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The Catalyst

 **University at Buffalo** *The State University of New York*

Department of Chemical & Biological Engineering News



Message from the Chair

David A. Kofke

This is an exciting time for UB, and for our Department in particular. The University has announced a very ambitious plan for growth: over the

next fifteen years UB will add 750 new faculty, and increase enrollments by 10,000 students.

You might ask, “Why?”, why is it important, or even desirable, for the University to grow this much?

There are several reasons.

One is that we simply have ambition—we want UB to be recognized nationally as a great university, and we want our alumni to be even more proud of their connection to UB than they already are. And like it or not, many ranking and quality measures are *extensive*, not *intensive* (to borrow ideas you learned from thermodynamics); per-faculty or per-student measures are downplayed. Large public schools such as Pittsburgh, Michigan, Purdue, Wisconsin, *etc.* through their sheer size have a built-in advantage that we want to eliminate.

But it is not just form over substance. We can indeed be better by being larger. With more faculty, some of us can be occupied with doing more than just the basic jobs of running the department—we become increasingly able to pursue new research and education initiatives. We can cover a broader range of research topics; we can teach more electives; we can devote more time to improving the curriculum; and we can pursue funding opportunities that lead to the creation of major research centers.

Another driver for UB’s growth is the crucial role that UB has come to play in the Western New York economy. With the demise of the manufacturing sector, UB’s intellectual

resources are viewed as an engine for economic growth of the region. UB’s expansion will position it to fulfill this role much more effectively. Obviously, Engineering is expected to be a key contributor to this effort.

Economics imposes some hard realities also on UB and CBE itself. As you might gather from how this newsletter is produced, we run a no-frills operation. As a state university, our tuition must be kept low to ensure that we remain financially accessible to all qualified students. But the difference between, say, the \$33,000 tuition at Cornell, and \$6000 at UB has a real impact on our relative resources. Our growth (along with alumni and corporate support) can help us to minimize our own financial shortfalls while we work to help the region.

It is interesting to note that the entire hierarchy of administration here has completely turned over in the past three years. This includes the State’s governor, the SUNY chancellor, UB’s president and provost, Engineering’s dean (now a chemical engineer!), and CBE’s chair. That’s a lot of people wanting to leave a mark. Whether this is good or bad of course depends on what we all do. As I recounted in our Spring 2006 newsletter, CBE has fared very well in recent years, largely due to Carl Lund’s leadership. But change is inevitable, and it should be welcomed for the opportunities it brings.

The impact of UB’s ambitions is already being felt in CBE. In the following pages you can learn about four new faculty who have joined our ranks in just the past year. And in our next mailing I hope to tell you about two more!

I always enjoy the spike of web-site activity and correspondence that follows our semiannual newsletter. We’re extremely proud of our alumni, and I encourage you to keep up the feedback and to share your accomplishments with us. Also let us know what *we* can do to make you even more proud of your UB chemical engineering degree. ■

Welcome New Faculty

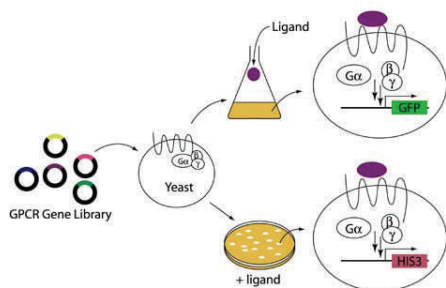
In July 2006 **Sheldon J. Park** joined our faculty as an Assistant Professor. He graduated from Berkeley in 1991 with BS degrees in math and physics before pursuing his MS in high-energy nuclear physics at MIT. He subsequently received his PhD in biophysics from Harvard in 2000, where he worked on elucidating the molecular details of the interaction between protein molecules involved in T-cell activation using biochemical and spectroscopic techniques.



Sheldon Park

From 2002 to 2006, he worked at the University of Pennsylvania as a postdoc, splitting his time between labs in chemistry and chemical engineering. His research focus during this time was an application of computation and experiment to study structural and functional properties of proteins. In one study, he combined molecular simulation, structural bioinformatics, and X-ray crystallography to investigate the relation between protein and solvent molecules, demonstrating the highly specific structural roles played by a buried water molecules. He has also used simulation and a fluorescence-based activity assay in yeast to correlate protein dynamics with the strength of protein-DNA interaction.

Park's research at UB includes engineering of novel protein molecules, biophysical characterization of protein-carbohydrate interaction, and development of a high throughput assay to identify novel ligands against G-protein coupled receptors, (GPCR) which are the molecular targets of the majority of therapeutic drugs.



Functional GPCR can be expressed on yeast. A high-throughput assay using a reporter, an enzyme, or a survival gene can identify a mutant GPCR that bind target molecules. ■

Hailed for his progressive attitude toward research and education, combined with a track record of team-building and encouraging industry partnerships, **Harvey G. Stenger, Jr.** became Dean of UB's School of Engineering and Applied Sciences in August 2006, as well as Professor in the Department of Chemical and Biological Engineering.

Stenger's vision for UB Engineering focuses on raising its national rankings — already in the top 15 percent of the nation's 350 engineering schools — by fusing research with education and community outreach, so that professors, students, staff members, and alumni feel a sense of pride from their work at the school.



Harvey Stenger, Jr.

An expert on synthetic fuels processing, fuel cell systems, and emission control, Stenger's research areas include hydrogen production, selective catalytic reduction of nitrogen oxides, mercury reaction pathways, catalytic destruction of chlorinated hydrocarbons, and fuel cell modeling and optimization.

Stenger joined the Lehigh University faculty in 1984 and received several university-wide teaching awards. After becoming Dean of Engineering in 1993 at Lehigh, he helped reinvigorate freshman engineering courses and secure a \$27.5 million alumni gift for the school.

He has been principal or coinvestigator in excess of \$4.4 million in research grants and contracts from government agencies and industry. A prolific author, his work has been published in more than 65 engineering journals.

Stenger graduated with a BS in chemical engineering from Cornell University in 1979. He earned his doctorate in chemical engineering from the Massachusetts Institute of Technology in 1983. ■

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Joining our faculty as Assistant Professor this spring semester is **Michael W. McKittrick**. After graduating from Virginia Commonwealth University in 2000 with bachelor's degrees in chemical engineering and chemistry, McKittrick joined the chemical engineering department at the Georgia Institute of Technology as a graduate student.



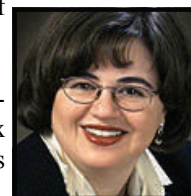
At Georgia Tech, where he received his PhD in 2005, his major focus was on developing novel methodologies for supporting organometallic complexes on silica surfaces. In particular, his

Michael McKittrick research led to a supported ethylene polymerization catalyst that was very well defined and significantly more reactive than previous materials. In addition, he developed a spatially isolated aminosilica surface that has subsequently been used in catalysis, adsorption, and separation applications.

Shortly after completing his doctorate, McKittrick joined the University of Colorado-Boulder as a postdoctoral research associate. His research focus was the development of novel methacrylate monomers for use in photopolymerizations, specifically for dental restorative applications. His other main research interest was the incorporation of porphyrin complexes into a polymer matrix through the use of thiolene photopolymerizations.

McKittrick's research at UB will focus on the development, synthesis, and characterization of novel photofunctional materials. Specifically, he will be looking at successfully immobilizing porphyrin complexes on a variety of supports, from rigid silica supports to more flexible polymeric materials. The end applications of these materials will be in wastewater treatment, biomaterials (anticancer, antiviral, antibacterial agents), and in small molecule transformations (e.g., pharmaceuticals).▪

Last, but not least, also joining our Department in January 2007 as an Assistant Professor is **Marina Tsianou**. Marina's interests are in the area of molecularly engineered materials, addressing products and processes relevant to chemical and biological engineering that ultimately improve the quality of life by contributing to advanced materials, improved health, or a cleaner environment. Basic elements for such products and processes are molecules and nanoparticles of synthetic or biological origin.



After serving as a technical specialist/project manager at Xerox Corporation, Tsianou joined UB as Principal Research Scientist and Research Assistant Professor, **Marina Tsianou** with research and teaching activities in the areas of polymers, colloids, and materials.

In her new position at UB, Tsianou will direct her efforts toward the study of intermolecular and interpolymer complexes for nanoscale patterning, the development and utilization of crystallization control by the local/confined environment, and the incorporation of biological motifs into self-assembly-biomimetic self-assembly. She also plans to continue and expand interactions and collaborations with colleagues in Europe and at the NIST Center for Neutron Research.

Tsianou received her PhD in 2000 from Lund University, Sweden, where she carried out research on polymer physical chemistry at the Center for Chemistry and Chemical Engineering. She earned an MS degree in chemical engineering in 1995 from Tufts University, and holds a diploma in chemical engineering from National Technical University, Greece.

We are very pleased to welcome all the new faculty to our Department and wish them long, successful careers at UB.▪

Support Staff Notes

Susan Schebell retired from CBE in October 2006 after 18 years of service in the department as Graduate Program Secretary. We wish Sue a very happy and healthy retirement!

Andrew Schultz has been appointed *Research Assistant Professor*, in addition to his appointments as *Research Scientist* and *IT Specialist*.

Dawn Townsend has returned to the Department as a *Secretary I*, and has taken over the duties of Graduate Program Secretary, as well as Purchasing Secretary. We are happy to welcome her back!▪



AIChE & SBE Update

by Chris Wirth
President of the UB Student Chapter of AIChE

The University at Buffalo student chapter of AIChE had a very successful fall semester. The addition of a new division to our chapter, a trip to San Francisco, and successful social, academic, volunteer, and industry events have us appreciating last semester, while eagerly awaiting the next!

As noted in the previous issue's AIChE update, we have incorporated a new sister club, the Society of Biological Engineers (SBE). With the efforts of the club's chair, Stacy Pustulka, vice-chair, William Frank, and student chapter advisor, Dr. Koffas, UB's Student Chapter of SBE was officially recognized by the national chapter. This demonstrates our club's leadership among the nation's universities – we are one of the first nine recognized student chapters. Other universities with chapters include Johns Hopkins, Ohio State, UCLA, and MIT.

In early November, thirteen of our club's members traveled to San Francisco, CA for the National AIChE Student Conference. Attended by over 1,000 chemical engineering undergraduates, this conference brings together the best and brightest ChemE students from dozens of universities for various technical, academic, and social events. A few examples of the seminars and events we attended are: the graduate school fair, "Meet the Professionals", "Women in Engineering", and "How To Run Your Chapter Smoothly." The highlight of the student conference is the ChemE Car competition. Our club qualified for this national competition last spring by placing in the regional competition at Penn State University. In the past, our school's car has performed very well in this event. However, this year we suffered a huge disappointment when our ChemE car failed to arrive in San Francisco, forcing us to forfeit our spot in the competition. Still, the members of our team retain their enthusiasm and plan on entering the regional competition this spring at Bucknell University using a car with an entirely new design. Everyone on the

AIChE ChemE Car team is eagerly awaiting this chemical engineering challenge!

These two major events were supplemented by new and exciting events hosted by our club in fall 2006. In early October, our club hosted the first annual AIChE & SBE Fall Potluck at South Lake Village on UB's North Campus. About 35 people attended the stomach-filling event, where the perfectly grilled hot dogs were only trumped by Dr. Sheldon Park's chocolate cheesecake (hint: I think

Danny Wegman baked it!). Our club also hosted two industry seminars, which invited both recent and "not-so-recent" UB alum to come in and speak about their companies. Participants included

If you, or a representative from your company, would be interested in speaking to our undergraduates, please contact Chris Wirth at clwirth@buffalo.edu.

Lindsay Mroz (UB '06) and Brian Peer (UB '05) representing Praxair and John E. Monacelli (UB '78), who spoke on behalf of

The Babcock & Wilcox Company. Our club is currently planning seminars for spring 2007, so if you are interested in speaking on a topic important to your company, please do not hesitate to contact me (clwirth@buffalo.edu). Finally, our club had the pleasure of hosting a unique event at UB. The first annual UB Science and Engineering Undergraduate Research Fair was held in early December and was attended by nearly 80 undergraduates. Faculty from the Chemical & Biological Engineering, Physiology & Biophysics, Physics, Chemistry, Biochemistry, Biology, and Pharmaceutical Sciences Departments presented posters outlining research currently being conducted in their labs and opportunities for undergraduates to get involved. The fair was a great success and we are planning to repeat and grow this event for 2007.

A few of the things on tap for next semester are a trip to Bucknell University, John Chen (the president of the AIChE) visiting UB, and the AIChE & SBE banquet. So, I know the busy fall semester will only be out done by spring 2007!▪

What Are Your Former Classmates Doing Now?

Sarves Peri (PhD, 1994) is the Director of Global Supply at National Starch and Chemical, member of the ICI Group. He has been with the company for the past 12 years where he held a variety of roles in the areas of R&D, production management, plant operations management, and supply chain decision support modeling. At National Starch's Natural Polymers Group, Sarves is responsible for three broad groups — Global Supply chain Optimization, International Customers Relations Management, and Transportation and Logistics Management. In addition to his PhD from UB, he also earned an MBA degree in Operations Management and Finance from NYU.

Jung-Chang Chi (PhD, 1974) is a Professor and former Head of the Department of Chemical and Materials Engineering at Tamkang University in Taiwan. His research interests are in the areas of chemical reaction engineering, biochemical reaction engineering, and wastewater treatment. His current research focuses on the effects of feed cycling on the fate of plasmid-bearing microorganisms in CSTRs.

David C. Lovetro (MS, 1977). Following graduation from UB, Dave spent 8 years working in the Process Design Group at Occidental Chemical in Niagara Falls, NY. In 1985, he and his wife moved to Marietta, GA where he began working at Eka Chemicals Inc. (a Akzo Nobel Company) as a Sr. Process Engineer. In 1989, he was reassigned as a Program Manager in charge of special projects, and later became Manager of Applications Engineering for Eka's Specialty Oxidants function. He is currently involved in technical marketing with their Business Development function. Dave and his wife, Laura, have one daughter, and he would love to hear from some of his "old-timer" classmates. (For more information about Dave, please go to www.cbe.buffalo.edu/AlumniNews.htm).

Trevor D. McKee (BS, 1999). After graduating from UB, Trevor worked at GIBCO Cell Culture Research and Development as a research assistant (summer 1999), then entered the Biological Engineering graduate program at MIT that fall. He joined the lab of Dr. Rakesh Jain, at Massachusetts General Hospital/Harvard Medical School, and worked on techniques to measure and improve drug and gene delivery to solid tumors. After successfully defending

his Ph.D. in the spring of 2005, he moved to the Ontario Cancer Institute in Toronto, where he is currently working as a postdoctoral fellow on methods to image extracellular matrix remodeling in mouse models of disease. Besides academics while at MIT he was the Co-chair of the Housing and Community Affairs Committee of the Graduate Student Council, and is the current President of the Ontario Cancer Institute Postdoctoral Association. He has taught a course for the past two summers in the DaVinci Engineering Enrichment Program, a program designed to educate high school students about the various engineering disciplines to help them with their career choices. He will be married this summer to Jennifer Morin, an engineer now studying to be an occupational therapist. ■

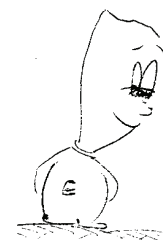
Edward M. Murphy (BS, 1999) has been awarded the *2006 Young Engineer of the Year Award*, by the Erie-Niagara Chapter of the NY State Society of Professional Engineers. Ed is currently a project chemical and environmental engineer with Golder Associates, an international environmental and earth engineering company, out of their Niagara Falls, NY office. Ed joined Golder in May of 2000, and works on diverse environmental engineering projects for industrial clients, including remediation projects under RCRA, vapor intrusion projects, water treatment projects, human health risk assessment, and process engineering as well as preparing spill plans, storm water plans, and has participated on projects in over 20 states. Ed is also tasked with project management and business development activities. Through his college years, Ed was an emergency response operations center attendant and intern engineer at Ecology & Environment in Lancaster, NY.

Ed also holds an M.Eng. degree in Civil (Environmental) Engineering from UB (2003). After completing his EIT (IE) exam while a senior in college, he passed the Chemical Engineering PE exam in 2003, and has since become a licensed professional engineer in 4 states (NY, OH, PA and MD).

Ed is married to his wife of 7+ years, Kelly, and has two children, Eddie and Abby. They spend their spare time restoring a Victorian home in Middleport, NY, and Ed is also a college baseball umpire. ■

Moving?? Don't forget to send your new address to:

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