Message from the Department Head

The year is coming to an end and some of you will be leaving Carnegie Mellon to start careers elsewhere. Congrats and good luck! I am sure that you will find lots of challenges out there but that your time here has prepared you well.

Many things are going in the department these days. As many of you have noticed there have been more seminars this semester than in almost any semester in the past decade. We are in the midst of active recruiting and have made a number of offers to excellent candidates. In many respects this seems to have been one of the best groups of faculty candidates that I have seen in my time here. We’ll know in the next few weeks which of them have chosen to come here. On another front we have managed to hire Mr. Larry Hayhurst as shop foreman. Welcome Larry!

Planning continues for the renovation of Doherty Hall. The cost estimate for the schematic drawings developed last semester has come in within budget and we are now ready to enter the next phase of the project which is the development of design and then construction drawings. This will take place over the summer and the beginning of next semester and will require active input from all parts of the department and from our campus neighbors. Once completed, construction bids can be solicited and, if all goes according to schedule, work can begin in January. This should be an exciting time but will require a great deal of attention from many of us and we will have to be flexible as the renovation process proceeds.

Other planning for the immediate future includes an event to celebrate the 100th anniversary of the department. Our intent is to invite back a number of alumni and former faculty to join us in the celebration. They should be able to give us in interesting perspective on the changes that have occurred at CMU and in the Chemical Engineering discipline over the past century (or at least the 50 years or so that they remember).

Once again, congratulations to those of you who will be graduating! Good luck!

Andy
**Department News**

**The 2005 Jerry Seiner Memorial Lecture**
The 2005 Jerry Seiner Memorial Lecture in Colloids, Polymers and Surfaces will be given by Matthew Lynch, Senior Research Scientist in the Colloid and Surfactant Group from Procter & Gamble on Wednesday, May 4, 2005 at 10:45 AM. The title of the lecture is “Polymer Induced Gelation of Dispersed Soft Colloidal Dispersions.” It will be held in the Mellon College of Science Auditorium, Doherty Hall Room 2302. All are invited to attend.

**CAPD Short Course**
The CAPD Short Course, “Conceptual Design, Optimization, and Process Operations” will be offered from May 18 to May 24, 2005, in the department. Featuring Professors Biegler, Grossmann, and Hauan, the course will cover applications in analysis, synthesis, and planning. For more information, see the Web site: [http://capd.cheme.cmu.edu/](http://capd.cheme.cmu.edu/).

**CAPD Annual Review**
The Annual Review Meeting of the Centre for Advanced Process Decision-making took place on March 7 & 8, 2005. The meeting was attended by industrial participants from various chemical and technology companies. Events of the meeting included presentations by departmental faculty, students, and industrial participants; a poster session, and a reception and dinner at the LeMont Restaurant.

**National Engineers' Week 2005**
The Chemical Engineering Department participated in National Engineers' Week at the Science Center on February 18-19, 2005, presenting hands-on polymer activities. A sincere thank you to the following volunteers that made our event a wonderful success:


**VOLUNTEERS are needed for...**
Moving 4th Into Engineering, hosted by ICES held on Saturday, April 23.

The Sally Ride Festival for 5th to 8th grade girls held at The Petersen Event Center on Saturday, May 7. CIT is a sponsor for the event and Chemical Engineering will host a table with hands-on activities.

Please contact Annette Jacobson (jacobson@andrew.cmu.edu) or Rose Frollini (rf3n@andrew.cmu.edu) for more information and to volunteer.
CPS SEMINARS -- Spring 2005

Professor Lynn Walker - April 19, 2005
Title: “Wormlike Micelles as templates for Polymerization :From Nano-sausages to Nano-rods.”

Professor Gary Miller - April 28, 2005
Title: “Tumble a software package for the simulation of soft tissue in 2D.”

All lectures start at 10:45 AM in Doherty Hall 1112, with refreshments at 10:30 AM in DH 1102.

Faculty News

Ignacio Grossmann together with Frank Bates (Minnesota), Alex Bell (Berkeley), Mike Shuler (Cornell) and Jimmy Wei (Princeton) delivered a lecture at the 40th Anniversary of the Kelly Symposium at Purdue University. His lecture was entitled, "Research Challenges in Process Systems Engineering."

Ignacio Grossmann has been named chair of the Peer Committee of the Chemical Engineering section of the National Academy of Engineering for the 2006 election.

Larry Biegler and his former student, Andreas Waechter, presented joint optimization seminars at the Fields Institute of Mathematics, University of Toronto in March, 2005

Larry Biegler was invited to the Institute of Scientific Computing, University of Heidelberg in February, 2005. While there, he presented four lectures on the optimization of dynamic optimization and applications in chemical engineering.

Malvern Instruments, Limited (UK) has purchased an option on a technology created as a by-product of research by Dennis Prieve and Paul Sides and graduate students James Hoggard and Jeffrey Fagan. The invention is an apparatus and method for measuring the apparent surface charge of planar solid surfaces. According to the agreement, Malvern is supporting the building of a prototype, to be called the "ZetaSpin X.1". The prototype is to be available for testing on or about June 1 2005. Malvern will thereafter have 6 months to evaluate the prototype, research the market, and decide whether to offer it as a product.

The Institute for Surface Chemistry (Ytkemiska Institutet AB, or YKI) in Stockholm, Sweden, has appointed Bob Tilton as a YKI Ambassador. The YKI Ambassador program was started this year to engage international academic researchers to promote the scientific program of YKI and to expand YKI's opportunity to establish new collaborations worldwide. There are five YKI Ambassadors.

YKI is an internationally leading industrial research institute with deep knowledge in applied surface and colloid chemistry. YKI serves 85 member companies in many industrial branches including pharmaceuticals, biotechnology, food, industrial chemicals, household products, engineering, pulp and paper, coatings, ceramics, concrete, adhesives, paint, ink and printing.

Visiting Scholars – Welcome!

Luis Taboada, from IIM-CSIC in Spain, working with Prof. Erik Ydstie’s group.

Mak Paranjape, Visiting Professor from the Physics Department at Georgetown, and his research interests are in the area of MEMS device development for medical applications.

Undergraduate News

Senior Banquet: The seventh annual senior banquet sponsored by AIChE and the department will be held on May 4, 2005, for all graduating seniors, faculty and staff. It will be held at the Engineers Society of Western PA, 337 Fourth Avenue, Pittsburgh, PA 15222 and will begin at 6:45 PM. This event is always a lot of fun and a great chance for one last goodbye to friends.

COMMENCEMENT 2005!
Carnegie Mellon's 108th commencement will take place at 11 a.m. on Sunday, May 15th in Gesling Stadium (rain or shine). The procession of candidates across campus will begin at 10:30 am. The ceremony will last about one hour.

The Chemical Engineering department ceremony will begin immediately following the university ceremony at The Carnegie Lecture Hall in The Carnegie Museum. After the ceremony a special reception will be held in The Hall of Architecture for graduates and their guests.

The Doctor’s hooding ceremony will take place at 8 pm on Saturday, May 14 in the Wiegand Gymnasium of the University Center. Doctor's candidates, participating faculty and other ceremony participants will robe in Rangos Hall (second floor, University Center) at 7:15 p.m. and begin to process at 7:45 pm. Doctor’s candidates and faculty members should have confirmed their participation.

Be sure to follow the schedule of events and latest news at the commencement web site http://www.cmu.edu/commencement/. If you have any questions about the university commencement ceremony, send e-mail to commencement@andrew.cmu.edu. If you have
questions about the departmental ceremony, contact Cindy at cp32@andrew.cmu.edu or stop by to see her in DH 1101.

**GATE Engineering Apprenticeship**
The CIT office sponsored the GATE Engineering Apprenticeship program on March 16th. CIT hosted 40 high school students who are in gifted programs at area schools. Several of our Chemical Engineering sophomores helped mentor these students by taking them to classes, points of interest, activities, etc. Thanks to William Nicoll, Michael Nigra, Jen Njoroge, Mike Aliprando, Calvin Ng, and Maureen Tang for taking the time to mentor! Chemical Engineering had the most mentor representation for CIT!!

**Summer Research Internships**

The following students have been selected to work in Faculty and Graduate research groups for the summer:

*Undergraduate Summer Research Internships:*

- Alan Abel - (Professor Walker)
- Daniel Sunday – (Professor Walker)
- Brian Hunter – (Professor Donahue)
- Zachary Martin - (Professor Schneider)
- Gloria Kim – (Professor Schneider & Professor Tilton)

**Farewell**
Farewell to the exchange students who spent the 2004-05 school year with us!

From RWTH Aachen in Germany: Andreas Harwardt, Jan Nöcker, and Markus Spiegel.
From Imperial College in London: Elvin Mootoosamy, Pui Chuan Wong, Yee Mang Wong, and Clement Zhao.

We have enjoyed meeting all of them and bid a fond farewell!

**Good Luck**
We also send our best wishes with the following students who will be studying abroad in the departmental exchange program for the 2005-06 academic year:

To RWTH Aachen in Germany – Serena Hanor and William Nicoll.
To Imperial College in London – Kristen Henry and Samantha Rosenthal.
The men’s basketball teams had an excellent season this year. The men's team had the best record in 25 years and advanced to the second round of the ECAC playoffs. **Michael Divens**, a senior chemical engineer, was named to the All-UAA second team. Divens became the 15th men’s basketball player in school history to score 1,000 points for his career. Senior chemical engineer, **Baris Polat** and junior chemical engineer **AJ Straub** both contributed to the fine season. Polat, a guard, was named to the UAA All Academic team.

**Carissa Sain**, senior chemical engineer and captain of the women's team, was named Honorable Mention All-UAA. Sain became the seventh women’s basketball player in school history to score 1,000 points for her career.

We are very proud of these student-athletes who have learned to balance a demanding chemical engineering work-load with the time and energy required to compete at a high level in varsity athletics.
Professor Powers was especially happy to be able to watch CMU basketball that involved his students. If you know of talented basketball players with an interest in chemical engineering, please let Professor Powers help with the recruiting.

Congratulations to the following seniors who are expected to receive their degrees on May 15, 2005:

- Steven Back
  Additional Major: Biomedical Engineering

- Aaron Beaber
  Minor: Colloids, Polymers, and Surfaces

- Eric Boudreaux

- David Chan
  Minor: Colloids, Polymers, and Surfaces

- Yan Xi Chan

- Yi Chen
  Minors: Biomedical Engineering & Chinese

- Matthew Dalka
  Additional Major: Engineering and Public Policy

- Michael Divens

- Karoline Evans

- David Flowers

- Justin Gargas
  Additional Major: Biomedical Engineering

- Nicole Gartner
  Additional Major: Biomedical Engineering

- Dana Gary
  Additional Major: Biomedical Engineering
  Minor: Colloids, Polymers, and Surfaces

- Pierre Guimard
  Additional Major: Biomedical Engineering
Amy Haag

Nathan Lazur
Minor: Biomedical Engineering

Brian Leukart
Additional Major: Biomedical Engineering

Roy Ludwick
Additional Major: Biomedical Engineering

Steve Marshall
Additional Major: Biomedical Engineering

Daniel McNerny
Additional Major: Biomedical Engineering

Jessica Melanko
Additional Major: Biomedical Engineering

Timothy O’Dowd
Additional Major: Engineering and Public Policy

Kienuwa Osayawe
Minor: Colloids, Polymers, and Surfaces

Kevin Paavola
Additional Major: Biomedical Engineering

Gene Pan
Minor: Biomedical Engineering

Reema Patel
Additional Major: Biomedical Engineering

Baris Polat
Minors: Business Administration & Colloids, Polymers, and Surfaces

Raihan Rozlee
Additional Major: Biomedical Engineering

Edmund Saw

Luke Schwartz
Additional Major: Biomedical Engineering

Teddy Suwignjo
Minors:  Chinese & Business Administration

Megan Tzeng
Additional Major: Biomedical Engineering

Derek Underwood
Additional Major: Biomedical Engineering

Jonghyun Won
Minors: Business Administration & Economics

Kierra Wright
Minor: Biomedical Engineering

Allen Yang
Minors: Biomedical Engineering & Colloids, Polymers, and Surfaces

Class of 2008

Welcome to the following first-year students who have chosen to join the chemical engineering department.

Samuel Aigen  Julian Hoang
Krishnan Aiyer  Hsiao-Wen Huang
Zijian An  James Kenney
Kevin Anderson  Alok Khetan
Keith Aziz  Rohan Kilachand
Ester Marie Barbuto  Kyu Sung Kim
Melissa Bartel  Sung Kwang Kim
Alana Bereck  Ka Wai Ko
Robert Bethea  Kelly Lacey
Benjamin Chang  Ivan Lee
Siwei Chang  Simon Markowski
Hyun Hee Cho  Sarah Mitchell
Bur Chu  Stephen Nagy
Yena Chung Adwoa  Emory Neely
Darko Nathan  Vaishal Patel
Diorio-Toth Katie  Monica Pheifer
Dolan Alexander  Chad Pugh
Donovan Paras  Joseph Remolona
Doshi  Meagan Robles
Denver Faulk  Thomas Saiget
Daniel Ford  Karl Scott
Candice Gesecki  Anubhav Shankar
Loriany Gil  Tyler Shaughnessy
Siobhan Halloran  Howie Shen
Suvana Hashim  Amy Staloch
Graduate News

The Chemical Engineering Graduate Student Open House was held the weekend of March 18-19, 2005. We thank all the graduate students for their help in recruiting new students.

Bruno Marques received a Best Poster Award from the ACS Division of Colloid and Surface Chemistry at the 229th ACS National Meeting, in San Diego. The title of his presentation was "Electrostatic and Hydrophobic Interactions of DNA Oligomers with Peptide Nucleic Acid (PNA) Liposomes".

Congratulations to the following students who are scheduled to graduate on May 15th:

Ph.D.

Ashish Agarwal
Title: Logical Modeling Frameworks for the Optimization of Hybrid Systems
Advisor: Prof. Ignacio Grossmann

John Barr
Title: A Compression Rheology Model of Batch Centrifugal Filtration
Advisor: Prof. Lee White

Calvin Chan
Title: Modular Logic Model Synthesis and Verification of Chemical Processes
Advisor: Prof. Gary Powers

Jeffrey Fagan
Title: AC Electric Field Induced Electrohydrodynamic Forces on a Single Colloidal Particle near a Planar Electrode
Advisor: Prof. Paul Sides and Prof. Dennis Prieve

Vikas Goel
Title: Stochastic Programming Approaches for the Optimal Development of Gas Fields under Uncertainty
Advisor: Prof. Ignacio Grossmann

Preeti Kamakoti
Title: First Principles Prediction of Hydrogen Transport in Binary Copper-Palladium Alloys
Advisor: Prof. David Sholl
Bruno Marques  
Title: Surfactant Microstructures as DNA Sequence Tags  
Advisor: Prof. James Schneider

Maame Yaa Poku  
Title: Nonlinear Process Optimization with many Degrees of Freedom in Process Engineering  
Advisor: Prof. Lorenz Biegler

John Siirola  
Title: Agent-Based Collaborative Optimization  
Advisor: Prof. Arthur Westerberg and Prof. Steinar Hauan

Cong Xu  
Title: Multi-scale Modeling and Optimization of PEM Fuel Cells: Analyses in Operations, Economics and Materials  
Advisor: Prof. Myung Jhon and Prof. Lorenz Biegler

Hao Zhou  
Title: Manipulation and Patterning of Colloids and Biological Cells near Electrode Surfaces  
Advisor: Prof. Robert Tilton and Prof. Lee White

M.S.

JitKang Lim  
Title: Electrohydrodynamic Control of Reactions in Microfluidic Systems: Selectivity and Spatial Control Mechanisms  
Advisor: Prof. Robert Tilton

M.Ch.E.

Kofi Darkwa  
Seung Han  
Hann-Chung Wong

We wish all of our graduates the best of luck!
Faculty Profile

Getting to Know the Faculty and Staff

Professor Neil Donahue

Well then. Five years can go by in a pretty big hurry. Still, I was a postdoc for twice as long, so maybe that is why it feels like we just got here. Kielan, our older daughter who had just turned 2 when we arrived is now in first grade in Squirrel Hill, and Innes, who was born just after we arrived, is 4 and happy in the Cyert Center over in Morewood. A couple more years and that trailer will vanish from the back of my bike. This is a good thing because we are moving from our house near Schenley Park to one down a quiet street that backs onto Frick Park; it drops about 120 feet in a quarter mile and it’s a bear to haul that thing up. The location is delightful, however; it is a great compromise among being off in the woods somewhere, being close to city activity, and being close to work.

I take minimizing driving as a professional responsibility. Autos are the single largest source of carbon dioxide and fine particulate matter to the atmosphere, and my research is directed at questions related to global climate and fine particulate matter. Consequently, I try not to drive much. The temptation to turn to technological fixes is extreme when one is in a technological discipline, but I am convinced that no reasonable scenario leads to reasonably widespread prosperity without a considerable change of behavior on our part. If you think this is all fuss and bother, consider for a moment what might have happened if Molina and Rowland had not figured out the connection between CFCs and ozone depletion in 1974 and we had instead gone ahead using CFCs as propellants at the pre ’74 rate of growth for another decade before noticing the ozone hole in the Antarctic. Without any question there would still be continent-scale ozone holes annually in the northern hemisphere. What would that mean? I don’t know. However, the sunscreen industry would be a good buy.

OK. So it is pretty clear that I am an ‘eco-bunny’ (a phrase coined for us nuts by an actual ecologist at Brown while I was an undergrad there – he later married one of us…). I also, as an undergraduate physics major, would have been pretty darn happy contemplating the mystery of cosmic inflation for the rest of my days. However, there was a certain dissonance there between my real, practical concerns about the environment and intellectual curiosity. I actually wanted to do something relevant. I suppose a natural conclusion to that was to wind up in engineering. I couldn’t be happier.

The party line here at CMU is that our major strength is interdisciplinary work. I don’t tend to conform to party lines, but this time I believe it. The Air Quality Group (probably soon to be the CEnter for Air Quality Studies, but if you have a better acronym let me know…) comprises five faculty members in six departments (myself, Spyros Pandis, Peter Adams, Allen Robinson and Cliff Davidson), and what I really love is attacking problems where our different perspectives really stir things up. I’m working hard with Allen on the question of how organic particles emitted from combustion sources are processed in the atmosphere. His imperative is to understand how real particles behave (what a crazy idea), while I am tempted as a physical chemist is to build a simple model system that I can more or less fully understand. Well, it turns out that most model systems don’t behave like real particles, to the extent we can figure out real particle behavior from ambient observations (that itself is exciting research). So, there is something about the complexity of real particles that makes them fundamentally different from their simple cousins (that sounds insulting); the oxidation rates of various constituents appear to differ from the model systems by 3 orders of magnitude. The entire community looking at this stuff (that would be 6-12 people globally) is now scratching its collective head over this and doing some pretty cool experiments.

The image Allen and I have is of stepping stones across a pond. Rather than have the fundamental work continue on irrelevant model systems and the practical work proceed on impossibly complex real systems, we are building a series of progressively more complex models and progressively refined real samples. The meeting point of those two efforts (as long as we don’t wind up like one of those tunnels dug from both ends culminating in an unintended double bore), promises to be much more than the sum of the parts. That’s why I’m here. Peace.