chapter, which actively supported graduate student seminar by hosting coffee-cookie reception most Thursdays. Schwerzler was active in organizing campus-wide graduate student social events.

Course in focus: CES 464—composite design and fabrication

Dr. Al Meier

Instructor: Dr. Al Meier, assistant professor of metallurgy

For this project, groups of 4-6 students were required to design , fabricate and predict the failure mode and load for a slender composite beam.

Only commonly available, low-cost materials (maximum expenditure $20/ team member) that could be processed using existing facilities were allowed. Each team's goal was to optimize strength-to-weight ratio while meeting the geometric, loading and environmental stability constraints.

CES 464 is a required upper level core-course for MSE and BMES majors and is a technical elective for GES and CE students.

At, left, Alicia Ballard (senior, CE) and Ethan Weikleenget (junior, CE) check their set-up on the Instron mechanical tester. Typically, the composites were fabricated using glass tubes and epoxy resin. The plastic sheeting will be draped around the sample and crossheads during testing to contain glass shards on failure.

In Memorium:
Dr. William Frank Hahn

Dr. William Frank Hahn, emeritus professor and chairman of the mechanical engineering department in the School of Engineering at Alfred University, died June 6, 2005, at his home in Valparaiso, IN, of an apparent heart attack. He was 64.

Born in Holyoke, MA, Hahn received a BS from Valparaiso University in 1962, and an M.S. and Ph.D. from the University of Illinois in 1964 and 1969. Prior to joining the AU faculty, he had taught at Gannon University in Erie, PA, and had also worked for Corning Glass Works in Corning, NY and Booz, Allen and Hamilton in Cleveland, OH. Hahn had been a professor at Valparaiso University since retiring from AU in 2003.

International students (from page 2)

the Ecole Nationale Superieure de Ceramique Industrielle (ENSCI), Limoges, France.

The Erlangen students will be here for the entire 2005-2006 academic year; students from other institutions are here for the Fall 2005 semester only. Several of the current International students are already familiar with AU through interaction with SoE students studying on their home campuses and look forward to meeting our students who will be taking advantage of the program in the spring 2006 semester.

AU engineering students benefit from a unique opportunity for study abroad; ceramics, materials or glass students in good standing spend a semester away without worrying about falling behind in their degree requirements.

Glass Innovation
(from page 2)

Amoroso's design manipulates the materials properties of glass to allow charging of a cylindrical flywheel to store radiation (Infrared to ultraviolet) energy using the principle of the Crookes radiometer. Design of photosensitive glasses through unique combinations of additives to control the absorption at the surface of the glass allows a tunable flywheel utilizing varying radiation sources such as high power lasers or simple lenses to focus sunlight. Again, 3.5 GPa strength glass is needed to achieve these goals, due to the tremendous angular momentum of the spinning flywheel and the need for high strength containment for safety concerns.

This year's prizes are to be awarded at the 3rd International workshop on Flow and Fracture of Advanced Glass, to be held October 4, 2005 at Penn State University, State College, PA. The industry consortium plans a new competition, open to global participation, for 2006. For more information on these and other award winning proposals or the 2006 competition, check out **http://www.gmic.org/news.html**.

Hall of Fame (from page 8)

records. He was Independent Collegiate Athletic Conference (ICAC) champ in the indoor and outdoor high jump in 1982 and was the ICAC indoor champ in both the high jump and 400-meter run in 1983, when he led AU to the team indoor ICAC title.

He is president and CEO of Ceramic Protection Corp. in Newark, DE, a manufacturer of ceramic products used in industrial and military applications. He lives in Newark, DE, with his wife, Rina, and their two children, daughter Amanda (12) and son Daniel (11).

Alfred University School of Engineering

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

Contact us at
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Alfred , New York 14802-1296

Engineer elected to AU Sports Hall of Fame

John Walsh '84 (BS, ceramic engineering) is among four to be inducted into Alfred University's Sports Hall of Fame this fall. Also to be inducted during banquet ceremonies Saturday, October 8, 2005, are William Ruffle '88, John Hoosock '92, and Julie Francis '93.

Walsh was a three-year member of the track and field teams at AU (1982-84) and served as captain his senior season. During his career, he set several school records that still stand today. He owns individual records for the indoor high jump (2.07 meters, set in 1984) and the outdoor high jump (2.09 meters, set in 1984). He was also part of the indoor and outdoor 1,600-meter relay teams that established school

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MS&T '05 Alumni and Friends Reception

More than 8,000 materials scientists and engineers are expected to attend MS&T '05, September 25-28 at the David L. Lawrence Convention Center in Pittsburgh.

Alfred University School of Engineering looks forward to meeting you there!

The AU School of Engineering Alumni and Friends reception will be held Tuesday evening, September 27th, at the Westin Convention Center. The event, scheduled for 7:00-9:00 pm, will be a great opportunity to meet with friends and faculty! A cash bar will be offered. As a courtesy, please email Marlene Wightman, Director of Continuing Education and Outreach, if you plan on attending.

We will be at booth 829 at the MS&T expo - and will be happy to mail you a complimentary pass to the expo(worth $50)! Exposition dates and hours are:
Tuesday, September 27, 2005 11:00 am - 7:00 pm
Wednesday, September 28, 2005 10:00 am - 5:00 pm

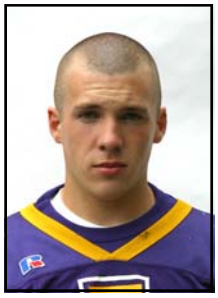
MS&T '05 is organized and sponsored by the American Ceramic Society (ACerS), the American Welding Society (AWS), based in Miami, Florida; the Association for Iron and Steel Technology (AIST), The Minerals, Metals & Materials Society (TMS), and ASM International (The Materials Information Society).

AU Football, Soccer start season with high expectations

Engineers will help get the job done!

Alfred University football is coming off its best season in 15 years Head coach Dave Murray and the rest of the Saxons have every reason to believe they can top those accomplishments in 2005. One reason for that optimism is the return of several key players - several engineers - and strong recruitment.

Special teams kicker Chris Reynolds (sophomore, ME) returning after a record-setting freshman year. Junior punter Pat Kreski (GES) is also returning. At receiver is Ben Stanton (Junior, CE), who has been plagued by injury the last two years, now healthy and ready to contribute. (Stanton photo not available.)



Chris Reynolds

Mike Penkin

Pat Kreski

Alex Carp

On defense, Coach Murray expects several youngsters, including sophomore tackle Mike Penkin (sophomore, EE) to make strong contributions this season.

A total of 19 engineers contribute to the success of AU Football, including 12 freshmen eager to prove themselves on the gridiron as well as in class and lab!

AU Mens' Soccer also has high expectations for a successful season in 2005. Engineers will contribute on both offense and defense. Offensively, David Suddaby (junior, ME) returns, while at defense Sophomores Brian Adams (BMES) and Rian Morgan (ME) will likely be top choices at the outside midfield positions. Senior captain Alex Carp (ME) will also return as a skilled defender. (Suddaby, Adams, Morgan photos not available.)

Go Saxons!