

Message From The Chair

Carl R. F. Lund

Well, when I took the job, I never expected I'd be the last chairperson of the Chemical Engineering Department, but I guess I was. We are now officially the *Department of Chemical and Biological Engineering*, and I'm as proud to be its first chair as I was to be the Chemical Engineering Department's last one. Dave Kofke has written a separate article specifically addressing the undergraduate curriculum vis-à-vis the name change, so I won't repeat that. I do want to offer a few words here to assure you that this is neither a knee-jerk reaction to shifting funding nor an act of trendiness. It is something that was discussed and deliberated over for a year before any official action was taken.

Our deliberations in this matter began with a consideration of the chemical engineering profession in general and of academic chemical engineering departments in the United States in particular. The clear picture that emerges is one of diversification, primarily into the biochemical, biomedical and bioengineering areas. The chemical industry is maturing, and while a need for chemical engineering skills will persist, it is anticipated that more growth will occur in the biochemical and biomedical sectors. As new drugs are discovered, or artificial skin is perfected, or other biological breakthroughs are made, the methods of chemical engineering will be perfectly suited to the development of processes for their commercial production, just as they were ideally suited to the development of plastics, synthetic fertilizers, etc. during the past century.

At the same time, U.B. faces a strategic need to increase

the amount of biological and biomedical activity taking place within the School of Engineering and Applied Science. The university is adding tremendous and exciting capabilities in bioinformatics, drug design and discovery, etc. Sound and strong biological engineering is a necessary complement to these areas. It can contribute in numerous ways toward a deeper understanding as well as in moving fundamental science to commercial reality. Our department already enjoys strong and fruitful collaboration in bio-related areas with several departments and centers at U.B.

We have also assessed our current strengths and priorities as they relate to the renaming of the department. We already have an excellent core group in the bio area, and, a large fraction of our "non-bio" faculty are actually involved in projects that fall under the purview of biological engineering. Indeed, the distinction between chemical research and biological research is already quite blurred, with the interface between them proving to be very fertile territory. In short, we believe that changing the name to the Department of *Chemical and Biological Engineering* will benefit the department, the school and the university. It is consistent with trends in the profession and at U.B. The new name does not represent a new initiative, rather, it more accurately describes what our department already is and what it already does.

As always, we love to hear from you, our alumni. Drop us a line or drop in to visit and tell us what you think about the name change, or just bring us up to date on what you've done since your days in the department. ■

Shape the Future of Chemical & Biological Engineering Education at UB!

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(and how well we taught them to you).

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Biological Engineering & the Undergraduate Curriculum

By: David A. Kofke, Professor & Director of Undergraduate Studies

The name change taken by the Department does not immediately affect the undergraduate degree—graduating students still receive a B.S. in Chemical Engineering. Rather, the name change reflects in part the impact that bioengineering is already having on our undergraduate curriculum, and heralds even larger changes to come. For instance, we are now instituting a Biological Engineering track. Students in this track take the same courses as others in the major, but they select all their electives to follow a suggested course within biological engineering. The courses are: Cell Biology, Human Physiology, Biochemical Engineering, Tissue Engineering, and a Bioengineering elective. Students completing the track receive a certificate upon graduation.

We expect that before long we will be making more significant changes to the curriculum to accommodate students with a serious interest in biological

engineering, as well as to guarantee all students some exposure to this important field. Such changes would keep intact the core chemical engineering elements, but would allow, for example, a student to elect biochemistry in lieu of a second organic chemistry course. Then, in addition, we would institute requirements for basic biology and genetics courses taken by all students.

We'd be interested in your input regarding any of these changes under consideration. What types of things could we do in this direction to be of most help to our graduates as they pursue their careers? Does this fit your view of the direction of the profession? If you'd like to learn more about some of the thinking that is guiding the evolution of biological engineering within our discipline, we suggest this commentary: G. Stephanopoulos, *Chemical Engineering Science* **58**, 4931 (2003).•

Graduate Students Showcase Their Work

By: Mark T. Swihart, Assistant Professor & Director of Graduate Studies

The sixth annual UB Chemical Engineering Graduate Research Symposium was held on November 5, 2003 on the UB North Campus. Our guest speaker was Professor David Corti from the School of Chemical Engineering at Purdue University. He delivered an outstanding talk on "Homogeneous bubble nucleation and cavity formation in superheated liquids." Following his presentation, CE graduate students presented posters describing their research. A total of forty-two posters were presented. The presentations were organized along the department's research themes of 'biological engineering', 'nanoscale and advanced materials engineering', and 'computational chemical engineering'. Awards were presented for the best posters, as determined by a panel of judges consisting of David Corti, Mattheos Koffas, Kevin Albaugh, Director of R&D at Praxair Electronics, and Michael Ryan.

First place went to **Yuanqing He** (advised by Mark Swihart, with co-author **Xuegeng Li**), for her poster entitled "Preparing macroscopic quantities of brightly photoluminescent silicon nanoparticles and

magnetic metallic nanoparticles". Second prize went to **Sang Kyu Kwak** (advised by David Kofke) for his poster entitled "Study of vacancies in FCC hard sphere crystals". Third place went to **Mark Beauharnois** (advised by Sriram Neelamegham, with co-author Sukhwinder Singh) for his poster entitled "Selectin length contributes to the 'threshold level of shear' required to support l-selectin mediated rolling".

The research symposium was once again organized by the department's assistant professors (Drs. Errington, Koffas, and Swihart). The audience for this symposium seems to get larger each year as we build on past successes, and we look forward to seeing many of you again at next year's event, to be held sometime in October 2004. The book of abstracts from the open house provides a nice summary of the wide variety of cutting edge research being carried out in the department. If you would like to receive a copy of this (electronic or paper), please contact Darlene Innes at innes@eng.buffalo.edu or (716) 645-2911 x2202. •

Enrollment, Retention, and Degrees

By: Michael E. Ryan, Professor & Associate Dean of Undergraduate Education

The overall enrollment at the University at Buffalo (UB) has increased over the past few years, partly in response to the increase in the number of high school graduates in New York State, and partly in response to an increase in the number of graduate students enrolled. This increase has also been reflected by a comparable increase in enrollment in the School of Engineering and Applied Sciences (SEAS) as can be seen in the Table. Chemical engineering has been fairly stable as far as undergraduate and graduate enrollment trends are concerned.

Enrollment	2003	2002	2001	2000	1999	1998
SEAS						
Undergraduate	2521	2546	2635	2572	2465	2160
Graduate	1109	1034	878	816	857	769
Chemical						
Undergraduate	179	173	188	207	196	181
Graduate	52	53	42	56	57	52

SEAS has developed an admissions procedure that is able to identify under-prepared students based on the applicants' incoming academic record in mathematics and technical subjects, as well as high school average and standardized test scores. The focus on technical high school coursework verifies

student achievement in the specific areas relevant to the engineering curriculum. This procedure was implemented with the cooperation of the Admissions Office for the cohort of students entering in fall 2000 and beyond.

Admissions and Academic Preparation

At the undergraduate level, the increase in engineering enrollment described above has occurred in parallel with the implementation of a more selective admissions process. SEAS has been particularly concerned with the success and retention of undergraduate engineering majors. Students leave or change majors, including engineering, for a wide variety of reasons. Historically, approximately 65-75% of students who left the engineering program were in, or near, academic difficulty in critical core engineering courses. This suggests that some entering freshmen might have been academically under-prepared and never actually had a realistic chance of success from the outset. The failure of an under-prepared student can exact a heavy cost to the individual. In addition to the financial cost, a poor academic record makes it difficult for the student to change majors or institutions. Overriding these considerations is the personal cost of discouragement, sense of hopelessness, loss of self-confidence, etc.

Conventional university admissions criteria, such as high school average and standardized test scores (such as SAT and ACT) correlate with academic success only in a rough global sense. These metrics are unreliable in identifying individual at-risk stu-

However, it is important to recognize that student welfare and success supercedes enrollment and retention objectives. Approximately five years ago, SEAS began the "Student Excellence Initiative" under the direction of Bill Wild. One cornerstone of the program was the establishment of "Academic Small Groups" in the areas of calculus, chemistry, and physics. Besides addressing the obvious content and problem-solving issues, these focus groups target the need for training in college-level thinking skills. The groups also enhance the sense of belonging to engineering, and they provide opportunities for helping students to process their experience. Students can also arrange to meet with a peer tutor (that is assigned to the group) outside of group hours if needed. The ultimate goal is that, after the first year, group participants have not only performed better in those courses, but have learned how to approach and analyze engineering-like material.

Students of all types populate the groups: from honors students working to move from a B to an A, to "at-risk" students struggling to move from a D/F to a C. Participation is voluntary and has grown dramatically since inception. The groups have now become part of the mainstream freshmen experience. The simple fact that so many students faithfully attend on a weekly basis is an indicator of their perceived value, as is the virtually 100% re-signup

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	2003	2002	2001	2000	1999	1998
Degrees						
BS (chemical)	48	40	34	48	32	53
ME (chemical)	8	2	4	5	5	3
MS (chemical)	3	3	5	7	3	8
PhD (chemical)	2	6	7	3	5	6

rate from fall to spring semester. There is also compelling data that group participation does impact course outcomes and student retention.

Another component of the "Student Excellence Initiative" is the assignment of freshmen engineering students to a faculty mentor. The faculty in the Department of Chemical and Biological Engineering mentor freshmen whose intended major is in chemical engineering.

Degrees

The degrees granted in the Department of Chemical and Biological Engineering are shown in the table above. With the higher admission standards and retention efforts described above, B.S. graduation rates are expected to be sustained or increased in the future.▪

AIChE Student Activities

By: Michael Dray, Student Chapter President, AIChE

As usual, UB's Student Chapter of the American Institute of Chemical Engineers (AIChE) has been an active SA club this year. We've held various student/faculty social events including happy hours (to help out the local tavern-type establishments), a club party, and our tradition of "Bowling with the Chair" – an evening in which the faculty can reinforce to the students that they are "boss" *OUTSIDE* the classroom as well!

In addition, several community service activities have been conducted, with one of the most interesting being the Engineering Extravaganza, which was held in mid-October. At this event, various clubs get together and show their wares to UB students and the surrounding community. Our chemical car was on display, and a representative from Praxair was kind enough to come and demonstrate one of the best (though possibly least efficient) uses of cryogenic fluids – making ice cream! Needless to say, this was quite the crowd pleaser!

One of the highlights of the semester for the club was the trip to San Francisco for the National AIChE Conference. We were lucky enough to scrape together enough funds for 15 members to go and experience the national convention. We even stayed at the Hilton (please, no Paris jokes). There were sev-

eral workshops to attend, including a fuel cell technology seminar, and another one on what new employers are looking for in newly graduated chemical engineers. A 'Casino Night' brought in a couple big winners (of chips, of course!), and the next day our pride and joy, "*Young Nasty Man*", competed in the chemical car competition.

We have been working on our car since last June, but things really got moving along in September. As fate would have it however, an undiscovered-until-too-late broken solder caused headaches for the car team on the first run at the competition. This was found and replaced, and the team prepared for the second and final run. This time the car traveled a ways down the path at a nice clip. Unfortunately, a misalignment was not noticed, and the car went out of bounds. After a ten-foot penalty, the car finished in the middle of the 31 teams competing. A first run would have allowed us to correct for this error, but it was a good learning experience for us, and we're very confident that we can do better next year! Hopefully we'll be able to beat the winners – a team that bought their fuel cell for upwards of \$800! (almost seems to defeat the purpose...).

The members of AIChE spent the semester break 're-charging' and coming up with ideas on how to make this next semester as interesting as the previous one.▪

Seminar Schedule – Spring 2004

(All seminars held in 206 Furnas Hall; SUNY at Buffalo Amherst Campus; 3:45 pm — unless otherwise noted.)

JANUARY 28, 2004

George T. DeTitta

Executive Director, Hauptman-Woodward Medical Research Institute

Department of Structural Biology, SUNY at Buffalo

"HTP Macromolecular Crystallization: Scale-Up Issues Going from 10 to the 2 to 10 to the 6 Experiments Per Annum"

FEBRUARY 4, 2004

Shekhar Garde

Rensselaer Polytechnic Institute

To Be Announced

FEBRUARY 11, 2004

John M. Canty, Jr., M.D.

Physiology & Biophysics, Division of Cardiology

School of Medicine & Biomedical Sciences, SUNY at Buffalo

"Adaptive and Maladaptive Responses of the Heart to Chronic Ischemia"

FEBRUARY 18, 2004

Eduardo Glandt

University of Pennsylvania

To Be Announced

FEBRUARY 25, 2004

Arindam Sen

Department of Cancer Biology, Molecular & Cellular Biophysics

Roswell Park Cancer Institute

"Strategies in Localized Drug Delivery"

MARCH 3, 2004

Robert K. Prud'homme

Chemical Engineering Department, Princeton University

To Be Announced

MARCH 10, 2004

Mikhail Khenner

Department of Mathematics, SUNY at Buffalo

"Modeling of Epitaxy on a Masked Substrate"

APRIL 7, 2004

Michael B. Lawrence

Biomedical Engineering, University of Virginia

To Be Announced

APRIL 14, 2004

Igor B. Zhulin

School of Biology, Georgia Institute of Technology

"Comparative Genomics of Signal Transduction in Prokaryotes"

APRIL 21, 2004

Julio M. Ottino

Department of Chemical Engineering, Northwestern University

To Be Announced

Honors and Awards

Jeffrey R. Errington, Assistant Professor, received a *National Science Foundation Career Award*. Jeff is a graduate of UB who earned his doctorate at Cornell University. His research focuses on the properties of materials and chemical systems from a microscopic perspective. He models interactions between molecules in complex fluids and biological systems to better understand their behavior. ■

Assistant Professor **Mark T. Swihart** has received the *J. B. Wagner, Jr. Young Investigator Award*, presented by The High Temperature Materials Division of The Electrochemical Society, Inc. Mark received this prestigious award in recognition of important contributions to the understanding of chemical vapor deposition, aerosol generation, and other high-temperature processes. This is an international award given just once every two years. Mark received a certificate and honorarium, and presented a keynote talk at the Fall meeting of The Electrochemical Society in Orlando, Florida. ■

The Department is very pleased to announce that Professor **David A. Kofke** has been selected as the recipient of the triennial *John M. Prausnitz Award* for excellence in phase-equilibrium research. This award is sponsored by the International Conference on Properties and Phase Equilibria for Product and Process Design. Dave will receive a plaque and gift and present a special lecture at the 10th Conference, to be held in Snowbird, Utah this May. The award is presented for achievement in applied chemical thermodynamics and honors a member of the

thermodynamics community who has "made significant and lasting contributions to the field of applied chemical thermodynamics." Previous winners of this award were: 1st in 1998 - Athanassios Panagiotopoulos, and 2nd in 2001 - Pablo Debenedetti. ■

Four undergraduate students were selected to receive scholarships sponsored by the School of Engineering and Applied Sciences. The winners were: **Gerald W. Hunt** and **Rachel Peck**, *Motorola Senior Scholarships*, and **Zhao-Heng Fang** and **Siew Shee Lim**, *Senior Scholarships*. These scholarships were presented to outstanding senior level students who are considering graduate study in Engineering at UB. ■

Department Promotions & Honors

Paschalis Alexandridis was promoted to Full Professor.

Stelios Andreadis was promoted to Associate Professor with tenure.

Sriram Neelamegham was promoted to Associate Professor with tenure.

Darlene Innes was promoted to Assistant to the Chair.

Mark Swihart has been named Director of Graduate Studies. ■

Alumni News

Dr. **Aristides Docoslis**, (PhD, 1999) Assistant Professor of Chemical Engineering at Queen's University in Kingston, Ontario, and recent PhD recipient from Chemical Engineering at UB, has been awarded a prestigious Canada Research Chair in Colloids and Nanoscale Engineering. This award is considered to be the equivalent of an NSF Career Award for Canadian Junior Faculty.

Aris' research at Queen's focuses on developing methods and designing tools to manipulate and organize nanoparticles using electric fields. The creation of these microstructures could lead to new advances in fuel cell technology as an alternative energy source, as well as the development of safer, less expensive automobiles and more sensitive medical and diagnostic devices. ■

Obituaries

Bryan C. Mihalick (MS, 2001) died suddenly in his home on July 4, 2003. Bryan earned a BS in Chemistry in 1998 and a BS in Computer Science in 1999 while attending Juniata College. He received his Master's degree in Chemical Engineering from UB in 2001 under

the direction of Dr. David Kofke. His master's thesis included development of a special software analysis tool which is still used today. Bryan was employed as a consultant at IBM. Survivor's include his parents, a sister, and a fiancé to whom he was to marry this sum-



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We would like to hear from you to know what you've been up to since graduation! Please take a few minutes to fill out the form below and mail it to us, or reply via the web at: www.cheme.buffalo.edu/alumni. We'll put your news in future issues of our newsletter, unless you indicate otherwise. (Please check one of the boxes below to indicate your preference).

Name: _____

Address: _____

UB CE degree(s) and years: _____

Spouse's Name and Children: _____

News/Comments: _____

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