
ChEWave

A newsletter from the Department of Chemical Engineering at Tulane University

Volume 5, Issue 1
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Notes from the Chairman

Dear Alumni, Students and Friends,

I feel very fortunate to start my service as department chair at a time that is very exciting both for the university and for the department. During Dr. Gonzalez's five-year tenure as chairperson, our program experienced an unprecedented era of stability and quality. There is an upbeat, positive feeling across campus about our new President, Scott Cowen, who, prior to coming to Tulane, was Dean of the Weatherhead School of Management at Case Western Reserve University. Our Dean of Engineering, Bill Van Buskirk, has just moved to a new job and location, as Provost and Senior Vice President at New Jersey Institute of Technology, and Prof. Mike Lynch of Mechanical Engineering is serving as Interim Dean for 1998-99. We are in the process of launching a national search for a new Dean of Engineering, who will assume office in the Fall of 1999.

Last academic year we had two seniors receiving national awards: an AIChE National Scholarship Award went to Angel Delcarpio and an AIChE Minority Scholarship Award to Kellé Hankton. On November 15, Stacey Bennett will receive a 1998 Minority Scholarship Award in the Annual AIChE meeting in Miami. We continue to encourage the involvement of our undergraduates in research, and in recent years their names have appeared in archival journal publications, something that makes our department unique campus-wide.

Our scholarly productivity has continued to grow, and we enjoy the rare phenomenon where all professors are involved in research, are active in publishing articles, supervise graduate students, and receive extramural funding. The junior Associate Professors have been awarded some of the nationally most competitive and prestigious research grants, including an NSF Career Award, an Engineering Foundation Initiation Grant, and a Brown Foundation

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Grant. We awarded eight PhD's in 1997 and expect to exceed that number in 1998. Our seminar series continues to feature prominent speakers who are introduced to our department and leave it with the best impressions.

As we position ourselves for the new century, we are determined to work even harder at maintaining and improving the education we offer to our undergraduates, in a learning environment where the professors are actively pursuing and generating new knowledge. We will also strive to provide them with an ever-improving physical environment that takes advantage of the recent technological advances in the information and instrumentation technologies. To that end, you can continue to be a partner in our department's mission by offering your generous support. Dr. Brian Mitchell, the founding editor of *ChEWave*, explains in another section of this newsletter the goals we have set and the mechanisms through which you can contribute.

Lastly, I hope that you will increasingly use this forum to keep us apprized of your personal and professional news and achievements.

Sincerely,



Kyriakos D. Papadopoulos
Professor and Chair



Fundraising Campaign Announced

The Department of Chemical Engineering has announced a \$200,000 fundraising campaign to begin October 1, 1998. The "Chemical Engineering 2000 Support Fund" drive is intended to position the department for its foray into the 21st century. Among the projects targeted for these funds are:

- Accreditation. The new ABET Engineering 2000 guidelines call for a substantial investment in curriculum assessment and evaluation. This will require manpower and improved information technology. Estimated cost: \$25,000.
- Unit Operations Laboratory Upgrade. The unit operations lab is in dire need of upgraded experiments. The current annual instructional budget allows only for repair of old equipment. A minimum of \$140,000 is required to develop at least two new experiments. A grant application will be made to the Instructional and Laboratory Improvement (ILI) program at NSF for this improvement. The department must contribute 25% of this cost, with 25% coming from the Engineering Dean/Office of research, and the remaining 50% from NSF. Estimated cost: \$35,000.
- Computer Laboratory Upgrade. The computer lab currently has only half of the machines required. The current machines are quickly becoming outdated. It is estimated that \$60,000 is required to double the number of machines, and \$20,000 annually to replace approximately 15% of the machines each year. Half of these funds should come from external sources such as state and federal grants and/or the Engineering Dean's Office. Estimated total cost: \$40,000.
- Faculty Hiring. In order to be competitive, the department must have the financial ability to offer a new faculty hire on the order of \$100,000 in start-up funds, in addition to those start-up funds provided by the Engineering Dean's and Provost's Offices. Estimated cost: \$100,000

"This is a very important time for our department," says Kyriakos Papadopoulos, the new department chairman. "There will be many changes taking place in higher education over the coming years both at the University and national levels, and we want to make sure our department is positioned to take advantage of whatever situations may present themselves."

Donations will fall into two general categories: corporate and private. Our corporate donors have been generous in the past, and we will count on them increasing their pledge for this very important campaign. The department only recently starting soliciting funds directly from the alumni, and we are appreciative of those of you who have returned the donation envelopes over the past two years. We will need, however, a much more concerted effort on the part of the alumni to make this portion of the campaign a success. Our goal is to raise \$50,000 in alumni donations through blanket mailings such as this. Corporate matching is an important part of the alumni contribution - if you have corporate matching, please make arrangements for it! The campaign is scheduled to run through December 31, 1999. We will be giving periodic updates, and will be developing a web site to keep you abreast of our progress. ■

Tulane Undergrad Wins AIChE Award

Stacey D. Bennett, a junior in chemical engineering, has been selected to receive a 1998-99 Minority Scholarship Award for College Students from the American Institute of Chemical Engineers, consisting of a \$1000 scholarship. Only six of these scholarships are given annually.

Stacey is vice-president for the AIChE Student Chapter at Tulane, and is active in the National Society of Black Engineers, the African-American Congress of Tulane and the Society of Women Engineers. She was also a summer intern at Bristol-Myers Squibb and Exxon.

This is the *third consecutive year* that students from our department have won national AIChE scholarships. Andrea Palmisano won a Scholastic Scholarship in 1996, as did Angela Delcarpio in 1997. Kellé Hankton was awarded a Minority Scholarship in 1997. ■

ALUMNI SURVEY

Please take a few moments to fill out the alumni survey on the following page. Detach this page and send it back to us in the enclosed envelope. If you are also sending a donation, you can either send the donation and the survey together, or, if you wish anonymity for the survey, send it in a separate envelope. All comments will be kept strictly confidential

These questions are an important tool in helping us evaluate and update our curriculum. Alumni and employer feedback will be an integral tool in the upcoming ABET accreditation under the *Engineering Criteria 2000* guidelines. We welcome any additional comments you may have.

Please look for additional surveys in the future. We intend to target specific groups of graduates, particularly those of you who have graduated in the past five years, as well as those of you who employ our graduates, for more detailed feedback on the current curriculum. Your time and input are much appreciated.

Highest degree earned at Tulane: _____ Year: _____

State (or foreign country) in which you currently work _____

| My education in the Department of Chemical Engineering at Tulane provided me with: | <i>1= strongly agree 7= strongly disagree</i> | | | | | | |
|--|---|---|---|---|---|---|---|
| An ability to apply knowledge of mathematics, science and engineering | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| An ability to design and conduct experiments and analyze and interpret data | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| An ability to design a system, component or process to meet desired needs | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| An ability to function on multidisciplinary teams | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| An ability to identify, formulate and solve engineering problems | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| An understanding of professional and ethical responsibility | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| An ability to communicate effectively | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| The broad education necessary to understand the impact of engineering solutions in a global and societal context | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| A recognition of the need for, and an ability to engage in lifelong learning | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| A knowledge of contemporary issues | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| An ability to use the techniques, skills and modern engineering tools necessary for engineering practices | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <i>An educational experience I am fully satisfied with overall</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| Rate your opinion of the importance of the following courses to the chemical engineering curriculum: | <i>1= very important 7= not important</i> | | | | | | |
|---|---|---|---|---|---|---|---|
| Stoichiometry (mass and energy balances) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Thermodynamics | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Applied Statistics and Probability | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Transport Phenomena (fluid dynamics, heat transfer, diffusion) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Unit Operations (e.g., separations processes, heat transfer equipment) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Unit Operations Laboratory | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Numerical Analysis | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Reactor Design | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Process Design and Economics | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Automatic Process Control | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Practice School ¹ | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Undergraduate Research ² | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

¹Practice School: Students are assigned, in groups of three or four, to a project at a local industrial facility. The project is one of current concern to the organization, and may range from a study of an operating process to the development of a new process.

²Undergraduate Research: Students work in the laboratory of a faculty member, carrying out state-of-the-art research in the area of expertise of the mentoring faculty member.

Faculty News

Daniel De Kee organized a meeting on the "Mechanics of Nonlinear Materials" in Bannff Canada in May 1998. He presented five lectures over the summer including two invited contributions at the Annual Canadian Society for Chemistry in British Columbia and at the 8th Australian National Conference on Rheology in Adelaide.

Richard Gonzalez will be on sabbatical during the Spring, 1999 semester. He plans to visit the South Shetland Islands, Japan, and France, among others.

Vijay John has returned to the department after spending two years at the National Science Foundation. Vijay was a program director in the Chemical and Transport Systems Division of the Foundation.

Daniel J.I. Lacks gave a seminar in the Physics Department at Brock University (Canada) entitled "Mechanical Instabilities and the Properties of Glasses and Liquids under External Stresses" in September.

Victor Law has taken a two-year leave of absence to take a position at the University of Limerick in Ireland. His job there is to start up a new degree program in Chemical Engineering. For the first time in history, the Irish economy is booming. Many new pharmaceutical and electronics manufacturing plants have been and are being constructed, so there is a significant need for more chemical engineers. Dr. Law will be making numerous contacts at universities throughout the U.K. and the E.U. He hopes that these associations will open new avenues for research funding and also provide a new source of graduate students for Tulane on his return.

Brian S. Mitchell presented talks at the Technical University of Freiberg, Germany in July, and at the Federal Institute for Materials Research and Testing, Berlin in August. He also received a \$25,000 grant from the Engineering Foundation to develop superconducting fibers using Inviscid Melt Spinning technology.

Kim C. O'Connor received two grants, one as P.I. from the Joe W. and Dorothy Dorsett Brown Foundation (\$360,000) to develop a breast implant alternative, and one as a co-investigator from NIH (\$921,280) for research training in surgical oncology. She also had a patent approved on "Three-Dimensional Optic Tissue Culture and Process". This past year, Kim presented talks at the AIAA Annual Aerospace Sciences Meeting in Reno, NV; at NASA Johnson Space Center, in Houston, TX; and served on the Research Project Review Committee for the College of Agriculture at the Univ. of Arizona. She is also currently co-Director of the Interdisciplinary Molecular & Cellular Biology Program at Tulane along with Prof. Bill Toscano of Environmental Health Sciences. ■

Recent M.S. Graduates

1998

- Wenyan Li (Mitchell)

1997

- Mark Nelson (Walz)
- Taylor Baumgartner (John)
- Dwana Bush (Papadopoulos)
- Jennifer Fenton (Walz)
- Thomas Neary (Law)

1996

- Atilio Zardetto (O'Connor)

1995

- Charmaine Williams (Pintauro)
- Luke Stevens (Pintauro)
- Nicole Frey (Law)
- Bernice Kacher (Law)

1994

- Walter Hugler

Alumni Page Grows!

We now have over 30 email addresses on the alumni home page. Take a look at:

<http://www.tulane.edu/~bmitche/alumni.html>
and add your name to the list! Simply send an email request, along with your year and degree to:

brian@mailhost.tcs.tulane.edu

TRIMMING THE FAT

Judith Zwolak, Tulane Publications Staff

A Tulane chemical engineer hopes to make cookies, crackers and french fries a little healthier. Peter Pintauro, professor of chemical engineering-with the assistance of chemical engineering graduate student Weidong An and postdoctoral researcher Jin-Ki Hong-has devised a new process to manufacture partially hydrogenated vegetable oils such as shortening and margarine, which are found in many popular processed foods. The new method reduces the amount of trans fatty acids, a particularly unhealthy fat usually found in high quantities in these products.



"When you want to make a margarine or some kind of shortening for baking purposes, you add hydrogen to a liquid oil," Pintauro says. "In the traditional way to do this, you form trans fatty acids." Recent research published in the *New England Journal of Medicine* has found that trans fatty acids are harmful because they not only raise bad cholesterol, but also lower good cholesterol. The Food and Drug Administration is close to requiring food companies to report the quantities of trans fatty acids on their labels, says an FDA spokesperson. Shortly after English chemist William Normann invented the process in 1901, food manufacturers have used hydrogenation for a wide variety of products. Adding small amounts of hydrogen to oil keeps it fresher longer, while adding more hydrogen turns liquid oil into a solid the consistency of butter.

Pintauro's new process uses electricity to hydrogenate the oil, rather than oil manufacturers' current techniques, which employ high temperature and high pressure. "As a consequence, we don't produce nearly as much of these undesirable trans fatty acids," he says. "With this method, we think we can reduce the amount of trans fatty acids, which is as high as 30 to 40 percent in some of these processed foods, to 5 percent."

Pintauro's team accomplishes this reduction by using fuel-cell technology. A typical fuel cell acts like a battery and allows hydrogen and oxygen to react over a metal surface, which results in electrical energy. Reversing the process, Pintauro adds electricity to the fuel cell and produces hydrogen on the metal, which then contacts the oil and hydrogenates it. So far, Pintauro has produced only a few cups of this oil on a small scale in his laboratory. The next step is to produce oils on a pilot scale-"something in between a laboratory-scale reactor like we have here at Tulane and very large reactors in a commercial plant," Pintauro says.

Samples of the oils produced in Pintauro's laboratory are currently at the U.S. Department of Agriculture's National Center for Agriculture Utilization Research in Peoria, Ill. Here, researchers are studying the oils' chemical composition and structure to learn how they will behave when they are used in final products such as margarine, shortening and frying oil, says Kathleen Warner, research leader of the Food Quality and Safety Research Group.

With FDA labeling in the future, "There is a big rush to find alternatives to the traditional method of hydrogenation," Warner says, "which is the main way the food industry gets oils for products like margarine and frying oil." The next step for Warner's lab is to do more performance tests on products made from the larger quantities of oils produced at the pilot reactor. Preliminary taste tests at the USDA labs have shown the oils to have improved flavor and odor characteristics as compared to traditional oils, Pintauro says.

Tulane has filed both domestic and international patents on the process. Pintauro says he hopes commercial production of the oil will begin within the next two years.

This article is reprinted with permission from the Summer, 1998 issue of Tulanian magazine.

AIChE Student Chapter News

The AIChE Student Chapter kicked off their year with a meeting on September 17. Bob Stenelle of Career Services was the speaker on how to prepare a better resume. We will be having a number of social functions this year, including our annual crawfish boil. We also hope to work closely with the New Orleans Local Section by setting up a mentoring program. Officers will be attending the AIChE National Convention in Miami this fall, and we once again hope to take a large group of students to the Student Chapter Convention in South Carolina next spring. There we hope to submit a bid to host the 2001 Student Chapter Convention.

The current officers are Kellé Hankton, President; Stacey Bennett, Executive V.P.; Jovana Stepanovic, V.P. for Programming; Asher Chancey, Treasurer; Brian Smith, Sr. Class Representative; and Soraya Khalje, Soph. Class Representative. New officers will be elected in December. ■

Upcoming Events

October 16-17, 1998

- Homecoming Weekend

October 17, 1998

- Society of Tulane Engineers Jazz Brunch & Annual Meeting; City Energy Club, 1100 Poydras, New Orleans
11 a.m. to 1 p.m., \$15 per person
For information and reservations call 865-5764
- Game at Superdome
Tulane vs. University of Louisville; 2:30 p.m.

November 15-20, 1998

AIChE Annual Meeting
Miami Beach, FL

Will you be attending the AIChE Meeting in Miami this November? Would you like to get together with other Tulane alumni for an informal dinner some evening? Send an email to Kyriakos Papadopoulos (pops@mailhost.tcs.tulane.edu) with some convenient times and we'll try to get together!

Recent Ph.D. Graduates

1998

- Mark McGann (Lacks), Johnson & Johnson
- Dennis Malandro (Lacks), CPU, Inc.
- Fernando Fondeur (Mitchell), Savannah River Corp.
- Binghui Li (Gonzalez), Sabic
- Ravi Prasad Ponangi (Pintauro), EPA
- Zhijun Xiao (Mitchell), Schlumberger
- Yahan Yang (Pintauro), Exxon Production
- Fahad Al-Mubaddel, Professor, King Fahhad University, Saudi Arabia

1997

- Sukanta Banerjee (John), Postdoctoral scholar, Purdue University
- Jagann R. Bontha (Pintauro), Pacific Northwest National Lab.
- Rao S. Deshiikan (Papadopoulos), Tektronix, Inc.
- Wangqui Hou (Papadopoulos), Witco Co.
- Kagzhuang Jian (Pintauro), Natural Polymer International Co.
- Amber Sharma (Walz), Seagate Corporation
- Jayaprakash Soma (Papadopoulos), Delta-Omega, Inc.
- Lakkapragada Suresh (Walz), Postdoctoral scholar, University of Arizona.

1996

- Cigdem Karayigitoglu (John), Ciba-Geigy.
- Zewen Liu (Papadopoulos), NOLA Computer Services
- Adesina Oyefodun (Law), Self-employed
- Xiaodong Xu (John), Monsanto

1994

- Mohammad Hindawi (Law), Environmental firm in Australia
- Nagesh Kommareddi (John), Baker-Hughes Corp.
- Ashoke Sengupta (Papadopoulos), Lignotech
- Tapashi Sengupta (Papadopoulos), Postdoctoral scholar, University of Wisconsin
- Murthy Tata (John), Miller Brewing Company
- Gustavo Yusem (Pintauro), Tektronix, Inc.

Alumni News

Wilfred Hellmers Charbonnet (BE, '40) was awarded the Service Corps of Retired Executives Association (SCORE) Platinum Leadership Award for his continuous meritorious, volunteer counseling services to the Small Business Community from 1984 to 1997, and for serving with distinction in the management of chapter affairs, as chapter chair, and in other chapter offices, by Gulf Coast Chapter 130 of SCORE, Gulfport, MS.

Otto Parets and Jessica Bivins (both BS, '96) were married in New Orleans on March 14, 1998. They both work for Union Carbide Corp. in Victoria, TX.

Obituaries

Dr. J. Grady Horne (BE 1946, MS 1950, Ph.D. Mathematics, 1956) passed away on July 25, 1997.

Department Homepage Revamped

The department's Internet homepage received facelift this past summer, thanks to Prof. Dan Lacks. It contains more streamlined graphics, allowing for improved access speed, particularly via modem connections. Important features such as the alumni homepage and current seminar series speakers have been retained and improved. "The format of home pages is changing very rapidly and becoming much more standardized," says Lacks, "We intend to keep ours as current as we can." We hope you will visit the new site at: <http://www.tulane.edu/~ceng>. ■

ChEWave is published twice a year for the alumni and friends of the Department of Chemical Engineering at Tulane University. Address changes and correspondences should be sent to:

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