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## Chapter 6

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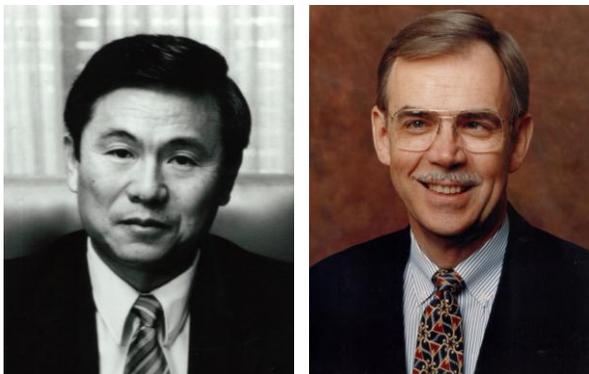
# Building for the Future. Reklaitis and Varma (1987-2011)

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After Andres announced his desire to step down as the Head of Chemical Engineering, Dean Henry Yang rapidly appointed one of his Assistant Deans, Gintaras “Rex” Reklaitis, as the Interim Head in August 1987. The Dean then formed a fairly large search committee with himself as the chair. It soon became obvious to the search committee that the best candidate to become the next head was performing the duties as interim head. Since the custom of Engineering was to do a national search for Head, the search committee spent over a month convincing Dean Yang that in this case a national search was not needed and would be counter-productive. Dean Yang eventually agreed to do what he wanted to do and Rex Reklaitis was named as the ninth Head of the School. He officially started as Head in December 1987 and relinquished his Assistant Dean position in 1988.

**Left:** Dean Henry T. Yang  
**Right:** Gintaras V. (Rex)  
Reklaitis (ChE 1970-  
present, Head 1987-2003)



In summer 1988 one of the first two hires under Reklaitis, Venkat Venkatasubramanian (B. Tech. ChE '77 University of Madras, M.S. Physics '79 Vanderbilt University, Ph.D. '84 ChE Cornell), an assistant professor at Columbia University, joined the School as Associate Professor. Venkat earned tenure in 1991 and was promoted to full professor in 1995. On February 3, 2011, the Purdue University Board of Trustees ratified the appointment of Venkat Venkatasubramanian as Reilly Professor of Chemical Engineering. [This professorship is named for Vincent P. Reilly (BS Engr. Purdue '22) who founded the Illinois Gear and Machine Company and bequeathed money to

Purdue for excellence in engineering education.] His interests in Artificial Intelligence (AI) and complex adaptive systems as applied to fault diagnosis, plant safety, operator advisory functions, pharmaceutical informatics, molecular products design and composite materials research would lead to considerable collaboration with other faculty members.

Venkat Venkatasubramanian



**Gintaras V. (Rex) Reklaitis  
(1942-)**

Gintaras Victor "Rex" Reklaitis (B.S. ChE '65 Illinois Institute of Technology, M.S. & Ph.D. '69 both in ChE from Stanford University, NSF post-doc 1969-70 Institut fuer Operations Research und Elektronische Datenverarbeitung, Zurich, Switzerland), a student of Douglas Wilde, joined the faculty with the goal of establishing a research program of international reputation in computer aided process design, optimization and simulation of chemical operations. An indefatigable worker and an excellent researcher, Rex developed into one of the leading authorities in this research field.

Reklaitis was promoted to Associate Professor with tenure in 1976 and to full professor in 1980. In July 1985 he became Assistant Dean of Engineering for Graduate Education and Research, Interim Head of Chemical Engineering in August 1987, and on December 1, 1987 he became the Head of Chemical Engineering. He served as Head of Chemical Engineering for over sixteen years, stepping down on December 31, 2003. On December 20, 2003 he was named the Edward W. Comings Professor of Chemical Engineering [this professorship honors the fourth Head of the School]. A number of ChE professors thought Reklaitis should become a distinguished professor in 2003 – this honor occurred in December 2007 when he became the Edward W. Comings Distinguished Professor of Chemical Engineering. In March 2010 he was named the Burton and Kathryn Gedge Distinguished Professor of Chemical Engineering. [This professorship is in honor of Burton H. Gedge (BSChE '41) and his wife Kathryn. Burton was commissioned in the army at graduation from Purdue and on D-day landed at Omaha Beach, Normandy. He left the army at the end of World War II with rank of major, then worked for 37 years with Procter and Gamble before retiring in 1983.]

Reklaitis has been recognized for his many research, educational, and leadership accomplishments with the 1984 AIChE CAST Division's Computing in Chemical Engineering Award, the 1994 ASEE Chemical Engineering Division Lectureship Award, election as a Fellow of AIChE in 1994, Distinguished Alumni Award (2002) and Professional Achievement Award (2006) from the Illinois Institute of Technology (the *other* IIT), election to the National Academy of Engineering (NAE) in February 2007, the 2010 Engineering College Team Excellence Award, and the 2010 AIChE National Programming Committee George Lappin Award. He has also won a number of best paper awards and has given a number of distinguished lectures. Reklaitis wrote two successful engineering textbooks. With A. Ravindran and K.M. Ragsdell he co-authored *Engineering Optimization: Methods and Applications* currently in the 2<sup>nd</sup> edition (2006), and with some assistance from Dan Schneider he wrote *Introduction to Material and Energy Balances* (1983). He was also the editor or co-editor of twelve symposia and conference proceedings and special journal issues. From 1986 to 1994 he was co-editor in chief and from 1994 to 2008 he was editor in chief of the journal *Computers & Chemical Engineering*.

Reklaitis has always been service oriented. In addition to serving as an associate dean and as Head of the School, he served as Chair of the Undergraduate Committee in the mid-1980s, and he was responsible for the major improvements in computer facilities that occurred in the School in the early 1980's. From 1992 to 1999, he served as director of the Computer Integrated Process Operations Center and from July 2006 to the present he has been Deputy Director of the NSF Engineering Research Center on Structured Organic Particulate Systems and Co-Director of the Pharmaceutical Technology & Education Center (see Chapter 8 for descriptions of these Centers).

His research group has been one of the major contributors to computer-aided process engineering, and his students continue to be in great demand by industry and academia. Reklaitis' research involves the application of computing and systems technology to support the design and operation of processing systems. His focus has been on issues arising in batch operations, which are heavily used in food, specialty chemicals and pharmaceuticals manufacturing. Reklaitis has been the advisor or co-advisor of 45 Ph.D. students. He has published almost 200 papers, presented over 65 invited academic seminars around the world, and been an invited conference keynote and plenary speaker at over 75 conferences around the world. Rex is extremely collaborative and has written papers with nine ChE faculty members, with a number of other Purdue faculty, and with a number of faculty around the world.

Rex has been a significant contributor to the education of both undergraduate and graduate students at Purdue. His early efforts were focused on the most important course in the undergraduate curriculum, ChE 205 (Mass and Energy Balances). He wrote the book that was used in ChE 205 for a number of years. For many years Rex was also heavily involved in the other book end of the core curriculum – ChE 450, design. Reklaitis with Venkatasubramanian developed the elective ChE 555, Computer Integrated Process Operations. In the pharmaceutical processing area ChE 597E/59700 and ChE 597D/59700, Principles of Pharmaceutical Engineering and Pharmaceutical Process Development and Design have been taught by Reklaitis since 2005.

Rex and Janine Reklaitis at 2007 celebration for Rex's election to the National Academy of Engineering (NAE). Rex couldn't have made it alone.



In addition to the numerous symposia organizing committees he has served on, Reklaitis' national and international activities include very extensive service to AIChE including Director from 1997-99, 2002 Annual Meeting Program Chair (an enormous task), National Program Committee Executive Board 2005-08 and Chair in 2007, AIChE Foundation Board of Trustees 2010-12, and all offices in the Computing and Systems Technology Division 1980 to 1992. Rex served as secretary, vice president and president of CACHE (Computer Aids for Chemical Engineering Education) Corp. from 1982-88. He has been an Academic Member of the Council for Chemical Research since 1988, was on the Governing Board from 1994-97, and a member of the Vision 2020 Steering Committee from 1997-2000. For many years he served on the *Chemical Engineering* magazine Kirkpatrick Achievement and Personal Achievement Boards of Judges. He has been of the advisory committees or visiting committees of the Chemical Engineering programs at Carnegie Mellon University, National University of Singapore, Illinois Institute of Technology, Qatar University, University of Illinois at Chicago, Louisiana State University, University of Buffalo, and the University of Hawaii (how does one get this gig?). From February to August of 1980, Reklaitis was senior Fulbright lecturer at Vilnius State University and Lithuanian Academy of Science. What all of these activities boil down to is Rex is very highly respected, has enormous patience working in committees, and at one time had more energy than most people (he claims to be slowing down).

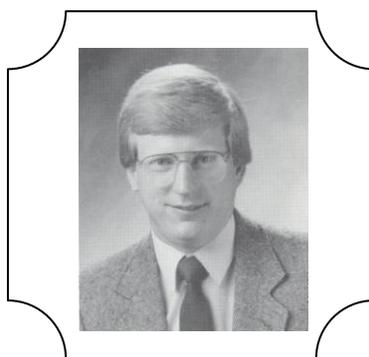
Reklaitis is very patient in working with diverse groups and is able to lead (or nudge) academics to work together towards common goals. His unusual background (see the article on Rex in *Chemical Engineering Education*, 34 (2), 98 (Spring 2000)) apparently provided him with this ability. Rex's view of the proper role of a department head appears to be give the faculty plenty of freedom with just enough structure that they pull together toward a common goal without realizing anyone has directed them toward that goal. When some work had to be done behind the scenes either Rex did it with no fuss or found a volunteer to do it. In the hands of a master like Rex this mode of operation tends to be very effective. The entire faculty appreciates the wonderful new facility that Rex's networking talents helped produce.

Since both authors were part of the School during Reklaitis' tenure as Head, it is difficult to obtain historical perspective on his accomplishments. We will end this section with the comments of Dr. Sally Mason, Provost (equivalent to Chief Operating Officer in a company) at the time Rex stepped down as Head. "Professor Reklaitis has led the School of Chemical Engineering in an exciting time of growth and expanded research. The fruits of his labor are particularly evident in the project under way to build an addition to the chemical engineering building."

Venkatasubramanian is very productive and one of the outstanding teacher/scholars in the School. Currently he has published 100 archival journal publications, 97 refereed conference proceedings and eight book chapters. He is the co-editor of two books, and has graduated 32 PhD degree recipients. In 1996 he was named to the Editorial Board of *Process Safety Progress*. In external recognition, among others, he received the Computing in Chemical Engineering Award (AIChE CAST Division, 2009), and in 2010 *Computers & Chemical Engineering* announced that three of his review articles were the most cited articles in the journal between 2003 and 2009. Internally, he has been recognized as University Faculty Scholar (1998), the Shreve Award for Outstanding Teaching in ChE (1993, 2004, 2006) and the Teaching for Tomorrow Award (2004). He was elected a Fellow of Purdue's Teaching Academy (2007) and has been co-recipient of two CoE Team Excellence Awards (2007, 2010). In 2011 he continued to win awards including being named a Fellow of AIChE and the College of Engineering Research Excellence award. He has served the profession as President of the non-profit CACHE (Computer Aids for Chemical

Engineering) Corp, and is currently Editor of *Computers & Chemical Engineering* journal. Venkatasubramanian has a sense of humor and likes to joke that he is the “biggest name in chemical engineering.”

In summer 1988 John Wiest (BSChE '81, University of Colorado-Boulder, Ph.D. '86, University of Wisconsin) joined the School as an assistant professor after a year of post-doc at the University of Sydney, Australia, and a year of post-doc experience at the University of Wisconsin. His research at Purdue was in the general area of transport phenomena with specific applications of non-equilibrium statistical mechanics and polymer kinetic theory in polymer theology. He was Bob Bird's last Ph.D. student at Wisconsin. Wiest worked closely with the students while teaching transport courses and as an advisor for the AIChE student chapter while at Purdue. The students were unhappy to see him leave for the University of Alabama in 1995. He is now a full professor of chemical engineering and associate dean at the University of Alabama-Tuscaloosa.



John Wiest

In 1988 several important staff changes occurred. The administrative assistant for the Head, Ms. Betty Harvey, resigned and was replaced by Ms. Carolyn Blue, an efficient long-term secretary in ChE. The author (PCW) had the joy of having Carolyn serve as his secretary for a couple of years. When Phil went on sabbatical in France in 1983-84, Carolyn suggested on her own that she would have time to type all of the drafts of the textbook he was working on. And she did it. This was the type of dedication she brought to the job as the Head's administrative assistant. Janet Taylor was promoted to the Secretary V position vacated by Carolyn's promotion. After the long-term undergraduate laboratory technician Jim Snell announced that he was planning to retire in 1989, Alden Emery hired Kenny McGlothlin to be trained as his replacement.

Reklaitis initiated two important programs in 1988. First, during that summer he and Jim Schorr (BSChE '54) initiated the New Directions Industrial Council starting with a 5 year commitment from Dow for \$ 0.25M obtained with the aid of Paul Oreffice (BSChE '49). New Directions in Chemical Engineering (now the Industrial Advisory Council) became and still continues to be an outstanding success. One of the main driving forces of this success was alumnus Jim Schorr. For more details on New Directions see the textbox. For more information about Jim Schorr (see next textbox) and Paul Oreffice (see textbox later).

### **New Directions in Chemical Engineering (Industrial Advisory Council)**

The goal of New Directions is to help the School achieve its vision of being "recognized world-wide: as a premier source of chemical engineering professionals and leaders of tomorrow, for high-impact fundamental research in chemical engineering areas, for exemplary partnership with industry and government in the development and dissemination of novel technologies." To do this, the New Directions Companies provide technical and monetary support as well as strategic and tactical advice. Since New Directions represents a cross-section of industry, the School pays attention to the Council's advice. For example, the courses ChE 320 (Statistical Modeling and Quality Enhancement) and ChE 497 (Process Safety Management) were added based to a large extent on the advice and guidance from New Directions.

The New Directions program was initiated by the School Head Rex Reklaitis and alumnus Jim Schorr (see next text box) in 1988. The original goals were to help the School develop an effective strategic planning process and to raise a total of \$5 M from the New Directions companies over a five year period. A seven member steering committee (later renamed the executive committee) was formed with Jim Schorr (Quantum Chemical) as the chair. Senior executives from Abbott Laboratories, Air Products, Amoco, and Dow Chemical strongly supported the effort. Jim led vigorous recruiting efforts to get companies to join New Directions. The original group of nine companies committed a five year total of \$1.2 M. By summer 1989 eleven companies had committed a combined five year total of \$1.4M. The steering committee met three times with Reklaitis, Delgass and Caruthers to work on recruiting and to prepare for the first annual meeting. The first annual meeting with thirteen company representatives to New Directions was held in October 1989. By summer 1990 New Directions commitments were 48% of the way to the goal. This included the donation of a solid-state NMR valued at \$0.8 M from GE Plastics.

By summer 1992 the New Directions program had seventeen industrial partners (Air Products, Amoco, Dow, Dow Corning, DuPont, Eastman-Kodak, Eli Lilly, Ethyl, Exxon, GE Plastics, Mobil, Monsanto, Morton International, National Starch, Procter & Gamble, Quantum Chemical and Reilly Industries) and had reached 66% of the original fund raising goal. At the September 1992 meeting the New Directions program (now with Union Carbide for a total of eighteen companies) was restructured to become a partnership to strive for continuous improvement of the chemical engineering program. The executive committee was restructured with Jim Schorr as the chair, Bill Wishlinski as vice-chair, and standing committees on Alumni Affairs, Curriculum, Development, Facilities and Research. Dow Chemical made a commitment of \$1 M over a five year period starting in 1993 to fund the Dow Chemical Engineering Instrumentation Laboratory. This commitment allowed the School to incorporate state-of-the-art instrumentation in undergraduate and graduate laboratories.

During the 1993-94 academic year, Lubrizol joined New Directions. The following year NALCO joined for a total of twenty companies. A diversity committee was formed to work on graduating more students from underrepresented groups from chemical engineering, and the executive committee was increased to eight industrial executives. In 1996 and 1997 New Directions focused its attention on reviewing the School's strategic plan. This called for increasing the number of faculty to 28 and the addition of a wing to the CMET building. During the 1996-97 academic year, New Directions grew to 21 companies. Under the leadership of Bill Wishlinski (Amoco), chair of the Executive committee, New Directions was reorganized after the September 1997 meeting to align with the strategic plan for the School. In May 1998 the Executive Committee developed the framework for a possible capital campaign in order to build a new wing. However, since the University decision on how to proceed was delayed, the Executive Committee instead focused on a membership campaign for New Directions.

In January 1999 Bill Smith (Eli Lilly) became the chair of the Executive Committee. Extensive membership discussions were held at the January 1999 Executive Committee meeting. At the annual meeting in September 1999 the twenty member companies were Air Products, BP Amoco Chemical Co., Dow, Dow Corning, DuPont, Eastman Chemical Co., Eastman Kodak, Eli Lilly, Equistar, Exxon Chemical Co., GE Plastics, Honeywell, Kimberly-Clark, Lubrizol, Millennium, Mobil, National Starch & Chemical, Proctor & Gamble, Reilly Industries and Union Carbide. A dozen additional companies were under active consideration, 28 companies had declined over the years, and nine companies were listed as "possibilities." By the next meeting, Anheuser-Busch, Fluor Corp., Hemlock Semiconductor Corp., Kraft, Shell Chemical Co., Sovereign Specialty Chemicals, 3M, and UOP had joined New Directions.

As part of the October 2000 New Directions meeting Reklaitis and Bettina McConnell, the ChE Director of Development, unveiled the *ChE Champions of Excellence Program*. The plan was to add 72,000 sq ft of space with 35,000 sq ft assignable and to remodel the old CMET building. Details of the building and the Campaign plans are discussed later in the text box, "A New Building for the School of Chemical Engineering." The New Directions meetings from 2001 to 2003 focused to a large extent, but not wholly, on the Campaign and the new building. Bill Smith retired from being Chair of the Executive Committee in June 2004, shortly after Rex retired as School Head.

In 2004 Dick Grabham (ExxonMobil) and Arvind Varma took over as Chair of the Executive Committee and School Head, respectively. They had the pleasure of planning for the completion and dedication of the new building, but then had to face the inevitable let down that occurs when a big project has been successfully completed. In 2004-2005 New Directions companies included Abbott Labs, Air Products, Anheuser-Busch, BP Chemical Co., Chevron Phillips, Dow, Dow Corning, DuPont, Eastman Chemical Co., Eli Lilly, ExxonMobil, Fluor Daniel Corp., GE Plastics, Hemlock Semiconductor Corp., Kimberly-Clark, Lubrizol, Lyondell Chemical, National Starch & Chemical, Pfizer, Proctor & Gamble, Shell Chemical, 3M, UOP and Valspar Corp. The big tasks at this time were renovation of the old CMET building and development of a new strategic plan. In 2005 the Executive Committee of the IAC started having its second meeting every year in Naples, Florida, during the President's Council event. From 2009 onwards, a second annual meeting of the full IAC was added, in Naples during the same event.

In January 2009 Rick Roberts (Chevron Phillips Chemical) became the Chair of the Executive Committee. At the February 13, 2009, meeting of the Industrial Advisory Council in Naples, Florida, ideas for both the Chemical Engineering of the Future Symposium and for the Centennial Celebration for the School were discussed (see Table 6-12 for details). Starting with this meeting, spring IAC meetings in Naples, Florida, included both IAC members and ChE Ambassadors. Strategic plans were discussed, and although it is not clear if all of the goals set for the 2002-06 plan were met, Rick Roberts pointed out that the major goal – building the addition – was accomplished. In addition the continued progress on renovations was also positive.

There was agreement that the School's new strategic plan should be kept short and relevant, with relatively few goals and metrics that are clearly stated and easy to measure. A baseline should be identified, measured at the beginning of the plan, periodically during the 5 years of the plan, and at the end. Some of the goals mentioned were:

- Improve the rankings to place our school in the top 10
- Finish the renovation
- Write textbooks

To accomplish these goals the right balance between the undergraduate and graduate programs needs to be maintained.

The Fall 2009 IAC meeting in West Lafayette on September 25<sup>th</sup> was immediately followed by the Chemical Engineering of the Future Symposium. The strategic plan was discussed and breakout groups discussed various aspects. The Spring 2010 IAC meeting in Naples, Florida on February 12<sup>th</sup> was again attended by both IAC members and ChE Ambassadors. The two main topics of this meeting were the Strategic Plan and the Centennial Celebration. Attendees were very positive about the increased coverage of safety in the ChE curriculum.

At the October 15, 2010 meeting in West Lafayette, the IAC members toured the Ideas to Innovation Learning Laboratory (i2i) in Armstrong Hall used by the First Year Engineering program. The current facility is a far cry from the facilities used by the Department of Freshman Engineering when the IAC members were students. Dean Jamieson presented an overview of the College's Strategic Plan. Attendees noted a general shift in IAC meetings from UG and recruitment only activities, to graduate and research topics. Some IAC members want more interaction with the faculty members and more discussion in advance on research topics. IAC members also offered to host ChE faculty (especially junior level) at their companies to facilitate research discussions. Companies are also interested in supporting research through Grant Opportunities for Academic Liaison with Industry (GOALI) projects, as a low risk option for starting research collaborations.



IAC with Linda Davis (center) in Fundamentals Lab in 2008.

### **James Schorr (BSCHE '54, Hon. Doctorate '87)**

Jim Schorr has frequently used his extraordinary talents for organization and networking to help Purdue University, the College of Engineering and the School of Chemical Engineering. After playing varsity basketball and baseball at Purdue, he graduated from ChE and then earned a MBA from IU in 1955 (everyone is allowed one mistake). He then went to work for Dow Chemical Company where he rapidly rose through the ranks from process engineer, to head of startup of Dow's first European Styrofoam plant, then became manager of Dow's major program for dissemination of production plants and foamed-plastic technology throughout the world, and ultimately to vice president and director of operations of Dow Chemical Latin America. He moved to Chemplex Company (a joint venture of American Can Co. and Getty Oil) as executive vice president and became president in 1981. Schorr greatly increased the operating efficiency of Chemplex and made the company much more attractive for potential buyers after Texaco, which had purchased Getty Oil and American Can which had started divesting peripheral business, decided to sell their joint venture. In 1984 Chemplex was purchased by InterNorth which merged Chemplex with Northern Petrochemical Company to form Norchem, Inc. In 1986 the company became Enron Chemical Company. Through all these changes Jim remained as the president.

Then in 1986 Enron Chemical merged with USI, which was a part of National Distillers and Chemical. In 1987 the company changed its name to Quantum Chemical and Jim became the president and corporation vice president of USI Division of Quantum Chemical Company and vice-chairman of Osterman and Company. On January 1, 1989, Jim elected to take early retirement.

Jim was named a Purdue Distinguished Engineering Alumnus in 1974. He has been a very active supporter of the School, of Engineering and of Purdue. Jim and Rex Reklaitis were the driving forces in the development of New Directions in Summer 1988. It is probably fair to say that without Jim and Rex there would have been no New Directions. Schorr served as the first Chair of the New Directions Executive Committee and chaired the first New Directions meeting in October 1989. Jim stayed on as Chair of the executive committee until the mid-1990s when Bill Wislinski became Chair. Jim strongly encouraged other companies to join New Directions. Jim was also active on the Capital Campaign Committee to fund the new Forney addition. He received the President's Council Ambassador Award in 1986, was Chair of the President's Council in 1988-89, and received the President's Council Distinguished Service Award in 1991. Jim was also the first Chair of the Engineering Dean's Club Executive Committee. In 2000 he received the President's Lifetime Achievement Award of the Purdue Engineering Alumni Association. There are eight Purdue graduates in the Schorr family (his four children all have Purdue degrees: Jenny (BA 1981 CLA); Andrew (BS 1988 CFS); Daniel (BS 1985 Tech); and Thomas (BS 1993 Ag), and Jim has endowed both a baseball scholarship and a ChE scholarship. Jim is also a Sagamore of the Wabash, an Award created and awarded by the Governor of Indiana.

Dr. Schorr is a founder and member of the ChE Ambassadors Club, an alumni group. In 2011 several prominent alumni of the School approached Arvind Varma and suggested that it would be appropriate to further recognize the tremendous contributions that Jim had made to the School. As a result the School developed a special School of Chemical Engineering Centennial Award that was presented to Jim in Naples, Florida, at the Industrial Advisory Council meeting dinner in February 2011. Imprinted on a crystal bowl shaped like a golf ball were the words:

PURDUE UNIVERSITY  
SCHOOL OF CHEMICAL ENGINEERING  
CENTENNIAL AWARD

Presented to

James F. Schorr

For his visionary leadership, deep loyalty and extraordinary service to the School and University

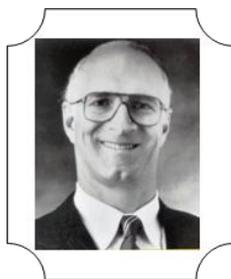


Jim Schorr and his wife Jane

### Chairs and Founding Supporters of New Directions Industrial Advisory Council

James Schorr (see box above), Paul Oreffice (see box later), Dick Hazleton (see box later), Tom Hodgson, Bill Madar, David Rea (see box for Capital Campaign), Bill Smith, and Bill Wishlinski were important early supporters of New Directions. The Chairs of the New Directions/Industrial Advisory Council Executive Committee have been Jim Schorr, Bill Wishlinski, Bill Smith, Dick Grabham, and Rick Roberts.

**Thomas R. Hodgson** (BSChE '63, HDR. '93) was a member of the Delta Upsilon fraternity and the Tau Beta Pi and Phi Eta Sigma honor societies at Purdue. Hodgson also earned a Master's degree in Chemical Engineering from University of Michigan and an MBA from Harvard Business School. From 1978-1983, he served as President of the Hospital Products Division of Abbott Labs, from 1983 to 1990 he served as President of Abbott International, and he served as President and COO of Abbott Laboratories from September 1990 to January 1999. He serves on the board of directors of Travelers Companies, Inc. and of Idenix Pharmaceuticals. Mr. Hodgson has been a member of the Chicago Council on Foreign Relations, the Economics Club of Chicago, the University of Illinois Business Advisory Council, the University of Michigan Alumni Research Committee, the University of Michigan College of Engineering National Advisory Board, the Lake Forest (IL) Board of Education, and a trustee of Rush-Presbyterian-St. Luke's Medical Center. Tom was a strong early supporter of New Directions. In addition to his Honorary Doctorate, he received the Outstanding Chemical Engineer award in 1993, the DEA in 1985, and the President's Club Pinnacle Award.



Thomas R. Hodgson

**William P. Madar Jr.** (BSChE '62, HDR. '99) was active in PSUB, Gimlet, Iron Key and Sigma Alpha Epsilon at Purdue. He earned an MBA from Stanford University in 1965. He is the former chairman and CEO of Nordson Corporation and a director of Nordson Corporation and Brush Engineered Materials Inc. He is Chairman of the Board of cPref, a developer of software for the market research service industry, and served as a Lubrizol director. He is also a trustee of the Cleveland Museum of Art. He co-chaired the Advisory Committee for the Ohio Innovation Fund, an early stage venture capital fund. Dr. Madar was formerly a Research Fellow at the Kennedy School of Government at Harvard University, and President of the board of trustees of the Hawken School, a private day school in Cleveland. Dr. Madar was instrumental in attaining a gift from the Nordson Foundation for Purdue's Chemical Engineering campaign. He was a strong early supporter of New Directions and was on the Chemical Engineering Steering Committee. He received the Outstanding Chemical Engineer award in 1990, the DEA in 1992, and an Honorary Doctorate in 1999.



William P. Madar Jr.

**William (Bill) Wishlinski** (BSChE '68) succeeded Jim Schorr as chair of New Directions in the mid-1990s. At Purdue Bill was a cheerleader, a role he was able to continue on New Directions. Wishlinski joined Amoco Chemical after graduation as an associate engineer, and moved through successive positions in central engineering. In 1977 he became process supervisor at the Amoco Texas City, Texas facility. After receiving a master's degree in business administration from the University of Houston in 1980, he moved into marketing positions. In January 1989 he was appointed general manager of Operations Planning and Product Logistics responsible for managing Amoco Chemical's transportation, marketing services, information services, and economic analysis functions. He was named Vice President and General Manager of Amoco Chemical Europe in January 1990. He retired from BP Amoco as a Vice President. In addition to serving on New Directions he was on the Capital Campaign Committee, and he was one of the founders of the ChE Ambassadors Club. He received the Outstanding Chemical Engineer award in 1993 and the DEA in 1990.



William Wishlinski

**William E. ("Smitty") Smith III** (BSChE '69) became the third Chair of New Directions in 1999. While a Purdue student, Mr. Smith was active in Sigma Alpha Epsilon and Grand Prix. Roger Gatewood (BSME '68) was his roommate. Since his father (BSME '40, deceased) was an alumnus and his sister was already a Purdue student, choosing Purdue was a relatively easy decision. The high point of Bill's student years was finishing third in the Grand Prix driving the Sigma Alpha Epsilon cart. Bill noted that during his sophomore slump and concerns about his future in ChE, Prof. Rushton (who was near the end of his storied career) encouraged him. After graduation Bill worked for Ceilcoate Corp. in Cleveland for two years. Although the job market was far from robust, Bill found a new position with Eli Lilly (it helps to have a few years of experience). While working for Lilly, Bill earned an MBA at Butler. In 2002 Bill was promoted from his position as Executive Director Engineering & Manufacturing Services to VP of Global Corporate and Manufacturing Services of Eli Lilly. He retired in 2004 and is now a private consultant. Mr. Smith has served on the board of the Indiana Repertory Theatre. Mr. Smith received the Outstanding Chemical Engineer Award in 1995, the DEA in 1998, and the 2000 Engineering Alumni Association Service Award. In addition to serving as chair of New Directions, he served on the Discovery Park Advisory Council and the Chemical Engineering Campaign Steering Committee.



William E. Smith III

**Richard (Dick) Grabham** (BSChE '70) became the fourth Chair of New Directions in 2004. Dick is honest that his true love at Purdue was baseball—not chemical engineering. "My mom latched onto the idea that I should go into engineering. She thought it would be good for me," said Richard Grabham, reflecting on a 30-year career in chemical engineering. "I was always interested in chemistry, but I had this wild idea that I could make it in baseball. I played all four years at Purdue. Engineering was my backup in case I failed." One thing he learned while playing

baseball, studying ChE, and carrying on a long distance relationship with his future wife at IU, was time management. He has retained his love for Purdue and his competitive spirit, but realizes that he wasn't cut out for a baseball career. Dick is actively involved with Purdue, serving on the Chemical Engineering Capital Campaign Committee, and as a member of ChE's strategic planning committee. He has been a volunteer solicitor of Purdue alumni and has helped identify ways for the University to connect with the ExxonMobil Foundation. He has hosted the executive committee in Houston and has participated in several teleconferences. He was named an Outstanding Chemical Engineer in 1999 and received the DEA in 2003. When he started with ExxonMobil the company had a single plastics plant. Dick became the vice president of ExxonMobil's Global Polypropylene Business Unit in 2002 and the company is currently the world's largest manufacturer of polyolefins. In his positions with ExxonMobil he has helped pioneer the global plastics market for both polyethylene and polypropylene. With ExxonMobil he helped transform Al Jubail, Saudi Arabia, from a tiny fishing village into one of the world's largest chemical sites.



Richard Grabham

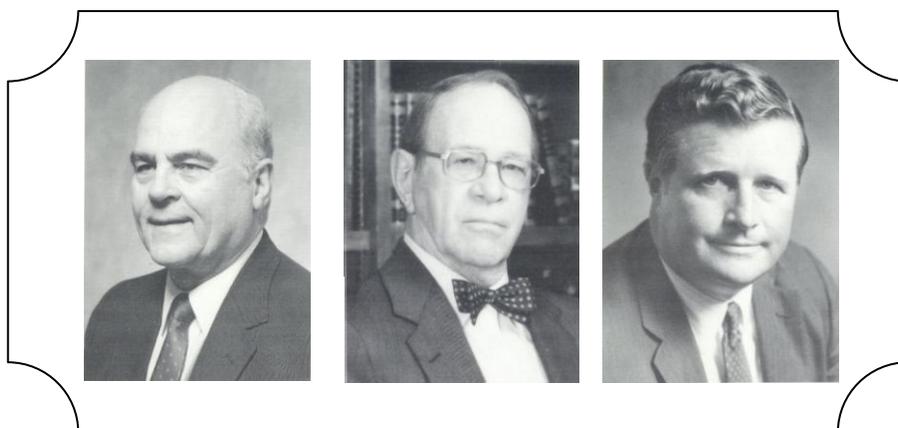
**Rick L. Roberts** (BSChE '76) became the fifth Chair of the Industrial Advisory Council in January 2009 and served on the committee that developed the School's 2010-2014 strategic plan. As a college student, Rick worked in the steel mills one summer and discovered a passion for being in the midst of the manufacturing process and understanding how it works, but not necessarily in a steel mill. After graduating, he began working as a process engineer at the El Segundo refinery for Chevron Phillips Chemical Company. He has progressed through the ranks with Chevron Phillips since then and is currently the Senior Vice President of Manufacturing at Chevron Phillips Chemical Company LP, headquartered in The Woodlands, Texas. As senior vice president of manufacturing, Roberts is in charge of both process and personal safety and oversees 10 U.S. plant managers. He received the Outstanding Chemical Engineer award in 2004 and the DEA in 2007. In 1980, he earned an MBA from Pepperdine University. Roberts has remained active with Purdue throughout his career.



Rick L. Roberts

The second important program initiated in 1988 was the Outstanding Chemical Engineering Alumnus program. In 1988 the School instituted the Outstanding ChE (OChE) Award awarding Albert Bernard, Jr. an OChE and a DEA. In 1989 Robert Bringer, Robert Henson and William Schmitt were awarded OChE awards. A concern that it might be difficult to find an appropriate

number of deserving awardees never materialized; instead, the School has had the opposite problem of having too many deserving awardees. In November 1993 at a special convocation all past DEA and Honorary Docs were also awarded the OChE award. Talks were given by Paul Oreffice (retired chair and CEO Dow), Bob Forney (retired Executive VP DuPont), and Bob Covalt (Executive VP Morton International). One of the School's minor embarrassments is that we have graduates who would have won awards if they had graduated from another school, but do not make the cut at Purdue. The list of awardees is at the end of Chapter 5 immediately before the lists of DEA and Honorary Doctorate awardees.



**Left:** Robert Bringer  
**Center:** Robert Henson  
**Right:** William Schmitt



**Left:** Bob Forney  
**Right:** Bob Covalt

In August 1989 Julian Talbot (BS Chemistry '81, Churchill College, Cambridge, UK, Ph.D. '84 Physical Chemistry, Southampton University) joined the School as an assistant professor after two post doctoral appointments—one in mathematics at Rutgers and one in chemistry at UCLA. His research was on the use of mathematics and computational techniques (molecular based) to study condensed matter with emphasis on interfacial phenomena, adsorption, and bulk fluids. He taught thermodynamics (ChE 211, 610, and 611), undergraduate laboratory, and polymers (ChE 544). He was a prolific author, mainly in physical chemistry journals, both as a post-doc and at Purdue. Professor Talbot left in spring of 1996 to pursue other career interests. Since 2008, Julian Talbot has been Director of Research of the unit of the Centre National de Recherche (CNRS) at the University of Paris VI, Jussieu.



Julian Talbot



Joe Pekny

Joe Pekny (BSChE, '85, Princeton, Ph.D. '89, Carnegie-Mellon University (CMU) joined the School in January 1990 after a post doc at the CMU Design Center. His research at that time was planning and scheduling systems, combinatorial optimization and application of parallel computing methods for process operations studies. In the last twenty years he has expanded his interests to include supply chain management, pharmaceutical pipeline management, model-based and data driven management, real-time decision systems, risk management, algorithm engineering, large-scale software systems, and sensitivity analysis. He rapidly developed into an outstanding teacher, student advisor, entrepreneur, researcher, and manager who was on call for a variety of tasks within the University. He was promoted to associate professor in 1994. In January 1996 Pekny took leave for a year to collaborate with several major corporations in the development and application of combinatorial optimization methods for batch process design, scheduling, and supply chain management problems. This leave did not affect his productivity, and he was promoted to full professor in 1998. He belonged to CIPAC (see Chapter 8) and with Prof. Blau chaired an international conference and published proceedings on "The Foundations of Computer Aided Process Operations."

Pekny has taught a number of mathematically oriented courses (ChE 630 "Applied Mathematics," ChE 550 "Optimization," and he developed ChE 697P "Parallel Computing Methods," and ChE 697M "Matching Theory." With Professors Venkatasubramanian, Delgass, Caruthers and Ramkrishna, he developed and team taught ChE 597G "Problem Solving," and with Profs. Venkatasubramanian, Doyle and Reklaitis he developed and team taught ChE 597O "Computer Integrated Process Operations." In 1998, with Visiting Industrial Prof. Gary Blau, he developed ChE 597A, "Risk Management in the Development of New Products & Processes" (see textbox in Chapter 7 for details of this course). He also taught the core senior courses ChE 456 "Process Control," and ChE 450 "Design and Analysis of Processing Systems" for a number of years. He received the Chemical Engineering Shreve Teaching Award and Kimberly Clark Student Mentoring Award. In 1999 he was appointed a Purdue University Faculty Scholar.

**W. Nicholas Delgass  
(1942-)**

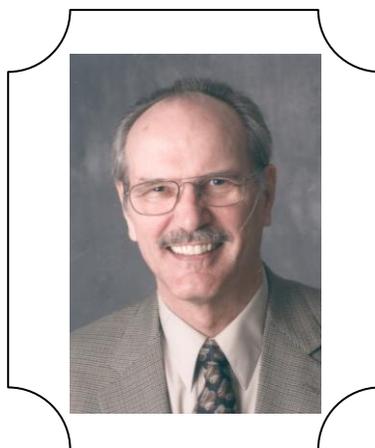
William Nicholas Delgass (B.S. ChE '64, B.S. Math. '64, University of Michigan, M.S. '66 and Ph.D. '69 both ChE from Stanford University) joined the faculty in 1974 as an associate professor after five years on the faculty at Yale University. He was promoted to full professor in 1978 and in 2007 was named the Maxine Spencer Nichols Professor of Chemical Engineering. [This Chair was established in 1998 by Dr. D. Edward Nichols to honor his wife Maxine Spencer Nichols (BSChE '49).]

At Stanford Delgass did catalysis research under the supervision of Michel Boudart and continued his catalysis research at Yale. Delgass' research interests include analysis of the behavior of various catalysts, especially those used in Fischer-Tropsch reactions, using various spectroscopic techniques such as Mossbauer spectroscopy, secondary ion mass spectroscopy, and X-ray photoelectron spectroscopy. He developed a nationally known research program in catalysis, and developed a strong collaboration with the Chemistry Department that has been instrumental in bringing to the School a range of sophisticated spectroscopic and other equipment. Nick has a sunny, outgoing disposition and is tied with Caruthers as the most collaborative faculty member – he has co-authored papers with 14 professors from the School. Delgass has been active in the Birck Nanotechnology Center, Energy Center, and Center for the Direct Catalytic Conversion of Biomass to Biofuels (C<sup>3</sup>Bio) all in Discovery Park, plus the Materials Research Center and the Coal Research Center. For his research excellence he received the 1985 Giuseppe Parravano Award from the Michigan Catalysis Society, the 2006 Excellence in Catalysis Award from the Catalysis Society of Metropolitan New York, the 2007 Purdue Engineering Team Excellence Award, and the 2011 Inaugural North American Catalysis Society (NACS) Award for Distinguished Service in the Advancement of Catalysis. A prolific author with over 150 papers, Delgass is also the coauthor of the book *Spectroscopy in Heterogeneous Catalysis Research*.

Delgass is a gifted educator, who has received a number of teaching awards, including the School's Shreve prize seven times, Engineering's Potter award, the University's Charles B. Murphy award, and the ASEE AT&T award. Nick has been a major contributor to both the undergraduate and graduate educational programs. He has perhaps instructed more beginning ChE students in ChE 205 (Mass and Energy Balances) than any other professor, and he frequently taught ChE 348 (Reaction Engineering). In the graduate program he taught the core course in reaction engineering, ChE 660, a number of times and developed new courses in catalysis (ChE 662) and ChE 666 on experimental methods for catalysis research.

Delgass has also been a good citizen in many ways. He was active in New Directions from the beginning of the program until 2006. From September 1996 to January 2004 Nick was the Associate Head of the School in charge of the undergraduate program and teaching assignments. Nick has also been very active professionally as a Director of the Catalysis and Reaction Engineering Division of AIChE for 4 years, chairing a number of symposia and serving on the organizing committee for catalysis conferences. In addition, he served as the Editor-in-Chief of the Journal of Catalysis for 5 years, which was essentially a full-time job.

The School will miss Nick when he completes his phased-in retirement and retires in May 2012.



W. Nicholas Delgass

In the Fall of 2001, Pekny was named the Director of the Discovery Park e-Enterprise Center that leads interdisciplinary research in computer systems analysis. As part of his Director duties Pekny wrote proposals and was the Founding Director of the Regenstrief Center for Healthcare Engineering. Joe practices what he preaches and was a founder of Advanced Process Combinatorics, Inc., a company that was based originally on Purdue University research (<http://www.combination.com>). Purdue University President Martin Jischke awarded Pekny the "One Brick Higher Award" – given to individuals that "go beyond the requirements of their role" in April 2007. After receiving this award, Joe continued to "go beyond the requirements of their role" and became the Interim Head of Industrial Engineering – a role that lasted 2 ½ years (it could have been worse, interim head Frank Clikeman in Nuclear Engineering continued for over 4 years). In 2011 Pekny returned to teaching in Chemical Engineering and was placed in charge of ChE 450 (design) with 143 students and help from visiting industrial professor Joe Alford (BS '66), Martínez-Sáenz, and Thomson.

Professor Pekny's numerous administrative duties outside of Chemical Engineering illustrate (depending on your viewpoint) one of the School's major contributions to Purdue or one of the School's major difficulties. Table 6-1 summarizes some of the faculty duties outside of the School. Although important to Purdue, these outside duties tend to dilute the professor's impact in ChE. My personal (PCW) thoughts, having spent nine years at zero percent and twelve years at 50% in ChE, are that these activities are beneficial to Purdue Engineering and the University as a whole, but are detrimental to the continuity of the professor's efforts in the School. However, on a cost-benefit ratio basis the best arrangement for the School is a professor at zero % on the payroll who still contributes significantly to the School. Chemical Engineering's special burden is the large contribution its faculty makes outside of ChE. The question arises if a relatively small school at Purdue should be expected to provide this much leadership. Of course, in one sense, these outside duties are the School's own fault for hiring talented and versatile professors who are willing to serve.

Every year there is always a lot of action and behind the scenes activity. In January 1990 the School launched an alumni newsletter that morphed into *ChE Impact* and later became *ChE News*. Although originally meant to be biannual, the newsletter was sent out somewhat erratically when Frank Oreovicz had enough news to fill out a newsletter. The School also started an alumni breakfast during Gala week. In 1990 David Carmichael (BSChE '84) joined the School

as computer specialist. The 50<sup>th</sup> anniversary of the CMET building was quietly celebrated. Renovations continued on the building as they do to this day. The College and School allocated gift funds for workstations and desktop computers.

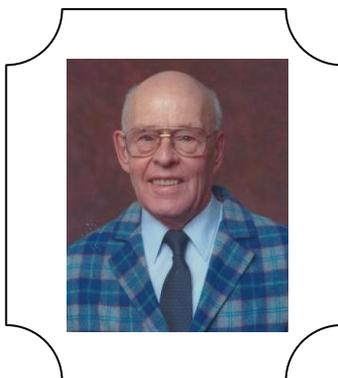
<b>Table 6-1. Faculty Duties in College, University, and Beyond – Too Much of a Good Thing?</b>		
Note: Does not include ChE based Research Centers (see Chapter 8), sabbaticals, or School duties.		
<b>Faculty</b>	<b>College or University Duty</b>	<b>Years</b>
Steve Beaudoin	Provost fellow	2009-10
Jim Caruthers	Faculty Fellowship in a Second Discipline	2008-09
Elias Franses	On leave as NSF Program Director	1990-91
Robert Greenkorn	Dir. Institute Adv Interdisc Engr. Studies	1972-75
	Asst. Dean Engineering for Research	1972-76
	Assoc. Dir & Director Engr Experimental Station	1972-80
	Acting Head A&AE	1973
	Acting Director & Director Environmental Engr. Center	1974-78
	Associate Dean Engineering	1976-80
	Director of Coal Research Laboratory	1978-80
	Vice President and Associate Provost of Purdue	1980-86
	Vice President of Purdue for Research	1986-94
	Dean of Purdue Graduate School	1993-94
	Director of Technical Assistance Program (TAP)	1996-2000
	Vice President of Purdue Research Foundation	1980-2000
Michael Harris	Interim Assoc Dean & Assoc Dean Engineering	2006-present
R. Neal Houze	Director Engineering Co-op Education Program	1982-2002
	Director Purdue University Co-op Education Program	1984-2002
David Kessler	Chairman University Senate	1972-73
	Assistant Provost	1976-80
	Director of Academic Information Systems	1978-80
	Head Division Interdisciplinary Engineering Studies	1982-2000
Sangtae Kim	Joint Appointment with ME	2003-present
	On leave as NSF Program Director	2004-05
	Leave of Absence as Director, Morgridge Institute Research, Madison	2008-present
Ralph A. Morgen	Research Director Purdue Research Foundation	1954-59
Joseph Pekny	Mann Dir. & Founder e-Enterprise Center, Discovery Park	2001-09
	Founding Dir. Regenstrief Center Healthcare Engr.	2005-06
	Interim Head Industrial Engineering	2008-10
Byron Pipes	Joint Appointments with A&AE and MSE	2004-present
	Director Purdue Institute for Defense Innovation	2007-present
Rex Reklaitis	Assistant Dean of Engineering	1985-88
Alex Sesonke	Assistant Chair Nuclear Engineering	1966
	Moved research & graduate students to Nuclear Engineering	1970
George Sherman	Chair of University Scheduling Committee	1940s & 50s
Jennifer Sinclair (Curtis)	Head Dept. Freshman Engineering	2000-03
	Associate Dean of Engineering	2002-03
Theo Theofanous	Moved to Nuclear Engineering	1975
Venkat Venkatasubramanian	Leave of Absence, Columbia University	Fall 2011
Phillip Wankat	Head Dept. Freshman Engineering	1987-95
	Acting Head Division Interdisciplinary Engineering	1990, 1997
	Interim Director of Continuing Engineering Education	1996
	Head Division Interdisciplinary Engineering	2000-04
	Interim Associate Dean of Engineering	2003
	Joint Appointment with School Engineering Education	2004-present



Hilary (Hampsch) Lackritz

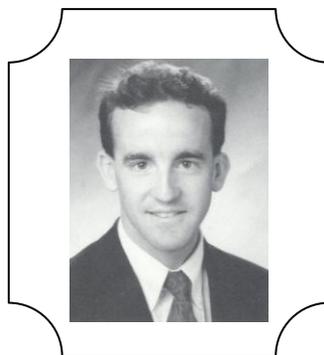
In 1990 Dr. Hilary Hampsch (BSChE '85 and Ph.D. '90 in Materials Science & Engineering, both Northwestern University), a postdoc at Eastman Kodak Corporate Research Laboratories, was hired as an assistant professor to start in summer 1991. Her research used real-time optical methods to study the microscopic behavior of polymers. She was very productive and published a number of excellent quality publications in a short period of time. Her teaching was in the polymer area (ChE 542 (now 442) and ChE 544) and in molecular engineering (now ChE 330). When Hilary was married she took her husband's name, Lackritz. Lackritz was promoted to the rank of associate professor with tenure in 1996. Because of dual career issues, in 1997 she moved to the San Francisco area and became a consultant in materials engineering and an Adjunct Professor at San Jose State University.

In 1991 Lyle Albright officially retired although he kept an office in CMET and stayed active until 2010 (see text box in Chapter 4).



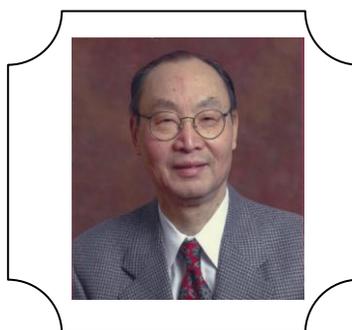
Lyle Albright

The next faculty member to join the School was Francis (Frank) J. Doyle III (BSChE '85, Princeton; C.P.G.S. '86, Cambridge; Ph.D. '91 Caltech) in August 1992. At Princeton in addition to being a classmate of Joe Pekny and an excellent student, Frank was a varsity athlete in sailing. He continued this activity (plus rowing) at Cambridge, and by some miracle continued sailing and qualified for the World Championship race in the Echells class whilst he was a graduate student in Manfred Morari's group at Caltech. After graduating from Caltech, he did a one year post-doc with DuPont to gain some practical experience before starting at Purdue. Doyle's original research area at Purdue was in traditional control from Caltech and in biosystems control from his year at DuPont. In the traditional area he worked with Reklaitis, Pekny and Venkatasubramanian and was a co-founder of CIPAC (see Chapter 8). In 1994 he started collaboration with Peppas that resulted in two Ph.D. graduates in the area of controlled drug delivery for diabetics.



Francis (Frank) J. Doyle III

Frank is a talented teacher who was much appreciated by the students. In addition to working with Professors Venkatasubramanian, Pekny and Reklaitis to develop and team teach ChE 5970 "Computer Integrated Process Operations," he was a frequent teacher of ChE 456, Control. He developed and started writing a book on *Process Control Modules – A Software Laboratory for Process Control* eventually published by Wiley in 1999. At Purdue he won the Shreve prize, the Potter award, the 1996 ASEE Illinois / Indiana Section Outstanding Teaching Award, the 1996 Tau Beta Pi Dean Marion B. Scott Exemplary Character Award, and he was one of the Schools of Engineering nominees for the University-wide 1996 Murphy Undergraduate Teaching Excellence Award. In Spring of 1996, Professor Doyle was named a recipient of the Office of Naval Research Young Investigator Award. This three year award was directed towards advancing his research on approaches to nonlinear process control through neuromimetics. Unfortunately, the majority of the award was used at the University of Delaware. Frank left Purdue in 1997 to go to the University of Delaware (he grew up in a chemical engineering family in Newark, Delaware, just a mile from the University). His period at Purdue and his early years at Delaware are profiled in *Chemical Engineering Education*, 34, (3) 192 (Summer 2000). When Frank left Delaware to go to the University of California-Santa Barbara, the Head of Chemical Engineering at Delaware complained bitterly of this poaching of one of his best young professors. We understand how he felt. Frank is now Associate Dean of Engineering at the University of California at Santa Barbara.



K. C. Chao

An era ended in December 1993 when K. C. Chao retired and was named Peffer Distinguished Professor of Chemical Engineering Emeritus. In June 1994 Doraiswami Ramkrishna was named the Harry Creighton Peffer Distinguished Professor of Chemical Engineering. Behind the scenes, the School continued to add and replace computers at a normal pace.

### Doraiswami "Ramki" Ramkrishna (1938-)

Doraiswami "Ramki" Ramkrishna (B.Ch.E. '60 University of Bombay, Ph.D. ChE '65 University of Minnesota) started at Purdue in August 1976. He was educated at the University of Minnesota under Arnold Fredrickson and Henry Tsuchiya, and his thesis addressed pioneering modeling aspects of the dynamics of microbial growth. After several years on the faculty of IIT Kanpur he returned to the USA where he was Visiting Professor at Wisconsin and Minnesota for two years. He was hired at Purdue in the spring of 1976. Ramki and Nicholas Peppas arrived at Purdue in August 1976 and soon became the main advisors of Koppel in promoting the School's research. Ramkrishna brought to Purdue a fresh approach to the study of chemical engineering problems, and he was a major force behind the significant revitalization of the graduate curriculum. A strong supporter of the idea that a successful student should obtain a global graduate education with courses in chemistry, mathematics and other areas, he was instrumental in drafting guidelines which assure our graduate students a balanced and modern ChE graduate education.

In 2009 Ramkrishna became the fifth National Academy of Engineering member of the School, but only the second who received the accolade while at Purdue. Previously elected were Dr. Rakesh Agrawal, Dr. Sangtae Kim, Dr. R. Byron Pipes, and Dr. Rex Reklaitis. This honor was the latest of many honors given to Ramki during his career. A short listing of his honors includes the AIChE Alpha Chi Sigma Award in 1987, the Mumbai University UDCT Diamond Award in 1994 and the 2009 Platinum Award, the AIChE Wilhelm Award for Chemical Reaction Engineering in 1998, the Thomas Baron Award of AIChE in 2004, an Honorary Doctor of Science award from the University of Minnesota in 2004, the "Jewel" of Ruia Award by Bombay University in 2006, a Fellow of AIChE in 2008, and a special issue (February 2009) of *Chemical Engineering Science* in his honor on Population Balance Modeling. At Purdue, Ramkrishna was named the H. C. Pepper Distinguished Professor in 1994 [this professorship honors the founding head of the School and was previously held by K. C. Chao], the College of Engineering Research Excellence Award in 2005 and the Team Research Excellence Award in 2010. Ramkrishna has received a large number of awards because he excels in a variety of areas.

Ramkrishna's research covers a wide range of interests including dispersed phase systems, stochastic analysis and simulation, reaction engineering, and cybernetic modeling of biological systems. All of his research is characterized by a lucid, elegant and exact mathematical analysis of various phenomena. He is considered one of a handful of outstanding applied mathematicians-chemical engineers and his book *Linear Operator Methods in Chemical Engineering*, (1984) coauthored with the legendary Neal Amundson, received much praise. His 2000 book *Population Balances. Theory and Applications to Particulate Systems in Engineering*, has also been praised and is frequently cited. Ramki, who also has a strong interest in biochemical engineering, is certainly one of the most famous chemical engineers on the faculty.

Every graduate student will testify that Ramkrishna's courses such as ChE 630, 660, 632, and 633 are *difficult* and *demanding*, but they are also *rewarding* and *empower* students with effective mathematical tools to solve difficult, intractable problems. One course from Ramki makes the semester a challenge – three or four would be undoable. On the other hand, the same students will also testify that Ramki is a sweet person who will go out of his way to help students. Ramki's love of solving challenging ChE problems and his love of an academic life are readily obvious to his graduate students and postdocs. Many of his former students are now members of ChE faculties throughout the world. Ramki's obvious skill at mentoring students, postdocs, and new faculty led to his receiving the Engineering Mentoring Excellence Award in 2010. More details of Ramki's career and glimpses of his rich family life are contained in a portrait in *Chemical Engineering Education*, 45 (1), 8-14 (Winter 2011). If you want to see Ramki's famous smile, just mention his grandson Rohan.

One of the authors (NAP) wishes to make an additional personal comment about Ramki Ramkrishna. Purdue has been blessed to have a scholar of his stature for the past 36 years. Ramki is the golden link with a generation of leading ChE scholars who believed in solving problems and debating their work rather than bragging about how much money they had and whether or not their research was translational or transformational. Their work, and Ramki's work, was and continues to be simply ground breaking and thought provoking. I cannot imagine that Ramki will ever retire. But if he does, I know the chemical engineering world will be a little poorer.



Dr. Eva Sevick-Muraca (BS ChE '83 and MS ChE '85 both University of Pittsburgh, Ph.D. ChE '89 Carnegie Mellon University, Post-doc Biochemistry/Optics 1989-91 University of Pennsylvania) joined Purdue in August 1994 as an assistant professor from Vanderbilt University where she had been an assistant professor for three years. Dr. Sevick-Muraca's research expertise was in theories and measurements of light propagation through condensed heterogeneous matter with applications in biomedical engineering and process on-line monitoring applications. She had worked with two giants in the field – Rakesh Jain at CMU and Britton Chance at Penn. At Purdue she was involved in teaching ChE 377 Fluids, ChE 540 Honors Transport, and a specialized course in optics. Professor Sevick-Muraca was the recipient of a National Institutes of Health Research Career Development Award, a very prestigious five year award with funding beginning in July, 1995. The award allowed her to advance her research in optical imaging and spectroscopy in the field of biomedical engineering. She joined a very small and distinguished group of chemical engineering researchers in the bioengineering domain who have been recognized by this award. She was promoted to associate professor with tenure in August 1996. Sevick-Muraca was elected a Fellow of the American Institute of Medical and Biological Engineering joining Profs. Peppas, Ramkrishna and Tsao. As these awards indicate, Sevick-Muraca is a very talented biomedical engineering researcher, and a true leader of the biomedical field and did pioneering work on imaging and breast cancer detection. Eva left Purdue in 1999 and is now in charge of a prestigious national imaging center. She is the Cullen Chair in Molecular Medicine, Professor and Director Center for Molecular Imaging, Part of the National Cancer Institute Network for Translational Research at the University of Texas Health Center in Houston.

In January 1994 Dr. Wayne Muench, a 1973 PhD in organic chemistry from Purdue who had over twenty years experience at Dow and Great Lakes Chemical joined the School as Director of ChE laboratories. Dr. Muench had considerable expertise and experience with safety programs in an R&D environment that was put to good use on the School Safety Committee.

Another era ended when Prof. Alden Emery completed early partial retirement and retired in May 1995. He was named Professor Emeritus. Robert Greenkorn was named the R. Games Slayter Distinguished Professor of Chemical Engineering in 1995. [R. Games Slayter (BSChE '21) became a vice president of Owens-Corning Fiberglas Corporation and was the second ChE alumnus to win an honorary doctorate award from Purdue. He donated Slayter Center to Purdue.] After a three month search, Jeff Valley, who still serves the School in 2011, was hired as replacement for Jerry Haugen as building deputy.



Eva Sevvick-Muraca

**James Michael Caruthers  
(1953-)**

James Michael Caruthers (S.B. Chemistry '75, S.M. ChE '75, Ph.D. ChE '77, all from MIT), a Ph.D. student of Robert E. Cohen, came to Purdue in 1977. Educated both as a chemist and chemical engineer, Caruthers had a strong background in mechanical properties of polymers with emphasis on viscoelasticity. His current areas of research are polymer mechanics; polymerization reaction, cure and degradation kinetics; development of cyber-infrastructure to support chemical and materials science; and electric vehicle technology with a specific focus on battery technology. He was promoted to Associate Professor with tenure in 1981, to full professor in 1986 and became the Reilly Professor of Chemical Engineering on February 3, 2011. [This professorship honors Vincent P. Reilly (BS Engr. Purdue '22), founder of Illinois Gear and Machine Company, who bequeathed money to Purdue for excellence in engineering education.]

Caruthers has co-authored 75 archival journal publications and 29 refereed conference proceedings from research done at Purdue. He is also the lead author of one book. Caruthers has written papers with 14 other professors in ChE which makes him (tied with Delgass) the most collaborative professor in the School. He has advised or co-advised 32 Ph.D. graduates and is currently advising or co-advising eleven Ph.D. students. Caruthers received the ASEE Curtiss McGraw Research Award in 1990 and the Engineering Team Excellence Award in 2007. He serves on the editorial boards of the *Journal of Time Dependent Materials* and *Rubber Chemistry and Technology*. He is currently the Director of the evGrandPrix, was the founding Director of Center for Impact Science and Engineering and for ten years was Director of Center for Materials Design.

Caruthers has provided exceptional quiet leadership and service to the School. He was Director of Graduate Studies from 1992 when he took over from Alden Emery until 2004 when Osman Basaran accepted the position. Jim was also the School's point person for the construction of the Forney Hall addition and for the current renovation. This task involved many hours of meetings and walk-arounds with construction personnel, and he had a major impact on

the design of the new Forney addition and on remodeling the older part of the building. Caruthers is widely considered to be a challenging, but fair teacher. He was heavily involved in the development of the undergraduate transport courses, ChE 377 and 378; development of the Honors Laboratory; development of the polymers courses ChE 442 and 544. More recently, Caruthers designed and led the implementation of the Fundamental Laboratory, which now provides hands-on instruction in three required Junior courses – ChE 377, Fluid Mechanics: ChE 378, Heat and Mass Transfer; and ChE 348, Reaction Engineering. In 2011, Caruthers launched the Chemical Engineering Battery Laboratory course. In the graduate program Caruthers has taught Transport, ChE 620, Advanced Mathematics, ChE 630 and several graduate electives.

Caruthers started at Purdue following the classical model of a professor who thought deep thoughts, worked with a few graduate students, wrote scholarly papers after the ideas had fully ripened, and taught students how to think. Over the years he has slowly but surely morphed into the modern entrepreneurial professor who thinks big, develops large teams and consortia, and brings in huge grants to the University. As principal investigator (PI) Caruthers has successfully brought more than \$20M in grants to Purdue and as co-PI he was a part of teams that brought in close to an additional \$20M. This type of success makes one known by the Dean, University President, legislators, and even the President of the United States. Because it is not often that a Chemical Engineering professor receives this type of press, the press release about one of the grants is presented on the next page. Although Jim did not seek this fame, there is no going back to the old classical model of a professor.

Caruthers is the PI on a recently awarded \$6.1M grant from the DOE (total budget of \$8.2M) for the Indiana-Advanced Electric Vehicle Training and Education Consortium (I-AEVtec) that includes Purdue, Notre Dame, IvyTech, IUPUI, Purdue-Calumet and Indiana University – Northwest. The I-AEVtec program is an education program in the electric vehicle and battery area that includes the development/delivery of (i) BS and MS degree certificates in Engineering and Technology, (ii) Associate degrees, (iii) K-12 engagement by teaming with 4H and rewriting the 4H electricity curriculum to include hands-on components and building electric go-karts (with difficulty sorted by age), (iv) community engagement via the ElectricVehicle-Hub and the Battery-Hub and (v) special programs for 1st responders, etc. As a component of the I-AEVtec program the team developed the nation's first electric vehicle collegiate go-kart race - the evGrandPrix in April, 2010. The 2011 evGrandPrix featured an April 30 race on the Purdue Grand Prix track and a May 7<sup>th</sup> national collegiate competition at the Indianapolis Motor Speedway. For details of the races see <[www.evgrandprix.org/](http://www.evgrandprix.org/)> Caruthers also helped Purdue obtain the first set of electric vehicle charging stations on a university campus in the nation. Caruthers take on his electric vehicle work: "I hope the work we are doing will excite young people and encourage them to look for important technical solutions."

James Caruthers (top left corner) is the Director of the evGrandPrix.



**Purdue University News Service Press Release**

by Judith Barra Austin, August 2009

**Obama announces grant for Purdue electric vehicle education program**

WEST LAFAYETTE, Ind. - President Barack Obama announced Wednesday (Aug. 5) that Purdue University will receive a \$6.1 million grant to develop degree and training programs for electric vehicles.

Purdue will partner with Notre Dame University, Indiana University-Purdue University Indianapolis, Ivy Tech Community College, Purdue University Calumet and Indiana University Northwest to develop the program. The goal is to educate and train the work force needed to design, manufacture and maintain advanced electric vehicles and the associated infrastructure.

The Indiana Advanced Electric Vehicle Training and Education Consortium will develop certificate and associate degree programs for vehicle technicians, bachelor's and master's degree programs for electric vehicle design and manufacturing engineers, and a certificate program in electric vehicle safety for emergency responders. It also will develop an outreach program to secondary schools and a Web site to provide information on electric vehicles to the general public.

"Electrification is the future of transportation," said James Caruthers, the project director and a Purdue professor of chemical engineering. "Indiana has a long history as a leader in electrification of vehicles, and this grant will allow us to educate and train a work force prepared to continue that leadership."

Caruthers said one area the consortium will explore is developing an electric car race similar to Purdue's annual Grand Prix kart race as a way of getting young people excited about the technology.

"This is a terrific example of the state's community college and universities partnering to provide a seamless higher education system to train students for the jobs of the 21st century," said Thomas Snyder, Ivy Tech president.

"Winning this grant was the result of a powerful Indiana-based effort between private companies and higher education called the Energy Systems Network," said Victor L. Lechtenberg, Purdue vice provost for engagement. "The goal is to make Indiana a center of energy innovation."

Paul Mitchell, CEO of Energy Systems Network, said: "Indiana is a global hotbed for the development and manufacturing of electric vehicles and the charging technology needed to power them. This grant will ensure that we have a first-class education and work force program to prepare Hoosier for these green jobs."

Obama announced the grant during a speech in Elkhart. The government is handing out a total of \$2.4 billion in grants to 48 projects in 20 states. He said Indiana is the second largest recipient of grant funding.

Dr. Osman Basaran (BS ChE '78 MIT, Ph.D. ChE '84 Minnesota) a group leader & senior development staff member in the Chemical Technology Division of Oak Ridge National Laboratory (ONRL) joined the School faculty in July 1995. While he worked for ONRL Basaran had also been an adjunct professor of chemical engineering at the University of Tennessee. In addition to his governmental laboratory and academic experience, Osman had industrial experience having worked as Senior Research Engineer with Air Products & Chemicals for 3 ½

years. His expertise lies in fluid mechanics and transport phenomena with emphasis on multiphase flow systems involving bubbles, drops, jets, atomization, and coating phenomena. He is both highly accomplished in mathematical modeling of such phenomena and in experimentation. At ONRL he had developed high speed visualization methods to study drop formation and impact. He joined the faculty as full professor without tenure and received tenure in 1997. In February 2003 he became the Reilly Professor of Fluid Mechanics [In honor of Vincent P. Reilly (BS Engr. Purdue '22), founder of Illinois Gear and Machine Company, who supported Purdue's excellence in engineering education.] and Professor of Chemical Engineering and in April 2010 he was named the Burton and Kathryn Gedge Professor of Chemical Engineering. [This professorship is in honor of Burton H. Gedge (BSCHE '41) and his wife Kathryn.]

Basaran's teaching has been focused on transport, particularly fluid dynamics, courses including ChE 377, 378, 540, 620, 621, 635 (advanced fluid dynamics), and a graduate course ChE 697B on Finite Element Analysis in Chemical Engineering. He has also worked individually with 11 undergraduate students doing honors research and with students for 14 offerings of ChE 411 for credit. He has been most active interacting with graduate students in his role as Director of the Graduate Program from 2004-09 and from his service on the Graduate Committee, the Graduate Recruiting Committee, and the Ph.D. Qualifier Committee. He has also served extensively on national committees of professional societies and as a symposium organizer.



Osman Basaran

Although Basaran does fundamental research on droplet formation with sophisticated experimental equipment and intricate mathematics, his work has proven to be of immense practical interests to companies such as 3M, Eastman Kodak and HP (ink jet printing), Cummins (combustion), Packard Biosciences and Roche Diagnostics (diagnostic devices), Procter and Gamble (bottle filling), and Fuji. His studies on drop breakup with viscous fluids may play an important role in improving fuel injectors and combustion in engines. His papers on dripping faucets, drop-on-demand, nanowire production and beading of saliva have been widely picked up in the media. An excellent researcher, Basaran publishes in the most respected journals in his area (*Nature*, *Science*, *Physics of Fluids*, *Physics Review Letters*, and *Journal of Fluid Mechanics*). In addition to his 100 papers in refereed archival journals, he has received 11 patents. He became a Fellow of the American Physical Society (APS)-Division of Fluid Dynamics in 2008. In 2010 Basaran was a co-recipient of the College of Engineering Team Research Excellence Award won by the Engineering Research Center for Structured Organic Particulate Systems, and he won the very competitive College of Engineering Research Excellence Award

for outstanding senior research. Ramkrishna and Venkatasubramanian are the only other professors in the School to win this award.

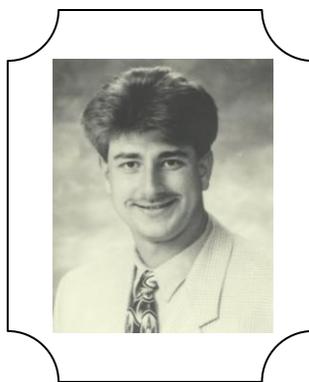
Donald Hannemann (BSChE '52), who had just retired from Amoco and is the twin brother of Robert Hannemann, was named Shreve Visiting Industrial Professor in fall 1995. He organized and taught the very popular course ChE 597B, The Chemical Process Industry, which had an enrollment of 80 students. In spring 1996 Dr. Cristi Bell-Huff, who earned her PhD in 1994 with Peppas, joined as a visiting assistant professor. She taught the polymer course ChE 442 and helped teach the senior lab, ChE 445. In May she accepted a position with Pfizer. Later she became a professor of chemistry at William Tyndale College in Michigan.

With the enthusiastic support of the faculty, Professor W. Nicholas Delgass was named the Associate Head of the School, effective in July 1995. [The faculty is always enthusiastic when someone like Nick will step forward to do the necessary but unglamorous jobs in the School.] As Associate Head, he was responsible for academic program administration, including course planning and staffing and scholarships, and for the Undergraduate Studies Office. In other faculty news Christos Takoudis was on leave at University of Illinois at Chicago considering a job opportunity, which he eventually accepted and moved to Chicago.

Building renovations continued with climate control work being done for much of the building in summer and fall 1996. Completion of the central climate control allowed for retiring a number of window air conditioning units.

The new strategic plan for ChE called for increasing faculty to 28 and addition of a new wing to CMET. This plan was reviewed and approved by the Industrial Advisory Council. Although nobody, except perhaps Reklaitis realized it at the time, this was really big news. Although it took another eight years to see bricks and mortar, this was the start of actually working for a new building instead of just dreaming.

Dr. Anton Jochen Lauterbach (Diploma Technical Physics '92 Univ. Bayreuth, Bayreuth, Germany; Ph.D. Physical Chemistry '94 Free University of Berlin, Post-doc ChE 1994-96 Univ. California-Santa Barbara) started as an assistant professor in August 1996. A native of Germany, he did his Ph.D. at the Fritz Haber Institute with Prof. G. Ertl, a world expert in surface science and heterogeneous catalysis and a 2006 Nobel Laureate in Chemistry. Lauterbach's post-doc adviser was the legendary Prof. W. Henry Weinberg. Lauterbach worked with Weinberg on the characterization of nonlinear phenomena which occur during surface reactions. When he was hired, Lauterbach was a very highly regarded experimentalist and a very productive researcher. His performance met the high expectations that the School had for him and he proved to be an excellent researcher, teacher and mentor of students. In research he was very collaborative and published papers with 8 other Purdue professors during the six years he was on the faculty. He was promoted to associate professor with tenure in 2000. Like Doyle in 1997, Lauterbach was lured away by the University of Delaware in 2002. In 2010 Lauterbach moved to the University of South Carolina where he is now Endowed Chair for Strategic Environmental Approaches to Electricity Production from Coal and Director of the associated Center of Economic Excellence of the state.



Jochen Lauterbach

Lauterbach taught ChE 211 (thermo), ChE 330 (Molecular Engineering), ChE 597 (a novel laboratory course on advanced chemical engineering experiments). One of the highlights of Lauterbach's stay at Purdue was that a seven member team he advised consisting of sophomores, juniors, and seniors, was selected to participate in the NASA Microgravity Program. The team members were Trisha Beutien, Brad Ecker, Cassandra Forthofer, Hilary Grinstead, Jennifer Ralston, Nicholas Saddah, and Amanda Schreiweis. The ChE team designed and constructed a reaction-diffusion experiment involving the Belousov-Zhabotinskii reaction and successfully flew the experiment at the end of March, 1998. The team's effort was widely reported in the media

Also in January 1997, Dr. Phil Wankat returned to full-time professorial duties in the School of Chemical Engineering after 8 ½ years as Head of Freshman Engineering and a one year assignment as Interim Director of the Continuing Engineering Education program. Whilst in these positions, his research had continued, but at a somewhat lower level, and he had taught a ChE course during spring semesters. He would stay full time in the School until July 2000.

Long overdue renovations of the undergraduate laboratory started in 1997, and the School continued to buy computers. These two tasks never end.



CMET Building Renovation in the 90s

### Elias I. Franses (1951-)

Elias I. Franses (Dipl. Eng. ChE '74 National Technical University of Athens, Ph.D. ChE '79 University of Minnesota) came to Purdue right after graduating from Minnesota (the "requirement" that new faculty do a post doc is quite recent). Franses was a student of T. Davis, L. Scriven and W. Miller, and is an outstanding experimentalist. He immediately established an outstanding program in colloid and interface science and surfactants at Purdue.

Franses' research includes a methodological evaluation of the fundamental and applied surface and interfacial properties of solids and fluids, and the stability properties of aqueous dispersions. With his students and collaborators he has analyzed a number of phenomena involving surfactants, suspensions, adsorption, micelles, dispersions, vesicles, liquid crystals, and aggregates. He collaborated with Dr. Hannemann on the role of surfactants in lung diseases of babies, with Prof. Narsimhan (ABE) on monolayer adsorption, with Prof. Caruthers on preparation of monodisperse polymer microspheroids, with Prof. Wang on interfacial adsorption and chiral separations, with Prof. Basaran on adsorption dynamics, with Prof. Corti on colloidal dispersion stability, and with Profs. Lauterbach and Delgass on other research. He has directed 22 Ph.D. and 17 M.S. theses. Several of his papers have won outstanding paper awards.

Franses has been quite active in professional activities. Elias has given over 40 invited presentations at universities, national laboratories and companies, and he and his collaborators have presented over 160 papers at meetings. He has also chaired or co-chaired over 20 symposia at national meetings. Franses served on the Advisory Board of the *Journal of Colloid and Interface Science* for three years and as Editor, *Colloids and Surf. A: Physicochemical and Engineering Aspects*, for four years. Franses also served for a year as a rotating program director at the National Science Foundation for the Interfacial, Transport and Separation Processes Program.

Locally Franses has been active in the School's Graduate, Graduate Recruiting and Undergraduate committees, he has done extensive work on the School's Safety Committee, and currently Elias is the Omega Chi Epsilon adviser and coordinator for the ChE Honors Program.

During his 32 years at Purdue, Franses has contributed to the fundamental and practical education of the undergraduate students. Franses devoted significant time in his first four years at Purdue modifying and improving the teaching of the Unit Operations Laboratory courses. Since that time he has become the face of thermodynamics to many undergraduate students, teaching ChE 211/311, on average once per two years, and teaching Intermediate Thermodynamics ChE 510 four times. He returned to the undergraduate labs (ChE 434 and 435) in the 1990's and in 2005-2011. For the graduate students he developed the popular graduate elective ChE 668 and taught it 14 times. Franses has also contributed to the teaching of chemical reaction engineering (ChE 348), design (ChE 450), applied mathematics (ChE 527 and 630), Transport (ChE 620) and Advanced Mass Transfer (ChE 624).

Pei-Lun Chung (Ph.D. '08), Linda Wang and Prof. Elias Franses in 2010.



In June 1997 Jennifer Sinclair (BSChE '83 Purdue, MA '85 and Ph.D. '89 both in ChE from Princeton, Higher Education Leadership Certificate '01 Harvard) [later Jennifer Sinclair Curtis] accepted an appointment as associate professor with tenure. Jennifer started research as an undergraduate at Purdue working with Nicholas Peppas on anomalous transport in glassy polymers and published three papers at that time. She did her PhD with Roy Jackson at Princeton on particulate flow systems. Subsequently, she taught at Lafayette College, Carnegie Mellon University, and the University of Arizona. At Purdue she taught ChE 536 (Particulate Systems), 205 (Mass and Energy Balances), and 540 (Honors Transport Phenomena). Her award-winning research focused on phenomena related to dilute and dense-phase gas-solid flows such as particle/turbulence interaction, solid-phase turbulence, solids mixing and transport, particle-particle and particle-wall interactions, and heat transfer and chemical reactions in pneumatic conveying. Her research involved both modeling and experimentation using laser Doppler velocimetry.



Jennifer Sinclair Curtis

In 2000 Sinclair became the first woman to Head an Engineering Dept at Purdue when she became Head of Freshman Engineering. In 2001 she was promoted to full professor and from 2002 to 2003 she was also Associate Dean of Engineering for Undergraduate Education. In July 2003 she returned full time to the School. While she was at Purdue she won the School Mentoring Award and the University Teaching for Tomorrow Award in 1999, the ASEE Sharon Keillor Award for Women in Engineering Education and the Purdue University Faculty Scholars Award in 2003, and the Eminent Overseas Lectureship Award, Institution of Engineers of Australia in 2004. In January 2005 Jennifer Sinclair Curtis left Purdue to become the Head of Chemical Engineering at the University of Florida. A profile of her life appeared in *Chemical Engineering Education*, 42, pp. 2-9 (Winter 2008). In January 2011 she became a Distinguished Professor at the University of Florida.

After eight faithful years taking care of the ChE computer system, in 1997 David Carmichael (BSChE '84) was promoted within the Engineering Computer Network to User Services Manager. David is now (2011) the ECN manager. He was replaced in ChE by Steve Plite who had worked on computer systems for Weyerhaeuser. Plite moved to Computer Science in less than a year and was replaced by Stacey Clark (BSChE '78 ).

In August 1997 Janet (Jan) Siebenthal was hired to do the unthinkable—replace Katie Eckman in the undergraduate office when Katie retired. [See box on Very Special Ladies—2 later in this chapter.] Suzanne Flavin was hired as a secretary. Dr. Bettina McConnell joined the School

to work with Reklaitis as his Development Officer. She was to play a major role in fund raising for the new building.

After four years directing the ChE business office, Hannah Moore moved to the Purdue Development Office. Her replacement was Diane Martin who started August 1998. Hardie Davidson the business office clerk graduated from Purdue and left. She was replaced by Sheila Foster. Sandra (Sandy) Hendryx who had worked with Jan in Freshman Engineering was hired as the Information Systems Operator in the Undergraduate Office to replace Karen Schneider who moved to Forestry. Sandy remains as a key part of the Undergraduate Office. Marcella Maynard was hired in 1998 as an Information Processing Systems Operator (aka secretary) – she retired in December 2010. After 10 years as the undergraduate laboratory technician, Ken McGlothlin announced his plan to retire in December 1998. This early announcement gave the School time to plan for a replacement. Eventually, his son Rick McGlothlin was hired as his replacement. Rick had significant experience in electronics and mechanical maintenance, and he remains as the undergraduate laboratory technician.

**Nien-Hwa Linda Wang  
(1949-)**

Nien-Hwa Linda Wang (B.S. ChE '71 National Taiwan University, M.S. ChE '73 University of Wyoming, Ph.D. ChE '78 University of Minnesota, post-doc Institute for Interdisciplinary Engineering Studies Purdue 1978 to 1980), worked with bioengineering pioneer and ultimately President of the University of Minnesota, Ken Keller and did a post-doc with Dr. Steve Ash on artificial kidneys. Wang was hired in 1980 to strengthen the biomedical engineering area. The School was quite fortunate in that, in addition to her expertise in biomedical engineering, it gained a specialist in separations as well. Within a short time her research in this latter area became nationally known, and she was promoted to associate professor in 1985 and to professor in 1992. Switching from one field of research to another is considered to be a dangerous career move for assistant professors. However, her work on artificial kidneys and her later work on amino acid, paclitaxel, and protein adsorption and separation is logically connected by the underlying biochemistry. Her research in separations including both the operation of Simulated Moving Beds (SMB) and the underlying mechanisms of adsorption is well known. Her most cited work is development of the standing wave analysis method for design of SMBs. She has consulted with a number of companies and helped Eli Lilly design an SMB for insulin purification. She was awarded the NSF Award for Women Scientists and Engineers in 1991, was a member of the NIH Study Section on Surgery and Bioengineering for five years, and is a Fellow of the American Institute for Medical and Biological Engineering.

Linda was the first female faculty member in the School and a pioneer female faculty member in Engineering at Purdue. She has served as a role model for three generations of female undergraduate and graduate students in chemical engineering, female engineering faculty at Purdue and female chemical engineering faculty across the country. She was a founding member of the Women Faculty in Engineering Committee and was chair of the committee's interviews of Head candidates from 1998 to 2003. She served two terms on the Engineering Diversity Action Committee, a term on the Committee on Faculty Relations (a necessary but unrewarding task), and a term on the Dean's Advisory Committee. This enormous service to the profession has added an extra burden to her career that was recognized with Purdue's Violet Haas Award in 2008 for facilitating the advancement of women and enhancing a positive professional climate for women at Purdue.

Wang has also contributed significantly to the teaching of transport phenomena (ChE 377, 378, and 540), separation methods (ChE 306, 558, and 623), and other courses including ChE 205 and 450. In addition, she has been involved in teaching more than her share of lab sections (ChE 434 and 435). She has been one of the major proponents of the introduction of undergraduates to research through ChE 411 or B.S. thesis projects, and advised one of the students in the first cadre of BS honors theses.

Professor Wang has been very active professionally serving as Chair of a Gordon Research Conference, on the editorial board of the *Journal of Reactive Polymers*, as a Director of the Separations Division of AIChE, two terms as a Director of the International Adsorption Society, and as chair or co-chair of an average of one symposium or conference per year. Within the School she chaired the ChE Undergraduate Committee for five years and was chair of the Qualifying Examination Committee for three years. Wang was also an adviser of the Taiwan Student Association for five years.



David Corti

Dr. David Corti (BS '91 Penn, PhD '97 Princeton under Pablo Debenedetti) who was hired in 1997 started as an assistant professor in August 1998. Corti did a post-doc in the Department of Chemistry and Biochemistry with Prof. Howard Reiss at the University of California-Los Angeles from December 1996 to June 1998. Corti is interested in thermodynamics, molecular modeling, complex fluids, nucleation and adsorption phenomena. In this research area he rapidly developed an impressive list of refereed publications (46 by 2011) and an excellent reputation among his peers around the world. He has also illustrated his interest in education by publishing two refereed educational papers.

Corti's teaching has focused on thermodynamics (ChE 211, 610, 611) and heat/mass transfer (ChE 378). David uses his droll sense of humor in class and as the current author of the faculty skits at the Razz Banquet. In the graduate level courses his teaching ratings have soared from good (~4.1/5) to amazing (5/5). He received an NSF Career award in 2002, the Purdue Teaching for Tomorrow award in 2002-03, and the University Faculty Scholar award in 2011. He was promoted to Associate Professor in 2004 and to full Professor in 2010. Since 2000 Corti has chaired or co-chaired 13 AIChE thermodynamics symposia. David takes his service duties seriously, and served as Chair of the ChE Honors Program for four years and Chair of the Undergraduate Committee for five years. At the current time he serves as Director of Undergraduate Studies in ChE and is the ABET coordinator preparing for the next ABET visit in fall 2013. David has proven that he is a master at these tasks.

Professor Jay H. Lee (BS '86 University Washington, Ph.D. '91 Caltech, both in ChE) was hired as an associate professor from Auburn University in August 1998. At Caltech he worked with Manfred Morari on control, the area that he continued to work in at Purdue. He taught ChE 456 and ChE 656 here. He only stayed at Purdue until 2000 when he went to Georgia Tech. In 2010 he became a professor and Head of the Chemical and Biomolecular Engineering Department at the Korean Advanced Institute of Science and Technology (KAIST).



Gary Blau

Professor Gary E. Blau (BS '64 University of Waterloo (Canada), MS '66 and Ph.D. '68 Stanford, all in ChE) was hired as a Visiting Industrial Professor in 1998 after a long industrial career with Dow Chemical and Dow Elanco. While at Dow Elanco he was an active participant in the Purdue CIPAC (see Chapter 8) and he had won the AIChE Computing Practice Award in 1997. An expert in risk management and statistics he collaborated and wrote papers with Caruthers, Delgass, Lauterbach, Pekny, Reklaitis, Riberio, Sinclair, Venkatasubramanian, and Wankat. He taught ChE 320 from spring 1998 through spring 2004. With Pekny he developed ChE 597A, Risk Management in the Development of New Products & Processes (see box in Chapter 7), and taught it with Pekny or Sinclair or by himself from Fall 1998 through Fall 2005. Recruiters told Blau that they could tell which students had been in his class. The general consensus of the students was, "It was way too much work for an elective...but worth it". In 2006 Blau became a research professor in the e-Enterprise Center and during 2008-11 was a visiting professor in Industrial Engineering.



Forney Hall showing the older part (CMET) in front and the Addition in back

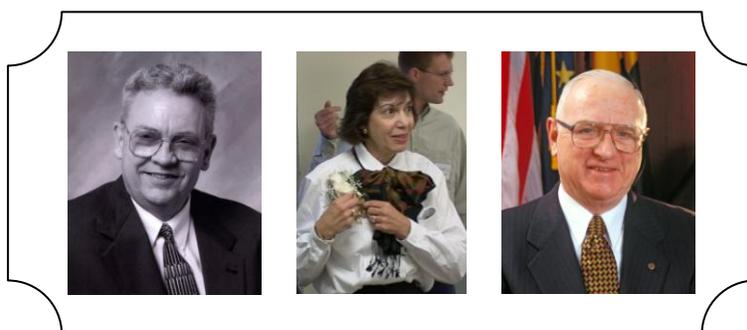
### A New Building for the School of Chemical Engineering

In 1996 the School's Strategic Plan called for a new addition to the 56 year old CMET building to alleviate the intolerable space squeeze. In 1997 New Directions approved the Strategic Plan. Realizing that ChE was so far down the Purdue list of programs to receive money for a new building that he would be retired long before the administration did anything, Reklaitis hired Dr. Bettina McConnell as the School's Development Officer and developed the bold plan to raise money from the School's loyal alumni and not from the State or the administration. Dean Richard Schwartz was very supportive, but President Beering, Vice President for Development Chuck Wise, and Treasurer Ken Burns were very hesitant to approve *the first academic building at Purdue to be constructed totally from private donations.*

In 1999 the University belatedly agreed to let the School try to raise the money for an addition to the CMET Building. To a large extent the future role of private fund raising in the construction of new buildings at Purdue depended on the success of the campaign.

The volunteer leadership for the campaign was identified. Potential lead donors were identified and contacted. On September 6, 2000, Purdue announced that Robert C. (BS '47, PhD '50) and Marilyn G. (BS '47) Forney (see text box) were the lead donors who had pledged \$10M for the campaign that was estimated to be approximately \$20 M for the new building, \$4 M for remodeling (\$2 M match from University), \$2 M for equipment, and \$1 M finance charges for a total of \$25 M private funding. Without the Forney's pledge there would have been no campaign, and the School would still be crammed into CMET. In October 2000 Reklaitis and Bettina McConnell unveiled the ChE Champions of Excellence Program. Donald J. Orr (BS '61) agreed to be the Capital Campaign Executive Committee Chair (see textboxes on Campaign Committee and on Don Orr). The original plan was to add 72,000 sq ft of space with 35,000 sq ft assignable and to remodel the old CMET building.

When the projected cost of the new building increased to \$23.5 M and the total campaign goal increased to \$28 M, the Purdue administration became nervous. The goal to keep the project moving forward was \$17.5 M by June 30, 2001. New Purdue President Martin Jischke, a master fund raiser and builder, agreed to meet with major donors. With the aid of 112 individual donors (of course including the Forneys) and seven corporate gifts (Dow Chemical Co. Foundation, Dow Corning, Eli Lilly, 3M, Gerstacker Foundation, Lubrizol, and Strosacker Foundation) \$18.7 M was raised. A very ambitious goal of \$23 M by December 31, 2001 was not met, but by May 2002 over \$22.3 M had been raised. At this point Schmidt Associates of Indianapolis was contracted to do the design of the project.



**Left:** Dean Schwartz  
**Center:** Tina McConnell  
**Right:** Pres. Steven Beering

Bids were requested in July 2002 with requests for a base bid (estimated at \$19.5 M) and four alternatives (total with all four alternatives estimated at \$23.5M). Fortunately, a miracle occurred. Because of the recession, contractors had difficulty obtaining new business. When the eight bids were opened on September 26, 2002, they were lower than estimated. For once we lucked out with our timing. The entire new building cost at this time, including all four of the alternatives, was estimated to be \$19.7 M, plus an estimated \$1.0 M for finance and development costs. As a result of the low bid, ground breaking ceremonies on September 28, 2002, were more festive than usual. Construction began on Nov. 2, 2002, the structural steel was completed on May 19, 2003, the exterior masonry and roof were completed October 15 and 31, 2003, respectively, and the drywall was finished on December 30, 2003. According to the financial records, the final cost of the Forney addition was \$19,820,000. The "extra" money that had been raised would be available for renovations of the old CMET building. After the building was dedicated October 22, 2004, the School had world class facilities.

Although the new Forney addition came in well under the estimated cost, the CMET renovations mushroomed to well above the initial cost estimates (see textbox on renovations later in this chapter).



The Forneys

**Robert C. (BSCHE '47, MSIE '48, Ph.D. ChE '50. Hon. Doc. '81) and Marilyn Forney (BSCHE '47)**

A \$10 million pledge from 1947 chemical engineering graduates Robert and Marilyn Forney of Unionville, Pa., provided the engineering and design fees and a major portion of the estimated \$19.5 million costs for the addition to the facility. In their honor, the school's facilities were renamed the Forney Hall of Chemical Engineering.

Starting as a research engineer in the Nylon Research Division at Dupont's famous Experimental Station in Wilmington, Delaware, Bob Forney moved through the ranks in DuPont's man-made fiber activities. In 1975 he became general manager of the Textile Fibers Department and a corporation vice president. Moving through other vice-presidential positions he was elected a director and senior vice president in 1979, and in 1981 executive vice president of the DuPont Company. He retired on December 31, 1989. Forney was a leader in the development and manufacture of important new fiber products. In the 1960s, he and a team of DuPont scientists led the production of synthetic fibers, including Dacron polyester, and the development efforts for many polymeric fibers, including many "spun-bonded" fibers. In the 1970s, Forney spearheaded DuPont's early development of Kevlar fiber, used in bullet-proof clothing, brakes and transmission parts, and a host of other applications. He has been active as the past president of the Purdue Club of Delaware, as a past member of the Board of Governors of the Purdue Foundation, and as a member of Purdue's National Campaign Cabinet.

Forney has garnered many honors. He received the DEA in 1974, an Honorary Doctorate in 1981, the Outstanding Chemical Engineer award in 1993, and the Outstanding Industrial Engineering award in 1997. He was elected to the National Academy of Engineering in 1989. He was cited by President Carter in 1980 for his work with the National Alliance of Business. In 1989 he received a NASA Public Service award and the highly coveted "Silver Snoopy" award from the astronauts for his volunteer work after the Challenger disaster.

Forney stated, "The essence of good engineering is knowing how to marshal the manifold talents of others in common pursuit of a technological objective. Certainly my most rewarding 'moments' - often several years in duration - were in doing just this." In this project the Forneys certainly followed Bob's advice. They told the School to design what was needed and did not micromanage.

Marilyn Forney has spent the past 20 years offering expertise in the construction of more than 800 low-income housing units for the elderly and disabled in Delaware and Pennsylvania. Marilyn, who has also led fund-raising efforts in a number of volunteer organizations, said it is important to give to worthy enterprises. "Our education at Purdue has been a very integral part of our life, and we feel it's important to give back," she said. "This is an important venture because of the many profound developments in chemical engineering, and we cannot afford to let these ongoing changes get past us. This expansion and renovation will keep Purdue at the top of the field."

"I spent my whole professional life working in the chemical industry, and the success I have achieved is in large part due to my Purdue education," Forney said. "Marilyn and I like what we see happening at Purdue's Schools of Engineering and in the School of Chemical Engineering. We recognize the need to modernize these facilities, which is why we decided it was time for us to give back to the university in an important way," said Robert Forney, "We decided we wanted to get involved with this project because, in addition to its other features, it will pave the way for more research and graduate studies in chemical engineering in this new century and new millennium."

The Forneys hoped their gift to Purdue would set an example to other active chemical engineering alumni who would also support the School. Bob and Marilyn, after you led the way, the rest of the alumni followed.



The Forneys with President Martin Jischke



Henson Atrium in Forney Hall looking at distillation tower (left) with the Catalysis research group and the main area (right) during speed networking of students and Industrial Advisory Council members in 2008

President Martin Jischke (left), Arvind Varma, Marilyn Forney, Robert Forney, and Dean Linda Katehi (2002-06) in large classroom in Forney Hall during dedication ceremony, Oct. 22, 2004.



Groundbreaking for Forney Hall

### Capital Campaign Executive Committee

Robert and Marilyn Forney – honorary co-chairs (see textbox)

Donald J. Orr – Campaign Chair (see next textbox)

#### Members:

Richard H. Grabham (see textbox for New Directions Chairs)

James F. Schorr (see textbox after New Directions)

William E. Smith, III (see textbox for New Directions Chairs)

William L. Wishlinski (see textbox for New Directions Chairs)

**Philip L. Krug** (BS '52) joined Lubrizol in 1954 and advanced through the ranks in manufacturing spending time both in Cleveland and Houston. While at Lubrizol he received a graduate degree from Case Institute of Technology in 1959. He became an officer of Lubrizol in 1975 and became the Executive Vice President of Lubrizol in 1985. He retired from this position in 1992. He served on the Board of the Cleveland Electric Illuminating Company. He received the Outstanding Chemical Engineer Award in 1994. As a student Phil was active in Reamer and Iron Key. Two of his four children, Douglas (BS CE '80) and Victoria (BA Int Des '86) are Purdue graduates. He is active in YMCA, Rotary and United Way. He is also a ChE Ambassador.

**David R. Rea** (BS '62, PhD Princeton '77) was a member of Reamers, Tau Beta Pi engineering honorary society and Omicron Delta Kappa honorary society at Purdue. He won the Omega Chi Epsilon Award as a senior. He joined DuPont in 1966 and retired from DuPont in 2001 as Global Vice President, Nylon Technology. Dr. Rea is noted for bringing attention to risks in toxic and bio-accumulative materials. He is past chair of the Council for Chemical Research (2000) and past chair of TRI/Princeton. In addition to providing critically important service on the Capital Campaign, David served on the College of Engineering's Advisory Council and is a ChE Ambassador. In 1996 Dr. Rea received the Outstanding Chemical Engineer Award and the Engineering Distinguished Alumnus Award from Purdue. He is a trustee of Philadelphia University and currently volunteers for various charitable activities. The Reas named Room 3007 in the Armstrong Hall of Engineering (currently Associate Dean Mike Harris' office) and classrooms 2152 and 2154 in Forney Hall

**Gerald (Jerry) Skidmore** (BS '54) received an MBA from Cornell and worked for Archer Daniels Midland (ADM). In 1963 when he was ADM National Sales Manager for technical grade soy isolates, he started Skidmore Sales & Distributing. Jerry was President until 1994 when his son Doug (BSChE '84) became president. Jerry is now Chairman of Skidmore Sales. Jerry has been active in the Institute of Food Technologists' (IFT) serving as President and Councilor of the Ohio Valley region and as a member and Chair of the Committee on Membership and Professional Affairs. Jerry was also one of the founding members of the Marketing and Management Division of IFT and the Food Ingredient Distributor Association. He is also a ChE Ambassador.



Construction of Forney Hall, 2002-04

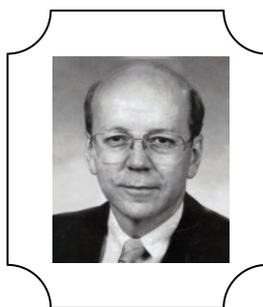
**Donald J. Orr (BSChE '61, MSIA '65, Honorary Doctorate '06)**

When the new addition to CMET was in the planning stages, a volunteer chair for the ChE Champions of Excellence Capital Campaign Committee was needed. Fortunately Don Orr agreed to become the chair. Don had long been an active member of New Directions and a member of the Executive Committee. He had many connections with executives in the chemical industry and understood finance. More important, Don is quiet, discrete, unflappable and effective, which are the perfect characteristics for the chair of a capital campaign.

In an interview for the Winter 2006 *ChE Impact*, Don stated "Purdue seemed to be the best fit for a number of reasons and, in retrospect, a lucky decision. Almost everything I achieved in my career is attributable to things I gained at Purdue as an undergraduate and graduate student: a sound underpinning in the basics of chemical engineering and industrial administration, managing time, and a good work ethic." At Purdue Orr was active on the Exponent in the sports department and he was sports editor his senior year. "But my best memory of Purdue is definitely meeting Nancy, my wife of 45 years."

After graduating, Don worked for six months for Standard Oil of California, served as a lieutenant in the Army, worked for a year for a natural gas pipeline company, and then he returned to Purdue to earn his MSIA from Krannert. He joined Air Products & Chemicals in 1965 in their career development program (two years of rotating career assignments). He advanced through a variety of positions in the company and became senior vice president in 1990. He retired from Air Products in 1997. During his tenure at Air Products, Don remained active at Purdue as a recruiter, as a member of the New Directions Executive Committee, as a member of the President's Council and as a member of Krannert's Dean's Advisory Council. Don is also one of the founders of the ChE Ambassadors Club.

Don has won considerable recognition from Purdue, both for his career accomplishments and for his extraordinary service to the University. He was named a Distinguished Engineering Alumnus in 1989, an Outstanding Chemical Engineer in 1993 and a Distinguished Krannert Alumnus in 1995. He received the Purdue Engineering Alumni Association Service Award in 2004 for his many services to Purdue. In 2006 he received Purdue's highest award, an Honorary Doctorate. Don has retained his love of sports and remains a loyal Boilermaker.



**Paul Oreffice (BSChE '49, Honorary Doctorate '76)**

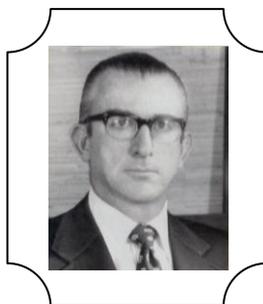
Paul Oreffice was born in Venice, Italy. His father, Max, was vocally anti-Fascist, and was imprisoned for a month when Paul was twelve. After his release, Max was under constant surveillance, making life in Italy unbearable. Paul and his sister were sent to school in Switzerland and were there when WWII began. The family sailed on the American ship Manhattan within weeks of Italy's entrance to the war in 1940. Having only temporary American visas and unable to return to Italy, the family obtained Ecuadorian visas and relocated to Ecuador. Max Oreffice's refusal to join the Fascist party gave his son a model for standing up for what he believed in. Oreffice is author of the book "Only in America." In this book, he discusses his journey as an Italian immigrant to becoming the CEO and Chairman of Dow Chemical Company.

Oreffice retired from Dow Chemical in 1992. He is a board member and former Chairman of the National Parkinson Foundation. His wife, JoAnn, also serves on that Board. Oreffice is also on the board of The Rollin M. Gerstacker Foundation. He has served on the boards of Coca-Cola (18 years), Fairfield Homes, Inc., Marsh and McLennan (International Advisory), CIGNA Insurance, The Morgan Stanley Group, and Nortel. He is also a trustee emeritus of the American Enterprise Institute. He has received The International Palladium Medal, the Chemical Industry Medal, and the Centenary Medal, the three highest awards granted by the world's chemical organizations.

While attending Purdue, Oreffice was a member of the Soccer Club and Tau Kappa Epsilon social fraternity and was an honorary member of the Purdue Foundation Student Board. He has served on the Engineering Visiting Committee, and is also a former Vision 21 Campaign Cabinet Member and Vision 21 Key Volunteer. He was chair of the President's Council in 1980 and received the President Council's Distinguished Service award (1986) and Pinnacle award (2003). He received an honorary doctorate in 1976 and was named an Outstanding Chemical Engineer in 1993. Oreffice was the plenary speaker at the November 1993 convocation to honor the 59 DEA and Honorary Doctorate recipients with Outstanding Chemical Engineer awards.

Oreffice's assistance in obtaining the funding of the Dow Chemical Engineering Instrumentation Laboratory and in obtaining the two million dollar Dow contribution and the Gerstacher Foundation contribution was critical in the success of the fund raising for Forney Hall. With his help the School was also able to obtain the commitment of other senior Dow executives. In addition, Oreffice also contributed personally.

Dr. Oreffice's interest in thoroughbred horses is keen. He is active with the New York Racing Association and the Thoroughbred Owners and Breeders Association.



### Robert T. Henson (BSCHE '36)

Robert T. Henson is an entrepreneur who co-founded Flexible Products in 1951 in Atlanta, Georgia. Bob retired as president and CEO of Flexible Products in 1989. By the time the company was sold to Dow Chemical in 2000 (the sale was negotiated by Bob's son Peter shortly before Peter died), it had grown to become one of the largest polyurethane suppliers in North America and one of the largest privately held companies in Georgia.

In 1989, Bob was recognized for his leadership in the industry and his concern for the welfare of his employees by being in the first group of three alumni (including William M. Schmitt and Robert P. Bringer) who received the School's Outstanding Chemical Engineer Awards. On June 30, 2007, Purdue president Martin Jischke hosted a celebration in the Forney Hall of Chemical Engineering to honor Robert Henson and his wife Adeline "Coc" Henson (June 14, 1917 – August 4, 2010) by presenting them with one of the Purdue's highest honors: the President's Council Pinnacle Award. The Hensons have been very generous to Purdue's School of Chemical Engineering to continue the School's bold vision of excellence. In recognition of their generosity, the new atrium in the Forney Hall addition, where the June celebration took place, was named the Robert T. Henson Atrium. (Paraphrased from ChE Impact, Winter 2007, Shari Schrader)

Mrs. Henson was also a remarkable person. She served as the secretary of Flexible Products during the early years. In later years she was a tireless volunteer and supporter of charities. She served over twenty years as a "pink lady" at Emory Hospital in Atlanta and organized many charity balls to support the hospital. She received the Channel 11 Community Service Award in 1986 and a Second Century Wadley Glenn Award from Emory University Hospital in 2007.

In 2002 when he first committed to supporting the School with a leadership gift, Bob Henson stated, "Whenever I think about Purdue, I always go back to my diploma, which includes a message from President Elliott. That message has been a guiding force and inspiration in my life. I don't know the whole thing by heart, but the first line reads, 'In the years you have been at Purdue, you have been changed.' My years at Purdue did indeed change me. Whatever success I have achieved derives from the teaching and learning of my Purdue experience. It is my privilege to enable today's students to pursue their goals in a world-class environment. My goal is to allow those who come after me to study and learn in a facility that's second to none."

Bob, your goal has been achieved. The Henson atrium has become a favorite study place for undergraduates when it is not in use for receptions, poster sessions, and other gatherings.

The Hensons receiving the Pinnacle Award on June 30, 2007. The Atrium was named in their honor.





Forney Hall Donor Roll

**Table 6-2. Purdue University President's Club Pinnacle Award Winners**

The new addition to Forney Hall and the renovations of the old CMET building would not have been possible without the donations of a large number of companies and individuals. Many of these individuals belong to the Purdue University President's Club based on their generous donations. Donors who have given more than one million dollars to Purdue receive the Pinnacle Award. The School of Chemical Engineering is blessed with a large number of Pinnacle Award winners and an extremely large number of other alumni who are very generous. Because of space limitations all of the donors cannot be listed here. A photograph of the plaque in the new Forney addition listing donors is shown. The alumni of the School who have received the Pinnacle Award are listed below.

Charles Davidson  
 Dr. Robert C. Forney  
 Dr. Robert E. Gadomski  
 Richard L. Groben  
 Dr. Richard A. Hazleton  
 Dr. David C. Henderson  
 Dr. James B. Henderson  
 Robert T. Henson  
 Dr. Thomas R. Hodgson  
 J. Timothy McGinley  
 Dr. Paul F. Oreffice  
 Dr. James H. Rust  
 Dr. Steven J. Swanson  
 Robert D. Weist  
 Dr. William D. Young

**Richard A. Hazleton (BSCHE '64, MSChE '66, Honorary Doctorate '98)**

Richard A. Hazleton joined Dow Corning as a process engineer after receiving his MS from Purdue. He rapidly advanced through the ranks in the company's European offices and became controller in 1981. Dow Corning sent him to the Harvard Advanced Management program which he completed in 1983. From 1983 to 1985 he was the manager of the Midland plant and in 1985 became US Area vice president and Director of manufacturing and engineering. In 1987 he became corporate vice president and then progressed to President and CEO in 1993. He retired as chairman of Dow Corning in 2001.

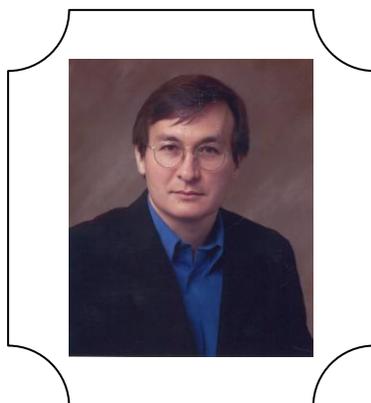
Hazleton arrived at Purdue certain that he wanted to be a chemical engineer. While attending Purdue, he was interested in student government and was elected vice president of the student body his senior year. This interest in the process of how government works later became important in his career. He noted that you "have to be interested and engaged in the world around you to be a leader. Since my student days, I've become by interest and necessity more engaged, more interested, and more involved in things going on in the outside world, and more concerned with how they affect me and my company." He also participated in Old Masters, Iron Key, Excalibur Club, Tomahawk, Phi Eta Sigma, Omega Chi Epsilon, Tau Beta Pi, and Omicron Delta Kappa at Purdue, and he received the Lottes Award as a senior.

Hazleton has served on Purdue's Chemical Engineering Capital Campaign Committee, chaired the Capital Campaign Committee – II, and the ChE Ambassadors Club, of which he was a founding member. Most recently he has served as Campaign Chair for the Renovations of the older part (the CMET building) of Forney Hall (see textbox on Renovations). He received both an Outstanding Chemical Engineer award and a DEA award in 1994, and is currently serving on the Purdue Foundation Development Council. The Hazletons received the President's Council Distinguished Pinnacle Award in 2007. The Hazleton's daughter, Mary Jane, is an assistant professor at Purdue North Central.

In 1994 when he received the DEA, Hazleton reflected, "Thirty years ago, chemical engineering was a relatively small, compact school at Purdue, so you got to know all the professors. It's an indication of the quality of the faculty that no one really stood out—all my professors were solid, creative people with differences in style and personality. My chemical engineering classes were challenging and enjoyable.... My Purdue experience has been valuable for me in two ways. First, the kind of knowledge I gained from the coursework, the chemical engineering part of the education, has clearly been valuable. It still is valuable in my current position, because I can understand what our business is and what the technology issues and challenges are. Even more important, though, has been the kind of thought process—the logical, analytical way of looking at problems and dealing with situations—that I received in my engineering education."



Staff additions in 2000 included George Bailey replacing Stacey Clark as the ChE Computing Systems Manager. Stacey moved to ECN. Eric Pratt was hired as the Assistant Computing Systems Analyst, which meant he did whatever George needed him to do. In the usual business office form of musical chairs Ms. Shelia Foster was promoted and replaced Mrs. Kamela Lawrence, whose husband had graduated from Purdue, as Account Clerk IV. Ms Julie Everett took over the position vacated by Shelia. Mrs. Suzie Flavin received the Omega Chi mentoring award and the Mortar Board Rose Award for helping students above and beyond the call of duty.



Gil Lee

Dr. Gil Lee (BSChE '87 Purdue, Ph.D. '92 Minnesota, Post-doc ASEE 1992-95) was hired as an Associate Professor without tenure in August 2000. He had worked in the Surface Chemistry Branch, Chemistry Division, Naval Research Laboratory, Washington D.C. from 1995 to 2000. At the Naval Research Laboratory he had been very productive doing research in nanometer scale science and its application in medicine and biotechnology; surface forces in macromolecular systems, and ultra-sensitive biosensors. He continued these research areas at Purdue and received tenure in 2003. His teaching at Purdue was in ChE 211 (thermodynamics), ChE 378 (heat & mass transfer), and electives ChE 597 "Microscale Physical Processes" and ChE 697 "Biophysical Engineering" that he developed. He left Purdue in 2008 and is now Stokes Professor of Physical Chemistry and Conway Fellow, School of Chemistry and Chemical Biology, University College Dublin.

In August 2000 John Morgan (BS '92 and MS '94 both from University of Kansas, Ph.D. '99 Rice University, post-doc University California-Berkeley 1999-2000, all in ChE) was hired as an assistant professor. His research interests are in production of anti-cancer compounds from plant tissue culture, transfer of plant secondary metabolite pathways to microorganisms, development of plant oxygenases as biocatalysts, and metabolic flux analysis of photosynthesis. At Purdue, Morgan's research has focused on metabolic engineering including metabolic flux analysis of algae for production of biodiesel and of cells for antibody production, metabolic engineering of the flavonoid biosynthetic pathway in yeast, continuation of his photosynthesis research, and optimization of expression of plant P450 monooxygenases in yeast. Morgan has been active in AIChE

programming, serving as Chair of one of its programmatic areas, and he is Associate Editor for Bioprocess and Biosystems Engineering.



John Morgan

As an experimentalist Morgan has been involved in teaching the undergraduate laboratory, ChE 435, and he took over the popular ChE 525 (biochemical engineering) elective from George Tsao in 2001. John has also taught ChE 205 (mass and energy balances) and he developed a ChE 697 elective on "Metabolic Engineering." Morgan was promoted to Associate Professor in 2006. He was the Kothari Visiting Professor at University of Mumbai, Institute of Chemical Technology, in Mumbai, India in the summer of 2008, and spent sabbatical during Fall as a Visiting Professor at National Taiwan University, in Taipei, Taiwan.



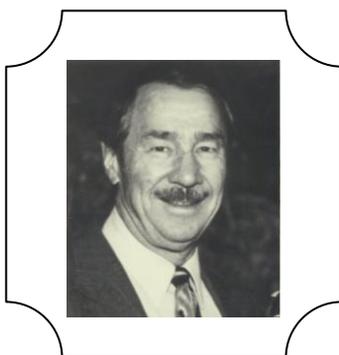
Kendall Thomson

The third faculty member starting in August 2000 was Kendall Thomson (BS ChE '90 Wisconsin, Ph.D. ChE '99 Minnesota, post-doc 1999-2000 North Carolina State). After earning his BS degree, Thomson worked as a research chemical engineer for UOP in Des Plaines, Illinois. Before starting at Purdue, Thomson co-authored a book, "*Linear Algebra and Linear Operators in Engineering: with applications in Mathematica.*" with Ted Davis, one of his thesis advisors at Minnesota. Thomson's research is in the area of ab initio molecular simulation and modeling with applications to catalysis and adsorption and catalysis. The major tool used is density function theory (DFT). Since ab initio molecular simulation and modeling are useful in a number of chemical engineering areas, Thomson has collaborated with eight other faculty members (Caruthers, Delgass, Franses, Hillhouse, Lauterbach, Ribeiro, Venkatasubramanian, and Wang). His most frequent collaboration has been with Delgass in catalysis research. Thomson received an NSF Career Award and the Purdue Seed for Success award in 2004, he was

promoted to Associate Professor with tenure in 2005, he became a Purdue University Faculty Scholar in 2007, and he was a member of the team that won the College of Engineering Faculty Team Award for Excellence in 2007.

Thomson's teaching initially focused on graduate level classes including ChE 630, (applied mathematics), ChE 660 (chemical reaction engineering), and a graduate level elective ChE 697, "Electronic Structure Theory and Modeling." More recently he has shown a real talent for teaching difficult undergraduate classes. Initially, he taught ChE 348 (chemical reactors & kinetics) and then switched to ChE 377 (fluids), which the students almost unanimously consider to be the most difficult course in the curriculum. The students in ChE 377 have greatly appreciated his efforts to clarify the difficult abstract concepts in fluids, and they responded by voting Thomson the 2011 Shreve Prize as best teacher in the School.

In 2001 Bob Greenkorn ended his storied career at Purdue by becoming Distinguished Professor Emeritus. Bob and his wife Rosemary divide their time between West Lafayette and Panama City, Florida. Bob has had time to study his passion – solar sun spots.



Bob Greenkorn

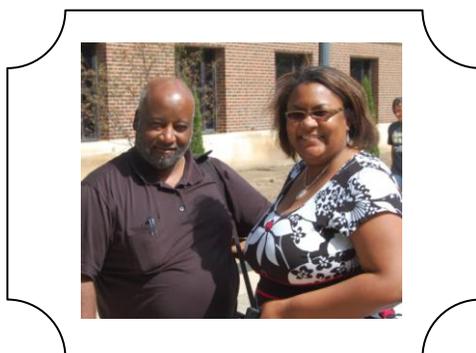
In 2002 after almost 25 years of service to the School Mrs. Janet (Taylor) Jones retired from her position as Information Processing Systems Operator V. Janet was well known for her motherly caring for the welfare of the students.

In August 2002 two additional faculty members were hired. Professor Michael T. Harris (BS ChE '81 Mississippi State University, MS '87 and Ph.D. '92 both in ChE from University of Tennessee), joined the department as an associate professor. After graduating from Mississippi State, Harris accepted a position with Oak Ridge National Laboratory (ORNL). While working at ORNL, Mike started taking courses at the nearby University of Tennessee eventually earning his MS and Ph.D. while an ORNL employee. His co-advisor for his Ph.D. research was an ORNL employee who also served as an Adjunct Professor at the University, Osman Basaran. Mike was Osman's first Ph.D. graduate (It would be wonderful if the first graduate student for all professors was as talented as Harris). After earning his Ph.D., Harris continued working for ORNL until 1996. In 1996 the lure of academe was too great and Mike accepted a position as an associate professor at the University of Maryland-College Park in the Department of Chemical Engineering and Institute for Physical Science and Technology. He was voted the University of Maryland-College Park

AIChE Student Chapter – Outstanding Teacher of the Year in May 1999. In 2002 the School was able to convince Mike and his wife Terry to move to Purdue. Harris was promoted to full Professor in 2006 and immediately demoted (half-time) to become Associate Dean of Engineering for Undergraduate Education.

Harris has the peculiar qualities of being interested in everything, having overly abundant energy, and never learning to say “no” in Kindergarten. As a result, he is always simultaneously immersed in numerous research, teaching and service activities. His current research interests include nanoparticle technology, biotemplates for synthesis of nanowires and nanotubes, micropatterning via organosol and hydrosol drops and bridges, protein crystallization, surface science and the fundamentals of electrokinetic separations. Many faculty have become theoretical, experimental or simulation specialists. Harris has not – he does all types of research. He has published approximately 60 refereed, archival papers and holds 11 patents. Harris currently has six Ph.D. students. Mike also involves undergraduates in his research – at Purdue 87 undergraduates have worked with him on research projects. In 2005 he became Associate Editor of the *Journal of Nanomaterials* and in 2007 Associate Editor of the e-journal *Chemical Engineering Letters*. In 2010 he was a member of the team that won the College of Engineering Faculty Team Award for Excellence.

Mike is also eclectic in his teaching interests. He has taught ChE 377 (fluids) multiple times, ChE 320 (statistical analysis), ChE 536 (particulate systems), and he has co-developed a new elective on safety engineering. Since AIChE and ABET will require safety as part of the 2013 accreditation visit, this course is the first step in introducing extensive material on safety in the curriculum. In service/administration Harris has been an Associate Dean for five years, and he shows no sign of slowing down. He has served on the Mississippi State University Advisory Council since 2004. Harris is very interested in diversity issues and the Directors of the Minority Engineering Program and of the Women in Engineering Program report to him. Harris is also quite active in AIChE, particularly the Minority Affairs Committee. He has won the Grimes Award (2004), the Black Achievers Award, and the Distinguished Service Award from the AIChE Minority Affairs Committee. He was elected a Fellow AIChE in 2009.



Michael Harris, with Prof Monica  
Cox of Engr. Education

Dr. Hugh W. Hillhouse (BS ChE '95 Clemson, MS ChE '96 University Washington-Seattle, MS Physics '99 and Ph.D. ChE '2000 University of Massachusetts-Amherst, post-doc in nanophysics 2000 to 2002 at Delft University of Technology, Netherlands) joined the School in 2002. At the time he joined the School he received a NSF CAREER Award based on a proposal submitted while he was a post-doc. Hillhouse is extremely talented and received the Acorn award from Purdue in 2004, was promoted to associate professor in 2007, was a co-recipient of the College of Engineering Team Award in 2007, Early Career Research Excellence Award from Purdue's College of Engineering in 2008, and the Shreve prize in 2009. He taught ChE 330 (Molecular Engineering) a number of times and restructured that course. He also taught ChE 540 (Honors Transport) and developed and taught graduate courses on Advanced Solar Energy Conversion, Electrochemistry, X-ray and Neutron Scattering Methods, and Nanomaterials.



Hugh Hillhouse (center)

Hillhouse arrived at Purdue with a strong focus to his research. After Dr. Rakesh Agrawal joined the School in 2004, Hillhouse and Agrawal collaborated on solar energy research. His research interests included colloidal and molecular self-assembly, nanostructured materials, thermoelectric phenomena, and facilitated ion transport. He authored or co-authored over 25 papers while he was at Purdue, and submitted six patent applications (five were with Agrawal). He spent the 2008-09 academic year on sabbatical at the National Renewable Energy Laboratory. Hugh was also active in service to the School on the Graduate Committee (chair 2009-10) and the Graduate Recruiting Committee and to Purdue as founder of the Purdue Young Faculty Association. He was also professionally very active as chair or co-chair of 16 sessions at AIChE annual meetings and organizing two different 3-day symposia in 2005. Hillhouse presented a large number of invited seminars at Purdue, at conferences and at universities. Unfortunately, one of the invited seminars was at the University of Washington in Seattle, and Hugh left Purdue and returned to the University of Washington in 2010, where he received his MS degree.

In December 2002 Nicholas Peppas (the author of the first edition of this History – see text box in Chapter 5 for more information) bid farewell to Purdue after 26 years, 51 Purdue Ph.D., 39 MS, over 800 technical publications, 240 invited lectures, 82 grants, and numerous awards.



Nicholas Peppas

In 2003 five new faculty members joined the School. Chelsey Baertsch and Fabio Ribeiro brought additional strength and enthusiasm to our already strong catalysis/surface faculty science cluster. You-Yeon Won reinvigorated our polymer synthesis and drug delivery emphasis. Steve Beaudoin introduced new energy in the semiconductor manufacturing, specifically the chemical-mechanical planarization, domain. Sangtae "Sang" Kim brought a visionary leader and member of the National Academy of Engineering to Purdue.

Dr. Chelsey Baertsch (BS ChE '96 University Colorado-Boulder, Ph.D. '2001 University of California, post-doc 2001 to 03 MIT) started as an assistant professor in 2003. At Colorado she did extensive undergraduate research with Rich Noble, at Berkeley she worked with Enrique Iglesia, and at MIT she worked with Klavs Jensen. Her areas of expertise include heterogeneous catalysis, synthesis and characterization of metal-oxide support catalyst, and MEMS fabrication and application. In her teaching, Baertsch focused on undergraduate courses with emphasis on ChE 205 (Mass and Energy Balances), ChE 320 (statistics) and ChE 348 (kinetics). She put a lot of energy into teaching, and the students responded by awarding her the Shreve prize in 2009. Chelsey also served as the Omega Chi Epsilon advisor for six years.



Chelsey Baertsch

In 2006 Baertsch's efforts to set up her laboratory started to pay off when the first research presentations were made at AIChE meetings. She had a good year in 2007 since she was a member of the team that won the Purdue College of Engineering Team Excellence Award and she won a NSF Career Award. In 2008 the first three papers were published in archival journals and in 2009 her first four Ph.D. students graduated. Despite these successes, in 2010 Chelsey decided to leave Purdue to focus time and energy on her growing family. She discovered that with three young children she could not continue in her time-consuming full-time position.



You-Yeon Won (on left)

You-Yeon Won (BS ChE 1992 Seoul National University, Ph.D. ChE '2000 University Minnesota, post-docs 2000-01 ChE MIT and 2001-03 applied physics Harvard) was the second Assistant Professor to join the School in 2003. He worked for Ted Davis and Frank Bates at Minnesota and with David Weitz at Harvard. Won's areas of expertise when he joined the School included micellar structure of amphiphilic block copolymers, anionic and free-radical synthesis of block copolymers, and macro/micro-rheological characterization. You-Yeon has taught the polymer courses ChE 543 and 544, ChE 211 (thermo), and ChE 330 (molecular engineering). The students like his soft-spoken yet humorous demeanor and have rated both him and his courses highly. Won has served on the graduate committee, graduate recruiting committee and the centennial planning committee. He has been active in professional societies, particularly in chairing or co-chairing symposia at AIChE meetings. Won and his collaborators have published over 20 papers in his eight years at Purdue. Based on his productivity and the quality of his teaching and research, You-Yeon was promoted to associate professor in 2009.

As reported in the Fall 2009 *ChE Impact*, Won is applying his know-how with polymers to develop a delivery system for RNA interference (RNAi), a promising cancer therapy. By self assembly of a micelle of triblock copolymer and RNAi a micelleplex is formed that is the correct size to pass through the "leaky" tumor tissue. Won's carrier system is in the magic 10nm to 100nm range that is small enough to enter the leaky tumor tissue, but big enough to not diffuse back into the blood stream. Thus, the micelleplex can be injected into the blood and polymer complex automatically finds the tumor and delivers the RNAi. The system is relatively simple and worked in mice. Although clinical trials have not started, there is already interest from biotechnology firms.

Professor Stephen Beaudoin (BS ChE '88 MIT, MS ChE '90 University Texas-Austin, Ph.D. ChE '95 North Carolina State) came to the School in 2003 as an associate professor from Arizona State University (ASU) where he had been an Associate Professor. Although Steve enjoyed ASU and ASU appreciated him greatly, life-threatening desert allergy problems forced him to move. Purdue was the beneficiary of his need to move. Beaudoin was promoted to full professor in 2006 and was named a University Faculty Scholar the same year. He brought to the School abundant energy, a desire to teach and serve, and research interest in the areas of particle and thin film adhesion, chemical-mechanical planarization, biosensors and biopolymer processing. Beaudoin rapidly set up his laboratory at Purdue. He has currently graduated 11 Ph.D. students and 2 M.S. students from Purdue. A firm believer in involving undergraduates in research, he has

worked with 23 undergraduate researchers at Purdue. Steve has been particularly adept at obtaining grants from the Department of Homeland Security.



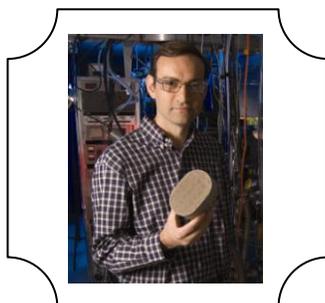
Steve Beaudoin (First from left, 2<sup>nd</sup> row)  
with the 2007-08 ChE award winners

Beaudoin is very interested in undergraduate students in general, and for 4 years he was in charge of undergraduate recruiting for the School. An excellent teacher, Beaudoin has taught ChE 205 (Mass and Energy Balances), ChE 306 (separations), ChE 377 (fluids), ChE 556 (semiconductor processing), and ChE 630 (advanced math). He was the inaugural winner of the Purdue University Student Government Teaching Excellence Award in 2005, and he won the Outstanding Mentor Award, from Omega Chi Epsilon in 2007. He also served as Associate Head of the School, Director of Undergraduate Programs, and Director of Undergraduate Retention. Steve has worked to broaden the diversity of the School (see Chapter 7), and he has been a member of the Engineering Diversity Action Committee for six years. Steve was also a Provost Fellow for one year; unfortunately, a task that removed him ½ time from the School. Beaudoin has been very active in professional societies as Associate Editor of *IEEE Transactions on Semiconductor Manufacturing* from 2001-2008, as Director of the Environmental Division of AIChE from 2003-2006, and as current President of the Particle Division of the Adhesion Society.

The fourth member of the faculty class of 2003 was Prof. Fabio Ribeiro (BS ChE '82 and MS chemistry '84 from Instituto Militar de Engenharia, Rio de Janeiro, Brazil, MS ChE '86 and Ph.D. ChE '89 from Stanford University) who joined the School as an associate professor from the Worcester Polytechnic Institute (WPI) where he was also an associate professor. Ribeiro and Delgass had both worked with Michel Boudart at Stanford, and they immediately started collaborating at Purdue. Ribeiro is an expert in the area of surface science and heterogeneous catalysis who strengthened Purdue's catalysis group. He set up his laboratory quite quickly and has been extremely productive in research. At Purdue he has had nine Ph.D. students graduate – seven of them have been co-advised. Currently he works with 19 Ph.D. students – all of them co-advised. He has published over 30 papers from his work at Purdue. In 2005 he won the Catalysis Society of Metropolitan New York Excellence in Catalysis Award. Fabio was promoted to full professor in 2006 and became a University Faculty Scholar the same year. In 2007 he was a member of the team that won the College of Engineering Team Excellence Award.

Ribeiro's undergraduate teaching has focused on ChE 348 (kinetics) and ChE 435 (laboratory). In his graduate teaching he has focused on the two catalysis courses, ChE 662 and 666. He has been very active in professional societies and is an Editor of the *J of Catalysis* plus he serves on the editorial boards of *Applied Catalysis B: Environmental* and of *Catalysis Letters*. In the Catalysis and Reaction Engineering Division of AIChE he served from 2005 as Director, Vice-

Chair, and then as Chair in 2010. He also has been a frequent organizer of AIChE symposia on catalysis. In the School Fabio has been active in a number of committees including the Industrial Advisory Council, Faculty Recruiting, Graduate Recruiting, Qualifying Examination, Safety, and as a frequent chair of the Instrumentation committee.



Fabio Ribeiro

### **Charles Davidson (BSChE '72)**

Charles D. "Chuck" Davidson (BSChE '72 Purdue, MS Management '81 University Texas-Dallas) is Noble Energy, Inc.'s chairman, and chief executive officer. Noble Energy is a leading independent energy company which has been engaged in the exploration and production of oil and natural gas since 1932. Noble Energy's operations include significant producing assets in the United States as well as in China, Equatorial Guinea, Israel, and the North Sea. Noble Energy has been publicly traded since 1972 and is currently a member of the S&P 500 index.

Before joining Noble Energy, Chuck was chairman, president and chief executive of Vastar Resources, Inc., a publicly owned subsidiary of ARCO, which merged with BP in 2000. In total, he has nearly 40 years of energy industry experience. Davidson received both the School's Outstanding Chemical Engineer Award and the Purdue Distinguished Engineering Alumnus Award in 2005.

Chuck and Nancy Davidson are the lead donors for the Capital Campaign for Renovation of CMET (see text box). Their continued support of the School of Chemical Engineering is based on a belief in returning favors. "Nancy and I have always believed in supporting our universities that helped prepare both of us for our future endeavors," says Davidson. "The driver for us is to help future students continue to receive the high-quality education that Purdue and its School of Chemical Engineering provide." The Davidsons received the Pinnacle Award from Purdue and their donation helped convert the old CMET room 302—known to many alumni as the main ChE lecture hall—into an executive board room. Davidson explains, "We had been supporters of the new building construction, and we wanted to ensure that the entire renovation process is a success." "The biggest impact this large executive conference room will have involves providing space to accommodate the number of people on our multidisciplinary research projects teams," says Arvind Varma, head of Chemical Engineering. "In addition, we'll have an appropriate space for faculty, staff, and student meetings, visitor presentations, and advisory council meetings." (Paraphrased from ChE Impact Winter 2006-07, LL)

While visiting Purdue to present a seminar in the Centennial series in April 2011, Davidson was encouraged to reminisce. He thought that the engineering economics he had been taught by a young Prof. Reklaitis in ChE 450 had been most useful for the career path he had taken. The other most useful material was thermodynamic phase behavior from Prof. Greenkorn's thermodynamics class. Another very useful part of his ChE education was group work outside of class since it is a very close simulation to industrial work. Although Chuck's mother Hazel was a 1925 Purdue graduate, he grew up in Grand Rapids, Michigan. He was interested in going to a

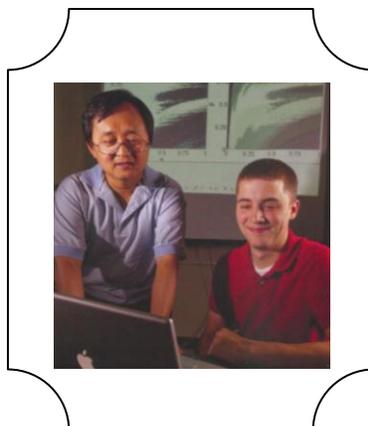
good engineering school and Purdue fit the bill. Fortunately, in the early 70's the difference between in and out-of-state tuition was modest so he could afford to attend Purdue. Another interesting story Chuck told was how he got into the upstream (exploration and production) side of the oil and gas industry. He interviewed with Atlantic Richfield (ARCO) for a position at their Harvey, Illinois, research facility in the downstream area, and was surprised to receive a call from their upstream business in Dallas. When he found out that chemical engineers could work in the upstream business, he accepted the job offer. At ARCO, Davidson advanced to eventually become the President and CEO of ARCO's subsidiary, Vastar Resources. In 2000 he moved to Noble Energy. Clearly, career paths of chemical engineers are not limited.

Risk management is critically important in the exploration and production business. Davidson thought that ChE 597A "Risk Management" would be an extremely useful course for graduates.



In November 2003 the faculty was delighted to welcome Dr. Sangtae "Sang" Kim (BS and MS '79 Caltech, Ph.D. Princeton '83) who joined Purdue to assume the position of Donald W. Feddersen Distinguished Professor of Mechanical Engineering and Distinguished Professor of Chemical Engineering. [This Chair honors Donald Feddersen (BSME '56, DEA '85, Hon. Doc. '01) who is a general partner of Bessemer Venture Partners.] Sangtae returned to academia after an extended absence from the University of Wisconsin, during which he held leadership positions in pharmaceutical R&D, to resume a research program in micro- and nano-fluidics and applications. Shortly after joining the School, Kim spent 18 months at the National Science Foundation as director of the division of shared cyberinfrastructure. In September 2008 Sang took a leave of absence to become executive director of the new Morgridge Institute for Research located on the University of Wisconsin campus. Sang's impact on the School was limited because of his fairly short tenure at Purdue and because of his split appointment with ME, but he continues to maintain regular contact while on leave and is a valued contributor to the School's visibility. At Purdue Sang taught transport courses ChE 377 and ChE 621.

In 2003 Reklaitis announced that he planned to step down as Head of ChE. As is usual, Dean Katehi formed a search committee with Ramkrishna as chair and a national search was conducted. After interviewing four excellent candidates and negotiations by Dean Katehi, this search was successful, and Dean Katehi hired Professor Arvind Varma to start as the tenth Head of the School in January 2004 as the unanimous choice of the search committee.



Sangtae Kim (left)

In December 2003 Rex was able to close his 16 plus prolific years as Head of the School to resume full-time teaching and research activities as the Edward W. Comings Professor of Chemical Engineering. In addition he continued his administrative activities as co-executive director of the Institute for Advanced Pharmaceutical Technology.

Dr. Arvind Varma received his Ph.D. from the University of Minnesota working with Neal Amundson. After a distinguished career at the University of Notre Dame where he had made major national research contributions and had received numerous awards, he became Head of the School on January 1, 2004. Since he had been Chair at Notre Dame, Varma had some idea of what becoming the Head at a major research university entailed. In many ways 2004 was an auspicious time to take over. With the new Forney addition under construction, the School was obviously moving forward and, for once, would have equal or better facilities than other ChE programs around the country. Although funds were needed for renovations of the old part of the building, the new Forney building was paid for.

With these new colleagues our School's faculty headcount had grown to 27—at that time the highest in its history. This growth was a result of President Jischke's goal of increasing the Engineering faculty roster by 75 new positions over a five year period. Aggressive faculty recruiting by the School made the increase happen.



Arvind Varma

The existing school faculty continued to make important strides and achieve noteworthy accomplishments and recognitions. In 2004 the strategic decision by the school to emphasize catalysis/surface science as a core, long-term strength, bore fruit with the launching of the catalyst design by discovery informatics project funded by the U.S. Department of Energy. Nick Delgass led this multi-million dollar project that involved a team of seven chemistry and chemical engineering colleagues. The top floor of the new Forney addition includes state of the art laboratories dedicated to this core domain. Another key development included the successful multi-investigator NSF MURI grant, led by Professor Hugh Hillhouse, which created a leading edge facility for in-situ X-ray structural analysis of nanomaterials.

When new Heads are installed, there are often other organizational changes. In June 2004 Carolyn Blue retired as the Head's Administrative Assistant. However, Carolyn continued part time as Rex's secretary, and she continued to mislead Rex into believing that he, not Carolyn, ran the journal *Computers in Chemical Engineering*. Rita Hillman was hired as Assistant to the Head, and she hired Melissa Lane as the main office secretary. Jenni Layne (now Jenni Mamph) was also hired. George Bailey, the computer facilities manager, left Purdue for a job at Ivy Tech in Indianapolis and Eric Pratt was promoted to ChE computer facilities manager. Shari Schrader, who had served as development director for Nursing and Health Sciences, was hired as the new Director of Development in January 2005. Linda Hawkins left the graduate office to move to Forestry and was replaced by Deb Bowman, a long-term secretary in the School. Cristina Farmus (MBA Krannert '04) became the business manager in July 2004. Cristina became Administrative Director for the School in September 2008. She is the photographer who took new photos for this edition of the *History*, and co-author of *A Pictorial History of the School of Chemical Engineering at Purdue University, 1911-2011*. Amy Hayden, currently Account Clerk V, was hired in the business office.

**Arvind Varma  
(1947-)**

Arvind Varma (BS ChE '66 Panjab University, MS ChE '68 University of New Brunswick, Ph.D. '72 University of Minnesota) was hired at Purdue as the tenth Head of Chemical Engineering but also to add to the School's expertise in areas such as reaction engineering, catalysis and applied mathematics. Arvind is a Minnesota-educated chemical engineer who did his PhD research under the legendary Neal Amundson, but was also close to Rutherford Aris. He was an assistant professor at the University of Minnesota during 1972-73 and worked for Union Carbide as senior research engineer during 1973-75. In 1975 he joined the University of Notre Dame as an assistant professor. He rapidly rose through the ranks, and from 1982 to 1988 he was Chair of Chemical Engineering. He became the inaugural Arthur J. Schmitt Professor of Chemical Engineering in 1988 and founding Director of the Center for Molecularly Engineered Materials in 2000. His career at Notre Dame was profiled in an article in *Chemical Engineering Education*, 32, (1) 2 (Winter 1998).

Varma's awe-inspiring research accomplishments include seminal contributions to chemical and catalytic reaction engineering, combustion synthesis of advanced materials, and inorganic membranes and reactors. At Notre Dame he published more than 220 archival journal papers, held two patents, co-authored three books, co-edited two others, presented 190 papers at professional society meetings, and graduated 36 Ph.D. students. He received the 1993 AIChE R.H. Wilhelm Award and the 2000 Chemical Engineering Lectureship Award from ASEE. In 1991 he received the Notre Dame College of Engineering Outstanding Teacher of the Year Award for undergraduate teaching, and in 2001 he was the inaugural recipient of the University of Notre

Dame's Research Achievement Award. With this background of achievement, Varma was eminently qualified to become Head of the School.

On January 1, 2004 Professor Arvind Varma began his tenure as the tenth head of the School of Chemical Engineering and the R. Games Slayter Distinguished Professor of Chemical Engineering. [This professorship is named in honor of R. Games Slayter (BSChE '21, Hon. Doc '49) the co-inventor of Fiberglass, vice president of Owens-Corning Fiberglas Corp., and the donor of Slayter Center. This professorship was previously held by Bob Greenkorn.] Because of his continuing service, it is impossible for the authors to gain historical perspective on Varma's leadership as Head.

Varma has worked tirelessly with the faculty to achieve two main goals. His first, raise the funds required to complete the renovations of the old part of Forney Hall (the old CMET building). This goal is close to completed and the building renovations are close to finished (see textbox). Of course, building renovations are never done since there is always more to do and new equipment that has to be purchased.

Varma's second goal has been to increase the visibility of the School and the rankings. Rankings are important because 1. rankings strongly influence students where to go to graduate school, 2. to a lesser extent rankings influence undergraduate students and their parents, and 3. rankings influence new and experienced professors where to accept a position. The school-wide efforts of the faculty to increase the School's rankings have included hiring outstanding new professors, publishing in high-impact journals such as *Nature* and *Science*, writing large proposals, and inviting well-known chemical engineers as seminar speakers. Specific efforts initiated by Arvind as Head include supporting all new graduate students for the first semester on School funds, increasing recruiting efforts for top-ranked graduate students especially those who are US citizens, developing an Academic Advisory Board (see textbox), and nominating faculty for national awards. Despite these extensive efforts, since rankings take a long time to change, the School's ranking has stayed essentially constant with an oscillation between 12<sup>th</sup> and 16<sup>th</sup> in the U.S.A. Rankings are discussed in more detail at the end of Chapters 7 and 8.

A difficulty during Varma's administration, as everywhere else in the US, has been lack of money. The so-called Great Recession (in the 1800's it would have been named a panic – a more appropriate name for what happened in the financial sector) impacted the Federal and State governments and eventually Purdue. The stimulus funds from the Federal government only delayed the impact of the budget shortfall. Despite the State budget shortfalls, Varma has maintained balanced School budgets and has been successful in obtaining new faculty positions by showing how the potential hires fit into Engineering's Signature Areas. In Fall 2011, the faculty count is 29, the largest in School history. In addition, the School has 494 undergraduates in sophomore to senior years, and 126 graduate students, also the largest in School history. Helped by the faculty's emphasis on multi-investigator large grants, the research expenditures for the School have increased from \$4.3 million in 2002-03 to \$12.5 million in 2009-10, a 2.9-fold increase which amounts to an impressive 16.5% annual compounded growth rate.

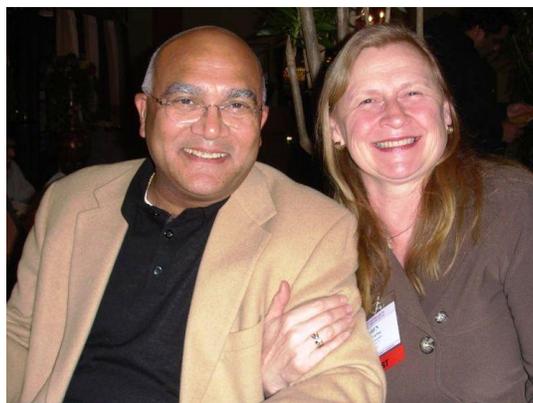
The faculty recognition efforts, noted above, have resulted in many national and Purdue awards for the School's faculty and staff in recent years. One of the most visible awards is membership in the National Academy of Engineering (NAE). In July 2003, the School had no NAE members; with careful recruiting and effective nominations, in Fall 2011 the School has six NAE members on the faculty – among the highest for chemical engineering programs in the US.

Varma is a Distinguished Professor based on the impact of his extensive research and publications in chemical and catalytic reaction engineering. He is currently interested in hydrogen fuel cells, combustion synthesis, and selective catalytic oxidations. Since coming to Purdue, he has

published 45 papers in refereed, archival journals; nine proceedings papers, and he has filed for five provisional US patents, all based on research done at Purdue. Since 2004 he and his students have presented 73 papers at 42 different conferences and he has presented 28 invited research seminars at universities. He has graduated 4 PhD students from Purdue and currently advises four Ph.D. students.

Varma has excelled in service as well. School Heads in Engineering automatically serve as members of the College Engineering Leadership Team (ELT) and on the Engineering Area Promotions Committee (EAPC). He has also served on many other Purdue committees including Chair of the College Internal Assessment Committee to review graduate programs and Chair of the College Financial Affairs team. Nationally, Varma continues to provide professional service. He serves on the International Symposium on Chemical Reaction Engineering (ISCRE) Board of Directors and was chair of ISCRE-18 held in Chicago in 2004. Since 1996, he has served as founding Editor of the Cambridge University Press Series in Chemical Engineering, and he is currently a member of the AIChE Awards Solicitation Committee.

Since coming to Purdue, Varma won the *Industry Week* Technology and Innovation Award, two Distinguished Alumnus Awards from Panjab University, was elected a Foreign Member of the Mexican Academy of Engineering, and became a Fellow of AIChE, the AAAS and the I&EC Division of ACS. In addition, Arvind was the G. P. Kane Visiting Fellow and the Golden Jubilee Visiting Fellow at UICT-Mumbai in January 2007 and March 2008, respectively. A festschrift in honor of his 60<sup>th</sup> birthday was published by the journal *Industrial & Engineering Chemistry Research* (Volume 47, No. 23, 2008) and he received the Leadership Award of the College of Engineering in April 2011.



Arvind and Karen Varma, at a dinner in honor of Arvind's 60th birthday during the AIChE annual meeting in November 2007.

In 2004 two senior faculty who are both members of the National Academy of Engineering, started at Purdue. Dr. Rakesh Agrawal (B. Tech ChE '75 Indian Institute of Technology Kanpur, MChE '77 University of Delaware, ScD '80 MIT) started at Purdue as the Winthrop E. Stone Distinguished Professor. [Stone was president of Purdue (1900-1921) during the period the ChE curriculum was started and the department was founded.] Attracting Rakesh to Purdue was a team effort of Reklaitis (his last recruitment effort), Ramki Ramkrishna (Rakesh's professor as an

undergraduate at IIT-Kanpur), Mike Ramage (BS '66, Ph.D. '70), Arvind Varma, and Dean Linda Katehi. Since ChE did not have an open Distinguished Chair position, Dean Katehi eventually had to take over the detailed negotiations with Agrawal, although Ramki and Arvind continued to encourage Rakesh to come to Purdue. Whilst cleaning out his collection of old notes to move to Purdue, Rakesh came across an old letter from 1975 denying him admission to Purdue's ChE Graduate program. Fortunately, Rakesh accepted our inherent admission of having made a mistake and came to Purdue 29 years later as a Distinguished Professor.

Rakesh Agrawal came to Purdue after 24 years of distinguished service at Air Products and Chemicals Inc. The holder or co-holder of 116 U.S. patents and nearly 500 non-U.S. patents, he had made truly extraordinary contributions to the development of gas liquefaction and cryogenic separation technologies, with more patents than any individual in Air Products' history. These patented ideas had been applied to nearly 100 operating plants with total capital expenditure for these plants in excess of \$1 billion. He also has 64 published papers in the areas of gas separations, membranes, distillation and other separation and liquefaction processes. Agrawal was the recipient of several awards from Air Products and from the American Institute of Chemical Engineers. He is the youngest recipient ever of Air Products' prestigious Chairman's Award, and he received the Presidential Citation for Outstanding Achievement Award from the University of Delaware in 1995, AIChE's 1998 award for Excellence in Industrial Gases Technology and its Separations Division's Clarence G. Gerhold Award in 2001, the Institute of Refrigeration's J & E Hall Gold Medal in 2004, was Regents' Lecturer at the University of California, Los Angeles, and was elected to the National Academy of Engineering in 2002. Most important, Agrawal decided to come to academe not to slow down and take it easy after a distinguished career, but to speed up and make a contribution to the world in solar energy research. With his very quick mind, abundant energy, and ever present smile, the School had no doubt that he will accomplish his lofty goal.



Rakesh Agrawal

At Purdue Agrawal continues his research on separation processes and started research on solar energy, which he sees as the path to a sustainable energy future. He collaborated with Hugh Hillhouse on solar energy applications and filed five provisional patent applications with Hillhouse on use of nanoparticles in thin film solar cells. Rakesh works with Ribeiro and Delgass on producing liquid fuels from biomass using thermochemical routes, and Rakesh was the principal investigator on a \$1.7M grant from DOE for liquid fuel production. In 2011 Rakesh's former student Vishesh Shah won the faculty lecture award for outstanding research. Agrawal has published 22 papers during his seven years at Purdue. During the 2010-11 academic year Rakesh was on

sabbatical as a Visiting Professor at Ecole Polytechnique Federale de Lausanne for one month and as a Visiting Scientist at Helmholtz-Zentrum Berlin für Materialien und Energie for five months.

Since he is one of the few ChE professors with extensive industrial experience, Agrawal has frequently taught ChE 450 design. He also developed a ChE 597 elective on Synthesis of Separation Processes and jointly with Hillhouse developed another ChE 597 elective on Advanced Solar Energy Conversion. At Purdue Agrawal has served on the following School committees: Graduate (Chair for two years), Faculty Recruiting, Professional Awards, and the Industrial Advisory Council. In addition, he served on the College of Engineering Research Advisory Committee. Agrawal is also very active professionally serving as a Director of AIChE for three years, on the National Academy of Engineering (NAE) Nominating Committee and as a member of the peer review committee for the ChE section of NAE, on Advisory Councils for Cornell and the Worcester Polytechnic Institute (WPI), and on a number of workshops, committees, and panels for AIChE, NAE, National Research Council, NSF, and DOE. He is also a consultant and serves on the technical advisory committees of a number of well-known companies. Since joining Purdue, Agrawal has continued to win an impressive number of awards including the AIChE Institute Lecturer (2005), AIChE Chemical Engineering Practice Award (2006), Industrial Research Institute (IRI) Achievement Award (2007), CHEMCON Distinguished Speaker Award of IChE (2007), AIChE Fuels and Petrochemicals Division Award (2008), inaugural winner of Excellence in Gas Processing Award at the Annual Gas Processing Symposium in Qatar (2009), and AIChE Founders Award (2011).



R. Byron Pipes

The other distinguished professor joining Purdue in 2004 was R. Byron Pipes (BS Civil Engineering '64 Louisiana Polytechnic Institute, MSE '69 Princeton University, Ph.D. Mechanical Engineering '72 University of Texas at Arlington). Initially, Pipes' appointments were to be in materials engineering and aeronautical and astronautical engineering. Following the suggestion of Caruthers, Varma worked with Pipes and Dean Katehi to include an appointment in ChE. Since Pipes was delighted that ChE was interested, he became the John L. Bray Distinguished Professor of Engineering [in honor of the second head of the School and the "father" of Metallurgical Engineering at Purdue] with joint appointments in A&AE, ChE, and MSE. Before coming to Purdue, Pipes had a distinguished academic career starting as an assistant professor of mechanical engineering at Drexel, then as associate professor, professor of mechanical engineering, co-founder and director of the Center for Composite Materials (a very successful research center that is still very active), Robert L. Spencer Professor of Engineering, Dean of Engineering, provost and vice president for academic affairs all at the University of Delaware. From 1993-1998 he was president of Rensselaer Polytechnic Institute (RPI). After RPI, Pipes was a

visiting distinguished scientist at the College of William and Mary for three years. During this time he did important research on carbon nanotechnology at NASA Langley Research Center. From 2001 to 2004 he was the Goodyear Professor of Polymer Engineering at University of Akron. Bryon is a member of the National Academy of Engineering based on his pioneering work in the field of composite materials processing and analysis and his leadership in developing academic-industrial collaborations in this area.

At Purdue, Pipes has been heavily involved with development of research centers. In 2007 he founded, and since that time has led, the Purdue Institute for Defense Innovation with the goal of establishing centers of excellence in areas of interest to the Departments of Defense and Home Land Security. The five centers under development are the Centers for: Traumatic Brain Injury Research, Systems Integrity, Thermal Management, Military Electronics and Nanocomposites. In ChE Pipes has served on the following committees: Honors Program, Instrumentation, and Strategic Plan. Because of his split appointment Byron's time in the School has been limited. However, he has developed a fruitful collaboration with Jim Caruthers, and when he is able to attend faculty meetings, his occasional comments illustrate the wisdom attained from his varied and distinguished academic career.

Even before he was hired, Varma realized that one of his major tasks would be raising funds and developing plans for renovation of the older part of Forney Hall (the former CMET building). Although initial planning was done before the Forney addition was dedicated, planning for the capital campaign for the renovations started in earnest after the dedication.

#### **Renovation of the CMET Building, the Older Part of Forney Hall**

In summer 2004 Don Orr, chair of the ChE: Champions for Excellence Capital Campaign Committee (see text box) informed Varma that he would like to step down as Chair. After consulting with Reklaitis and several alumni, Varma realized that Dick Hazleton (BSChE '64, MS ChE '66, Hon. Doc. '98; see text box) would be the ideal chair. Fortunately, Dick agreed immediately. Together, Dick and Arvind assembled the Capital Campaign Committee – II, which is a mix of original and new members. The members are: Robert (BSChE '47, PhD '50) and Marilyn Glenn Forney (BSChE '47), Honorary Chairs; Richard Hazleton (BSChE '64, MS '66), Chair; Richard H. Grabham (BSChE '70); Deb Grubbe (BSChE '77); Susan Hardman (BSChE '83); Jeffrey L. Hemmer (BSChE '80); Philip Krug (BSChE '52); William Madar (BSChE '62); Donald J. Orr (BSChE '74); Michael Ott (BSChE '74); Michael Ramage (BSChE '66, MS '69, PhD '71); David Rea (BSChE '62); Rick Roberts (BSChE '76); James F. Schorr (BSChE '54); and William E. Smith, III (BSChE '69). The first meeting of the new committee occurred during the President's Council event in Naples, FL on February 4, 2005.

Jim Caruthers with the aid of building deputy Jeff Valley and secretary Jenni Mamph agreed to be in charge of the renovations. Jim and Jeff have spent many hours working with the architects, construction crews and Purdue teams. The first of five renovation phases started in spring 2005. Four of the phases are completed for the Centennial Celebration and the fifth phase, renovation of the 3<sup>rd</sup> floor labs, is scheduled for completion in January 2012. Doing the renovations in phases allowed work to be done during the capital campaign. During each phase people and equipment are first moved to temporary quarters and then moved back when their area is renovated.

Although the new Forney addition came in under the estimated cost, the CMET renovations mushroomed to well above the initial cost estimates. During the course of the fund-raising, it became clear that the stacked labs area above the Unit Operations laboratory could be deferred to a much later date. Thus, fund-raising was limited to renovating the remainder of the CMET building. Detailed estimates were obtained, which put the cost of the "essential" renovations at \$10.2 million and that for the stacked labs area at \$2.25 million.

The lead donors for the renovation were Charles (BSChE '72, see text box) and Nancy Davidson. They contributed a total of \$1.5 million. Fund-raising proved to be more challenging than for the new building owing to the state of the economy and some "donor fatigue." However, once again the School's alumni proved their loyalty and dedication. Arvind and three successive Directors of Development, Shari Schrader (2005-08) and Julie Paolillo (2009-11) and Diane Klassen (2011-), spent days on airplanes visiting potential donors. The total funds raised for the renovation from June 30, 2004 until July 2011 were \$10.4 million.



An office in the CMET Building during (left) and after renovation.

Although the School had an Industrial Advisory Council since 1988, it had never had an Academic Advisory Board. In 2005 Varma instituted an Academic Advisory Board to provide input on academic issues including research, mentoring young faculty, and education. The Academic Advisory Board visits the School for two days and meets with faculty, graduate and undergraduate students. At the end of a visit they orally present their findings and later submit a written report (see box on Academic Advisory Council for membership).

**Table 6-3. Academic Advisory Board Members**

Formed in 2005 to provide input on academic issues, the Academic Advisory Board had meetings in 2006, 2007, 2008, 2009, and 2011. The distinguished (all are members of the NAE) Board members over the entire life of the Board are:

Alex Bell, University of California-Berkeley, Chair

Ignacio Grossman, Carnegie Mellon University

Mike Ramage (BSChE '66, Ph.D. '71), formerly ExxonMobil

Greg Stephanopoulos, Massachusetts Institute of Technology

Matt Tirrell, University California-Santa Barbara (retired from Board in Fall 2010)

Kristi Anseth (BSChE '92), University of Colorado – Boulder (added in Fall 2007)

Frank Bates, University of Minnesota (added in Fall 2010)



Academic Advisory Board, original group  
(Grossman, Ramage, Stephanopoulos, Tirrell, Bell)

In 2007 both Jeff Valley and Joe Pekny received the One Brick Higher Award from President Martin Jischke for service above and beyond the call of duty. Frank Oreovicz the School's Communication Specialist, who was well-beloved by the students, retired in 2007 after 28 years of service to the School.

On April 12 and 13, 2007, the School of Chemical Engineering celebrated its first Centennial – the 100th Anniversary of a Chemical Engineering curriculum at Purdue. As reported in Chapter 1, in April 1907, Purdue's board of trustees approved a new undergraduate curriculum in chemical

engineering that combined the principles of chemistry and engineering. The rapid growth of the program—within four years there were 79 students in the program—led to the founding of the School in 1911. The celebration, "Evolving Trends in Chemical Engineering Undergraduate Education: Opportunities and Challenges," kicked off with a dinner on Thursday followed by an all day program on Friday the 13th. Friday morning tours gave the School an opportunity to show off the new Forney addition. The afternoon's events include lectures from Dean Leah Jamieson who discussed "Innovative Trends in Undergraduate Engineering Education," Nick Delgass who presented "Historical Remarks About the Evolution of Purdue Chemical Engineering," and Steve Beaudoin who discussed "Recruitment and Retention: New Approaches." A panel discussion on undergraduate curriculum challenges and changes followed the lectures. Panelists were (left to right) Phil Wankat (BSChE '66); Rick Roberts (BSChE '76), Chevron Phillips Chemical Co.; Timothy Anderson, University of Florida; Ronna Robertson (BSChE '92), DuPont; and James Hill, Iowa State University. Rex Reklaitis was moderator.

Curriculum Centennial Panelists (left to right) Phil Wankat (BSChE '66); Rick Roberts (BSChE '76), Chevron Phillips Chemical Co.; Timothy Anderson, University of Florida; Ronna Robertson (BSChE '92), DuPont; and James Hill, Iowa State University. Rex Reklaitis was moderator.



After a three year break in hiring due to economic conditions, Dr. James D. Litster (BE ChE '79 and Ph.D. ChE '85 both from University of Queensland, Australia) was hired in August 2007 as a full professor. His hiring helped the University partially fulfill its commitment for the NSF Engineering Research Center (ERC) on Structured Organic Particulate Solids. Jim had been at the University of Queensland since 1987 serving as Lecturer, Senior Lecturer, Associate Professor (or Reader), Associate Director of the Centre for Multiphase Processes, Chair of Department of Chemical Engineering, Professor of Chemical Engineering, and Head (Dean in US terms) of the School of Engineering. From 2001 to 2005 he also was a Distinguished Visiting Professor of Chemical Engineering at the University of Delaware. Litster had a distinguished career before coming to Purdue including being elected a Fellow of the UK Institution of Chemical Engineers and receiving a number of University and Australian Education and Teaching Awards. Litster's research interests are in the area of particle technology, including particle design and formulation for pharmaceutical applications. He also has interests and experience in implementing educational innovations.

In the four years he has been at Purdue, Litster has made himself at home with the US educational system (although there are occasional Aussie comments) and has become an integral part of the School. In addition to joining the ERC he is the Director of Graduate Studies in the School. At Purdue he has given guest lectures in ChE 536 (particulate systems) and IPPH 562 (solids dosage forms) as well as teaching ChE 211 (thermo) and developing a new course ChE 597 "Particle Design and Processing." As Director of Graduate Studies Jim came forward when the School desperately needed a new course for TA training, and he developed ChE 697 "Experience in Teaching" with help from Wankat. He has also been a good citizen, serving as the adviser for the Graduate Student Organization and on the following committees: Graduate,

Graduate Recruiting, Undergraduate, International Programs, and Strategic Planning. Litster has continued his research in granulation with applications in the pharmaceutical industry at Purdue. He is currently supervising or co-supervising six Ph.D. students at Purdue.



Jim Litster (top, left)

#### Involved Alumni

**Michael P. Ramage** (BS '66, M.S. '69, Ph.D. '71, HDR '96) joined Mobil Research and Development Corp. at the company's Paulsboro, New Jersey, Research Laboratory after earning his doctorate working with Prof. Eckert in 1971. Dr. Ramage held a number of positions at Mobil including Research Associate, Manager of Process Research and Development, General Manager of Exploration and Producing Research and Technical Service, Vice President of Engineering, President of Mobil Technology Company, Executive Vice President, Chief Technology Officer, and Director of Mobil Oil Corporation. After the merger with Exxon to form ExxonMobil, he became Executive Vice President, ExxonMobil Research and Engineering Company. He is now retired from that position.

Mike has been active with Purdue and the School for a number of years. He is the only person who has served on both New Directions Executive Committee and the Academic Advisory Board. He is a founding member of the Purdue Energy Center External Advisory Council. He received a DEA from Purdue in 1986, the Outstanding Chemical Engineer award in 1993, and an Honorary Doctorate in 1996. In 1996 he was also inducted into the National Academy of Engineering. Dr. Ramage has served on a number of university visiting committees and was a member of the Government University Industrial Research Roundtable. He was a Director of AIChE and is a member of the Secretary of Energy's Hydrogen Technical Advisory Council. Dr. Ramage chaired the National Research Council report "The Hydrogen Economy: Opportunities, Costs, Barriers, and R&D Needs". Dr. Ramage is a member of Secretary of Energy Chu's Hydrogen Technical Advisory Council. He recently chaired NRC committees on "Resource Requirements for an Hydrogen Economy" and "Alternative Liquid Transportation Fuels". He has served on the NAE Council.

**Deborah L. Grubbe PE** (BS '77, HDR '10) has distinguished herself as an expert in engineering safety and an ardent advocate for diversity in engineering. She received a Winston Churchill Fellowship to attend the University of Cambridge in England and obtained a certificate of post-graduate study in chemical engineering. After graduation, she joined DuPont Corporation and held 15 progressive assignments within five business units over her 28-year tenure with the company. In 2005, she accepted an assignment with BP as vice president for group safety and industrial hygiene. After helping BP achieve two of the safest years in their 100 year history, Deb left BP in March of 2009, long before the disaster in the Gulf of Mexico. Ms. Grubbe started her own

consulting firm, Operations & Safety Solutions, LLC to address new challenges and affect positive changes within the industry. Ms. Grubbe was an advisory board member and is an Emeritus Member of AIChE's Center for Chemical Process Safety, she was recently appointed 2010 Chair of the AIChE Institute for Sustainability, and is currently a Fellow of AIChE. She currently serves on the NASA Aerospace Safety Advisory Panel and was a consultant on safety culture to the Columbia Shuttle Accident Investigation Board. With a broad range of experiences, she is a leader in safety across many business sectors—oil and gas, chemicals, aerospace, construction and healthcare.

A strong advocate for diversity in engineering, Ms. Grubbe actively participates in programs to raise cultural awareness and spark interest in the engineering profession among K–12 students. Deb is a long-standing mentor to Purdue students in the College of Engineering, the School of Chemical Engineering, and the Society of Women in Engineering. She also mentors students who are part of the Science, Engineering, and Math (SEM) program through the University of Delaware, which offers students with disabilities opportunities to explore interests in those disciplines. She was the DuPont representative to New Directions. Currently, Deb is working with Steve Swanson and Ron Cutshall to help develop ChE's new Process Safety Management course. She is well known among recent Purdue graduates for her shock effect tactics in ethics lectures to wake the students up to the seriousness of ethics in the chemical industry. Ms. Grubbe has received a number of honors and awards, including the Omega Chi Epsilon Award as a senior, Outstanding Chemical Engineer in 1994, and DEA in 2002, as well as the Trailblazer Award from the Delaware Alliance of Professional Women. She was named Engineer of the Year by the state of Delaware. Ms. Grubbe was the first woman and youngest elected member on the State of Delaware Registration Board for Professional Engineers.



Deborah L. Grubbe

**Dr. Steven J. Swanson** (BSChE '71, M. S. '72, Ph.D. '75) first came to Purdue from La Salle, IL, with "only a suitcase and \$20.00." He won the Omega Chi Epsilon Award as a senior. After graduating with his BSChE, he decided to stay at Purdue and did research with Emery and Lim on free and immobilized enzyme catalysts. Proving that the purpose of a Ph.D. is to learn how to do research and that the exact topic of the research is not critical, Steve then worked with Shell as a technical manager and then a process engineering manager for Shell Global Solutions. Although retired, he is currently a safety consultant with Shell. Dr. Swanson has been actively involved with the School of Chemical Engineering, as Shell's representative to the New Directions Industrial Advisory Committee and as a member of the New Directions Industrial Executive Committee. He was also involved with the Industrial Mentoring Program and Graduate Student Symposium. Currently he is working with Deb Grubbe and Ron Cutshall in developing the Process Safety Management course. He received the Purdue President's Club Pinnacle award in 2010 and is a ChE Ambassador.

**Ron Cutshall** PE (BSChE '71) served 4 years in the US Air Force before coming to Purdue. After Purdue he went to work for Amoco Oil Company in the Planning and Economics department. He then worked in various Amoco refineries in a number of design and process engineering positions. From 1984 to 1987 he was an operating manager at the Whiting refinery followed by various

technical oversight positions in Chicago and Naperville, IL. In 1994 he became project manager in the corporate Environmental, Health, and Safety compliance review area. Ron's final position was the Director of Process Safety for Amoco's Refining Business Group. In 1999 he retired from BP Amoco and became a private consultant for refining process safety and refining technology. He was a member of New Directions for seven years and worked with the professors, who taught design, on design projects for the seniors. He is currently the third member of the trio of Grubbe, Swanson and Cutshall that are helping to develop the ChE Process Safety Management course. Ron is an old fashioned, get your hands dirty and get the job done right engineer.



2011 Process Safety Management instructors:  
Steve Swanson, Ron Cutshall, Linda Davis, and  
Mike Harris (Deb Grubbe is missing)

**Kristi S. Anseth** (BSChE '92) attended the University of North Dakota at Williston (now Williston State College) and played on both the volleyball and basketball teams, earning the honor of Academic All-American her second year. She received an associate degree in 1989 and transferred to Purdue. At Purdue she did research with Peppas and his graduate student Christopher Bowman (BS '88, PhD '91) on the use of laser techniques to study polymer dissolution in microlithography and on the kinetic analysis of fast polymerization reactions for multifunctional polymers. She published three papers on this work. After receiving a NSF fellowship, she pursued her PhD ('94) at the University of Colorado-Boulder, working with Chris Bowman as his first PhD student. She then returned to Purdue as a post-doc with Peppas followed by a second post-doc with renowned chemical and biomedical engineer Robert Langer at M.I.T. She then returned to the University of Colorado as a faculty member. She rapidly became recognized as a brilliant biomedical engineer. In addition to receiving many awards, including NSF's prestigious Alan Waterman award in 2004 and AIChE's Colburn (2003) and Professional Progress (2009) awards, she was elected to the National Academy of Engineering in 2009 and the Institute of Medicine (IOM) of the National Academies in 2010 – she is the youngest member ever elected to both NAE and IOM. Currently, Kristi is a Distinguished Professor at the University of Colorado-Boulder and a Howard Hughes Medical Institute investigator, the first engineer to receive this recognition.

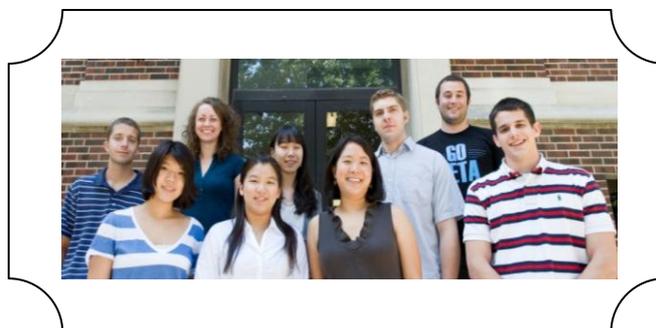
The School of Chemical Engineering has been proud of Kristi's success and has recognized her by selecting her as an Outstanding Chemical Engineer (2012). In addition, she will give one of the Centennial Lectures in 2011 and has been serving as a member of the School's Academic Advisory Board since 2010. She will be further recognized as a Distinguished Engineering Alumna in 2012.



Kristi Anseth

In 2009 Litster received the Achievement Award for Excellence in Granulation Research from the 9th International Symposium on Agglomeration, in 2010 he was a co-recipient of the College of Engineering Team Research Excellence Award won by the Engineering Research Center for Structured Organic Particulate Systems, and also in 2010 he was named a Fellow of the Australian Academy of Technological Sciences. He has frequently been an invited plenary speaker at international conferences and has chaired or co-chaired a number of symposia. He serves on the editorial boards of *Powder Technology*, *Particle and Particulate Systems Characterization*, and *AAPS Pharmaceutical Science and Technology*.

**Dr. Julie C. Liu** (BS ChE 2000 Princeton University, MS 2002 and PhD 2006 both in ChE from Caltech, NIH post-doctoral fellow 2006-07 University Massachusetts Medical School) joined the ChE faculty as an assistant professor in January 2008. She also became an assistant professor in Biomedical Engineering (BME) by courtesy. She received her doctoral degree for tissue engineering research under the direction of David Tirrell. Liu's research interests are in biomaterials, tissue engineering, and protein engineering. She is currently developing several new materials for use in cartilage engineering and vascularization for tissue-engineered grafts. In 2011 she received a 3M Non-tenured Faculty grant. Her research has proven to be very popular with students, and she now advises five Ph.D. students and has worked with a dozen undergraduate researchers.



Julie Liu (center) and her graduate and undergraduate students

At Purdue Liu started teaching immediately and was the first professor to teach ChE 378 (Heat & Mass Transfer) with all four of the fundamental labs operational. In her first exposure to teaching she also had the joy of a large class of almost 100 students. In two subsequent offerings of 378 she taught in the fall (the "off" semester) and had classes of 26 students each time. She also developed two elective courses in her scholarly specialty: ChE 597/BME 597 Tissue Engineering, which quickly became quite popular, perhaps because of the dual listing, and ChE 697 Protein Engineering. At Purdue, Julie has served on the Graduate, Faculty Recruiting and Graduate Recruiting committees. Nationally, Julie has been active in AIChE by chairing or co-chairing sessions, and she served as vice chair (2009-10) and chair (2010-11) of the Women's Initiatives Committee, which is actively involved with programming targeted towards female undergraduates, graduate students, and young faculty. Liu has also been active with Purdue's Women in Engineering Program (see box in Chapter 7).

In 2008 the **AIChE Centennial** celebrated a large number of chemical engineers in a number of different areas. Purdue was represented in all six areas. John Henry Rushton (see box in Chapter 4) was celebrated as one of 50 Founding Era ChEs. From the 100 ChE of the Modern

Era, Purdue was represented by Kristi Anseth (BS '92), Sangtae Kim, Michael Ladisch (MS '74, PhD '77), Nicholas Peppas (see box in Chapter 5) and Vern Weekman (BS '53, PhD '63). From the list of authors of 30 Groundbreaking Books, Purdue authors included R. Norris Shreve (see box in Chapter 3), Don Coughanowr, Lowell Koppel (see box in Chapter 5), J. M. Smith (see box in Chapter 4), and H. C. Van Ness. Clearly, Purdue's reputation as a cradle of outstanding textbooks is well merited. Purdue was represented in the category of 25 Top Industrial Executives by Paul Orefice (BS, '49) (see box in this chapter) former CEO of Dow Chemical. Our ChE in Space representative was Mary Ellen Weber (BS, '84), and our representative in 20 ChE's in Other Pursuits was Henry T. Sampson (BS '56) (see box in Chapter 4) who co-invented the gamma-electric cell, technology that is used in cell phones.

In February 2009 Mike Harrington started as the Computer Systems Manager in ChE. He replaced Kyle Pierce. In sad news for the School, Professor Emeritus Alden Emery died on February 7, 2009. In March Amy Hayden in the ChE Business Office received a well-deserve promotion. Julie Paolillo was hired in June as the Director of Development to replace Shari Schrader who became the Director of Advancement for the College of Technology.

Planning for the School's latest Strategic Plan began in May 2009, with the establishment of a committee comprising the following members.

**Faculty:** David Corti, James Litster, Byron Pipes, Kendall Thomson, Arvind Varma (Head)

**Staff:** Linda Davis, Cristina Farmus, Sandy Hendryx, Chris Murray

**Students:** Julie Renner (President, Graduate Student Organization),

Kyle Morton (President, ChE Student Advisory Council - undergraduate)

**Industrial Advisory Council members:** Thomas Degnan, Rick Roberts, Ronna Robertson.

During the plan's development, input on various drafts was obtained from all the School's faculty, staff, students and IAC members. The plan was finalized and issued on December 12, 2009. Key elements of the plan are shown in the flier on the next page.



Forney Hall, Fall 2010

**Values:**

Leadership;  
excellence and innovation;  
relevance and impact;  
commitment and

foundation as a means to continually improve its programs and physical facilities, while balancing short and long term goals.

**Engagement:** Encourage faculty, staff and students to develop a sense of personal responsibility and accountability for service at both the local and national levels. Promote entrepreneurial activity, leading to intellectual property, including invention disclosures and patents. Become a leader in sustainability on the Purdue campus.

**Professional Development and Recognition:** Encourage all



## School of Chemical Engineering *Strategic Plan 2010-2014*

**Vision:**

Be widely recognized among the premier ranks of chemical engineering programs in the world.

**Research:** To pursue breakthrough research that extends the boundaries of chemical engineering into areas which promote sustainability and which will have the greatest positive impact on our global society.

**Education:**

**Graduate Programs** - Recruit and retain high caliber graduate students from top-tier chemical engineering programs, provide challenging and relevant research programs, and a quality graduate level education.

**Mission:**

Provide students with a rigorous and relevant education, conduct field-defining research, and enhance the School's global impact.

**Undergraduate Programs** - Recruit and retain the most capable, motivated and diverse class of undergraduates, and help them to obtain a solid and relevant education throughout their Purdue experience.

**Global Impact:** Educate undergraduate and graduate students who will be successful in a global environment. Cultivate and expand research relationships with prominent international research organizations.

**Development:** Secure and improve the School's financial foundation as a means to continually improve its programs and physical facilities, while balancing short and long term goals.

**Values:**

Leadership;  
excellence and innovation;  
relevance and impact;  
commitment and responsibility;  
teamwork and partnership;  
diversity and respect;  
safety and sustainability.

**Engagement:** Encourage faculty, staff and students to develop a sense of personal responsibility and accountability for service at both the local and national levels. Promote entrepreneurial activity, leading to intellectual property, including invention disclosures and patents. Become a leader in sustainability on the Purdue campus.

**Professional Development and Recognition:** Encourage all faculty, staff and students to participate in activities that will enhance their career, develop their skills, and help them become more creative and productive. Actively promote recognition by internal and external award nominations.

**Culture and Environment:** Create an environment where faculty, staff and students are treated with respect and where superior teamwork is achieved. Enhance and expand safety activities and safety education.

In 2009 searches for new faculty came to fruition and three new assistant professors, Raj Chakrabarti, Yue Wu and Chongli Yuan, started in August. They add strength to the School's research and teaching in nanoengineering in a number of application areas. In addition, visiting professor Enrico Martínez-Sáenz joined the School.

Dr. Raj Chakrabarti (AB Chemistry '96 Harvard, MA and Ph.D. Chemistry 2002 Princeton, NIH post-doc 2003-06 MIT) was an Associate Research Scholar at Princeton before joining the School with an impressive publication record. In his research, which focuses on molecular-scale design and control, he is currently pursuing quantum computing for the design of next generation computers and rational protein design. Chakrabarti's research involves extending engineering principles, with suitable modifications, into the ultra-small, sub-nano range. The various aspects of Chakrabarti's education and research have prepared him for this interdisciplinary area. Chakrabarti noted, "Purdue provides an impressive infrastructure for the scale-up of cutting-edge engineering techniques from the drawing board to real-world applications "



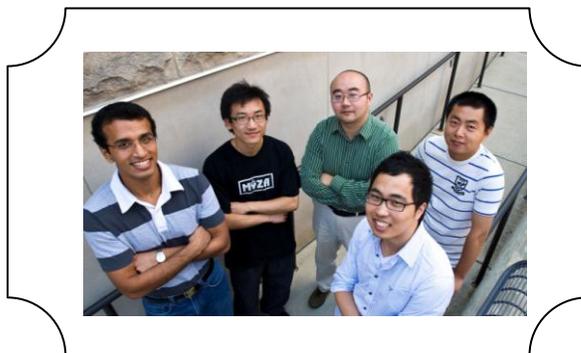
Raj Chakrabarti

At Purdue Chakrabarti introduced a new course ChE 597, Introduction to Quantum Control Engineering, to five students in spring 2010. In fall 2010 Raj had his baptism under fire, teaching ChE 456 to 150 students, and in fall 2011 he will again teach ChE 456. Strangely, Venkatasubramanian did not complain loudly about not teaching ChE 456 and being assigned electives instead. In Spring 2011 Chakrabarti taught ChE 656, Advanced Control. Raj has served on the Graduate and Graduate Recruiting committees and as Director of the International Programs in ChE.

Dr. Yue Wu (BS Chemistry '01 University of Science and Technology of China (USTC), Hefei, Anhui, P. R. China; Ph.D. Chemistry '06 Harvard; Post-doc Chemistry 2006-09 University of California-Berkeley) came to Purdue following his post-doc. Wu's research, on the applications of nanostructured materials in renewable energy, focuses on three components: energy generation through photovoltaic solar cells, energy storage through lithium batteries and supercapacitors, and energy conversion through catalysis and thermoelectrics. Wu was extremely productive throughout his education and was co-author of thirteen papers from his undergraduate studies. Yue modestly explained this by stating that it is very hot in the part of China where he did his undergraduate work and since only the laboratory was air conditioned, he spent a lot of time in the lab. When he arrived at Purdue, Wu had 28 research papers published (two in *Nature* and one in *Nature Materials*), six provisional US patents, and four international patents published. Wu says he was attracted to his research area by "the fascinating properties of nanomaterials." In 2010 Wu received a three year DuPont Young

Professor grant, an NSF grant on thermoelectrics and also the Air Force Summer faculty Fellowship.

At Purdue Wu developed two new ChE 597 courses: Introduction to Nanoscale Science and Engineering which he taught to eight students in fall 2009 and will teach again in fall 2011, and Introduction to Energy Storage Systems which he taught in fall 2010 to fourteen students. The latter course is part of Caruther's large battery project. Wu's real baptism to teaching large classes came in spring 2011 when he taught ChE 330 Molecular Engineering. Yue has served on the Graduate and Graduate Recruiting committees.



Yue Wu (center) and his research group

Dr. Chongli Yuan (BS ChE '02 East China University of Science and Technology, Ph.D. ChE '07 Cornell, post-doc molecular biology and biophysics 2007-09 ETH Zurich, Switzerland) also started at Purdue in August 2009. Her research in biomedical engineering uses an engineering approach to explore important biological phenomena. Yuan is interested in designing biomimetic nanoparticles for early detection of cancer and has received research grants from ACS-PRF and the Showalter Foundation.

At Purdue, Yuan jumped right into the core courses and started her teaching in spring 2010 with 133 students in ChE 211 (thermo). After this introduction to teaching, the fourteen students in polymers, ChE 442, in fall of 2010 must have been easy. In spring 2011 she again taught ChE 211. She is scheduled to teach a new elective ChE 597, Engineering Applications of Biological Molecules, in fall 2011. Chongli served on the undergraduate committee in ChE and she currently serves on the graduate recruiting committee.



Chongli Yuan

There is some concern in chemical engineering programs around the country about hiring new faculty who have degrees in disciplines other than chemical engineering. For example, in April 2011 the author (PCW) received a query from the University of Colorado-Boulder about Purdue's experiences. My personal opinion is that if professors are hired who do not have both BS and Ph.D. degrees in ChE, the more important degree to have in ChE is the undergraduate degree. The reason is that students are socialized to be chemical engineers as undergraduates. One of the difficulties in developing an outstanding faculty for both undergraduate and graduate programs is that research agendas in both industry and academe have expanded greatly, but the training needs of BSChE graduates have not shifted as significantly. As noted previously in the box on New Directions, maintaining balance between the undergraduate and graduate programs is critical. Hiring a few professors (less than a critical mass) who do not have any engineering degrees is OK as long as they think like engineers. Perhaps a more significant problem from the point of view of undergraduate ChE programs is the dearth of professors who have significant industrial experience.

In August 2009, Dr. Enrico Martínez-Sáenz (BS '68 National Univ. Mexico, MS '69 and Ph.D. '72 Notre Dame, all in ChE) joined the School as a Visiting Professor. Professor Martínez-Sáenz had a distinguished career with equal parts of academic [Universidad Nacional Autónoma de México, Universidad Autónoma Metropolitana-Iztapalapa (as Department Head and Dean), and Instituto de Estudios Superiores de Tamaulipas] and industrial experience [Química Lucava, S. A., Industrias Negromex, S.A. (INSA) as Director of Research and Development and Vice President, and Dynasol Elastómeros, S.A. de C.V. as Technical Director ]. He took early retirement in 2006 and returned to academe. He is a member of the Academy of Engineering of Mexico and received The National Quality Award (1996), and The National Technology Award (2001), both given by the President of México. At Purdue he has taught reaction engineering – ChE 348 and ChE 660, chemical engineering laboratory, ChE 434 and 435, and design, ChE 450. In 2011 he signed a continuing three year contract to visit at Purdue until 2014.



Enrico Martínez-Sáenz (center) with his wife Mirren, Prof. Varma, and graduate students

In September 2009 the School hosted the Chemical Engineering of the Future Symposium, which was attended by ChE academic leaders around the country as well as the School's Industrial Advisory Council. The Symposium explored and defined some of the trends that are changing ChE practice and education. Energy, the keynote topic, was moderated by Rakesh Agrawal with Prof. Maureen McCann of Purdue as the featured speaker. The panelists were Andrew Gellman (CMU), Edmund G. Seebauer (UIUC), and Fouad Teymour (Ill. Inst. Technology).

The second topic Pharmaceutical and Health Care Engineering was moderated by Rex Reklaitis with Prof. Elizabeth Topp of Purdue the featured speaker. Panelists for this session were Arindam Bose (Pfizer), Surya Mallapragada (Iowa State) and Joe Pekny. The final topical session was Education moderated by Phil Wankat with Prof. Joe McCarthy (Pitt) as the featured speaker. The panelists were Pedro Arce (Tennessee Tech), Ed Cussler (Minnesota), and David DiBasio (WPI). The Symposium was very informative, but as usual had little real impact on the slowly changing ChE educational process. A much more rapid, but still relatively slow, change is occurring due to the AIChE and ABET initiative to require safety for the next ABET accreditation visit (see Chapter 7).

Purdue has celebrated work anniversaries for staff for a long time. In December 2010 Larry Campbell celebrated forty years at Purdue, with 29 years in Chemical Engineering. Larry served faithfully and cheerfully as the Shipping and Receiving Clerk for all these years and retired in January 2011. In other celebrations of long service to Purdue: in May 2008 Karen Heide, Secretary, celebrated 35 years at Purdue with 20 years in ChE; in May 2010 Dr. David Taylor, the Director of Research and Instructional Instrumentation, celebrated thirty one years in ChE and retired in January 2011; in December 2009 Jeff Valley and in December 2010 Grigori Medevdev each celebrated fifteen years of ChE service; in December 2008 Sandy Hendryx and Marcella Maynard both celebrated ten years of service in ChE, and Marcella retired in December 2010; and in December 2008 Rick McGlothlin celebrated ten years of service and is still going strong. Carolyn Blue retired (for the second time, and this time for good) in December 2010 after 29 years of service in ChE. The large number of retirements at the end of 2010 and beginning of 2011 were due to retirement incentives offered by the University to cope with budget shortfalls caused by the Great Recession. In May 2011 Julie Paolillo left the School to become Director of Development for Biological Sciences and Statistics. Diane Klassen, who had considerable development experience at Purdue including in A&AE was hired as Director of Development in August 2011.



2010 Staff Awards. Front row: Mike Harris, Veronica Schirm, Linda Davis (Leadership Award Winner), Cristina Farmus, and Dean Leah Jamieson. Arvind Varma is behind Cristina and Bob Davis is behind Arvind

Much more recently Purdue, the College of Engineering, and finally ChE started to recognize meritorious service by staff with awards. The first such award in ChE was the College of Engineering Staff Award of Excellence-New Employee Award won in 2005 by Cristina Farmus. In 2006 Jeff Valley won the One Brick Higher Award from the University and in 2010 Jeff won the inaugural ChE Staff Excellence Award. In 2009 Larry Campbell won the College of Engineering Staff Award of Excellence-Professional Achievement Award, and Andrea Sills, business

manager, won the Professional Service with Pride Award from the College of Engineering Business Services. Linda Davis received the 2010 College of Engineering Staff Award of Excellence-Leadership Award for her leadership in the Fundamentals Laboratories, in teaching the seminar courses, coordinating the School's co-op program and in safety. In 2010 and 2011 Debbie Luedtke served as the Vice Chair and Chair, respectively of the Clerical and Service Advisory Committee (CSSAC). In 2011, Veronica Schirm won the second annual ChE Staff Excellence Award. In May 2011 Amy Hayden, Account Clerk V, graduated from Accomplished Clerical Excellence (ACE). Students have recognized staff for caring service for a number of years.

In 1990, Omega Chi Epsilon awarded Mrs. Katie Eckman its outstanding service award, and in 1992 she was further honored with the Association of Women Student's Very Important Woman award. In 2000 Mrs. Suzie Flavin received the Omega Chi mentoring award and the Mortar Board Rose Award for helping students above and beyond the call of duty. The Class of 2009 voted Mrs. Sandy Hendryx the "Most Helpful Staff Member," and in March 2011 Sandy received the Mortar Board Rose Award for her attention and caring service to the undergraduates in ChE.

#### **Table 6-4. Engineering-Wide Purdue Awards for Faculty**

The Dean A.A. Potter Award for best teacher and educator in engineering is discussed in Chapter 7. Other engineering-wide awards are the following:

The **Myron B. Scott Award** for inspiration and guidance to students is given by Tau Beta Pi to one Engineering professor each year. The recipients from ChE are Phillip C. Wankat in 1981, Frank Doyle in 1996, R. Neal Houze in 1998, and Nicholas Peppas in 1999.

The **Engineering Mentoring Award** is for mentoring graduate students, post-doctoral students and new faculty. ChE recipients are: Nicholas Delgass 2003, Phil Wankat 2005, Michael Harris 2006, and Ramki Ramkrishna 2010.

The **Team Research Excellence Award** for outstanding research by a team was given in 2007 to the ChE team of Chelsey Baertsch, Nicholas Delgass, Hugh Hillhouse, Fabio Riberio, Kendall Thomson and Venkat Venkatasubramanian. In 2010 the **Team Award** was won by the Engineering Research Center for Structured Organic Particulate Systems. Team members are Osman Basaran, Steve Beaudoin, Dor Ben-Amotz, Teresa Carvajal, Mike Harris, Jim Litster, Martin Okos, Rodolfo Pinal, Ramki Ramkrishna, Rex Reklaitis (Center Director), Lynne Taylor, Venkat Venkatasubramanian, and Carl Wassgren.

The **Research Excellence Award**, for outstanding senior research was won by Ramki Ramkrishna in 2005, Osman Basaran in 2010, and Venkat Venkatasubramanian in 2011.

The **Early Career Research Excellence Award** for outstanding research by a junior faculty member was given to Hugh Hillhouse in 2008.

The **Seed for Success Award** for new faculty was won by Kendall Thomson in 2004 and Chelsey Baertsch in 2005.

The **Engineering Leadership Award** for exemplary leadership was given to Arvind Varma in 2011.



Larry Campbell (center) receiving the College of Engineering Staff Award of Excellence-Professional Achievement Award from Dean Leah Jamieson and Associate Dean Klod Kokini in 2009.

At the time of the Centennial the faculty members with the shortest tenure at Purdue will be Dr. Brian Boudouris (BSChE '04 UIUC, Ph.D. '09 chemical engineering University of Minnesota, Post-Doc 2009-11 University California-Berkeley) and Dr. Jeffrey J. Sirola (BSChE '67 University of Utah, Ph.D. '70 chemical engineering University of Wisconsin) who join the School in Fall 2011. Brian is an assistant professor who adds to the School's strengths in polymers and energy applications. His research is in the area of design of optoelectronically active polymers, polymer-based electronics and solar cells. Jeff joins Purdue as a Professor of Engineering Practice after retiring from Eastman Chemical Company. Sirola is well-known as a long-time expert on process synthesis and the co-author with Dale Rudd and Gary Powers of *Process Synthesis*, Prentice-Hall (1973), a member of NAE and ABET Board, and AIChE president in 2005. Jeff is very familiar with Purdue and his son John graduated from the School in 2000. At Purdue Jeff will help teach ChE 450, senior design, be involved with the Global Policy Research Institute (GPRI) and with faculty in the energy/sustainability areas, and will serve as a resource in our planning efforts in his areas of expertise, including manufacturing.



**Left:** Bryan Boudouris  
**Right:** Jeff Sirola

<b>Table 6-5. Scholastic Awards for Juniors in ChE</b>				
The School has two awards for outstanding juniors – the Stephen Craig award, established in 1973 in memory of Stephen K. Craig (B.S. '67, deceased), and the George T. Tsao award established by Prof. Tsao in January 1989 to honor outstanding juniors interested in renewable energy.				
<b>Year</b>	<b>Stephen Craig Award</b>		<b>George T. Tsao Award</b>	
2011	Evan Bugher		Yiwen Chen	Alyssa De Vries
			Wesley Fleming	Margaret Hwang
			Marilyn Slininger	Tyler Tekyl
2010	Kimberly Ohn		William Borrer	Nicholas Seprodi
			Kathryn Buckalew	Ashley
			Vacchiano	
			David Lyons	
2009	Nathan Vogler		John Kindler	Lindsay Williams
			Brian Lowry	Jason Wu
			Byron Wall	
2008	David Hanna		Venkatesh Botu	Dustin Rains
	Laura Quock		Caleb Class	Ashley Wenger
			Renan Oliveira	
2007	Scott Fagan		Ajlan Al Zaki	Vikram Pansare
			Jeremy Jones	Dennis Yang
			Russell Nix	
2006	Daniel Robbins		Airine Airine	James Skallerup
			Jason Lamuda	
2005	Samantha Sanders		D. Mullaly	D. Eckerle
2004	Amanda Braun		Emily Hunter	
2003	Ben Rosenbaum		K. Tijptowidjojo	
2002	Pat Stenger		Henry Santoso	
2001	Margaret Horton		Theis F. Clarke	Tze Lee Phang
1999	Matthew Lee		Emily Williamson	
1998	Cassandra Forthofer		Roger Hoover	
1997	John Whitaker		Kevin Rabinovitch	
1996	Jeffrey E. Lin		Andrew C. Allock	
1995	Jennifer Harting		Melissa Laucks	
1994	Michele Bland		Dicksen Tanzil	
1993	Brian Eastin		Michael Hoffman	
1992	Mark Billian		Kristin Hickey	
	Brian Zylla			
1991	Kristi Anseth		Tom Adkins	
1990	Kendall Justiniano		David Burkett	David Staehler
	Linda Manning		Kevin Chaussee	
1989	Jeffrey Kobe			
1988	Jo Ann Campbell	Roberta Petersen		
	Kevin Haehl	Lisa Shieh		

1987	Christopher N. Bowman	
1986	Lyn Marie Eshelman	
1985	Michael Jones	
1984	Georgeann Economy	
1983	Kevin J. McLaughlin	
1982	Steven D. Perry          Jennifer D. Sinclair	
1976	Peter S. Barnes	
1974	Elizabeth L. Ryker	

<b>Table 6-6. Additional Awards for Graduating Seniors</b>			
In addition to the Lottes award (Table 3-1), the Omega Chi Epsilon award (Table 4-1) and the AIChE award (Table 5-7), the School awarded a American Institute of Chemists (AIC) award through 2001 when the AIC stopped presenting the award to chemical engineering students, the Purdue Student Engineering Foundation (PSEF) award for exemplary achievements started in 2002 and was not given in 2011, and a Senior Design award for the teams with the best designs in ChE 450 has been awarded most years since 1984.			
<b>Year</b>	<b>AIC award</b>	<b>PSEF award</b>	<b>1<sup>st</sup> place Senior Design</b>
2011	--	--	Nathan Davis Grant Haeussler Suzanne Robison Caitlin Schmitt
2010	--	Lindsay Williams	No award
2009	--	Laura Quock	Jonathan Adams Eric Frankowski March Millerth
2008	--	Laura Berryman	Clayton Collins Jared Inman Robert Purcell
2007	--	Lee Swanson	Xiang-Jie Chung Troy Conant Jennifer Gress Siao Yee Wee
2006	--	David Mullaly	Albert Faulkinbury David Mullaly Akshay A. Shah
2005	--	Emily Hunter	Benjamin M. Davis Emily A. Hunter Stephanie L. Pasky

2004	--	Annette Stiers	Craig Bonaccorsi Thomas Bowers Wei-Seng Chan Craig Erny
2003	--	Josh Schoenherr	Oluseun Agboola Donald E. Owens III Ryan Stoa
2002	--	Teresa Zakaria	James Breidenbach Christina Snider Malvaiz Adith Sujan
2001	Jennifer Witman	--	Frederick Brown IV Mark Richmond Nicholas Staab
2000			Elizabeth Davis Meara Kelley Suzanne Marko
1999	Cassandra Forthofer		Jennifer Brunner Elizabeth Dussich Amy Gentz Kerry Nead
1998	Ben Voss	--	Robert E. Cowden Herman Gunawan Bryan D. McVicker Steven J. Tomory
1997	Christopher Lawler	--	Mingh Luong Michael Miltenberger
1996	Jennifer E. Harting	--	Jennifer E. Harting Lisa LaMacchia John Willham
1995	Nicole Lark	--	Michele Bland Edward Crane Dennis Willig
1994	Gregory McCullough Jason Zinschlag	--	Kristin Cieciva Steven Matthews Alan Pruitt
1993	Ranee Stile	--	Jason Chow Robert Magee David Morrison

1992	Thomas Adkins	--	Darin Campbell Kenneth Harris James Kaleta
1991	Rex Frost	--	David Adams Mary Darrah Scott Stouffer
1990	Leah Roehl	--	Neal S. Davenport Sara L. Gallo Leah M. Roehl
1989	Kevin Haehl	--	No award
1988	Wolfgang Kadavanich	--	Wolf Kadavanich Brian Turk Curt Walker
1987	Jeannine M. Sivy	--	Susan Anderson Julie Hall Mark Schmalfeld
1986	Bill Morokoff	--	Paul Miller James Ritter Brian Sanders
1985	Robert Novy	--	Brian Craig Darryl Kinzer Brian Tulloh
1984			Les Elkin Anne Holland Steve Perry
1983	Jennifer D. Sinclair Scot W. Warren	--	
1982	David N. Chiang	--	

**Table 6.7. Miscellaneous Undergraduate Student Awards**

**Varsity Walk Award** is for the student athlete who brings the most national recognition to the University. Terry Dischinger received this award in 1962.

**Graduation Respondent.** Outstanding Seniors from different departments are selected by an interview process done by the Office of the Vice President of Student Affairs to be graduation responders. The following ChE Students have been selected for this honor:

Ashley Wenger	August 2009
Emily Hunter	May 2005
Heather Baburek	December 2000
Jennifer Harting-Ward	August 2000
Diane Whirledge	May 2000
Craig Riley	December 1992

The **Flora Roberts Award** (established in 1926) is a Purdue-wide award for an outstanding senior woman. Emily L. Maddox-Liggett in 1977, M. Susan Ogg in 1979, Alyssa A. Dudkowski (degree in ChE and Chemistry) in 1993, Rachel Peck in 1999, and Amanda Louise Schreiweis in 2000 are the winners from the School.

The **Grand Prix Outstanding Student Award** (established in 1971) recognizes leadership, scholarship and service to Purdue by a student of the University. The only recipient of the School has been Deli S. Atkins-Schleiffarth (B.S. '78).

The **Bruce Helfert Outstanding Junior Award** (established in 1973) was given to Cheryl A. Penkowski (B.S. '83) in 1982.

In 1985 the Indianapolis Chapter of AIChE sponsored the **AIChE Best Senior Award**. Its recipient was Jean F. Meyer (B.S. '85).

1989 **National Polymer Science competition** administered by Univ. Dayton. Michael Wolfe won 1<sup>st</sup> prize and Timothy Pierce won 3<sup>rd</sup> prize

**Society for Advanced Material & Process Engineering Undergraduate Awards** is a national competitive program. Betty Ficek won 1<sup>st</sup> place in 1990 and 1992. Natalie Sisniewski won 2<sup>nd</sup> place in 1993.

**Kimberly-Clark/National Society of Black Engineers** (NSBE) scholarship for academic excellence was won by Olukayode Ogundeyi in 1993

1993 **National Environmental Engineering Design Contest** won by team led by Kristin Hickey and Lori Phillips with other team members Valerie Kensler, Scott Fulton (ME) and Kevin Selwa (ME).

Olga Shebanova was awarded the **Sandra Postel Purdue SWE Leadership Award** in 2004

Tyler Tekyl, a ChE undergraduate served as the **Student Representative to the Purdue Board of Trustees**, July 1, 2009 to June 30, 2011. In an unprecedented move, Governor Mitch Daniels appointed another ChE undergraduate, Miranda McCormack, who will be a junior, to serve on the Board of Trustees starting July 1, 2011.

Alvin Ang in 2007 **Business Professional of America** won 2<sup>nd</sup> place in Interview competition and won 3<sup>rd</sup> place in Keyboarding competition. In 2010-11 in Soy Innovations competition was on 1<sup>st</sup> place team that won \$20,000 prize, and in **Burton D. Morgan competition** the team won 3<sup>rd</sup> place with \$5000 prize.



Tyler Teykl (BS '12), Student Trustee on Purdue Board of Trustees, 2009-2011.



Miranda McCormack, Student Trustee, 2011-2013. Two trustees from the same school is a record.

### **ChE-SAC and ChE Connections Student Organizations**

In fall 1971 an Undergraduate Advisory Board was approved with the charge to: organize themselves, set up propagation procedure, conduct course & instructor evaluations, provide advice on textbooks, set up a "buddy system" for sophomores, provide tutoring, and set up their agenda. David F. Strahorn was the first president. This Board disappeared without a trace after 1972. The Chemical Engineering Student Advisory Council (ChE-SAC) was organized in October 1997 with a mission (described by the students) "to facilitate communication between students and faculty for the betterment of the chemical engineering department [sic] along with the students enrolled in it." The organizer was Becca Kopp, (BSChE, '99). The council consists of 12 students including representatives from the sophomore, junior and senior classes plus representation from co-op students, AIChE and Omega Chi Epsilon. Potential members submit an application and are interviewed. One of the initial goals of the council was revitalizing the ChE Connections mentoring program. ChESAC hosts events such as a mentoring program where ChE seniors talked with incoming ChE sophomores, mid-term formative course evaluations, socials for students and professors, chemical engineering ambassadors, tee shirt sales, and philanthropic activities. The advisors were Nicholas Delgass (1997-2006), Ramki Ramkrishna (2006-07), Steve Beaudoin (2007-08), and David Corti (2008-present). The chapter officers are listed in Table 6-8.

The ChE Connections program was originally organized by Lisa Bunch in August 1996 to provide mentoring to students. Initial interest was high with 230 undergraduates signed up and sixty trained as mentors. Later, the organization struggled for several years because of low interest from undergraduates before folding. Professor Nick Delgass briefly served as the advisor. Officers are listed in Table 6-9.

<b>Year</b>	<b>President</b>	<b>Vice President</b>	<b>Treasurer</b>	<b>Secretary</b>
1997	Cassandra Forthofer			
1999	Elizabeth Davis		John Sirola	Chris Calderon
2000	Devon Devrieze		Keng-Jin Lee	Michelle Leung
2001	Michelle Leung	Keith Melchiors	Jeff Miller	Gwen Hallberg
2002	Jennifer Savaiano	Mark Uline	Melissa Stok	Doug Metrish
2003	Drew Pfister	Brian Ward	Eric Born	Evan DiGregory
2004	Drew Pfister	Evan DiGregory	Eben True	Kelly Manfred
2005	Eric Born	Kirk Liu	Jason Ormes	Ben Bankes
2006	Kirk Liu	Sonya Dwivedy	Jason Ormes	Ben Bankes
2007	Russell Nix	Meredith Spencer	Jessica Perry	Vikram Pansare
2008	Brittany Hasler	Phil Schoh	Tiffany Rummell	Braden Snook
2009	Kyle Morton	Julia Smith	Braden Snook	Sarah Beigh
2010	Ashley Vacchiano	Allison Jaspering	Patrick Meyer	Shannon Blazek
2011	Patrick Meyer	Justin Off	Ian Smith	Jana Skiles

<b>Year</b>	<b>President</b>	<b>Vice President</b>	<b>Treasurer</b>	<b>Secretary</b>
1999	Deny Bobula		Mike Clark	
2000	Deny Bobula	Brandon Golden	Jamie Gatchalian	Mike Clark
2001	Brooke Butler	Brandon Golden	Jeff Kaltunus	Kanishka Mapa
2002	Jeff Kaltunus		Kanishka Mapa	Kanishka Mapa
2003	Peter Rokosz	Brittany Barrett	Joe Filbrandt	Joe Filbrandt
2004	Lauren Hunding	Matthew Grabbe	Kentaro Otsuka	Apri Melinda
2005	Apri Melinda	Chris Froiland	Akshay Shah	Nick Bullington

Chemical engineers actively participate and serve as officers and committee chairs in the activities of the Tau Beta Pi engineering honorary society, the National Society of Black Engineers, the Society of Hispanic Engineers, the Society of Women Engineers, and the Society of Professional Engineers.

## Contemporary Student Life

In many ways current students are very similar to students in the past – they study hard and play hard. Almost all of them have the latest electronic gadgets, but this is similar to the past when students wanted the latest stereo equipment or computers. Their advisors and faculty mentors strongly encourage students to become *involved* in one extracurricular activity. Many students belong to one of the organizations sponsored by the School: AIChE Student chapter, Omega Chi Epsilon, and ChE-SAC. These, and other student organizations, provide leadership opportunities for officers (AIChE officers Table

5-8, Omega Chi Epsilon officers Table 4-2, ChE-SAC officers Table 6-8) and committee chairs. Students are also involved in a number of volunteer activities sponsored by these and other student organizations.



Any activity involving free food is popular. AICHE students line up for free food at AICHE cookout 2010.



**Left:** Students want to learn about the real world. John Morgan (center) lectures to an attentive group of AICHE students on practical fermentation as part of the popular AICHE pubbing with professors activity.



**Right:** Tiffany Rummell (BS '10) and Lauren Fagerman (BS '10) donate at the blood drive in the Henson atrium.



ChE students are involved in volunteer activities and intramural sports. ChE undergraduates at 2010 Relay for Life.

AICHE bowlers in 2010.



### Very Special Ladies, Part II

**Kathryn A. "Katie" Eckman** started in the School as a part-time secretary in the ChE co-op office. In 1976 Lowell Koppel, who had a keen eye for competence, convinced her to move upstairs as the administrative assistant to the Head where she reigned until 1981 when she took the position of undergraduate Administrative Assistant when Mary Hutchings retired. Thus, Katie became "mother" for a generation of students. In her role as the undergraduate counselor, Katie knew all of our students. "Knowing" the students, for her, meant going beyond the day to day practicalities of making sure that a student was in the right class or on track for graduation. Her relationship with a student often pre-dated that individual's participation within the department, for she was also a counselor in Freshman Engineering. Katie's strength was her ability to unite professional competence with interpersonal involvement. In a program as difficult and rigorous as Chemical Engineering, she provided emotional support for students having difficulties, a very important role deeply appreciated by the students. She'd take a personal interest in each student and go "that extra mile" to help. At the same time, she also knew when to be firm, when to remind the student to buckle down and work harder—but she did so kindly and fairly. When asked who helped them the most in getting through Purdue, graduates invariably answered—Katie! Each year at the senior banquet she received special recognition from the graduating seniors. In 1990, Omega Chi Epsilon awarded her their outstanding service award. She was further honored with the Association of Women Student's Very Important Woman award in 1992. In 1996 she entered the University's early partial retirement program. In this role she first trained **Ms. Lisa (Burge) Bunch** (BS ChE '87), who had worked for Eli Lilly for six years as a staff engineer as well as in the Department of Freshman

Engineering. After Lisa left for another career, the School was fortunate to attract **Mrs. Janet Siebenthal**, an experienced and highly regarded counselor in the Freshman Engineering Department in August 1997. She worked with Katie until Katie's retirement in 1998. Unfortunately, instead of enjoying a long and fruitful retirement, Katie died following a tragic car accident in 2007. **Sandy Hendryx**, who had worked with Jan in Freshman Engineering, was hired in August 1998 as the records clerk in the undergraduate office replacing **Karen Schneider** who moved to Forestry. Hendryx received the Mortar Board Rose Award in March 2011. Jan Siebenthal served the School faithfully until she retired in 2005. In August 2005 **Veronica Schirm** transferred from Krannert to ChE to become the new Undergraduate Program Administrator in ChE. We are happy to report that the School's tradition of having a "mother" on duty continues.

After Katie Eckman moved to the Undergraduate Office, Andres hired **Betty C. Harvey** (1981-1987) as the administrative assistant to the head. To replace her Reklaitis promoted a long term secretary in ChE, **Carolyn Blue**, who served faithfully as administrative assistant to the Head until June 2004. Carolyn continued to serve Rex and the School as the administrative assistant for the journal *Computers & Chemical Engineering*, which Reklaitis edited. Carolyn retired in December 2010. The Assistants to the Head serving Varma were first **Rita Hillman** (2004-05) and then **Chris Murray** (2005-present).

In the Graduate Office Mrs. **Phyllis Geiger** was Alden Emery's secretary for many years. After she retired, Mrs. **Joan McGlothlin** was hired as graduate secretary (McGlothlin is a familiar name in ChE since her husband Kenny was the undergraduate lab technician and later her son Rick replaced him). In 1993 Joan retired as the graduate secretary and **Mrs. Linda L. Hawkins** was hired as her replacement. Linda, a native of Indiana and a Ball State University graduate, was previously Supervisor of Student Services in the Office of the Registrar. After Linda moved to Forestry in 2005 (she retired from the University in 2011), **Deb Bowman**, a long-term secretary in ChE since 1985, took over this position.

Another lady who became very special to the alumni was **Dr. Bettina McConnell** who joined the department in June 1998 as Development Director with dual appointment as Associate Development Director of the Schools of Engineering. Tina worked closely with Reklaitis in raising the funds for the addition to CMET that made it Forney Hall. Unfortunately, before the building was dedicated, she had to resign because of a stroke.

**Table 6-10. Where Are They Now?**

Here is a (partial) list of former faculty members of the School and their present affiliation.	
Ronald P. Andres (1981-2004)	Professor Emeritus, Purdue, WL
Chelsey Baertsch (2003-10)	Portland, OR
Ronald G. Barile (1966-80)	Dynacs, Inc., Kennedy Space Cntr.
Gary E. Blau (1998-2006)	Visiting Industrial Professor IE, Purdue
K. C. Chao (1968-93)	Professor Emeritus, Purdue
Jennifer Curtis (1997-2004)	Professor, Univ. Florida
Francis Doyle (1992-97)	Prof. & Assoc. Dean Univ., Calif.-Santa Barbara
Robert Greenkorn (1965-2001)	Professor Emeritus Purdue, WL
Hugh Hillhouse (2002-10)	Professor Univ. Washington, Seattle
Lowell B. Koppel (1961-85)	Retired Vice-President, Aspen Tech
Leslie E. Lahti (1963-67)	Dean Emeritus Univ. Toledo

Jochen A. Lauterbach (1996-2002)	Professor, Univ. South Carolina
Gil Lee (2000-2006)	Professor Chemistry, Univ. Col. Dublin
Jay H. Lee (1998-2000)	Head ChE, KAIST, S. Korea
Henry C. Lim (1966-1987)	Professor Emeritus U. Calif.-Irvine
Michael F. Malone (1979-80)	Vice Chancellor, Univ. Mass-Amherst
Nicholas A. Peppas (1976-2002)	Professor, The University Texas at Austin
Jin Ho Seo (1986-89)	Prof. Food & Animal Biotechnol., Seoul Natl
Alexander Sesonske (1954-70)	Retired, Turnwater, WA
Eva Sevick-Muraca (1994-99)	Professor Univ. Texas Health Center-Houston
Paul T. Shannon (1958-63)	Retired, Vancouver, WA
Robert Squires (1962-2004)	Professor Emeritus, Purdue, WL
Christos Takoudis (1981-96)	Professor, University of Illinois at Chicago
Julian Talbot (1989-1996)	Directeur de Recherche, CNRS, Univ. Paris VI
Theofanis G. Theofanous (1969-75)	Professor, Univ. California-Santa Barbara
John W. Tierney (1954-56)	Professor Emeritus, University Pittsburgh
George Tsao (1974-2005)	Professor Emeritus Purdue, WL
Theodore J. Williams (1965-70)	Professor Emeritus Purdue, WL
William A. Weigand (1967-81)	Professor Univ. Maryland-College Park
John M. Wiest (1988-95)	Professor & Associate Dean, Univ. Alabama

**Table 6-11. Longest Tenure in Faculty**

With the many changes in the faculty over the years, very few faculty members in the early decades served the School for more than 30 years (excluding their time as professors emeriti). This has changed. Here is a list of the faculty members with the longest tenure in the School as of June 2011.

R. Neal Houze (1969-present)	42 years
Robert Hannemann (1969-present)	42 years
Robert Squires (1962-2004)	42 years
Phillip C. Wankat (1970-present)	41 years
G. V. Rex Reklaitis (1970-present)	41 years
Alden H. Emery, Jr. (1954-1995)	41 years
Roger E. Eckert (1964-2003)	39 years
W. Nicholas Delgass (1974-present)	37 years
David P. Kessler (1964-2002)	37 years
Lyle F. Albright (1955-1991)	36 years
Robert A. Greenkorn (1965-2001)	36 years
Doraiswami Ramkrishna (1976-present)	35 years
James M. Caruthers (1977-present)	34 years
Elias I. Franses (1979-present)	32 years
N.-H. Linda Wang (1980-present)	31 years
George T. N. Tsao (1974-2005)	31 years
John L. Bray (1923-1952)	29 years
Nicholas A. Peppas (1976-2002)	26 years
K. C. Chao (1968-1993)	25 years
Frederick Serviss (1929-1954)	25 years
R. Norris Shreve (1930-1955)	25 years
John M. Woods (1952-1977)	25 years

At the time he retired, George W. Sherman, Jr. had the longest tenure of any faculty member in the history of Purdue (48 years, 1912-60), but only 23 years in Chemical Engineering.

Longest tenure at Purdue at the 2011 Centennial Celebration: Profs. Hannemann, Houze, Wankat



### Some Unusual Careers and Interests – Part 2

Chemical engineers continue to violate the stereotype of an engineer. Although we are unaware of many interesting cases, a few additional careers will be mentioned here.

**David R. Aufferberg** (BSChE '85) works for Goodyear Tire & Rubber Company in Race Tires Program as team leader for Drag and Sports Car Tires (2005 ChE Newsletter).

**Clifford W. Browning** (BSChE '72) a patent and trademark attorney and partner in the Indianapolis law firm Krieg DeVault LLP was appointed editor in chief of *The Trademark Reporter*®. (2008 ChE Impact)

**Raymond Carlston** (BSChE '73) retired from service as an assistant state attorney (felony prosecutor) in Jacksonville, Florida in August 2008. He is currently serving as the command legal counsel, Naval Hospital, Naval Air Station, Jacksonville, Florida (2009 ChE Impact).

**David L. Click** (BSChE 1960) has been serving with the Division of Overseas Ministries, Christian Church-Disciples of Christ in Lesotho, Africa (1999 ChE Newsletter).

**J. Eric Dietz** (PhD '94) was chosen by Indiana governor Mitch Daniels to be the first director of Indiana's Department of Homeland Security (2005 ChE Newsletter). He is currently a faculty member in Purdue's College of Technology.

**Clifford C. Furnas** (1900-69, BSChE '22, HDR '45, NAE Member) participated in the 1920 Olympics in Antwerp, Belgium and qualified for the finals in the 5000 m race. He became a professor at Yale and a noted heat transfer expert. He then became President of the State University of New York at Buffalo where the ChE building is named the Furnas building.

**Abbie Griffin** (BSChE '74) was awarded the Crawford Fellow of the Product Development and Management Association (PDMA) for her research contributions in product innovation management. She is the Royal L. Garff Presidential Chair in Marketing, Univ. Utah, David Eccles School Business (2010 ChE Impact).

**John T. King** (BSChE '36, deceased) was founder, secretary, and production manager of National Homes Corp., Lafayette, IN, and co-founder and president of New Century Homes, Inc. (Summer 2000 ChE Newsletter).

**J. Timothy McGinley** (BSChE '63, Honorary Doctorate '2010) played basketball at Purdue, then was managing partner of House Investments in Indianapolis and is now retired as Chair of the Purdue University Board of Trustees.

**John L. Myers** (BSChE '51), now retired, was the mayor of King City, CA for 12 years and on the Mee Memorial Hospital Board of Trustees for 22 years. In 2000, he and his wife were Chamber of Commerce Citizens of the Year (2005 ChE Newsletter).

**George Perkins** (BSChE '37, PhD '40) was a consultant and founding board member for Addiction Recovery Associates of Kentuckiana in Louisville, KY. He is a member of the national Faces and Voices of Recovery campaign committee (2005 ChE Newsletter).

**Jack B. ReVelle** (BSChE '57) served 12 years in the U.S. Air Force including Vietnam, then earned his M.S. and Ph.D. in Industrial Engineering and Management from Oklahoma State. He is a consulting statistician ("The Wizard of Odds") who authored or co-authored 11 books. He was inducted into the Purdue ROTC Hall of Fame in 2006.

**Barbara Roberts** (BSChE '78) is a project manager with WorldCom in Tulsa. She wrote that she is "involved as a cuddler at St. Francis Hospital and ordained minister." (Fall 2002 ChE Newsletter)

**Gavin Sinclair** (BSChE '83, deceased) published an inspirational book that grew out of his own experiences: *All things work for Good: A Book of Encouragement for people with Cancer, Their Family and Friends* (The Positive Press, Tucson, AZ, 1997). He earned a PhD in economics and taught in Technology at Purdue.

**James L. Smith** ('67) was a captain in flight operations for United Airlines (2005 ChE Newsletter).

**Karen Yancey** (BSChE '79) teaches math and environmental biology at the Correctional Facility in New Castle, Indiana (Fall 2010 ChE Impact).



Clifford Furnas as a member of the Purdue Track Team (1900-69, BSChE '22, HDR '45, NAE Member)

Although the exact date of the Centennial of the School is June 14, 2011, the School is celebrating the entire year. The Centennial Planning Committee (see box) determined to start Centennial Celebrations in January 2011 with seminars. The main celebration and banquet will be held in October 2011. In addition two histories of the School would be prepared – this *History*, (available as a paper copy, on a CD or as free pdf files) and a coffee-style book, *A Pictorial History of the School of Chemical Engineering at Purdue University, 1911-2011*.

### **Centennial Planning Committee**

#### Alumni

**Michael Graff** (MS '79, OChE 2002, DEA 2008), President & CEO, American Air Liquide Holdings, Inc.

**Jeffrey Hemmer** (BS '80, OChE 2001, DEA 2009), Senior Vice President, The Sinclair Group, Ltd.

**Surya Mallapragada** (PhD '96), Stanley Professor and Chair, Department of Chemical and Biological Engineering, Iowa State University

**Rick Roberts** (BS '76, OChE 2004, DEA 2007), Senior Vice President, Manufacturing, Chevron Phillips Chemical Company

#### Faculty

**Arvind Varma**, R. Games Slayter Distinguished Professor; Head, School of Chemical Engineering; Chair of Centennial Planning Committee

**Joseph F. Pekny**, Professor

**Gintaras (Rex) Reklaitis**, Burton and Kathryn Gedge Distinguished Professor

**Phillip C. Wankat** (BS '66), Clifton L. Lovell Distinguished Professor

**You-Yeon Won**, Associate Professor

#### Staff

**Cristina D. Farmus**, Administrative Director

**Julie A. Paolillo then Diane Klassen**, Director of Development

#### Undergraduate Students

**Kyle Morton** (BS 2010), ChE-SAC President 2009-10

**Ashley Vacchiano** (BS 2011), ChE-SAC President 2010-11

**Patrick Meyer**, ChE-SAC President 2011-12

#### Graduate Students

**Julie Renner**, Graduate Student Organization President, 2009-10

**Sara Yohe**, Graduate Student Organization President, 2010-11

**Laura Hirshfield**, Graduate Student Organization President, 2011-12

On January 25, 2011 Dr. Robert Hannemann (BSChE '52) presented the first Centennial seminar. The list of Centennial Seminars for 2011 is in Table 6-12, and the schedule for the Centennial Celebration on October 7 and 8 is in Table 6-13.

**Table 6-12. 2011 Centennial Seminars**

Jan. 25	Dr. Robert Hannemann (BSChE '52) Purdue University, "Purdue Chemical Engineering and Medical Research – A Review of the Past and a Vision of the Future"
Feb. 17	Dr. Surya K. Mallapragada (PhD '96) Iowa State Univ., "Bioinspired Materials"
March 22	Dr. Aditya Bhan (PhD 2005) University Minnesota, "Catalysis in a Pocket: Catalytic Consequences of Spatial Constraints in Acidic Zeolites"
April 14	Mr. Michael J. Graff (MS '70), President/CEO American Air Liquide Holdings, Inc. "Science & Engineering: Serving in the 21st Century"
April 21	Mr. Charles Davidson (BS '72), Chairman/CEO, Noble Energy, Inc., "Technology Impacts on Global Energy Supplies"
April 28	Mr. Michael H. Ott (BS '74), President and CEO, Polysciences, Inc., "Polysciences, Inc. – The First Fifty Years 1961-2011"
Aug. 30	Dr. Deborah L. Grubbe (BS '77/HDR 2010), Owner, Operations & Safety Solutions, LLC, "Entrepreneurship Lessons Learned from Large Organizations"
Sep. 27	Mr. Norman L. Gilsdorf (BS '77), President, Honeywell Process Solutions, "Have Chemical Engineering Degree – Will Travel"
Oct. 4	Dr. Jennifer S. Curtis (BS '83), Distinguished Professor, School of Chemical Engineering, University of Florida, "Particle-Laden Flows: Application, Modeling Approaches and Challenges"
Oct. 13	Ms. Emily M Liggett (BS '77), CEO, Nova Torque, LLC, "ChE Entrepreneurship: Building on a Technical Foundation"
Nov. 10	Dr. William D. Young (BS '66/HDR 2000), Venture Partner, Clarus Ventures, LLC, "History and Promise of Biotechnology"
Nov. 29	Dr. Kristi S. Anseth (BS '92), Howard Hughes Medical Investigator & Distinguished Professor of Chemical & Biological Engineering, University of Colorado at Boulder, "Goodbye Flat Biology"

**Table 6-13. Planned Centennial Celebration Schedule  
(Friday October 7 & Saturday October 8, 2011)**

Friday, October 7.

1:00	Welcome Address, Forney Hall G140
1:15	Centennial Lectures, Forney Hall G140
	Entrepreneurship and Other Pursuits: Robert Weist (BS '62)
	Academia: Nicholas Peppas (Faculty member, 1976-2002)
	Industry: Paul Oreffice (BS '49)
2:30	Panel Discussions (3 parallel sessions), Forney Hall
	<i>Entrepreneurship and Other Pursuits:</i>
	<b>Panelists:</b> Don Dunner (BS '53), Linda Huff (BS '70), Tim McGinley (BS '63), Gerald Skidmore (BS '54).
	<i>Academia:</i>
	<b>Panelists:</b> Abbie Griffin (BS '74), Duncan Mellichamp (PhD '64), Tony Mikos (MS '85, PhD '88), Jamey Young (PhD '05).
	<i>Industry:</i>
	<b>Panelists:</b> Jeff Hemmer (BS '80), Mike Ramage (BS '66, MS '69, PhD 71), Rick Roberts (BS '76), Ronna Robertson (BS '92).
3:45	Presentation of Centennial Scholarships
	Centennial Undergraduate Scholarship: Keith Andrew Kral
	Centennial Graduate Fellowship: Caleb Miskin
	Graduate and Undergraduate Students Posters, Forney Hall
4:45	Break
6:30	Reception and Dinner, Purdue Memorial Union
	Dinner Speaker: Robert Forney (BS '47, MS '48, PhD '50)
October 8	Times depends on football game kickoff
	Forney Hall and Discovery Park Tours
	Pregame reception, Henson Atrium of Forney Hall
	Football game – Purdue vs. Minnesota



STATE OF INDIANA  
OFFICE OF THE GOVERNOR  
State House, Second Floor  
Indianapolis, Indiana 46204

Mitchell E. Daniels, Jr.  
*Governor*

June 2, 2011

Greetings!

As Governor, it is a pleasure to welcome you to the myriad events and activities to commemorate the 100<sup>th</sup> Anniversary of the Purdue University School of Chemical Engineering.

“A Century of People and Progress” is certainly a fitting theme that embodies the commitment of Purdue University to the education of students in this vital field. The far-reaching impact of these studies and programs has shaped and will continue to shape our lives for a better future. Improvement in our global environment will depend on the success of our ability to provide renewable energy and cutting edge research.

On behalf of the State of Indiana, congratulations to everyone at the School of Chemical Engineering on this landmark occasion and best wishes for another century of success. Thank you for all you do to make a positive difference in the lives of so many in our local and global communities.

I hope this will be a rewarding and enjoyable Centennial Celebration Year as you honor your past and look with a new vision toward the future.

Sincerely,

A handwritten signature in cursive script that reads "Mitch Daniels".

### **R. Neal Houze (1938-)**

It is fitting that a biosketch of Neal Houze, the regular faculty member with the longest tenure in the School, be the penultimate item in this chapter as we celebrate the 100<sup>th</sup> Anniversary of the School.

Dr. R. Neal Houze (BS ChE '60 Georgia Tech, MS ChE '66 and Ph.D. ChE '68 both from University of Houston, post-doc 1968-69 Technische Hogeschool, Delft, The Netherlands, Laboratorium voor Aero- en Hydrodynamica) started at Purdue as an assistant professor in September 1969. His early research at Purdue was done in collaboration with Theo Theofanous who started at the same time as Neal. Together they studied turbulence and mass transfer in turbulent flows. Houze became Coordinator of the ChE Cooperative Engineering Education Program in 1973 and stayed in this position until 1982. In 1974 he was promoted to Associate Professor with tenure.

Houze belonged to the tail end of an older generation of professors who believed that universities existed for the students. He soon started devoting a significant portion of his activities to cooperative education, and he became one of the leading figures in this area. In 1982 he became a Full Professor. From 1982 to 2002 he was the Director of the Engineering Cooperative Education Program. In 1985 Houze was also appointed Director of Purdue's Cooperative Education Program – a position he also held until 2002 when he returned to teaching and service in ChE. From 2005-2007 he again served as the ChE co-op coordinator – proving that one can go home again. In recognition of his contributions to Cooperative Engineering Education Neal was awarded the Bormann (1989) and Freund (1990) awards of the American Association for Engineering Education (ASEE). He was elected a Fellow of ASEE in 1999. In October 2010 Houze was inducted into the inaugural class of the Purdue Cooperative Education Hall of Fame.

In addition to co-op, Neal's other professional love is teaching. He was heavily involved in teaching the transport courses ChE 377, 378, 540, and 620, and their precursors (see Chapter 7 for course histories). As an experimentalist he taught both ChE 434 and 435 laboratory courses, and he served as the laboratory director from July 2008 to May 2011. He also saw the need for a practical course to prepare seniors for their first few years on the job and developed ChE 463 "Applications of Chemical Engineering Principles," which has proven to be a very popular elective. In addition, Neal was often asked to fill in where needed and he has taught the seminar courses and ChE 306.

Students appreciate professors who love teaching. Houze won the Shreve prize five times (1998, 2001, 2003, 2008, and 2011), the ASEE Illinois/Indiana Section Teaching award in 2000, the Purdue Murphy award for Outstanding Undergraduate Teaching in 2002, the Potter award in 2003, and in 2003-04 he was selected as one of three senior faculty for the Purdue Teaching for Tomorrow program. In addition, he received the M. B. Scott Award from Tau Beta Pi in 1998 and the Omega Chi Epsilon ChE Mentoring award in 2000 and 2003. He was a Faculty Affiliate of Purdue's Center For Instructional Excellence from 2004-08 and received a ConocoPhillips Faculty Award for 2009 to 2010. When Michael Ott (BSChE '74, OChE '02, DEA '07) was asked which professor had the most impact on him, he answered without hesitation, "Neal," because of the encouragement Neal Houze gave him as he struggled in ChE.

Neal started in Purdue's five year phased in retirement program in July 2011. He will teach in the fall semester and have time off for woodworking and other creative activities in the spring semester.



Veronica Schirm, Deb Bowman, Cindy Claus (Prof. Houze's wife), Rick McGlothlin and Prof. Neal Houze at the 2011 Commencement Reception

## Closure

On June 14, 2011, as the School of Chemical Engineering at Purdue reaches its one-hundredth anniversary, we find outstanding graduate and undergraduate programs of national reputation that Professor Peffer could have never predicted when he became the first Head of the School in 1911. With a faculty of 28 professors and three visiting professors, a graduate student body of approximately 125 and an expected fall undergraduate enrollment of nearly 500 sophomores, juniors and seniors, the School is looking forward to an even brighter and more glorious future. To paraphrase Shakespeare (*Macbeth* V.1.42): "Yet who would have thought the old School to have had so much blood in it?"

