FUELING THE FUTURE WITH algae

PURDUE **CHEMICAL**

ENGINEERING IMPACT

FALL 2010

Celebrating Our Centennial
The year ahead

Bubbling Up
Research to better control nucleation rates

Lifelong Ties
Tim McGinley's enduring bonds to Purdue

On My Mind

Welcome to the fall 2010 issue of Impact Magazine. In this issue, we explore creativity; in the current economic context, creativity gains universal value and we need to learn to embrace it outside the classroom or the research laboratory. During the 2009-10 year, we awarded 143 BS, 12 MS and 18 PhD degrees. We are sending these young men and women into a challenging work environment, where solid chemical engineering skills need to be coupled with versatile creative forces to find a promising job and become successful with limited resources.

In the past fiscal year, we have finished renovating the first floor in the original part of the Forney Hall. We are now renovating the ground floor, and expect completion by next February, which will leave only the third floor labs for the final phase. It has taken creativity and resourcefulness, along with generous and loyal support of alumni and friends, to make progress on this critical project so important for our school's future.

We are now seeing in University and school budgets the effects of the financial climate that is affecting the world outside academia. It takes vision, fiscal responsibility and the creativity of our faculty, staff and students to continue improving the education and research programs in our school, to ensure that we maintain our place among the preeminent chemical engineering programs of the world.

This fall, 502 undergraduate and 115 graduate students returned to fill the classrooms and laboratories in Forney Hall. Our research labs are bustling with new projects (turn to page 2 to read more about a novel way to create biofuel from algae) and unprecedented research activity. During the 2009-10 fiscal year, our school broke our funding record with $12.5 million in research expenditures, a 53 percent increase over the previous year. Come visit us and experience the daily extraordinary!

Hail Purdue!

Arvind Varma
R. Games Slayter Distinguished Professor and Head

On the Cover: Professor John Morgan's work with algae could result in the economic production of biodiesel, a valuable alternative fuel. The algae is now studied in a bioreactor, shown in this cover image. (Photo by Mark Simons)

PURDUE UNIVERSITY
COLLEGE OF ENGINEERING

School of Chemical Engineering

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Correction

In the Spring 2010 issue of ChE Impact, the story on page 2 misquotes the number of barrels of oil used globally each year. The correct figure is about 31.4 billion barrels (86 million b/d *365).

Tell Us What You Think

Share your Purdue memories, react to a story, or let us know your thoughts about a particular issue. Write to us at peimpact@purdue.edu. In doing so, you grant us permission to publish your letter in part or in whole in an upcoming issue. We reserve the right to edit letters for length and/or clarity.

Faculty members working with the Engineering Research Center for Structured Organic Particulate Systems were recognized with the College of Engineering's 2010 Team Award, nominated by Nick Delgass. From left: Osman Basaran; Mike Harris; Carl Wassgren; Rodolfo Pinal; Martin Okos; Venkat Venkatasubramanian; Jim Litster; Lynne Taylor; Steve Beaudoin; Teresa Cadwallader (administrative assistant); Teresa Carvajal; and Gintaras Reklaitis, director of the center. (Not pictured: Dor Ben-Amotz and Doraiswami Ramkrishna.) (Courtesy photo)

Faculty Awards

Osman Basaran, the Burton and Kathryn Gedge Professor, received the 2010 College of Engineering Faculty Excellence Research Award.

David Corti has been promoted to professor effective August 2010. For more on Corti, see page 5.

Nicholas Delgass, the Maxine Spencer Nichols Professor, received the inaugural NACS Award for distinguished service in the advancement of catalysis.

Doraiswami "Ramki" Ramkrishna, the Harry Creighton Peffer Distinguished Professor, received the 2010 College of Engineering Faculty Excellence Mentoring Award.

Fabio Ribeiro, professor, has been appointed as an editor for the Journal of Catalysis.

Gintaras "Rex" Reklaitis, the Burton and Kathryn Gedge Distinguished Professor, is the recipient of the 2010 George Lappin Award, the AIChE National Program Committee Service Award.

Arvind Varma, the R. Games Slayter Distinguished Professor and head, was elected foreign member of Mexico's Academy of Engineering.

Phillip Wankat, the Clifton L. Lovell Distinguished Professor, received the 2010 Joseph J. Martin Award, American Society of Engineering Education (ASEE).

Yue Wu, assistant professor, received a 2010 Young Professor Grant from DuPont.

Student Awards

The following PhD candidates recently received Purdue awards:

Easa Al-Musleh, the ChE Outstanding Graduate Teaching Assistant.

Heather Emady, the Outstanding Service Scholarship Award for Chemical Engineering, College of Engineering.

Intan Hamdan, the CETA Teaching Award, College of Engineering; and the Purdue Student Engineering Foundation Outstanding Graduate Student Award.

Clancy Kadrmas, the Excellence in Teaching Magoon Award, College of Engineering.

Julie Kadrmas, the Outstanding Service Scholarship Award for Chemical Engineering, College of Engineering.

Kathryn Smith, the Excellence in Teaching Magoon Award, College of Engineering.

Sara Yohe, National Science Foundation Fellowship. Yohe was also elected president of the Purdue Chemical Engineering Graduate Student Organization for 2010-11.

Alumni Awards

Deborah Grubbe (BSChE '77), received a Purdue honorary doctorate of engineering degree during the May 2010 commencement ceremony. She is the owner of Operations & Safety Solutions, LLC, Chadds Ford, PA.

Norman Gilsdorf, (BSChE '77) received the 2010 Distinguished Engineer Award and a 2010 Outstanding Chemical Engineer Award from Purdue. He is President of Honeywell Process Solutions.

Centennial Announcement

On June 14, 2011, the School of Chemical Engineering will celebrate 100 years of its founding by the Purdue Board of Trustees. To celebrate this occasion, the school has declared 2011 the Centennial Celebration Year. Multiple events and activities are planned:

- **Centennial Seminars** will take place throughout the calendar year 2011, with speakers drawn from prominent school alumni from all walks of life (industry, academia, entrepreneurial, nontraditional).
- A book, ***100 Years of Chemical Engineering at Purdue***, co-authored by Phil Wankat and Nicholas Peppas.
- **Main Event**, October 7-8, 2011

We are looking for interesting alumni stories and pictures from your days in Chemical Engineering at Purdue. The most interesting ones will be included in ***100 Years of Chemical Engineering at Purdue***, while the rest will be posted on this website. If you have anything that you want to share, please contact Cristina Farmus at cfarmus@purdue.edu.

For more details, visit the centennial website at **https://engineering.purdue.edu/ChE/AboutUs/Centennial**.

100 years

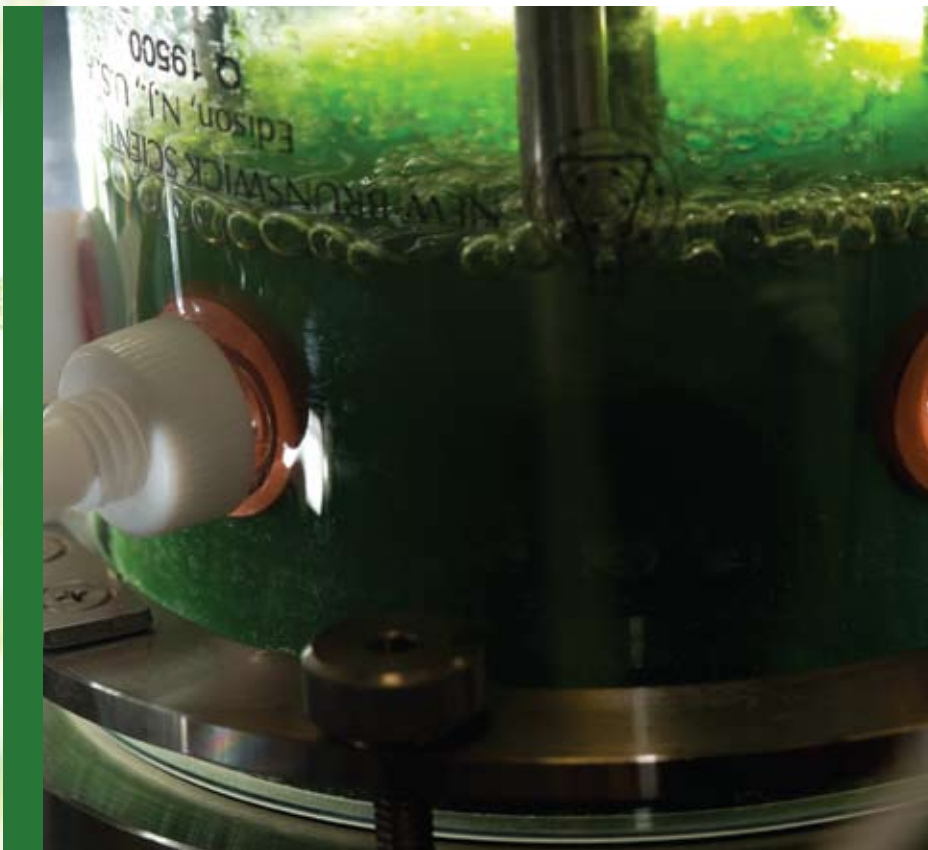
Tim McGinley (BSChE '63), received a Purdue honorary doctorate of engineering degree during the May 2010 commencement ceremony. He is the founder of House Investments and House Investments Securities, Inc., Indianapolis, IN, and a former member (1989-2009) and chair (1993-2009) of the Purdue Board of Trustees.

Jason Wu, (BSChE 2010), National Science Foundation Fellowship.

Metabolic engineering boosts potential of *algae* as the biodiesel of the (near) future

By Gina Vozenilek
Photography by Mark Simons

Good news is bubbling up about research already under way . . . on a promising fuel alternative that derives from algae. Algae naturally produce oil that can be processed and blended with petroleum-based fuel to make a biodiesel. And though there are many hurdles between the current state of this science and the point at which production can begin on a commercial level, the scientists and engineers at work on algae-based biodiesel are progressing by leaps and bounds.



Simply green

Ask John Morgan, associate professor of chemical engineering, what first interested him in researching algae-based biodiesel, and he waxes a little poetic about photosynthesis: "I really enjoy the simplicity of the process," he says. "CO2, sunlight … the cell — life — turns them into all these wonderful molecules."

But of course Morgan is a scientist first, and his real passion is one particular photosynthetic "factory": an alga known as Chlamydomonas reinhardtii. It was selected by Morgan's team as a good specimen to work with because it comes with a file brimming with decades of previous research. "A lot is known about this strain," Morgan says, "but only recently has it been studied for lipid production."

That file is about to get even fatter. Researchers at Purdue and Iowa State have won a highly coveted, $4 million grant through the American Recovery and Reinvestment Act to add to the body of research on C. reinhardtii and use it to explore this hopeful energy technology.

Morgan outlines the targets for the three-year grant: to increase the algae's growth rate; to broaden the thermal tolerance of the algae, particularly so that it can be made to grow at higher temperatures; and to increase the algae's lipid content by overexpressing the genes that encode for enzymes in the lipid-biosynthetic process.

Morgan likes the straightforward nature of the underpinnings of this potentially revolutionary technology. "Science doesn't have to invent some brand-new pathway," he says. Compared with some other proposed solutions to the energy problem, algae-based biodiesel is one predicated on principles that have long been understood. C. reinhardtii naturally stores its excess metabolic carbon as both starch and lipid. Normally, some of the algae's energy is put into starch and to fuel the self-propagation of the cells. It wants to reproduce itself. But for algae processing to be worthwhile, the cells need to produce more oil, not sugars. This is the problem Morgan is working on: how to induce these algae to shift a majority of carbon storage to lipid production, maximizing the yield of oil.

> continued on next page

LEFT: Chlamydomonas (algae) cells being grown in a photobioreactor.

RIGHT: Professor John Morgan reviews results from a liquid chromatograph/mass spectrometer.

John Morgan (standing, center), and graduate assistant John O'Grady (left) set up the liquid chromatograph/mass spectrometer for analysis of the metabolism of algae cells. In the foreground, Cameron Hill, graduate research assistant, samples the photobioreactor.

Cellular "GPS" system

Morgan's particular task is pinpointing the fate of that valuable extra carbon in the algae cells using something known as metabolic flux analysis. He uses a metaphor to explain this process: "We're basically making a traffic map of the molecules within the cell, like a GPS." Metabolic flux analysis provides the genetic engineers a snapshot of the molecular pathways within the algae's cells, pointing out where the "roadblocks" are occurring. With this information, the genetic engineers on the team can increase certain enzymes to "widen the road" and, to round out Morgan's transportation analogy, they can add new enzymes to "build new roads." It is the ability to monitor the molecular movements within the algae's metabolic pathways that enables researchers to manipulate the critical lipid production.

And how will Morgan and his colleagues know if they have achieved the optimal lipid yield? Before they began the bench experimentation, they used mathematical simulations to suggest ideal scenarios of how best to coax the algae into producing the most oil per day. With the help of sophisticated computer modeling, they generated three or four hypothetical best cases; each will spur a round of genetic engineering to see which formula of enzymatic controls best boosts lipid production.

Benefits and challenges

The benefits of algae-based biodiesel are many. One major plus is that algae do not need arable farmland to grow, as does the corn that finds its way to ethanol production. "We don't want to compete with food production," Morgan says. "Currently produced biodiesel fuels come from soy oil and canola oil, but algae can utilize nutrient-poor areas."

Right now algae are being cultivated in bioreactors, a situation that limits the economic viability of algae-based biodiesel. "Ideally, we'll eventually want to be able to grow the algae in outdoor ponds," Morgan says, acknowledging that using bioreactors to grow algae is very expensive. But once algae is moved to the wild, so to speak, it becomes more difficult to control the purity of the medium. Bacteria like to feast on algae, for example. That is why being able to grow the algae at temperatures that impede the growth of these predators would be a key to success.

Side benefits have been identified in conjunction with algae-based biodiesel production: the use of waste-product biomass as animal feed, particularly in aquacultural industries. Algal waste makes excellent fish food, for example. It can be used in fertilizers and soil conditioners as well, contributing to its environmental promise.

Extracting the algae oil is an area that other researchers are investigating, and another crucial hurdle to its commercial viability. "Harvesting algae oil right now is energy-intensive," Morgan admits. But he notes that once the oil has been collected and processed into biodiesel, the fuel product itself is extremely easy to incorporate into the nation's current energy portfolio. It can be pumped through the existing pipeline infrastructure and burned in today's engines, which could operate on a 50/50 biodiesel-petroleum ratio. That compares very favorably to ethanol's 15 percent.

Morgan thinks that we are about 10 years away from pulling into our local gas station and filling up the tank with algae-based biodiesel. That's not such a very long wait.

"The oil we find under the ocean was produced by marine organisms doing a similar process as our algae; they fixed carbon dioxide using energy from sunlight," Morgan says. "However, as opposed to those organisms that have been buried in the bottom of the ocean under high pressure for a long time, the process we are using to create oil does not require us to wait millions of years." ■

Inter-Particle Power

From bubble nucleation to colloidal dispersions, every 'little bit' counts

In a research area characterized by observing, manipulating, controlling, and ultimately predicting behaviors of minute particles and small-scale processes, David Corti was drawn to the School of Chemical Engineering for a relatively global reason: growth potential.

"I felt the school would be a particularly nurturing environment for young faculty," says Corti, who came to Purdue in 1998, "and it's lived up to my expectations."

Corti traces his current research interests — bubble nucleation and colloidal dispersions — to his PhD at Princeton University and postdoctoral work at UCLA. And, as with all compelling research, pursuing these quests throughout his 12 years at Purdue has pointed to more questions.

Recent findings in bubble nucleation research, for example, cast doubt on some aspects of a theory dating to the 1920s that attempts to describe the underlying molecular mechanism behind a phenomenon called "homogeneous nucleation."

"Our findings offer a new picture of how phase transitions occur in liquids," says Corti, "and we're still working through the implications. If we're able to better control nucleation rates, it could lead to different ways of making materials, or to materials with interesting properties." Further research also could result in a more precise understanding of the "phase transition" that takes place when bubbles form, grow, and then become a vapor — insights with possible implications for industry.

Corti's joint project with Elias Franses, which is sponsored by the Hewlett-Packard Labs Innovation Research Program, focuses on colloidal dispersions. Specifically, Corti is researching the stability of ink dispersions by controlling the force interactions between pigment particles.

"Hewlett-Packard's concern is with pigment particles in ink that might clog printer-heads," Corti explains. "By manipulating the properties of these inks, we can examine how fast pigment particles come together or whether they're well-dispersed. Ultimately, our findings could lead to new ways of making improved inks.

"In general, the more understanding we gain about how to influence the behavior of particles, the better we're able to tailor processes in order to either get a better product, or prevent an undesirable outcome."

Employing computational methods to mimic a range of systems make "the sky the limit" for Corti's research. "The freedom and flexibility of the computer helps us understand, on a molecular level, the same concepts that would be very challenging to obtain, in some cases, experimentally."

In the years ahead, Corti anticipates his findings will move from the School of Chemical Engineering to the industrial world — and possibly beyond.

"With nucleation, all roads point to the fact that what we found appears right," he says. Currently, we're looking for the signature of what makes it right. That's the puzzle on my part — to further prove that what we've found is correct."

Jan Mathew

Professor David Corti (Photo by Mark Simons)

Ashley Vacchiano recently completed a study abroad trip in Harbin, China. (Photo by Cristina Farmus)

One Senior to Watch

Dedication and rewarding academic pursuits characterize her journey

For ChE senior Ashley Vacchiano, things have been a little bit busier than usual lately. The Merck Engineering and Technology fellow for two consecutive years, she enters her last year as an undergraduate with high hopes for life after college.

Vacchiano's area of study is pharmaceutical engineering, and she plans to seek a manufacturing position within industry upon graduation. When she does, her resume will reflect a successful undergraduate career, built on hard work and long hours in Forney Hall.

In addition to the Merck fellowship, which rewards outstanding second- and third-year ChE students with a scholarship and paid summer internship, Vacchiano has received academic achievement awards from industrial sponsors such as U.S. Steel, Raytheon and Chrysler. She received the Shrader and Doody Chemical Engineering Scholarships for achievements in the School of Chemical Engineering and is an Engineering Ambassador.

Looking ahead to the future, Vacchiano wants a career that will have an impact on the world. Specifically, her interest lies in the different ways various portions of the drug manufacturing process can be controlled to assure that drugs are of the highest quality.

"I'd like to work on sustained-release drug capsules and making them more effective."

– Ashley Vacchiano

"Ultimately, I'd like to work on sustained-release drug capsules and making them more effective," she says.

A native of Chicago, Vacchiano doesn't rule out the possibility of graduate school once she has established a career path in the pharmaceutical industry.

Although she is the first member of her family to attend Purdue — with her younger sister to follow next year — Vacchiano is a Boilermaker through and through. When she leaves Forney Hall after long hours in the lab, she loves simply being on campus and finds the collegiate community at Purdue very fulfilling.

That Purdue spirit has funneled her time into campus activities such as planning Chemical Engineering Kids Day this past spring. "We had about 40 third- and fourth-grade students on campus to take part in activities and learn about chemical engineering," she says.

Vacchiano also enjoys Purdue football weekends, which often mean family visits. She also found time to travel to China this past summer on a study abroad program.

■ **Barbara Leonard**

Research Goes Green

Graduate student pursues biomass-to-alternative fuel research

As discussions grow in size and depth about the future of alternative fuel sources and alternative energy, one voice is growing louder — Purdue's School of Chemical Engineering. As a ChE graduate student studying energy issues, Sarah Yohe brings a unique perspective to the conversation.

Hailing from a farming background in the Dakotas and Minnesota, Yohe, whose research is in the field of renewable energy and catalysis, is interested in the conversion of biomass into transportation fuel.

"My graduate research project is working on the development of a novel thermochemical catalytic process for the conversion of biomass to transportation fuel," she says. "Within this project, my specific emphasis is on fundamental studies of biomass conversion and catalyst development. This process and other research on the conversion of biomass into useful fuels has high potential to fundamentally transform the way energy is harnessed and consumed."

The idea of using her passion for science and engineering for the betterment of society came about during an internship in North Dakota Sen. Byron Dorgan's office in Washington, D.C., during the summer of 2005.

In her spare time, Sara Yohe enjoys being part of the chemical engineering student community. She also plays basketball and piano, and loves swimming and gardening. (Photo by Cristina Farmus)

"During the internship, I was afforded opportunities to learn about the political side of technological issues, attend conferences on technological topics and work on energy-related legislation," Yohe says.

"This atmosphere exposed me to a new social and political way of thinking about technology," she says. "Since then, both my undergraduate and graduate research, as well as extracurricular activities, have been geared toward renewable and sustainable energy technologies."

Yohe set about making this happen by enrolling in a dual degree program between Concordia College in Moorhead, Minn., and the University of Minnesota in Minneapolis. She graduated in 2008 with a bachelor's in chemical engineering and a BS in chemistry from Minnesota and a BA in applied science with a mathematics minor from Concordia.

Yohe's catalysis and energy research has garnered some attention. She is the recipient of a 2010 National Science Foundation Graduate Research Fellowship.

On campus, Yohe is a founding member and vice president of the Chemical Engineering Sustainability initiative (CSi), a student organization dedicated to stimulating a sustainable lifestyle within the School of Chemical Engineering. She also was elected in May as the 2010-11 Purdue Chemical Engineering Graduate Student Organization (GSO) president.

After completing her PhD at Purdue, Yohe plans to continue with catalysis and energy research and teach at the university level. "This will allow me to continue working in an area I am passionate about and give me the opportunity to share this interest with students," she says.

"I have had the opportunity to mentor an undergraduate researcher and have found this to be one of the most rewarding parts of graduate school," says Yohe. "This makes me very eager to become a faculty advisor and mentor graduate students as they pursue their own advanced degrees." ■ **Barbara Leonard**

To view website:
www.engineering.purdue.edu/h2biomass

Linda Davis: "I like knowing that what I am doing is helping to develop the next generation of chemical engineers."

In the Service of Students

Managing the broad spectrum of student professional development needs

Whether you are a student thinking about a career in chemical engineering or a faculty member looking for resources on safety, there is only one person to go to. Meet Linda Davis, industrial education director in the School of Chemical Engineering.

In this role, Davis wears a number of different hats, each in the service of supporting and advancing students in their scholarly and professional pursuits.

Davis, a chemical engineer, joined Purdue in 2007 after 24 years in the industrial sector, many of those at Air Products and Chemicals, serving in various engineering, business and management roles.

Known as the "go to" person for students seeking to gain professional guidance and advice, Davis realizes the importance of her position. The assortment of student-centered activities in which she has a hand speaks for itself. Davis manages 70 students within the chemical engineering co-op program, instructs an array of professional development seminars for students, oversees the Fundamentals Lab — a state-of-the art teaching laboratory — in Forney Hall, and dedicates a significant portion of time to reviewing student resumes and providing job search coaching to both undergraduate and graduate ChE students.

When not teaching or interacting directly with students, Davis takes time to look at the bigger picture. "One of my large personal initiatives recently has been the Women In Chemical Engineering Seminar that was launched in spring 2009," she says.

The seminar, which took place in April, was a rewarding success for Davis, who served as organizer and host. Sponsored by Shell Oil, the event boasted the participation of 57 undergraduate and graduate female chemical engineering students, chemical engineering alumnae, and chemical engineering faculty and staff.

Attendees met to discuss and network on career choices, opportunities and challenges for female chemical engineers. A committee of students, alumnae and staff helped with the planning and execution.

Recently, a collaboration between Davis, Professor Michael Harris and ChE alumna Deb Grubbe led to the concept of an undergraduate elective course in chemical process safety. Currently being developed, the course will debut in spring 2011. This focus ties in well with another hat Davis wears, that of chair of the ChE Safety Committee.

For Davis, the purpose always comes back to students. "I like working with students and watching them grow and be successful," she says. "I like knowing that what I am doing is helping to develop the next generation of chemical engineers." ■ **Barbara Leonard**

Outside the office...

Davis has two young granddaughters with whom she loves spending time. She also enjoys traveling, cooking and gardening.

‘Hail Purdue!’
A lifelong song for McGinley

Becoming a boilermaker seems natural for a child who often rode the rails and whose father worked for the Pennsylvania Railroad. For Tim McGinley, though, the title came with a capital “B” as he took to the Gold-and-Black’s basketball court, earned a chemical engineering degree, and tallied 20 years as a Board of Trustees member.

With a knack for math and chemistry, a basketball scholarship and ROTC enrollment papers under his arm, J. Timothy “Tim” McGinley (BSChE ’63) left Indianapolis in fall 1958 for Purdue University.

It was the first of countless trips he’d make to campus, even long after graduation. Among them: In 1972 for the Distinguished Engineering Alumnus Award; 1983 as an Old Master; 1989 for his first of 20 years of Board of Trustees meetings; and 1994 for the Outstanding Chemical Engineering Alumnus Award.

“I was the first in my family to go to college,” McGinley says, and those undergraduate years were life-changing. “I consider my chemical engineer degree as the basis for my entire career. I learned about hard work, analytical thinking, and exploring alternatives in great depth before reaching conclusions.”

“I truly believe in giving back and helping provide that opportunity for others.” – Tim McGinley

With varsity basketball, four years of ROTC and chemical engineering studies, time management was his greatest challenge. “I had to balance my concentration, energies and time. That was a good lesson.”

His career path took him to government service, corporate leadership and entrepreneurial ventures, including Indianapolis-based House Investments Inc., a real estate investment firm he founded in 1978 that has sponsored projects in a dozen states.

“My training and skills prepared me to do a variety of things,” he says. “You have to be able to unite people behind a common cause, work with teams, motivate people, and put the right people in the right jobs. Learning that started with experiences in the chemical engineering classrooms and on the basketball court.”

Bringing his skills back to campus as a member of the Board of Trustees was “a tremendous opportunity,” he says. “Our goal the last 10 years was to take Purdue to the next level, and I hope people will judge my time as having been successful.”

McGinley and his wife, Jane, also a Purdue graduate, have pledged $2 million to the Purdue Opportunities Award Program, which provides scholarships to income-eligible students.

“We personally experienced the importance of scholarships,” he says. “My parents would not have been able to afford to send me to Purdue. I truly believe in giving back and helping provide that opportunity for others.” ■ **Barbara Leonard**

The McGinley File

1963	BSChE, Purdue
1965	MBA, Harvard
1966	White House Fellow
1967	Deputy Assistant Secretary of Labor
1969	Executive Vice President, National Homes
1973	Co-founded Jonathan Group, residential developer
1978	Founded House Investments Inc., a real estate investment company
2000	Elected to Indiana Basketball Hall of Fame
2006	Inducted into The Indiana Academy
2009	Retired after 16 years as chairman of Purdue Board of Trustees
2010	Received honorary doctorate, Purdue Engineering

1940-69

Milt Lauenstein, BSChE '45, has been devoting the past 10 years of his life and income to the reduction of war and the suffering that results. Along with a group of experts, he established an organization called the BEFORE Project, working to prevent wars in West Africa.

Leonard Fabiano, BSChE '58, is currently teaching a freshman introductory course and senior process design course at the University of Pennsylvania. He continues to serve as consultant for several industrial clients in the process design area.

Joseph Alford, BSChE '66, was elected to the AIChE's Education and Accreditation Committee. Among other duties, this committee manages AIChE's involvement in ABET, which reviews and accredits university engineering programs.

Kent Allan Williams, BSChE '68, MS '70, retired after 40 years of service at Oak Ridge National Laboratory, in the distinguished research staff member position. His work dealt mainly with the technical and economic analysis of advanced nuclear systems, and he authored or co-authored over 100 papers and journal articles on this subject and other energy areas. He is now starting a part-time consulting business.

1970-79

Deborah Grubbe, BSChE '77, HDR 2010, was named to the advisory board of the University of Alabama at Birmingham Master's in Engineering Program for Advanced Safety Engineering and Management.

Hector Dalton, BSChE '79, was promoted in December 2009 to vice president, International Manufacturing and Supply Chain, 3M, St. Paul, Minn.

Robert Myers, BS '79, was named director of engineering for the Primary Care/Oncology Business Unit, Pfizer, Peapack, N.J.

Karen Yancey, BSChE '79, teaches math and environmental biology at the correctional facility in New Castle, Ind.

1980-89

Bill Carter, BSChE '80, was promoted to manager of the Process Department which supports oil refinery and poly silicon design, Anvil Corporation, Bellingham, Wash.

Richard D'Ardenne, BSChE '80, is part of the North Caspian Operating Co. as Phase II delivery manager on the Kashagan Project, ConocoPhillips, Astana, Kazakhstan.

Eleftherios (Terry) Papoutsakis, MS '77, PhD '80, the Eugene DuPont Chair in the chemical engineering department and the Delaware Biotechnology Institute at the University of Delaware, is the recipient of the 2010 International Metabolic Engineering Award.

Joe Smich, BSChE '80, was promoted to senior manager of the Gasoline Technology team in the Technical Service Department, UOP LLC, Des Plaines, Ill.

Cathy Scott, BSChE '82, was elected to the Marketing Research Association national board of directors as a director-at-large for 2010-12.

Sharron Hunter-Rainey, BSChE '83, was selected Most Influential Faculty by undergraduate students and Teacher of the Year by graduate students for the 2009-10 academic year, North Carolina Central University, Durham, N.C.

Jennifer Sinclair Curtis, BSChE '83, professor at University of Florida, was elected AIChE fellow and ASEE fellow. She also received a Fulbright Research Scholar Award to Australia for 2010-11.

Tony Mikos, PhD '88, the J.W. Cox Professor of Bioengineering and Professor of Chemical and Biomolecular Engineering, Rice University, is the recipient of the 2010 ASEE Meriam/Wiley Distinguished Author Award, for his book titled "Biomaterials: The Intersection of Biology and Materials Science." He is also the recipient of the Food, Pharmaceuticals and Bioengineering Award, AIChE, 2010.

Send your updates to **chealumni@ecn.purdue.edu**. News from the most recent six months will be included in the next issue of *Impact*. Any other updates will be listed on the ChE alumni website at **engineering.purdue.edu/ChE/People/Alumni**.

1990-99

Brian Shoener, BSChE '91, in March 2010 started a new job as project manager for water/wastewater projects, Provost & Pritchard, Fresno, Calif.

Joshua Rockhold, BSChE '94, was promoted to director, Delivery and Logistics with responsibility for global supply chain, Harland Clarke Corporation, Santa Ana, Texas. He also attained the CPSM certification in June 2010.

Carrolette Winstead, BSChE '95, received the Supernova Award for 2009 at the Arizona Department of Environmental Quality (ADEQ) for commitment to ADEQ's mission and employees. She is also co-author of the book "In Situ Bioremediation of Perchlorate in Groundwater," (Hans F. Stroo; C. Herb Ward, Eds.), 2009.

David Sabbagh, BSChE '98, was promoted to senior group leader, Food Science & Technology, Solae, St. Louis, Mo.

Rebecca Kopp, BSChE '99, recently became an associate attorney at Parker, Wright, Morris & Arthur in the Labor and Employment Department, Cleveland, Ohio. She is a frequent speaker on workers' compensation issues and president of the Purdue Alumni Club of Cleveland.

Seung Jin Lee, PhD '99, is the Asia Pacific regional business development industry leader for Energy and AP marketing, DuPont Chemicals and Fluoroproducts, Seoul, Korea.

2000-2010

Kristin Shuler (Levin), BSChE '00, in June 2010 was promoted to validation manager, Kleen Test Products, Menomonee Falls, Wisc.

Kacey Fetcho-Phillips, BSChE '02, received a 2010 New Faces of Engineering Award from National Engineers Week Foundation and NSPE. She is a graduate student in the MIT Leaders for Global Operations program as a 2011 candidate for MBA and Master of Chemical Engineering degrees. She is completing an internship until December 2010 at Novartis in Siena, Italy.

Zach Hilt, MS '02, was promoted in July 2010 to associate professor with tenure at University of Kentucky. He serves as the 2010-11 director of programming, AIChE Nanoscale Science Engineering Forum.

Mark Byrne, MS '97 and PhD '03, the Mary & John Sanders Associate Professor at Auburn University, received the 2010 Provost's Award for Faculty Excellence in Fostering Undergraduate Research and Creative Scholarship. He was also the National Academy of Engineering's U.S. Frontiers of Engineering Meeting Conference Committee member – organizer and chair of the Engineering Inspired by Biology session.

Ryan Stoa, BSChE '03, completed an MBA at the University of Wisconsin–Milwaukee and obtained certification as a professional engineer.

Kristianto Tjiptowidjojo, BSChE '04, completed a PhD in chemical engineering at University of Minnesota and is now applying his knowledge and training to the area of high-speed roll-to-roll nanomanufacturing process as a postdoctoral research associate at the University of New Mexico.

Elizabeth Reinitz, BS '07, was promoted to senior process engineer in March 2010 in API Manufacturing, Eli Lilly & Co., Indianapolis, Ind.

Shatara Mayfiled, MS '08, was promoted to Grade 9 Engineer, Altria, Richmond, VA. She is currently pursuing a MS at Purdue in agricultural economics and an MBA at Indiana University's Kelley School of Business.

Rob Collins, PhD '08, received a Research Publication Award, Chemical Engineering, Purdue University.

Nanette Boyle, PhD '09, received the Faculty Lecture Award, Chemical Engineering, Purdue University.

Craig Cameron, BSChE '09, is pursuing a PhD in materials science and engineering with a minor in electrical engineering at Georgia Institute of Technology. In April 2010, he received a Department of Defense SMART scholarship.

Moiz Diwan, PhD '09, received a Research Publication Award, Chemical Engineering, Purdue University.

Qijie Guo, PhD '09, received a Research Publication Award, Chemical Engineering, Purdue University.

Andrew Smeltz, PhD '09, received a Research Publication Award, Chemical Engineering, Purdue University.

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