

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

CACT offers a variety of research opportunities

FROM CACT DIRECTOR DR. VASANTHA AMARAKOON

Reading the articles in this newsletter, a single theme becomes apparent: the CACT offers industry unprecedented research and economic opportunities on a variety of levels. The CACT brings together diverse companies that share common goals in cutting-edge research. Innovations and efficient process development lead to profits for the participating companies.

The benefits of CACT membership are greater today than ever before. Members of the CACT have access to the research assistance and unparalleled expertise of the faculty and staff members of the NYSCC School of Ceramic Engineering and Materials Science. In addition, CACT members have access to the School's

world-class equipment for processing and measurements. A major selling point of the CACT is the huge cost savings compared with companies buying their own in-house equipment and expertise.

CACT members have the option of working with CEMS students. The several articles on co-op experiences emphasize the students' enthusiasm and dedication to their companies. Many students also work

as summer interns or during the semester at AU. Students and companies working together through the CACT have a long history of success. We are very proud of our students' participation in these programs. They benefit from their hard work both academically and through personal growth, preparing them for

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Dr. William LaCourse and his wife, Patricia, co-owners of new CACT affiliate Santanoni Glass and Ceramics, Inc., present a check covering membership and additional research to be carried out at the CACT. Pictured, left to right, Joyce Farnum, Assistant to the Director, Dr. Vasantha Amarakoon, CACT Director, Dr. William LaCourse, Dr. Licio Pennisi, Technical Assistant to CACT Director, and Mrs. Patricia LaCourse. More information on Santanoni Glass can be found on page 9 of this issue.

Clare to lead AU photonics effort

UNIVERSITY AMONG PARTNERS IN GOVERNOR PATAKI'S PHOTONICS INITIATIVE

Alfred University will be among the university partners in creation of a Center of Excellence in Photonics and Optoelectronics in Rochester. Dr. Alexis Clare, associate professor of glass science, School of Ceramic Engineering and Materials Science, is AU's lead photonics researcher in the Center of Excellence.

The proposal, announced January 22, 2001 in Rochester by Governor George Pataki and Senator Charles Schumer, has already garnered \$45 million in support from Kodak, Corning and Xerox; the target is \$75 million in private support, with the state to commit additional funds from Pataki's \$1 billion high-tech/biotechnology initiative. A drive to raise the additional \$30 million in private

investment to fund the initiative has also been announced.

"The fact that this remarkable investment from leading technology companies has come forward so quickly demonstrates that our new Centers of Excellence initiative will produce tremendous benefits for the Rochester economy and the entire State," Governor Pataki said. "Clearly these world leaders in high-tech recognize that our top-flight research institutions and business infrastructure will serve as the building blocks for the 21st century economy."

"Photonics is the equivalent of electronics, except it uses light instead of

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

CACT associates continue to offer co-op experiences

OSRAM SYLVANIA INC.

by Rebecca Francy

After my junior year in undergraduate ceramic engineering, I decided that it was time to see what “the real world” was really like. I moved to Warren, PA and began an eight-month co-op at the electronic components and materials division of Osram Sylvania. I worked in the analytical laboratory performing tests and interacting with engineers, production employees, and customers.

My most important tool in the lab was my ability to think logically and clearly. It was my job to figure out why parts failed and find possible solutions. I had learned to use most of the equipment in CEMS. I was also introduced to equipment I had never used before, including XRF, Melt Flow, DMA, vibration testing, and digital imaging plus thermal and environmental testing apparatus required for automotive tests.

I learned about plastic injection molding and the automated machinery to mold, stamp, assemble, and package various products. When new automated lines were delivered, I worked alongside the engineers and technicians to get the machinery into production.

Though half of the work I did was day-to-day testing and troubleshooting, I had one large project for Ford Motor Company; if the goal was achieved it would save Ford millions of dollars

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BUFFALO CHINA

by Karen M. Russell

Throughout the summer and fall semester of 2000, I took a co-op at Buffalo China Inc., a division of Oneida Ltd. that supplies restaurants and hotels with commercial dinnerware. During my co-op, I focused on the body end of the process while trying to absorb as much about glazing and decorating as possible.

My knowledge from CEMS classes and labs was tested daily. Buffalo China ware is formed using jiggering, ram pressing, dry pressing and pressure casting. Pressure casting was the most challenging process I encountered, requiring me to learn a process thoroughly enough to troubleshoot new bodies and a new machine. I worked alongside Nikola Ninos (AU '91), R&D Director, to find optimum conditions for production slips, varying fundamental system properties.

An interesting project involved matching a body color from a 100-year-old piece of Buffalo Pottery. Buffalo Pottery was founded by The Larkin Soap Company and has grown into today's Buffalo China. After performing many trials, and with the help of Dr. David Earl, a match was found. This project demonstrated the importance and power of statistical experimental design in research.

My co-op opportunity provided networking experience and a professional relationship with a leading dinnerware

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ADVANCED MONOLYTHIC CERAMICS

by Michael Micciche

During the summer and fall of 2000, I was on co-op at Advanced Monolithic Ceramics (AMC) in Olean, NY. AMC manufactures Multi-layer Ceramic Capacitors (MLCC's), used as filters in a wide variety of communications, automotive and aerospace applications.

I worked as a process engineer on the production floor, participating in all aspects of manufacturing from batching through quality control. I was also responsible for investigating new materials and implementing new procedures, including writing procedural specs and training employees. CEMS classes came alive with daily application of processing principles.

The most rewarding part of my co-op was the daily interaction with employees. By working with the operators and using their knowledge of the equipment, I was able to help solve problems more easily. I became proficient at operating almost every piece of equipment in the plant and helped to train newly hired employees.

During my co-op, building expansion doubled the size of AMC's production facility. I was involved in planning the layout, installation and qualification of new production equipment.

This was my second co-op and both experiences showed me the tremendous

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Clare

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electronics to communicate, manipulate, create and detect signals,” explained Dr. Clare. In the near future, optical network applications will power the Internet, exploiting the full optical fiber bandwidth by transmitting, combining, amplifying, and switching wavelengths via photons. Currently, photonics is at the stage that electronics was 30 years ago, with the development and integration of component parts into larger systems and subsystems. The photonics industry is a

\$100 billion industry, growing at an annual rate of 18 percent.

Photonics is one of the areas of concentration for undergraduate students in the School of Ceramic Engineering and Materials Science, which also received State University of New York funding last summer to develop a PhD in materials science and engineering that would emphasize photonics.

“This is a very natural partnership for Alfred University,” said AU President

Charles M. Edmondson. “Faculty in our School of Ceramic Engineering and Materials Science have been involved in photonics research and education for a number of years. Participation in this initiative underscores our role as a leader in the photonics education field.”

Other academic partners in the creation of the proposed photonics center are the University of Rochester, Rochester Institute of Technology and Cornell University.

New venture promotes advanced sintering technology

Ceralink Inc., newly located in the Alfred Ceramics Corridor Innovation Center (CCIC), offers unique services to advanced ceramic producers. Having international experience in innovative technologies in advanced structural and electronic ceramics, Ceralink will assist industry in the cost effective outsourcing of their research and development through appropriate university partnering while maintaining the industrial focus.

Ceralink will establish a microwave prototype and testing center at the Alfred CCIC in 2001. With recent breakthroughs, microwave technology is emerging as an attractive option for high temperature ceramic processing. Advantages include decreased manufacturing costs through shorter firing times with better uniformity of product compared to conventional and electric firing. Ceralink will offer companies testing and product development using state-of-the-art fully

integrated microwave furnaces. Ceralink will showcase commercially available microwave systems and interface with equipment suppliers for industrial scale-up. Improved and unique properties can be achieved by utilizing the volumetric heating associated with microwaves.

Ceralink is working in collaboration with the Center for Advanced Ceramic Technology on the densification of nanoceramics through microwave and millimeter-wave sintering.

Alfred is ideal for technology transfer

Nostalgia had no place in Dr. Holly S. Shulman's decision to locate her new venture, Ceralink Inc., in the Alfred CCIC facility. Most important to this AU grad (BS CerEng '86) was the international reputation of Alfred's CEMS faculty in advanced sintering technology. Dr. Shulman, who holds degrees from the University of Pittsburgh (MS '90) and the Swiss Federal Institute of Technology (EPFL), Lausanne (PhD '97), also cites the

excellent support for new ventures provided by the CACT and the advantages of access to the CEMS faculty and facilities as a CACT affiliate. She sees the high quality, well-prepared CEMS undergraduate population as an essential source of professional employees as Ceralink expands.

Shulman's concept for Ceralink grew from her research experience at New Zealand's Crown Research Institute on microwave processing. Collaboration with the faculty at the University of Wollongong, NSW, Australia, led to successful microwave sintering of large, high-quality alumina shapes using advanced millimeter-wave technology developed by Communications & Power Industries (CPI) of Palo Alto, CA. Needing an East Coast US demonstration facility for their technology, CPI was open to collaboration with Dr. Shulman and enthusiastic about the advantages of Ceralink's Alfred location.

Shulman sees her venture as an essential link in international technology transfer between researchers, CPI technology and the US advanced ceramics manufacturers. Ceralink will present microwave sintering to potential users as a working technology with the capability to densify large shapes using its 4 ft. x 2 ft. diameter cavity.

Ceralink is also negotiating to establish a US demonstration facility of a UK-developed process for combined microwave/conventional sintering technology.

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productive entry into the workforce.

There are more long-term economic benefits to CACT membership. Governor Pataki's State of the State address emphasized his new 1 billion dollar high-tech initiative to promote collaboration between business and universities, leading to high-tech job growth in New York State. The CACT promises to be an integral part of this program.

There are also opportunities for new companies to develop locally. The Ceramics Corridor Innovation Center (CCIC) and the Sugar Hill Industrial Park (SHIP) both provide entrepreneurs with excellent facilities and services to jump-start their companies. New ventures at CCIC and SHIP particularly benefit from CACT affiliate membership.

Our thanks to all of our participating companies for their support throughout the years. It is your participation that makes all of this possible.

CACT membership services and benefits are showcased in a new and informative CD-ROM, featuring interactive guided tours of the School's state-of-the-art research facilities. For further information or to request a copy of this innovative CD, contact Dr. Licio Pennisi (fpennisi@alfred.edu or (607) 871-2486).

For further information, please contact Dr. Vasantha Amarakoon, CACT Director, at famarakoo@alfred.edu.



Dr. Jon Binner (center), Professor, Loughborough University, U.K., is welcomed to the CACT by Dr. Holly S. Shulman (left) Ceralink, Inc., and Dr. Vasantha Amarakoon (right), Director, Center for Advanced Ceramic Technology. Dr. Binner, an expert in microwave sintering of advanced ceramics and non-oxide materials, is head of a European consortium on microwave sintering of ceramics. On his February 9, 2001 visit, Dr. Binner presented a special graduate seminar.

Out of the woods and into the high-tech ceramic arena

by Seann Bishop

Xylon is a Greek term meaning “out of the woods,” and was chosen by XYLON Ceramic Materials, Inc. founder Nicholas Burlingame because he thought it was appropriate to its beautifully wooded New York location. Although XYLON may have a “rustic” name, the company has proven that it is anything but.

Since its 1990 founding, XYLON has been a high-tech ceramic business specializing in stabilized zirconia ceramics. Housed in the Alfred CCIC, it is a microenterprise in the highly competitive ceramic arena. Within 14 months of start-up, XYLON became the sole US producer of USFDA registered ceramic femoral heads for hip joint replacement systems, just the first of XYLON’s many achievements. In 1996, XYLON became the first manufacturer registered by the USFDA to produce a larger ceramic ball for hip joint replacements.

XYLON began as a joint venture between academic researchers and industry. Supported by the CACT and in collaboration with Assistant Professor of Ceramic Engineering Dr. Gary Fischman, the company started with only one employee. Ten years later, XYLON has become a leader in advanced stabilized zirconia ceramics, competing against at least four companies each having annual revenues of one billion dollars. The CACT still remains an integral part of the

company’s success, serving as an interface between the business and CEMS resources. Burlingame is quoted as saying that the CACT also “offers good customer contact opportunities.”

Innovation is XYLON’s key to success. Initially, XYLON couldn’t find zirconia powder that would meet their special needs for composition and purity. This led them to develop their own specialty powder which opened a whole new avenue - specialty powder development and sales. XYLON is also researching the use of zirconia powders in aerospace and industrial electronics applications to provide resistance to wear and corrosion.

According to XYLON Vice President Paul Johnson, the ongoing expansion of ceramic powder technology is well suited for new target markets such as thermal barrier coatings (TBC’s) and solid electrolytes as well as biomedical and industrial applications. XYLON has always cultivated strategic relationships with customers, allowing it to maintain a customer focus that is technology driven rather than a broader market driven approach. What’s new is that XYLON now offers the choice of its high-tech ceramic powders in addition to fabricated components. XYLON can tailor precise compositions for a variety of forming processes. This allows the formation of materials with specific structural, electronic, chemical and thermal attributes

required by various applications.

Burlingame lists other “milestones” in XYLON’s recent development. First, as of 1999, the company has added a new sales and marketing arm headed by Ralph C. Searle. XYLON is currently in pursuit of ISO-9002 registration. Becoming registered by the International Standards Organization (ISO) will allow it to expand its markets globally. XYLON has also expanded from zirconia parts production to parts and powder production. Biomaterials still constitute the largest portion of XYLON’s revenue, but zirconia powder sales are on the rise.

Finally, the company is in pursuit of new growth areas such as Electrostatic Dissipative (ESD) devices, TBC’s, solid electrolytes and high purity refractories. XYLON was recently awarded a US Patent (No. 6,136,232) for an Electrostatic Dissipative (ESD) Zirconia. ESD devices allow gradual electrostatic charge dissipation during industrial handling. Otherwise, electrostatic charges build up until a sudden discharge occurs, possibly damaging production pieces. ESD materials are often used in manufacturing computer disc drives, microelectronics and semiconductors. XYLON is positioned to apply for global patent protection for this technology.

Seann Bishop is a senior majoring in materials science and engineering.

BMES: Biomaterials emphasizes science

by Seann Bishop

Dr. Alan Goldstein, Director of the Biomedical Materials Engineering Science Program, states “Biomaterials are going to play a role of increasing importance in all of engineering as we move into the 21st century.” Because of the uniqueness of the School of Ceramic Engineering and Materials Science’s BMES program, it is set to be a leader in revolutionizing the field of biomaterials.

CEMS has a strong history of involvement in biomaterials, particularly in

the areas of dental and bone ceramics (see XYLON profile above). It is also home to a satellite of the NSF Industry-University Center for Biosurfaces. The BMES program gained tremendous support for its expansion with the recent approval of a new master’s degree program and funding to develop a PhD program within the next two years.

The School’s BMES program concentrates on the science behind biomaterials, giving it an edge over its competition. Goldstein says, “Few existing

biomedical engineering programs emphasize development of new biomaterials. Therefore, our program will train a unique group of undergraduate scientists whose focus is on materials and their interactions with cells and tissues.”

He explains, “It is not widely recognized that the living surface may modify the material surface in an interactive and dynamic fashion. An understanding of this dynamic interactive system will create both new opportunities for creating

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AU President and CEMS Dean address CANY gathering

Dr. Charles "Charley" Edmondson, president of Alfred University and Dr. Ronald S. Gordon, Dean of the School of Ceramic Engineering and Materials Science, addressed the more than seventy members and guests of the Ceramic Association of New York at its recent Fall Social held September 19th at Snug Harbor on Keuka Lake.

In his remarks, Dr. Edmondson expressed his appreciation of the renowned faculty of the School of Ceramic Engineering and Materials Science, giving CEMS its world-wide reputation and consistently contributing to AU's inclusion on the short list of the best, distinctive small universities in North America. Dean Gordon presented the state of CEMS and introduced the audience to the challenges in its future.

President Edmondson and Dean Gordon opened the floor to questions from the audience which ranged from addressing the continuing enrollment down-turn to recent changes in the administration of the College of Ceramics.

Edmondson stressed AU's continuing commitment to the College, its faculty and students. His remarks were echoed by AU Interim Provost Dr. Susan Strong, also in attendance, who stressed the long and successful working relationship between AU and SUNY.

The School has seen a recent down-turn in enrollment, both graduate and undergraduate. Partially reflecting general trends in higher education, CEMS recruitment is also hindered by limited public understanding of ceramic engineering and materials science career opportunities. Both speakers remarked that the School's best allies in the recruitment battle are our outstanding alumni and alumni network, strongly represented in CANY membership. A continuing effort by alumni and friends in CANY with the goal of a student per member per year would put an end to recruitment problems.

Dean Gordon noted that the School relies on such efforts to increase the effectiveness of Ann Baldwin, CEMS

Coordinator of Student Services and Special Projects (baldwin@alfred.edu).

Ms. Baldwin actively promotes the School's programs during numerous high school visits during the year and will gladly contact potentially interested students or respond to their questions on our degree and research programs.

SUMMER INSTITUTE IN SCIENCE AND ENGINEERING FOR HIGH SCHOOL JUNIORS

June 24-28, 2001

The Summer Institute is a wonderful opportunity for students to explore their interest and their career opportunities in science and engineering.

Students who wish to participate must return:

- A completed application
- \$25.00 deposit check (non-refundable)
- Up-to-date transcript (to January 2001)
- A letter of recommendation from a high school teacher
- A financial statement, if aid is requested

Please send all items in one packet. The deadline for application is May 18, 2001. All acceptances will be mailed by June 1, 2001. We realize that you need to know early so your summer plans can be finalized. If you need an earlier decision, please indicate the date by which you need to be notified.

Limited scholarship funds are available.

**For complete information contact
Marlene Wightman
(wightman@alfred.edu) or
click on "Before" at
www.nyscc.alfred.edu/cems
and follow the Summer Institute link!**

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biomaterials and aid in attenuating harmful side effects of existing materials used in bioengineering."

Examples of new biomedical opportunities are improved materials for implanted medical devices and for artificial organs and bones. Goldstein continues: "biomedical materials are the key enabling technology that provides the foundation for a whole array of bioengineering applications, covering everything from implants for optimized drug delivery to actual tissue engineering." Goldstein cites CEMS' strength in glass and ceramics in helping the BMES program to create or discover new potential biomaterials.

Goldstein himself brings strength to the BMES program. Considered the world's foremost authority on bioprocessing of

rock phosphate ore, Goldstein has spent the past 20 years studying the interactions of living cells with materials. He also holds the AU Norman and Evelyn Fierer Chair in Molecular Cell Biology.

The uniqueness of the School's BMES program is already having an impact on industry. Recent corporate partnerships range from DNA microarray companies to building product manufacturers. According to Goldstein, this interest is because "the interaction of materials with biomolecules, living cells, and tissues has such an incredible range of applications and is of such importance."

Seann Bishop is a senior majoring in materials science and engineering.

The Whitewares Research Center

PERSPECTIVES FROM VICTOR INSULATORS AND BUFFALO CHINA

by Anne Ebert

The Whitewares Research Center (WRC), an industry-academia consortium, conducts research in all aspects of traditional manufacturing: dinnerware, electrical insulators, sanitaryware, and tile. The current membership is composed of 18 dinnerware and electrical insulator manufacturers and raw material suppliers. Victor Insulators and Buffalo China are charter members. Resources, money, and time are all needed to do in-depth research and development on ceramics; by taking advantage of the WRC, small and large companies are able to gather more information about their materials and processes.

"When the WRC was proposed, there wasn't really another source for basic, unbiased research on clays and processing," comments Mike Dempsey of Victor Insulators. "The WRC whets your

appetite, makes you aware of what you could do." Nik Ninos of Buffalo China agrees and states, "The work in the Center changes the way you think about the manufacturing problem, and provides tools for alternative solutions."

Not only CEMS faculty but also undergraduate and graduate students work on WRC projects, part of what makes the WRC so valuable. Mr. Dempsey said, "The Center is creating students who have an interest and knowledge about whitewares... this is a worthwhile investment for these companies and a service to the industry."

The WRC has a projected \$450,000 research budget for the year, plus several leveraged projects with state agencies like NYSEKDA and EMIG. The total research budget for 2001-2002 is expected to be \$1.2 million. More than doubling in size since its inception, WRC research has

increased by a factor of six.

The WRC is currently revising its technology transfer program. "Research conducted but not disseminated is essentially worthless. The WRC is developing a program to ensure that the information gets to the members and is used," comments Ninos.

"[The WRC] is already generating information faster than some of the participants can absorb it," comments Dempsey. "There are plenty of topics of great interest to explore. It sounds clichéd, but it seems that every door we open leads to two more doors to explore."

For more information on WRC research or membership, contact Dr. William Carty, carty@alfred.edu.

Anne Ebert is a junior majoring in ceramic engineering.

CEMS acquires an optical interferometer

by Jessica Torrey

CEMS recently acquired an optical interferometer, the Zygo NewView 5000, for the measurement of surface roughness. The Whitewares Research Center spearheaded the effort to purchase the new instrument; matching funds were provided from several other CEMS research programs. Primary funding for the instrument was obtained from a grant from Buffalo China in conjunction with NYSEKDA, for the study of surface finish on dry-pressed dinnerware.

Dry pressing, potentially the most efficient forming technique for dinnerware, produces a rough surface that eliminates the use of the thin glaze finish required by many in the dinnerware industry. The optical

interferometer, or "profiler," will be used to characterize the effects on the surface finish of the pressed body from altering polymeric additives, spray drying protocols, and dry pressing techniques.

The NewView system uses white light

interferometry, creating a series of light and dark bands that are then converted into images that can be magnified up to 26 times on a video monitor. It can produce 0.1 nanometer resolution (in the z-axis). 3-D images are generated by

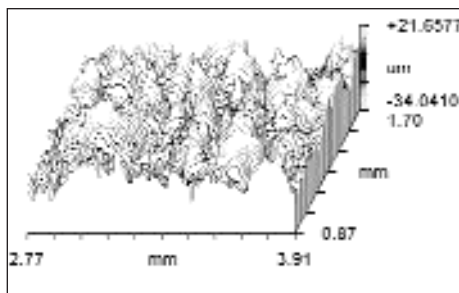
rastering the light beam across the sample surface much like an SEM scan. Compiled data are then displayed in color as images, plots or numeric representations of the surface structure. The instrument also has

the ability to scan several areas and merge the data to create an image of a much larger surface.

Optical interferometry can be a very powerful research aid in many other areas and is an excellent addition to the CEMS equipment base. Dr. William Carty, director of the WRC, says the system is "unique in an academic facility in New York, and probably in any materials science department." The instrument can simultaneously characterize the size and thickness of clay particles without affecting their original character and can measure the thickness of thin films and the dilation of electrostrictive materials.

Perhaps one of the most promising areas of use is in the field of biomaterials. Due to its non-contact approach, the optical profiler is ideal for characterizing the surface of biomaterials in order to predict their interaction with surrounding tissue.

Jessica Torrey is a senior majoring in ceramic engineering.



An oblique image of the surface of dry-pressed green ware, as taken with the Zygo NewView 5000 by the Whitewares Research Center.

Research opportunities at Center for Glass Research

by John Mauro

The mission of the NSF Industry-University Center for Glass Research (CGR) is "to advance the field of glass science and engineering through research, education, and technology exchange driven by the cooperative efforts of academe, industry, and government." Internationally, the CGR has 33 Affiliate companies, including New York's Corning Incorporated and Guardian Industries. CGR Affiliates pool resources and conduct research to build a knowledge base benefiting all of the member companies.

An example of mutual benefit is a recent CGR project to develop a database of glass melt properties. The CGR is investigating melt compositions used in many different applications, including

containers, float glass, TV glass, fiberglass wool, E-glass fiber reinforcements, and low-expansion borosilicate glasses.

The CGR is also pursuing research regarding the effect of OH^- on the bulk and surface properties of glass. The CGR sponsors projects in many diverse areas, including redox measurements, interfacial wetting behavior, softening point measurements, batch reactions, surface studies, emissions analysis, and chemical solubility and diffusion in glass melts.

The CGR provides member companies with unique research facilities and expertise, for example, access to the CGR's commercial apparatus for measuring the partial pressure of oxygen in glass melts. The CGR has also developed techniques for measuring surface tension at

various melt temperatures and atmospheres.

The primary CGR research center is at the NYS College of Ceramics at Alfred University under the direction of Dr. Thomas P. Seward III. The CGR also features a refractories research site at the University of Missouri-Rolla and a glass surfaces and interfaces research site at Pennsylvania State University. The directors of these sites are Dr. Robert E. Moore and Dr. Carlo Pantano, respectively.

For more information on the CGR or to request information on becoming a CGR Affiliate, please contact Director Seward by phone at (607) 871-2432 or by email at seward@alfred.edu. The CGR faculty and programs are featured on their website <http://cgr.alfred.edu>.

CGR names new assistant director

by John Mauro

The Center for Glass Research (CGR) has appointed Terese Vascott to the position of Assistant Director for Technology. Vascott's responsibilities are twofold: she serves as a research liaison and as a service provider for the CGR Affiliate companies.

Vascott's role as a liaison involves working with the CGR research subcommittees to identify the needs of the Affiliate companies. She then matches these needs with faculty interests in those areas of research.

As a service provider, Vascott manages CGR member access to the facilities and equipment at the School of Ceramic Engineering and Materials Science. As CGR Affiliates, companies are entitled to enhanced access to these facilities and services.

Vascott holds an MS degree in ceramic engineering from Alfred University and a BS degree from the Virginia Polytechnic Institute. She worked as quality assurance officer and research engineer on the West

Valley Demonstration Project for the Institute of Glass Science (NYSCC) and then as a process development engineer at West Valley Nuclear Services.

Vascott joined XYLOX Ceramics as process engineer in 1995 and continues a part-time association with that company. Vascott is the coauthor of several publications on heat treatment, phase stability, and the electrical resistivity of glass microstructures.

The CGR has also announced the appointment of ChangQing Shen as the Assistant Director of the CGR Site for Glass Surfaces and Interfaces at

Pennsylvania State University. Shen's research has included work with glass surfaces and the structure, properties, and aging behavior of glass fibers. Shen holds PhD and MS degrees in ceramic science from Alfred University and a BS degree in biophysics from Peking University.

John Mauro is a senior majoring in both glass engineering science and computer science with a minor in mathematics.



Terese Vascott, CGR's new Assistant Director for Technology

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Ceramics Corridor® news

The Ceramics Corridor® Innovation Center (CCIC) at Painted Post, New York is fully occupied and recently found it necessary to add approximately 8,000 square feet of modular units to accommodate requests for additional office and lab space:

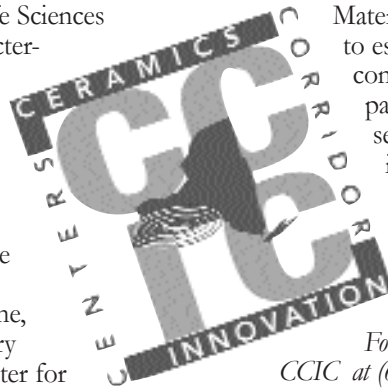
Corning Community College has added additional classrooms and a new computer lab to accommodate the weekend degree program in Opto-Electronics for Corning Incorporated's Photonics Technologies Division employees and also the 30% increase in enrollment of the New Visions Engineering Program for gifted high

school students.

The Advanced Life Sciences group of the Characterization, Science and Services Division of Corning Incorporated requested additional space to establish new R&D labs at the Painted Post facility.

On the Alfred scene, CCIC is working very closely with the Center for Advanced Ceramic Technology (CACT) of

the School of Ceramic Engineering and Materials Science, Alfred University to establish special projects in conjunction with corporate partnership opportunities. The seven tenants are also increasingly utilizing CACT resources to facilitate their own special projects and development of new products.



For more information, please call CCIC at (607) 587-9444 or visit the website at www.ceramicscorridor.org.

Sugar Hill Industrial Park: an address for success

The Sugar Hill Industrial Park (SHIP) is a project of Sugar Hill Development Corporation (SHDC). The industrial park will be specifically for ceramic, glass, advanced materials and other light industry. Fiber optics, telephone, gas, water and sewer services are in place. Electric lines will be installed on the first 6 of 13 sites in the 80.3-acre park once construction of the first building commences.

SHDC officers Dr. Maurice Rucker, Charles Nissler, and Charles Jessup are available to answer questions on funding incentives, construction site costs, and other related issues from CANY business members or other firms interested in visiting the industrial park. Also available are Mr. Joseph Cardinale of the Empire State Development Corporation and Mr. Rick Rebadow, Western New York Region Economic Development Manager for NYSEG.

Companies locating in the Industrial Park will have easy access to the academic and research community. The Center for Advanced Ceramic Technology (CACT) of the NYSCC School of Ceramic Engineering and Materials Science at Alfred University, the SUNY College of Science and Technology at Alfred, and the Ceramics Corridor Innovation Center are all within walking distance of SHIP.

Businesses can take advantage of these institutions for upgrading the skills and knowledge of current employees, for faculty research support, cooperative work programs and internships for students, and for a ready pool of knowledgeable and skilled graduates. The Allegany County Employment and Training Office will also be available to provide funding and other resources to meet company training and education needs.

SHDC's success will mean more jobs, and expanded tax base and, in a larger sense, the nurturing of the Ceramics Corridor regional economy. SHDC has been very successful in obtaining funding and other support from such sources as the USDA's Rural Development Agency, the NYS Department of Transportation, and the Allegany County Legislature. The Town of Alfred and two Alfred businesses, Baker's Construction and Jeffers Construction, have also helped to develop Sugar Hill Industrial Park. Special thanks are given to State Senator Pat McGee for her assistance in securing a major grant, funded through a member item, to defray the cost of electrical line installation.

The SHIP's location combines the beauty and peaceful atmosphere of a rural area with a rich, historic heritage and the advanced technological capabilities of the

Ceramics Corridor. Buildings designed to accommodate the special needs of each business, landscaping and ample parking are just a few of the amenities that make SHIP a special place to locate. Lease rates are very competitive; SHIP can also build to lease with an option to buy. This option allows firms to lease for the first three to five years, with the option to purchase the facility and land at a later date. Payments made during the lease period will reduce the cost of the purchase. Businesses may also purchase sites and construct their own facility.

SHIP has launched its website, www.ship-alfred.org, containing useful information about the industrial park. With major assistance from NYSEG, a four-fold, full color brochure has also been produced. SHIP would like to thank Chris Wood, Manager of Economic Development, Marlene Turock, Communications Specialist, Theresa C. Partell, Market Research Analyst and NYSEG for their support.

To arrange a visit or for additional information, please contact Dr. Maurice Rucker, President, Sugar Hill Development Corporation. The mailing address is 99 North Main St., Alfred, NY 14802. Dr. Rucker may also be reached by telephone at 607-587-8460, by fax at 607-587-9535 or by email at cln@infoblvd.net.

New venture: Santanoni Glass and Ceramics

by Aubree Buchtel

Dr. William LaCourse, Professor of Glass Science in the School of Ceramic Engineering and Materials Science, is the founder of Santanoni Glass and Ceramics. Santanoni, a new CACT affiliate, expects to be producing fine ceramic memorial picture frames, urns and plaques by late spring of 2001.

Fine dinnerware makers often use bone ash with china clay, but Dr. LaCourse decided his company would literally use bone in a composition to make various ceramic and glass products. When a pet dies in a large city, the owner usually must take it to a veterinarian for cremation. Dr. LaCourse asks, "Why not put the ashes of your pet into a ceramic or glass

composition?" This composition could then be used to make a product the owner could keep forever. Since the cremated pet remains consist of bone ash, a traditional bone china composition can be used.

To learn what products would be most popular among city pet owners, the Alfred University School of Business conducted a marketing survey. Their results showed that the most popular items would be picture frames, urns, and plaques. Marketing is geared toward veterinarians, since this could be an additional service offered to their customers.

As a CACT affiliate, Santanoni benefits from the efforts of Rob Hausrath, a CEMS graduate working under Dr. Paul Johnson, who is performing

developmental experiments on various bone china compositions.

Santanoni gets its name from a mountain in the Adirondacks near Newcomb, NY, Dr. LaCourse's hometown. Santanoni's initial production will utilize the facilities of the Alfred CCIC, but future plans will move the company's facility nearer to its namesake. That region currently has high unemployment. Santanoni is considering the development of other products, including various porous glasses, which have extremely high surface areas useful for catalytic reactions. *For further information, contact Dr. Wm. LaCourse at lacourse@alfred.edu.*

Aubree Buchtel is a senior majoring in ceramic engineering.

Oneida Ltd. joins CACT

by Catherine Burke

Oneida Ltd. is one of the world's largest manufacturers of fine china, dinnerware, and glassware. When a problem arose with glass fracture, Oneida relied on CEMS expertise. Dr. Bill LaCourse and his team successfully solved Oneida's glass fracture problem.

This guided help and consultation, along with a good recommendation from

Buffalo China (a subdivision of Oneida), convinced executives at Oneida to become a CACT Affiliate. As an Affiliate, the company can call on the help of CEMS faculty and students when problems arise and make use of the laboratory equipment, clearly a good investment. The contributions of Oneida and other CACT affiliate members will also go toward

funding for graduate and undergraduate research, making more opportunities available for CEMS students and faculty.

Oneida Ltd. is based in Syracuse, New York. For more information on Oneida Ltd., go to <http://www.oneida.com>.

Catherine Burke is a senior majoring in ceramic engineering.

Xinetics

by Krista Carlson

Xinetics was founded by a group of engineers from Litton Itek Optical Systems, United Technologies Optical Systems, and MIT's Lincoln Laboratories. Created in 1993 to preserve critical defense-related materials technologies and to develop them into commercial precision motion-control products, Xinetics is located in the former Fort Devens complex in Devens, MA.

Xinetics produces actuators, electroceramic devices that deform in the presence of an applied electric field, changing shape to move objects. Xinetics also produces advanced silicon carbide optics and engineered devices for precision movement.

According to Xinetics representative

Roger Bagwell, the company's main products are deformable mirrors, digital electronics, multilayer co-fired actuators, silicon carbide mirrors, and other active devices. Digitally controlled, deformable mirrors are used to minimize the blurring in astronomical imaging caused by the scattering of light by Earth's atmosphere. Over 10,134 multilayer cofired actuators have been integrated into mirrors, all of which have been fully-functional.

Deformable mirrors are used in many commercial applications, including astronomy, eye disease diagnosis, and semiconductor processing. Silicon carbide mirrors are used because they are stronger, lighter and have a lower thermal expansion than pure metal mirrors. Xinetics makes

open and closed-back mirrors with sizes up to 18-inches in diameter, and is also integrating actuators into micropositioner systems for use in commercial and medical instruments.

Xinetics is a CACT associate company. Several CEMS students are working with Xinetics through the CACT office: undergraduate Eric Lintz completed a summer 2000 internship; his project is continuing with undergraduate Sean Anderson's current co-op project on ceramic processing development. Xinetics is also partial sponsor of graduate student Chris Pagoda's research on cryogenic dielectric ceramics.

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

Corning Inc. and CACT design new co-op options

by Brad Bowden

Throughout their junior and senior years, students in the NYSCC School of Ceramic Engineering and Materials Science (CEMS) take courses focusing on their individual interests in materials science and engineering. Unsure what direction to take, I chose to look for an internship for work experience that would help give me some direction. I actively sought and obtained an internship at Corning Incorporated because of their rich history in glass science and their position at the forefront of many glass-related technologies.

During my internship, I worked on a development project relating to the fabrication of Corning's ULE® glass for the special application extreme ultraviolet (EUV) lithography. EUV may be the lithography technology of the future. Current systems use 248 or 193 nm

wavelength light; EUV lithography represents a "quantum leap" over this technology since it uses a UV laser source (about 13.8 nm). This enables much more precise and detailed lithography on silicon wafers.

However, when lithographic features are generated that are only a few nanometers in size, the system tolerances are extremely small. Also, there is currently no material that can transmit such high-energy light at an appreciable level. So reflective optics are used; Corning's ULE® glass is considered to be the best material for this application because of its nearly zero CTE at room temperature. Very low thermal expansion is necessary so that dimensions of the optical components remain constant to correctly focus the extreme UV light source.

My internship extended into a co-op

through the CACT. I became an employee of the CACT and, as a CACT affiliate company, Corning hired me as a contract employee. An unexpected benefit of the relationship between Corning and the CACT came when we needed certain equipment not available "in-house" but available in CEMS. Both CEMS equipment and the expertise of Dr. Bill Walker and others at the CACT were exceedingly valuable to our project.

Dr. Kenneth Hrdina, my supervisor at Corning, was pleased with this unique co-op arrangement, saying "The CACT [Affiliates Program] is a much appreciated mechanism by which Corning Incorporated can obtain summer interns or co-ops at a reduced cost."

Brad Bowden is a junior majoring in glass engineering science.

CACT Associates offer co-op

OSRAM *continued*

annually. I organized and performed testing, met with Ford representatives, and worked with the company statistician to analyze the data. I wrote and organized most of the final report, which Osram and Ford are expecting to publish.

Through my co-op experience, I was becoming part of the Osram "team," daily performing work crucial to product design and development. I learned how a large company operates in both good times and bad. I was treated equally as an engineer, and made many good friends.

Rebecca Francy is a senior majoring in ceramic engineering.

BUFFALO CHINA *continued*

company. The enjoyable work environment made it easy to complete work and also develop relationships with the lab technicians and others in the plant. Buffalo China also provided me with a mentor to advise me about goals and ways to be successful throughout life.

Karen M. Russell is a senior majoring in ceramic engineering.

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ADVANCED MONOLYTHIC *continued*

opportunities available in the ceramics industry. I already have almost a year and a half of the industrial experience that employers look for in new graduates. AMC has offered me a full time position as ceramic engineer after I finish my final semester at AU. It doesn't get any better than that!

Michael Micciche is a senior majoring in ceramic engineering.

BUFFALO CHINA

by Ann Marie Di Raddo

Last semester I was working as a co-op at Buffalo China, a division of Oneida Dinnerware. I worked alongside the glaze and decorating engineer, focusing on the development of new products as well as trouble shooting process-related problems. Buffalo China's objective is to create new products that will be attractive to its commercial customers while improving the efficiency of its processes.

My most significant project was in unleaded glazes. A toxic material, it would be optimal to remove lead from our glazes. Lead is used because it increases brilliance while making the glaze process more forgiving by providing a wider firing range. I developed unleaded glazes for our matte colors and worked with various vendors on developing a clear unleaded glaze. I also worked with the decorating department in new color development.

My experience at Buffalo China was great, allowing me to see first-hand how a successful department and company is run. I worked with a great group of people and looked forward to working everyday. My co-op experience also helped me form valuable connections in the ceramic industry. I highly recommend taking a semester to complete a co-op.

Ann Marie Di Raddo is a senior majoring in ceramic engineering.

Dal-Tile

by David Fogelman

Dal-Tile, the largest manufacturer of ceramic tile in the United States, recently joined the CACT Affiliate Program. The Dallas based company, founded in 1947, employs over 7,700 people and operates nine manufacturing facilities in the U.S. and in Mexico. According to its website, Dal-Tile "offers the most comprehensive product line in the ceramic tile industry, including glazed and unglazed floor tile, glazed wall tile, glazed and unglazed ceramic mosaic tile, porcelain tile, quarry tile, stone products and installation products." Dal-Tile acquired American Olean Tile in 1995, the combined company becoming an industry giant. Sales exceeded \$800 million in 1999, and 2000 revenues are expected to surpass \$1 billion.

Dr. David Earl has spent the past two summers consulting for the company at its Dallas corporate research and development facility in Dallas, TX, working on improving quality control systems. Dr. Earl, who will be supervising all of the company's projects through the CACT, says that Dal-Tile is mostly concerned with "analytical work and statistical problem solving." Thus far, frit samples from a European supplier have been analyzed to detect crystalline impurities, determine their composition, and insure the homogeneity of the incoming material.

For further information, contact Dr. David Earl at earlda@alfred.edu or visit <http://www.daltile.com>.

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

CACT Affiliate: Norwich

by Kasi Emo

Norwich Aero Products, Inc. (Norwich, NY) is a large manufacturer of thermocouples and RTD sensors for the aircraft industry. Boeing and the federal government are just a few of their major customers. Norwich also engages in contract work.

Norwich has been an affiliate member of the CACT for a relatively short time, but is already counting the benefits. Jonathan Dougher, a materials engineer for Norwich, estimates that the CACT reduced their analytical testing costs by 50-75%. The Affiliate Program also provides expert assistance. Dougher and Dr. David A. Earl, Assistant Professor of Ceramic Engineering in CEMS, have been working closely together over the past year to solve some of Norwich's processing problems.

The main objectives are to enhance dielectric strength and other aspects of platinum RTD sensor performance while reducing internal costs. Program areas have included improved inspection, characterization and quality control of incoming raw materials with optimization

of processing parameters to ensure consistent coating characteristics. The program will also develop a statistical experimental design to quantify the effects of processing variables on product electrical properties.

All of the immediate objectives in these areas have been accomplished. Efforts continue in order to continually improve Norwich's processes. They test 100% of their platinum RTD sensors for electrical requirements, ensuring no failing elements leave its facility. Achieving 100% reliability has its price, however. Through the CACT's assistance, Norwich's platinum RTD yields have shown increasing improvement from 1999 to 2000, improving profitability while enhancing reliability and allowing Norwich Aero to be more competitive in their marketplace.

Kasi Emo is a senior majoring in ceramic engineering with a minor in glass science and technology.



Dr. David Earl, right, with graduate student Mushitaq Ahmed, proudly demonstrate the performance of a new state-of-the-art heating microscope.

For more information, contact Dr. Earl at earlda@alfred.edu.

Research and faculty news...

Dr. Walter A. Schulze, Professor of Ceramic and Electrical Engineering, has been elected to serve as one of the twelve technical representatives of the Administrative Committee of Ultrasonics, Ferroelectrics and Frequency Control Society of the IEEE.

The next Advances in Fusion and Processing in Glasses meeting has been scheduled for July 2003. **Dr. James Varner** and **Dr. Thomas Seward** are co-

organizers of the meeting. Details will be posted on the CGR website, cgr.alfred.edu

Dr. David Earl, Assistant Professor, CEMS, has acquired a state-of-the-art heating microscope for his current research on melt viscosity and surface tension of glasses and glazes based on dimensional changes during heating. The microscope, the only one of its kind in the US, allows viewing of dimensional changes as low as +/- 0.01% during

simulated firings to 1600°C with controlled heating rates up to 80°C/min. Direct observation of sintering behavior can also be achieved using this device.

Dr. David Earl is also the 1999 recipient of the annual John E. Marquis Memorial Award, presented by the American Ceramic Society's Materials Equipment and Whitewares Divisions, for his paper "Effects of Glass Frit

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Research

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Composition on Crystallization and Zircon-Vanadium Pigment Dissolution,” appearing in Ceramic Engineering and Science Proceedings, 2000, Volume 21.

The award was presented on October 30, 2000, at the joint meeting of the American and Mexican Ceramic Societies.

The CEMS Laboratory for Electronic Ceramics hosted the fifth annual Office of Naval Research Lead Magnesium Niobate (PMN) Measurement Workshop, gathering international PMN ceramic researchers from North America operating under ONR funding. Seventeen projects were presented by CEMS faculty and students.

Dr. J. Fan, Associate Professor of Mechanical Engineering, Alfred University, also presented his work.

Dr. James Marotta, Assistant Professor, CEMS, has recently received a research grant entitled “Formation and Characterization of Calcium Phosphates,” funded by Regeneration Technologies, Inc., of Alachua, FL.

2001 CALENDAR OF EVENTS

CONTACT: MARLENE WIGHTMAN (WIGHTMAN@ALFRED.EDU)

FEBRUARY

National Engineering Week
February 18-24

MARCH

Alfred University Career Fair
March 22

APRIL

CACT External Advisory Board meeting, April 19, 9 a.m.
Scholes Lecture - Dr. Helmut Schaeffer
Deutsche Glastechnische Gesellschaft
April 19, 11:20 a.m.
CANY spring meeting, following Scholes luncheon, April 19
AU alumni reception at ACerS, Crowne Plaza Hotel, Union Station, Indianapolis, Indiana, April 23, 5:30 to 7:30 p.m.

MAY

Refractories - on-line short course
May 7-June 15
Surface Area & Porosity Characterization short course, May 9-11

MAY (continued)

CEMS Advisory Board Meeting
May 17-18

JUNE

Analytical Scanning Electron Microscopy short course, June 4-6
Introduction to Ceramics for Non-technical Personnel, June 6-8
Kiln Automatic Control & Designing of a Firing Curve, June 6-8
Introduction to Ceramics for Plant Personnel, June 11-13
Glass: Its Production and Properties June 11-13
Statistical Design & Analysis of Experiments, June 13-15
Glass-to-Metal Sealing for Advanced Technologies, June 14-15
Fracture Analysis of Glasses & Ceramics June 18-21
Summer Institute in Science and Engineering for high school juniors June 24-28



Advances

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