

The Newsletter of the New York State Center for Advanced Ceramic Technology

CACT leverages resources for NYS economic activity

Dr. Vasantha R. W. Amarakoon, Director of the NYSTAR designated Center for Advanced Ceramic Technology (CACT) at Alfred University submitted the CACT performance data for the year 2000-01 at the October 2001 CACT External Advisory Board meeting.

New programs initiated by the CACT's 1997 redesignation have resulted in significant improvements in New York State industry participation in CACT sponsored industrial research and development projects. Industrial projects, started as 1-3 month short-term research through the CACT Affiliate and Associate programs, have transformed into long-term graduate-student-run research activity.

Seed projects initiated by the CACT have blossomed into 4-year NSF funded research programs for two CEMS faculty members, Drs. Scott Mixture and Doreen Edwards. Both received 4-year NSF Career Development Grants for a total of \$900,000 in the areas of improved ceramics for use in fuel cells and other electrochemical devices.

Dr. Amarakoon reported that new ventures are being created in the Alfred

Ceramics Corridor Innovation Center (CCIC) through CACT support and other funds leveraged from state (NYSERDA) and federal (NSF, DOE, DOD) agencies. Ceralink (microwave prototype and testing facility), Santanoni Glass and Ceramics (fine ceramics memorial picture frames) and Meadow River Enterprises (electroluminescent ceramics) are three

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CACT "seeds" grow 10-fold with Federal funds

2000 seed in Solid State Ceramic Lighting (Dr. Doreen Edwards) → \$600K (2 yr) DOE product development grant.

2000 seed in Ion transport (Dr. Doreen Edwards) → \$450K NSF CAREER grant.

1999 seed in Oxygen conduction in Aurivillius Ceramics (Dr. Scott Mixture) → \$450K NSF CAREER grant.

Recent NYSERDA matches help CACT work harder for industry

Ceralink, Inc. "A Millimeter and Microwave Testing Center" (Dr. Herbert Giesche)
Buffalo China, "Reduction of Lead-Based Industrial Waste" (Dr. David Earl and Dr. John Williams)

Victor Insulators, "Optimization of Firing Schedules for High-Tension Electrical Porcelain" (Dr. William Carty and Dr. Scott Mixture)

Ferronics, "Optimization of Mn-Zn Ferrite Processing" (Dr. Vasantha Amarakoon, Dr. Licio Pennisi, Dr. William Walker)

From CEMS Dean Ronald S. Gordon

The 2001-02 academic year marks important changes affecting CEMS and Alfred University. Dr. David Szczerbacki is AU's new provost and vice president for Academic Affairs. Szczerbacki has served as dean of AU's College of Business and was acting dean of the College of Engineering and Professional Studies.

NYSCC school deans started reporting to the AU provost in summer 2000. We have continued to reorganize the College; President Charles M. Edmondson and Provost David Szczerbacki announced that a Statutory Executive Council (SEC) would be created with Dean Richard Thompson as chair and Dean Ronald Gordon and Scholes Library Director Carla Johnson as members. The SEC is charged with reorganization planning,

college administration and budget oversight in consultation with NYSCC's Faculty Council and Director of Business Affairs. The provost serves as the NYSCC unit head for the 2001-02 academic year and is an ex-officio member of the SEC. SUNY administration agrees with the long-term objective of having the two school deans serve as unit heads beginning with the 2002-03 academic year. The SEC and provost are working toward an NYSCC organization to best serve the strategic and operational interests of AU and the College.

The newly refurbished Binns-Merrill Hall (BMH) is again administrative center of the College with the offices of Deans Thompson and Gordon. All financial

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<http://nyscc.alfred.edu/external/cact>

Pennisi and Walker promoted to new CACT positions

by Krista Carlson

Dr. Licio Pennisi and Dr. William Walker were recently promoted to new positions in the CACT office. Pennisi is now the assistant director of CACT/extension services and Walker is the assistant director, CACT research and outcomes measurements/CANY.

Pennisi is in charge of day-to-day Sponsored Programs (OSP) activities in CEMS. In this new position he is responsible for providing technical support to NYS and out-of-state ceramics and glass industry clients. He also coordinates workflow of industry-sponsored analytical characterization and testing requests. Pennisi represents the CACT in various forums and negotiates with industry clients on projects involving



Dr. Licio Pennisi



Dr. William Walker

CACT/OSP Affiliates and Associates activities, and is the first person companies talk to when they are interested in working with the CACT.

Walker assists companies with research, outcomes measurements, and coordination of CACT activities. He will also work on projects within his area of expertise.

The CACT must solicit \$1.25 million from NYS corporate partners in order to receive an additional \$1 million match from New York State. The CACT must also show its economic benefit to these companies such as new jobs or improved productivity. Walker works with companies to help determine and document economic outcomes that result from CACT activities and is involved with reporting these outcomes to the state.

Walker also coordinates CACT/CANY activities: another way of helping NYS companies by bringing people together and helping companies to network.

Krista Carlson is a sophomore majoring in glass science engineering with an astronomy minor.

External Advisory Board holds October meeting

CACT Director Vasantha Amarakoon, members of the CACT staff and AU Provost David Szczerbacki met with the CACT External Advisory Board prior to the McMahon Lecture/luncheon on October 11, 2001.

According to Director Amarakoon faculty involvement in research is the key to the success of the CACT. It is the faculty who write the proposals to companies and government agencies, identify and acquire equipment, and champion the research projects. The CACT facilitates these activities by maintaining proactive interactions with industry; establishing connections between companies and faculty members with common interest and research goals. Using this approach, the CACT has been credited by NYSTAR with \$34 million in economic impact on New York State for fiscal year 2000-01.

Looking to the future, Amarakoon feels that the CACT needs to rethink its funding base. While industrial sponsored

September 11, the New York State budget may see a significant drain. Universities will continue to play a larger role in long-term "blue-sky" research. In addition, short-term company-specific problem solving will continue to be a key aspect to CACT activities.

Amarakoon sees CACT involvement within the larger AU community as an important opportunity for the future. "There is a need to build synergy with other programs at Alfred University, including electrical engineering, mechanical

engineering, environmental studies, chemistry and physics," according to Amarakoon. In order for cross-campus research activities to be successful, Amarakoon believes that new graduate programs need to be developed, and the research needs to be faculty driven. (famarakoo@alfred.edu)



The Center for Advanced Ceramic Technology's External Advisory Board held a meeting on October 11, 2001 on the Alfred University campus. Shown left to right, Dr. William Walker (CACT), Fred Calhan (Refractron), Michael Clement (Ferronics), Dr. Bill Hahn (AU Mech. Engr.), Joyce Farnum (CACT), Dr. Robert Locker, EAB Chair (Corning Inc.), Dr. Licio Pennisi (CACT), Dr. Joseph Capurso (Ferro Electronic Materials), Les Rickard (Buffalo China), Dr. David Szczerbacki (AU Provost), Dr. Xingwu Wang (AU Elec. Engr.), Thomas Sonnevile, President of CANY (AluChem), and Dr. Vasantha R. W. Amarakoon (CACT).

projects will continue to be the primary focus of the CACT, it will become increasingly important to leverage government funding to help support these projects, permitting New York State companies to get the best value for their investment in the CACT. With the recession, companies have less money to spend on research; in the wake of

AU is partner in new information technology effort

By Karen Russell

The Center for Electronic Imaging Systems, CEIS, is one of fifteen centers designated as an Enhanced Center for Advanced Technology (eCAT). CATs are located throughout New York State and sponsored by the New York State Office of Science, Technology and Academic Research (NYSTAR). The CEIS vision is to establish and maintain a leading national center for all phases of electronic imaging systems, from the development of new technology to the technology transfer and economic development. Their mission is to conduct research and achieve results that benefits New York State and the nation.

Within the CEIS is the Information Technology (IT) Collaboratory. This is comprised of the Rochester Institute of Technology (RIT), University of Buffalo, and both the New York State College of Ceramics and the electrical engineering department at Alfred University. Together these three schools will help each other to advance the field of information technology. RIT will provide expert knowledge of semiconductors while AU contributes expertise in materials.

Dr. Alexis Clare, professor of glass science, will contribute her knowledge of photonics and fibers. Dr. Doreen Edwards, assistant professor of materials

science, will purchase a spectroscopic eclipsometer to aid in characterization of thin films. Dr. Xingwu Wang, professor of electrical engineering will purchase an electron beam deposition instrument to make high quality thin films.

Together, CEIS integrates the resources at the three universities with the product development and commercialization capabilities of its industrial members.

Karen Russell is a senior majoring in ceramic engineering with minors in chemistry and glass science.

CACT leverages

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such start-up companies participating in development/manufacturing projects with close collaboration with faculty in CEMS and Art & Design.

The table shows that projections for the year 2001-02 and beyond are promising with increased CACT/industry

collaborations expected with funds leveraged from federal and state agencies, Corning-CACT collaborations via the CCIC, and increased collaborations with other CATs.

This issue of Advances highlights several CACT/industrial projects in student-

written articles, CACT Affiliates program, CACT Associates program, selected CACT faculty research expertise and their projects. For further information please contact Dr. Vasantha R. W. Amarakoon at famarakoo@alfred.edu.

CACT PERFORMANCE STATISTICS

	1998-1999	1999-2000	2000-2001	2001-2002 (proj.)
TOTAL EXPENDITURES (\$)				
Through NYSTAR*	\$962,534	\$948,994	\$1,059,647	\$1,114,000
Through participating NYS industry	\$830,363	\$976,158	\$1,340,469	\$1,800,000
Through participating out-of-state industry	\$465,387	\$668,644	\$1,206,174	\$1,400,000
COMPANIES SUPPORTING CACT				
NYS industries	45	34	58	70
Out-of-state industries	25	25	33	45
FACULTY MEMBERS PARTICIPATING IN CACT PROJECTS	20	21	21	24
CEMS GRADUATE STUDENTS				
CACT supported	12	15	14	16
Other support	51	40	52	60
FEDERAL FUNDING SPONSORED PROGRAMS & CACT	\$1,393,708	\$1,227,434	\$1,160,163	\$1,250,000

*NYSSTF prior to 2001

CACT Affiliate: Reliable Automatic Sprinkler Co., Inc.

by Rebecca Cochran

The Reliable Automatic Sprinkler Company is working on short-term research projects with the Center for Advanced Ceramic Technology (CACT) at Alfred University. Reliable has global sales with distribution facilities



Dr. Rebecca DeRosa

located throughout the United States. The corporate headquarters are located in Mt. Vernon, NY. Reliable's ever-expanding fire sprinkler line currently

contains a range of sprinklers, including quick and standard response, dry, residential, institutional, storage, extended coverage, and special application sprinklers.



Dr. Alan Meier

CACT faculty Dr. Rebecca DeRosa and Dr. Alan Meier are working in collaboration with Reliable to enhance the performance of quick response sprinklers through the use of innovative technology.

An effective sprinkler must provide a quick response to fire to maintain a survivable environment for occupants to safely escape from danger. A first-class sprinkler can also minimize fire damage. In order to provide this optimal protection, quick response sprinklers must have high thermal sensitivity to provide an effective alert and an optimal spray pattern for discharging water on the fire.

Rebecca Cochran is a junior majoring in ceramic engineering

CACT Affiliate: Unison Industries

by David Fogelman

Unison Industries, a world leader in the design and manufacture of electrical components, sensors, and systems for aircraft, industrial, marine, military, and space uses, is a new CACT company. According to its website, www.unisonindustries.com, "Unison



Dr. Herbert Giesche

provides direct support to engine manufacturers, airframe manufacturers, major commercial air carriers worldwide and the United States Government. Typical

customers include General Electric, Rolls-Royce, Pratt & Whitney, Boeing, Airbus, Cessna, Piper, Raytheon, Textron Lycoming, and NASA."

Major Unison product lines include turbine and piston engine ignition systems, electrical power generation and control systems, electrical wiring harnesses and panel assemblies, sensors, switches, and bellows assemblies.

Unison's world headquarters are located in Jacksonville, Florida. Unison's Norwich, New York, facility is currently working with Dr. Herbert Giesche through the CACT on a short-term quality-control project. The Norwich plant specializes in

product and design engineering, new product manufacturing, repair, overhaul, and technical support for customers. The Norwich facility manufactures power generation and control systems for gas turbine engines, metal encased ignition leads, sensors, space ignition systems, and satellite harnesses. Approximately 300 Unison employees work in Norwich.

For more information, contact Dr. Licio Pennisi (pennisi@alfred.edu), Dr. Herbert Giesche (giesche@alfred.edu), or www.unisonindustries.com.

David Fogelman is a senior majoring in both ceramic engineering and computer science.

Research and faculty news...

Dr. Walter Schulze and **Dr. Steve Pilgrim** are on the international advisory committee of the 2002 IFFF conference (May 2002, Nara, Japan). Schulze and Pilgrim are also general chairs for the 2004 ISAF meeting in Montreal.

Dr. Scott Misture and his graduate students presented research papers at the December 2001 MRS Boston meeting and at the August 2001 Denver X-ray Conference in Steamboat Springs, CO.

Dr. Rebecca DeRosa and **Dr. David Earl** are co-authors of "Statistical Evalu-

ation of EIS and ENM Data Collected for Monitoring Corrosion Barrier Properties of Organic Coatings on AL-2024-T3" to be published in *Corrosion Science*.

Earl, Pilgrim and **Ann Baldwin**, CEMS Director of Student Services, were inducted into Omicron Delta Kappa, the National Leadership Honor Society, on December 2, 2001.

Dr. William Walker presented a paper at "Fine Powder Processing 2001" (State College, PA), highlighting his CACT-based research on powder compaction and

strategies for eliminating early-stage processing defects.

Dr. William Carty, Director of the Whitewares Research Center (WRC), reports that WRC has received substantial grants from NYSTAR for technology transfer and from NYSERDA in the area of high-strength porcelain and control of pyroplastic deformation.

Carty also reports that the Science of Whitewares IV, scheduled for June, 2002,

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CACT Associate AMC wins award

from Empire State Developments

Mr. Daniel R. Jordan, president and CEO of Advanced Monolythic Ceramics Inc. (AMC) of Olean, New York, received one of two 2001 Small Business Person of the Year and Small Business Not-For-Profit Organization of the Year awards. The awards, presented by Lt. Gov. Mary O. Donohue at a "Salute to New York State Small Businesses" ceremony held at the State Capitol in Albany, recognize outstanding contributions to New York's small-business community.

"Governor Pataki's tax cuts and fostering of a business-friendly environment, combined with the hard work and dedication of people and organizations like this year's award winners, have helped New York's small-business community thrive," Lt. Gov. Donohue said.

Jordan founded AMC, manufacturing specialty ceramic capacitors, in July 1994. He chose to locate the company in the Western New York region because of the skilled, motivated work force the area offered, the accessibility to the Ceramics Corridor and a high quality of life.

Since 1998, AMC has nearly doubled its work force from 48 to 95 employees and has increased sales from \$2 million in 1998 to \$3.5 million in 2000. The company



Lt. Gov. Mary O. Donohue presents Daniel R. Jordan (second from left), President of Advanced Monolythic Ceramics, with the state's Small Business Person of the Year award. Also present at the ceremony were NYS Small Business Advisory Board Chairman Ross M. Weale and Jordan's wife, Cindy.

ranks 32nd in employment in Cattaraugus and Allegany counties. Additionally, it has developed a global presence and become the largest North American manufacturer of its line of products.

Advanced Monolythic Ceramics Inc. is a CACT Associate member. For more information about the awards nomination application process and ESD's services for small businesses, contact the Division for Small Business by calling toll-free, 1-800-STATE-NY, or via e-mail at esd_smallbus@empire.state.ny.us.

CANY

<http://www.cany.net>

The Ceramic Association of
New York

CANY's next meeting is planned as a 1/2 day technical meeting followed by a facilities tour at R.I.T. in early spring, 2002. For program and registration information, contact

Dr. William Walker at
walkerw@alfred.edu.

Short courses for industry

Marlene Wightman, director of continuing education/conferences, NYSCC, has announced that 2002 short courses will include many new offerings, reflecting the breadth of CEMS faculty. Wightman also plans increased emphasis on customized on-site courses developed by faculty and staff for specific industry needs.

Not available at press time, the complete listing will be available on-line in February 2002 at nyscc.alfred.edu. To request tailored on-site course development or for a catalog, contact Wightman at (607) 871-2425 (wightman@alfred.edu)

CEMS Dean

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support functions of the NYSCC are in close proximity to the school deans. The Office of the CEMS Director of Undergraduate Programs is now located in BMH along with the offices and labs of Professors Doreen Edwards, Linda Jones, Scott Misture and Rebecca DeRosa. DeRosa's labs will be located in the adjoining Hall of Glass Science (HGS).

BMH is the headquarters of Biomedical Materials Engineering Science research labs and offices of Professors Alan Goldstein and Subrata Saha. The Center for Glass Research will be returning to BMH. The undergraduate optical microscopy laboratory is also returning to new quarters in BMH. The Schein-Joseph International Museum of

Ceramic Art has been relocated to the Palladian Room of BMH, a temporary home until its new building is constructed. With BMH coming back on line, the combined CEMS office and laboratory spaces in McMahan, BMH and HGS are now approximately 62,000 sq. ft.

The Office of the CEMS Director of Graduate Programs is now in the former McMahan office of the CEMS Dean. Planning the rehabilitation of an expanded McMahan Building, including the CEMS faculty and the SUNY-appointed architect, has begun. The 5-year program is to accommodate the anticipated growth of CEMS research and graduate programs.

CEMS undergraduates now have more choices and options: minors in glass,

photonics, and biomedical materials and 4+1 BS/MS (MBA) degree combinations with graduate study in biomedical materials engineering science or business are available. CEMS currently has 255 BS and 64 graduate students, including 27 doctoral students. The letter of intent for the new Materials Science and Engineering PhD degree has been approved by SUNY administration; a final proposal for this new doctoral program is under preparation.

Finally, it is with great personal sadness that I note the passing of Dr. Curt Scott, a distinguished alumnus and founding chair of the CEMS External Advisory Board. A special CEMS scholarship fund has been initiated in his honor.

(gordon@alfred.edu)

CACT purchases Netzsch STA Jupiter 449

By Cheryl Junker

A new Netzsch Jupiter 449 simultaneous thermal analysis (STA) unit was purchased through a grant from the National Science Foundation and the CACT at Alfred University. CEMS' Dr. Rebecca DeRosa is principal investigator, Dr. Michelle Hluchy (AU geology), Dr. Garrett McGowan (AU chemistry) and Dr. Gerald Fong (Alfred State College physical sciences) as contributors, on the 2-year grant. The Jupiter 449 can perform simultaneous differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA).

The instrument is top-loading with excellent versatility in sample size tested, accommodating macro-(up to 5 grams) and micro-(in the μg region) sized samples.

The large temperature range, operating from -120° to 1500°C , allows testing of a variety of materials including polymers, low molecular weight organic additives, ceramics, and glass.

The DSC component reports a great deal of data, including measurements for specific heat, melting temperatures, transition enthalpy, phase transformation, crystallization temperatures. The data are readily interpreted to yield degrees of crystallinity, glass transition temperature, decomposition effects, reaction kinetics, and purity determinations. The DSC detector is highly accurate, even at the highest running temperatures.

The Jupiter 449 TGA can return values for mass changes associated with

decomposition, dehydroxylation, and corrosion/oxidation. Simultaneous TGA/DTA can enable studies in thermal stability, reduction, multiphase, reaction kinetics, and purity determination.

The Jupiter 449 will be installed in the new Binns Merrill Hall thermal analysis lab in January, 2002. CACT funding has also assisted in the acquisition of a Netzsch STA 409 CD, capable of combined thermal analysis to 2000°C . This instrument is used by Dr. Linda Jones in research studies on SiC and glass melt emissions.

Cheryl Junker is a junior majoring in ceramic engineering

News from the Ceramics Corridor® Innovation Center

Alfred's Ceramics Corridor® Innovation Center (CCIC) facility has been slated as the location for the new Advanced Research Center in Photonics (ARC/photonics) recently funded by NYSTAR. The ARC will function as a prototype manufacturing facility to train student technicians and engineers from Alfred University, Alfred State College and Rochester Institute of Technology in the field of photonics. Manned by faculty, engineers and research scientist partners of the initiative - Alfred University, Alfred State College, RIT and Corning Incorporated - the center will provide on-the-job-training that will be an advantage for graduating job seekers in a rapidly growing industry where there isn't much time for a learning curve.

"[The ARC/photonics] has great potential to stimulate the economy of the entire region," stated AU President, Charles M. Edmondson in a recent interview with Alfred magazine, adding that he is "particularly pleased that the project involves Corning Incorporated as a corporate partner."

In addition to providing mentoring support for the project, Corning Incorporated, a long-time stakeholder in the CCIC program, is also providing

funding and equipment for the prototype facility. Photonics research and development is not new to the CCIC. Corning, an industry leader in photonics research and development, traces its photonics roots to innovations nurtured in the CCIC-Painted Post facility.

LightPath Technologies recently located at CCIC's Painted Post facility to conduct research and development on various optical matrix switching fabrics. LightPath uses its proprietary automated manufacturing processes, including laser fusion and laser polishing, to provide optical components and sub-assemblies to telecommunications manufacturers. Their highly flexible automated processes significantly increase volume production with reduced cost and improved reliability and performance. LightPath manufactures a range of products used in telecommunications networks and the traditional optics.

Dr. William LaCourse, NYS College of Ceramics Professor of Glass Science, CEMS, has located his new venture, Santanoni Glass & Ceramics, at the Alfred CCIC. The company will mainly target the pet industry, focusing on the research and product development of "bone china" memorial urns, plaques and photo frames that are comprised of the remains of

beloved deceased pets. Wally and Norma Higgins, two internationally known ceramics artists who are also stockholders of the company, will be active in technical and design aspects of the operation.

The "bone china" technique has been utilized for centuries in the creation of fine dinnerware and other decorative items. The process produces a high-quality, translucent product. Marketing will be aimed at veterinarian offices in large cities where pet owners are often required to have their deceased pets cremated.

For more information, please call CCIC Executive Director Jon Wilder at (607) 587-9444, email him at jwilder@ceramicscorridor.org or visit the website at www.ceramicscorridor.org



The Alfred, NY, Ceramics Corridor® Innovation Center is home to a growing number of diverse technical ceramics companies.

Technology Transfer Center added at CCIC

by Jeff Povelaites and Gabrielle Gausted

How do laboratory prototypes make the transition to mass-production smoothly and easily? Well, they don't. When a company makes the jump from prototype to full-scale production, scale-up problems often cause wasted resources and revenue loss.

The Technology Transfer Center (TTC) is a new addition to the Alfred CCIC that will soon play a key role in the research-to-production transition. A CACT laboratory facility, TTC works with small businesses in design and product testing.

What makes this laboratory different are its capabilities to act as a small production line where several pilot-scale projects can be made and tested. Problems or bugs that occur during pilot production can be solved before the product is put into full-

scale production, thereby saving money and manufacturing resources.



Dr. Xingwu Wang, AU EE professor, with donated RF plasma machine at new TTC facility.

TTC arose from the combined efforts of Dr. Xingwu Wang, an AU electrical engineering professor, and CACT Assistant Directors Dr. William Walker, Jr. and Dr. Licio Pennisi.

Donations of equipment have come from local and national businesses interested in ceramic research. TTC is targeting New York businesses, or

those wishing to relocate here.

Wang's research includes deposition of ceramic aerosol films formed in air onto a variety of materials. Ceramic coatings have many applications including superconductors and electronic circuits. Wang envisions a thin film lab at TTC containing all the major machines involved in the process, such as a sputtering gun, RF plasma, laser,

and an electron-beam evaporation tool, all donated by large companies.

TTC's first client, a small Rochester start-up, is now finalizing its contract with TTC. They plan to provide financing to rebuild machines and maintain operations. In exchange, TTC will be testing oxide films for optical filters, a technology the company is currently trying to implement in production.

The TTC is not yet fully operational and is always looking for further corporate equipment donations to increase its "outlab" capabilities for industry. For any information on the Technology Transfer Center, please contact Dr. Licio Pennisi (pennisi@alfred.edu), Dr. William Walker (walkerw@alfred.edu), or Dr. Xingwu Wang (fwangx@alfred.edu).

Jeff Povelaites is a sophomore majoring in ceramic engineering with a minor in chemistry. Gabrielle Gausted is a sophomore majoring in ceramic engineering with a minor in fine arts.

AU enters into informal agreement with KICET

Thanks to a new informal agreement, the School of Ceramic Engineering and Materials Science, the Center for Advanced Ceramic Technology (CACT) and scientists at a Korean research laboratory may soon be cooperating on research projects.

A memorandum of understanding was signed in November by Ronald S. Gordon, dean of the NYSCC School of Ceramic Engineering and Materials Science (CEMS), Vasantha R.W. Amarakoon, director of the CACT Center; and Su-Chul Chung, president of the Korea Institute of Ceramic Engineering and Technology (KICET).

KICET works closely with universities in Korea, operating in part with private funding secured from Korean industry. KICET is involved in advanced ceramics technologies, primarily in the areas of electronic ceramics and bioceramics.

The agreement calls for the three parties to exchange scientific and technical information in the pursuit of collaborative

research programs in the field of ceramics. Cooperative activities may consist of information exchange, technical assistance and research cooperation.

"They (KICET) may have visiting scientists coming here to work, and our professors may go (to Korea) to teach and assist in research,"

Amarakoon said. "They bring people with great expertise, and our visiting professors will be exposed to some of their equipment."

Amarakoon noted that the agreement will benefit all parties involved. "There are opportunities for collaboration," he said. "There may be a (research idea) that is not popular here (among private industry in

the US) that may generate interest among private industry in Korea, and vice versa. With this agreement, all parties can work

together, sharing their resources."

Gordon added that CEMS may benefit from an increased number of graduate students and post-doctoral researchers coming to AU from Korea.

The agreement, which is non-binding, lasts for five academic

years after which all parties may authorize its extension.

For more information, contact Dr. Vasantha Amarakoon at famarakoo@alfred.edu.



CEMS Dean Ronald S. Gordon, left, KICET President Su-Chul Chung center, and CACT Director Vasantha Amarakoon met in November to sign a memorandum of understanding between all three parties.

New faculty bring diversity to Alfred University

DR. SUBRATA SAHA

by **Cory M. Bishop**

With an emphasis on broadening the scope of the School of Ceramic Engineering and Materials Science, the school recently focused on strengthening the program in areas other than ceramics. To do this, Alfred University is hiring new faculty in areas like biomedical materials.

Dr. Subrata Saha is one of those new faculty members, coming to us from Clemson University. While at Clemson, Saha served as the Director of the Bioengineering Alliance. He will play a major role in strengthening biomedical materials engineering science (BMES) at AU, working hard to make the BMES program more attractive, particularly exploring ways of bringing in more pre-med students. He would also like to develop linkages with medical centers in the Buffalo, Rochester and Syracuse areas, possibly bringing in physicians and surgeons as adjunct faculty members.

Saha has interests in methods for nondestructive testing. He wants to explore

methods like ultrasound and vibrations for testing bones, bone cement and artificial joints without destroying them.

Like most faculty here in the School of Ceramic Engineering and Materials Science, Saha will be utilizing both graduate students and undergraduate students in his research. However, Saha is also interested in bringing high school students into the research world. He feels they are more than competent enough to do the work and he hopes to expose them to the field of materials at a younger age.

Saha is looking to work closely with industry as well. He would like to expand the industrial internships, sending both undergraduate and graduate students to work with orthopedic companies and dental companies.

Saha is also working with the CACT, networking with various companies here in New York State. He is working with STS Biomedical to produce coatings for catheters to lubricate them or make them

antibacterial. He is also exploring electrical stimulation and its positive effects on healing as well as its interactions with antibiotics. Saha would also like to model the antibacterial properties inherent in some preexisting materials.

Saha has already gotten started, teaching Team Project I, a graduate course exploring biomedical technology. In addition to the follow-up course Team Project II, Saha will also be teaching Advanced Biomaterials as well as Ethical Issues in Biomaterial Engineering in the spring semester.

Cory M. Bishop is a senior majoring in both ceramic engineering and physics.



Dr. Subrata Saha

DR. CARL BOEHLERT

by **Samuel Moore**

Dr. Carl Boehlert is a new assistant professor in the School of Ceramic Engineering and Materials Science, bringing extensive knowledge of advanced characterization techniques in metallurgy to our program. Boehlert will teach CES 220, Mechanics of Materials, in the spring semester. He hopes to incorporate microscopy into the classroom and laboratory to demonstrate microstructure



Dr. Carl Boehlert

versus mechanical properties. Nickel-based superalloys resist creep at high temperatures but different processing

methods yield different results. Boehlert hopes to quantify these various processing-related microstructures and study their effect on the superalloys' mechanical behavior. With the use of orientation imaging microscopy, different grain orientations can be characterized and quantified and then related to the overall mechanical properties of the metal. After gaining knowledge of how these grain orientations affect mechanical properties, processing of nickel-based superalloys can then be tailored to the desired mechanical properties of the application. He is working collaboratively with Specialty Metals Corporation on this project.

Boehlert's CACT seed research project is a study of the grain boundary engineering effects on mechanical behavior of nickel-based superalloys. Nickel-based

Boehlert also continues his groundbreaking research in capturing electron backscattered kikuchi patterns of highly reactive metals, including plutonium and cerium. A kikuchi pattern shows both crystal orientation and symmetry. Boehlert

and his colleagues at Los Alamos National Laboratory (LANL) were the first to capture SEM backscatter kikuchi patterns and to demonstrate the capability of this new technique. Highly reactive metals form a layer of oxidation very quickly in air so he and his coworkers at LANL designed a vacuum suitcase to transport samples from a scanning electron microprobe, used to sputter clean the surface of the metal, to the SEM to ensure surface cleanliness and integrity. At LANL, this technique will help to improve safety and reliability of nuclear stockpiles.

Other research areas for Boehlert include physical metallurgy of titanium-based intermetallic alloys and metal matrix composites.

Samuel Moore is a junior majoring in ceramic engineering.

Nanotechnology Conference held in Lake George

by Jake Amoroso

Economic competitiveness for semiconductor industry firms was examined at the Albany Symposium on Global Semiconductor Issues held in Lake George, New York, September 10-12, 2001. The conference addressed global economic factors likely to impact the semiconductor industry in the future and provided a comprehensive view of the changing economic and technological aspects of the semiconductor industry to advance individual enterprise and economic prosperity. Noted speakers included Dr. Alain Kaloyeros of Albany NanoTech. The keynote address was given by Governor George E. Pataki.

Governor Pataki emphasized the theme of integrated high-tech research and development during his September 10th address. The Governor explained his plan to maximize the State's return on higher education by pushing the State's higher education facilities to cooperate with

industry allowing these universities to become mainstream technological development centers. The Governor's initiative plans to fund not only university research, but also prototyping, workforce training, and economic outreach.

Kaloyeros, Executive Director of Albany NanoTech, is working through the University at Albany-SUNY to create a leader in scientific materials research and technology. As part of Governor Pataki's one-billion dollar high-tech initiative to fund advanced university research, Albany NanoTech will integrate university level research with global development and a high-tech workforce to draw industry to New York State. Kaloyeros recently addressed Alfred University students and faculty at this year's annual McMahon lecture on October 11, 2001.

The Center for Advanced Ceramic Technology is similarly at the forefront in this high-tech economic initiative as a

leader and role model in university cooperation with industry. Dr. Vasantha Amarakoon, CACT Director, Dr. William Walker, Assistant Director, Research and Outcomes Measurements/CANY, and Dr. Licio Pennisi, Assistant Director, Extension Services, were present at the conference representing the CACT.

Governor Pataki was pleased to meet the CACT representatives and expressed an appreciation for their ongoing efforts contributing to a highly competitive and growing economy for New York.

Jake Amoroso is a junior majoring in glass science engineering with a minor in physics.

Kaloyeros is 22nd McMahon lecturer

by David Fogelman

Dr. Alain Kaloyeros, dean of the School of Nanosciences and Materials at the SUNY University at Albany, Director of Albany NanoTech, is the 22nd annual John F. McMahon Memorial Lecturer. He is also director of the SUNY Albany Institute for Materials, a \$100M umbrella organization with six major interdisciplinary research centers.



Dr. Alain Kaloyeros

Kaloyeros delivered a lecture entitled "Albany NanoTech: A New Paradigm for University Business in the 21st Century." He presented the new paradigm of University-led advanced materials research, integrating research pilot prototyping, high-tech incubation, training and economic outreach.

Kaloyeros received a PhD in condensed matter physics from the University of Illinois at Urbana-Champaign in 1987, joining the SUNY-Albany faculty in 1988. He has been a full professor at UAlbany since 1994.

Governor George Pataki recently appointed Kaloyeros to serve on the Board of Directors of the New York State Spinal Cord Injury Board.

David Fogelman is a senior majoring in both ceramic engineering and computer science.

AU alumni began the McMahon Lecture Series in 1980 to honor Dr. McMahon's prolific contributions to Alfred University and the study of ceramics. McMahon spent 68 years with the college as a student, researcher, professor, dean, curator, and dean emeritus. The McMahon Achievement Award is a distinctive honor given annually to a scientist who has worked to better society and further the materials industry.

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NYSCC analyzes magnetic material from Buffalo farm

by Krista Carlson

While cleaning off his bulldozer blade, Cletus Kraft, a farmer from Buffalo, NY, found an odd black material stuck to it. Pulling it off he found that it had magnetic properties. Not knowing what it was, and interested in finding out, Kraft took the piece to the NYSCC for analysis in August.

Ward Votava, adjunct instructor and technical specialist in scanning electron microscopy, started the testing by looking



Ward Votava, seated, adjunct professor and specialist in scanning electron microscopy, explains to Cletus Kraft and family, left, what the findings were after analyzing a material which Kraft had discovered on his Buffalo, NY farm.

at a small sample of the piece under the ETEC scanning electron microscope. Usually before putting a sample in the SEM you need to coat it with a 60Au/40Pd alloy so that the material becomes conductive; this material was already conductive so no coating was needed. Votava magnified it about 8000 times and analyzed the material's grains. Energy dispersive x-ray

spectra (EDS) showed the composition of the material but one more test was run to be certain.

Dr. Scott Misture, assistant professor of materials science, and his group then got a chance to analyze the material. The group ran an x-ray powder diffraction measurement on the specimen. X-ray diffraction shows the arrangement of the atoms in a crystalline material, which serves as a fingerprint for the material.

Misture analysis agreed with Mr. Votava's findings that this "mysterious magnet" was actually a ferrite. Ferrites can be used by themselves or used to make magnetic ceramics. From its chemical composition Votava and Misture judged that this particular piece was from the 1970's and may have come from an electric motor.

Krista Carlson is a sophomore majoring in glass science engineering with an astronomy minor.

Alfred Tile, Inc. joins Sugar Hill Industrial Park

Dr. Maurice Rucker, president of Sugar Hill Development Corporation (SHDC), has announced that Alfred Tile, Inc. will construct a 26,000 sq. ft. facility in the Alfred Sugar Hill Industrial Park for the production of decorative ceramic tiles. A January 2002 ground breaking is planned.

According to Alex Burr, General Manager of Alfred Tile, the company will manufacture background and decorative tiles for use in the residential market at the Alfred plant. Part of the finishing process for a portion of the factory's products will be accomplished at Alfred; the remainder of the products will be shipped to a subsidiary company in Bolivia for hand painting. The Alfred plant is expected to hire 65 employees and the Bolivia plant to hire 100.

The company's initial plan had been to open a production facility in Mexico. Burr explained the change to the Alfred area: "The factors that led us to locate in Alfred were the presence of an industrial park

that was ready for occupancy, the inclusion of that park in an Empire Zone and the ability to draw on the many persons in the area who had the skills necessary to develop and make this project a reality. Alfred University has a worldwide reputation in the ceramics field and we want to both capture the advantages of this reputation and help the local economy through the creation of jobs. Also favoring this area was the ready availability of very high-grade New York State talc, a major ingredient of our product."

Working on this project with Burr are John Lang, Richard Lang, Laurie Keenan and Wallace Higgins. All are graduates of the NYS College of Ceramics. Higgins is also a former professor at the College.

The products will be marketed through 200 Expo Home Centers of Home Depot which are now being opened throughout the United States.

Burr pointed out that the company expects to need to add another 20,000 sq. ft. of manufacturing space and additional

employees once production is running.

Speaking for Sugar Hill, Rucker said, "This will be the first production facility to be established in the industrial park. Its presence will be a fulfillment of the corporation's objectives of job creation through utilizing the unique features of the Alfred (New York) area. A second business will be locating in the park during the Spring of 2002."

Rucker also applauded the continuing support of New York State Electric and Gas (NYSEG) of the SHDC's development efforts. NYSEG provided pro-bono assistance in designing and printing SHDC's highly-praised business brochure, which is a prime example of partnering as a critical component in furthering economic development in the Ceramic Corridor®.

For more information, contact Dr. Maurice Rucker, SHDC President, at (607) 587-8460.

Who are the CACT customers?

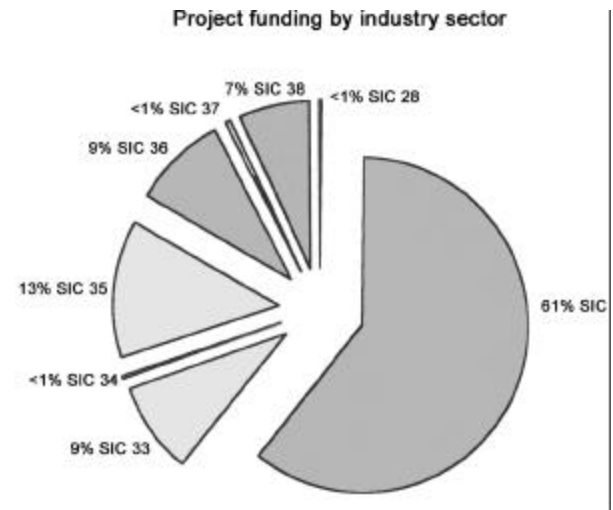
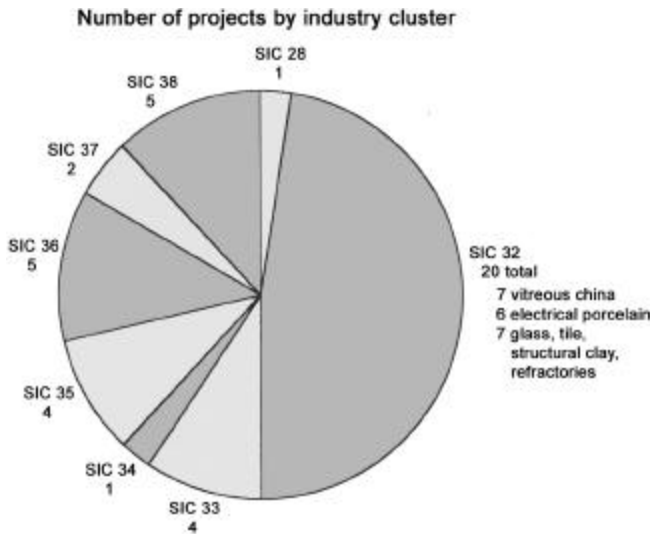
by Gretchen Schwerzler

Data from all currently funded CACT projects from New York businesses were analyzed to determine the different types of industries that the CACT serves. The ongoing projects were categorized and grouped together by industry type using 2 digit SIC codes.

The pie charts demonstrate the variety of industries involved with the CACT, the distribution of total contracts and percentage of total funding in each area. It is interesting to note that although the CACT primarily works in the traditional ceramics industries, a considerable number

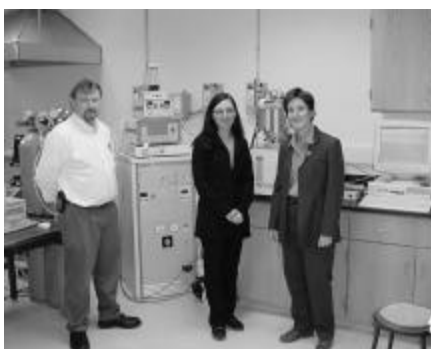
of projects are in the electronics (36) and instruments (38) areas.

Gretchen Schwerzler is a senior majoring in ceramic engineering with a minor in business administration.



SIC Code	Industry sector	SIC Code	Industry sector
28	Chemicals and allied products	34	Fabricated metal products
32	Stone, clay and glass products	36	Electronic and other electric equipment
35	Industrial machinery & equipment	38	Instruments and related products
33	Primary metal industry	37	Transportation equipment

Binns Merrill Hall comes back on-line



Several CEMS labs have been relocated to the newly renovated Binns Merrill Hall. The photo at left shows the lab of Dr. Linda Jones (far right), along with representatives from Netzsch who are installing her new STA 409 CD equipment, which will enable TG DSC/DTA measurements at temperatures up to 2000°C. In center photo, Dr. Alan Goldstein is shown in the new BMES lab where research will be conducted to develop next-generation biomaterials devices for many applications. Photo at right shows Dr. Scott Misture (at left) with PhD student Mike Haluska, at one of the high temperature diffractometers. The instrument allows in-situ XRD studies of materials under controlled atmosphere from RT to 1600°C.

Research and faculty news

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has been cancelled. A new date for the conference has not yet been established.

Dr. Alastair Cormack represented the NYSCC at the signing of a Memorandum of Understanding with Japan's National Institutes of Material Science in December 2001. During the fall, Cormack presented invited lectures at the 79th Bunsen International Discussion Meeting on Ionic Motion in Materials with Disordered Structures in Muenster, Germany, and also at the University of Trento, Italy.

Dr. Doreen Edwards presented recent work at the November 2001 ACerS PacRim meeting. Cormack was also a session chair and invited speaker at the PacRim meeting.

First International Workshop on Glass and the Photonics Revolution May 28-29, 2002 Bad Soden, Germany

Glass users, glassmakers, photonics theorists and photonics engineers will come together for the first time in a concerted effort to point the way toward future uses of glass. The one-and-a-half day workshop will feature invited presentations from industry, government and academe, and a concluding panel discussion.

Held in conjunction with the annual meeting of the German Society of Glass Technology (DGG), the event will be sponsored jointly by the NSF Industry-University Center for Glass Research and the NYS Center of Advanced Ceramic Technology, both of the NYS College of Ceramics at Alfred University, and the German Glass Industry Association (HVG). Dr. L. David Pye and Dr. Helmut Schaeffer will serve as co-chairs.

The workshop proceedings will be edited by Ms. Margaret A. Rasmussen. For information, contact M. Kruger at 607-871-2423 or email krugerm@alfred.edu.



Advances

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