



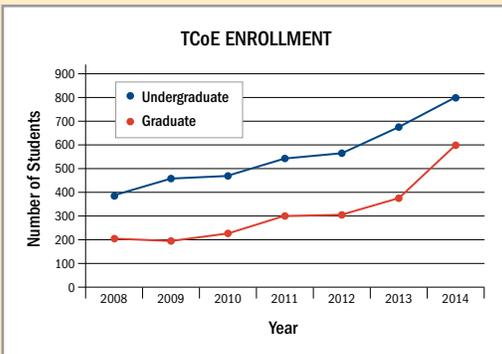
Dean's Remarks



Successes and innovations continue unabated in the TCoE. In this newsletter you will read about the potential to brand our undergraduate programs around entrepreneurial thinking, a prospect that is exciting

and one that has energized many of the faculty. We are grateful for the continued support we receive from the Kern Family Foundation that enables us to work toward this goal. Together with the technical excellence of our programs, the development of technical communication and entrepreneurial thinking skills will make our students particularly attractive in the job market.

As shown in the chart below, our enrollments continue to grow at both the undergraduate



and graduate levels. Over the last six years, the undergraduate enrollment has doubled from 400 to 800 and the graduate enrollment has tripled from 200 to 600. This trend brings both good news and bad news. The growing student population has enabled us to grow our faculty and the "new blood" is infusing energy and vibrancy into the college.

For example, in September we dedicated the new Cyber Forensics Research and Education Laboratory, the first of its kind in Connecticut. However, we are now severely space-challenged with our classrooms, laboratories and machine shop filled to the brim. We have outgrown Buckman Hall, the building that houses the college, and are exploring options that will allow us to sustain our growth.

The Branding of a College

The TCoE's continuing focus on entrepreneurial thinking is generating more funding, a new learning tool – and a strong new identity.

The engineer who thinks like an entrepreneur. It's a revolutionary mindset and, for the Tagliatela College of Engineering, there's no going back. The days of teaching technical competence alone are gone for good here, having given way to a dynamic new movement that merges the pure engineering disciplines with an understanding of such factors as customer awareness, societal value, and other business concepts that bring the marketplace right into the classroom.



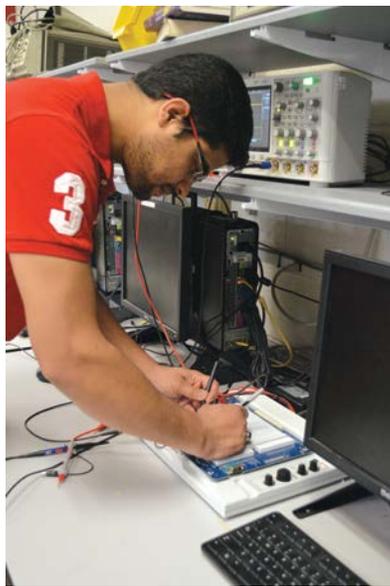
The engineering-business mind meld at the College got its momentum from the Kern Family Foundation three years ago, when the Foundation invited UNH to join KEEN, an acronym for the Kern Entrepreneurial Engineering Network, through which the Foundation bestows grants to further entrepreneurial thinking in engineers. The foundation has bestowed grants for a number of projects at UNH since then, but the latest grant is perhaps the biggest game changer in how the College inculcates the lessons that successful entrepreneurs know by heart.

The project consists of the development of short online learning modules – topic-focused instructional units – that will be embedded into engineering courses across all disciplines and throughout freshman, sophomore, junior, and senior years. Dean Ron Harichandran and Professors Maria-Isabel Carnasciali, Jean Nocito-Gobel, and Nadiye Erdil conceived the topics and structure for the modules. The developers of the modules – academics and practitioners – were selected through a competitive bidding process.

Bonnie Riedinger, Director of eLearning for UNH, who is overseeing the development of the modules, gave details on how the learning process will unfold: Outside the classroom, a student will read the online material, perhaps view some videos or screencasts within the module, perform some practice exercises, and then take some short quizzes to determine how well he or she comprehended the material. The instructor would then pick up the ball in face-to-face classes, developing other activities that could spin off from the material learned in the modules. The instructors themselves will receive training through KEEN on how to deploy the modules and provide the contextual reinforcement.

A total of 17-18 modules will eventually be developed. The Office of eLearning staff is presently working with subject matter experts and a full-time UNH instructional designer to develop storyboards, which will outline what the modules include. Ultimately, the modules will go live via an authoring software known as Lectora, which is used to create online training courses, assessments, and presentations. The Lectora modules will be embedded in the Blackboard course management system at UNH and can be embedded in any learning management system. All modules are being produced under the Creative Commons licensing model, will be stored in the KEEN repository, and may be downloaded and used by any institution or individual.

Seven of the modules will be completed by December 2014. Each one has a title: “Developing Customer Awareness and Quickly Testing Concepts Through



Customer Engagement,” “Learning From Failure,” “Establishing the Cost of Production or Delivery of a Service, Including Scaling Strategies,” “Determining Market Risks,” “Financing a Business,” “Building, Sustaining and Leading Effective Teams and Establishing Performance Goals,” and “Applying Systems Thinking to Complex Problems.”

Students will invest about six to nine hours of their time per module, depending on its content.

Dean Harichandran believes the modules have the potential to help students open doors

that engineers have not been used to opening in the past: “Together with solid technical knowledge and communication skills, the ability to think entrepreneurially will enable UNH engineering students to become tomorrow’s leaders and help U.S. engineering companies maintain their global leadership position.”

Meanwhile, back at the dorm . . .

. . . eighteen highly motivated, freshman engineering students have formed a cohort to lead some of the activities that spin off from the modules. Living together in a new Entrepreneurial Engineering Living-Learning Community (E²LLC) — an offshoot of the existing Engineering Living-Learning Community — the students will serve as “commandos” leading the charge to create enthusiasm for entrepreneurial thinking. Professor of Civil and Environmental Engineering Jean Nocito-Gobel, who oversees the new Entrepreneurial LLC, defined its purpose: “You want to have a core group of students that you can get excited. If you can get students enthused from their freshman year, they’ll help get other students, as well as the faculty, enthused and motivated.”

The E²LLC students will work hard to earn their commando status. To start, they will attend a summer camp in which they will define a problem, come up with an idea on how to solve it, and work through the stages to come up with a prototype. They will emerge from the camp as a kind of “special ops” unit, entering the fall semester as leaders, with a two-fold mission: assist faculty members in deploying the modules in class and continue to create excitement for entrepreneurial thinking among their fellow students. They will do that for the entirety of their college career — and be paid for their efforts.

Some real-world entrepreneurial experience is also in the works. Dean Harichandran is forging a partnership with The IP Factory that may enable some members of the cohort to become involved with start-up ventures when they are juniors and seniors. A not-for-profit corporation, The IP Factory, Inc. creates companies and jobs in Connecticut by using its closely managed commercialization process to pull together proven technologies or preliminary business plans from major Connecticut companies, a well-defined analytical protocol, vetted entrepreneurs, and capital.

By the time they graduate, the students will have acquired a first-rate set of entrepreneurial skills. With experience of this kind embedded in their resumes, they’ll have an edge in a highly crowded job market.

Let the evidence show

As with any new initiative, it’s important to measure effectiveness and impact. So, bringing experience that includes educational program measurement and assessment to the table, Professor Cheryl Li will assess the impact of the modules, as well as the E²LLC, on the mindset of the students. As her baseline, Li gave students a 37-statement questionnaire to answer on Freshman Orientation Day, before the program got underway. At the end of the spring semester, students will answer the exact same questionnaire.

The questionnaire asks the student to do some honest self-analysis and includes such statements as: “I am able to define an engineering problem in terms of value creation,” “I have no idea how to assess business risk,” and “I pay attention to the inefficiency in the market,” with a choice of answers that run the gamut from “I don’t understand” all the way to “Strongly agree.”

The hope is that the answers given at the end of spring semester will be significantly different from those given on Freshman Orientation Day. This will enable Li to assess how far the modules and the E²LLC have moved the needle on the entrepreneurial-mindset dial.

To evaluate the E²LLC, Li will compare the answers of students living in the E²LLC with other students who are also taking the modules but not living in the E²LLC.

She will also compare students who are taking the online modules in a course with students who are not taking the modules, since during the pilot phase not all sections of a target course will deploy modules.

“Not everything will rest on the students’ opinion of their own progress, though,” explains Li.

“I’m also developing assessment tools that will enable a more objective evaluation of the module-using students’ actual performance.”

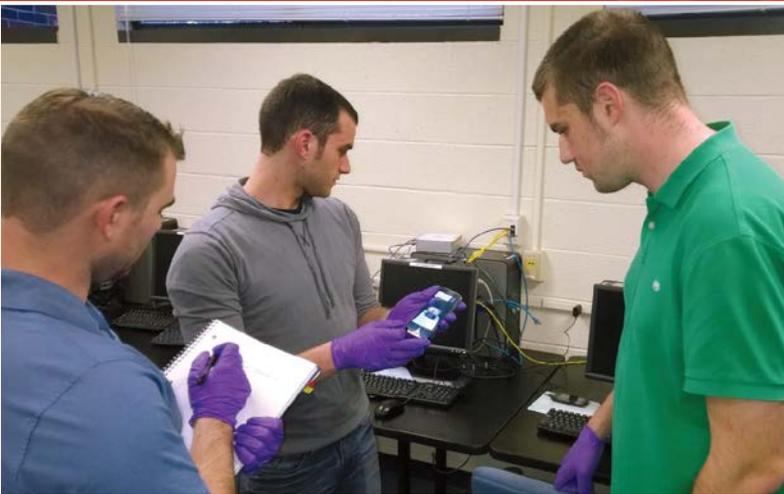
One thing is certain, though, as far as the LLCs are concerned: Over the next few years the College intends to morph its traditional Engineering LLC into the E²LLC so that many more students are exposed to entrepreneurial activities during their freshman year.

An emerging TCoE brand

An enormous team effort that’s pulling in experts from three different areas — module development, LLCs, and assessment, as well as the driving force that is KEEN — the project is best distilled to its essence by Dean Harichandran, who declared, “There’s a potential here to brand the entire Tagliatela College of Engineering around the theme of entrepreneurial thinking.”

It’s a vision that’s looking to be more and more grounded in reality.





STUDENT RESEARCH PROJECTS THAT ARE HOT RIGHT NOW

Cyber Forensics Research Group Uncovers Social Messaging Security Issues Affecting Close to a Billion People

Dr. Ibrahim Baggili, with Dr. Frank Breitinger, Dan Walnycky and Jason Moore. Each day 968 million people send what they think are private messages, photos or videos to another person via social messaging apps. But the Cyber Forensics Research and Education Group made people around the world think twice about that. Dan Walnycky produced five videos and released them on five consecutive days on the group's YouTube Channel, outlining security problems on 19 popular apps including Instagram, OKCupid, TextMe, and MeetMe. They found that passwords in plain text, user locations, chat logs, images, video, and audio could all be viewed without a person's knowledge. The story was immediately picked up by the local, national, and international media, including The Huffington Post, Fox News, and CNET, and it has been published in over 20 languages world-wide. The group is now studying apps that take and store screenshots while a Smartphone is in use, leaving people vulnerable to spying.

DHS Funds the Artifact Genome Project to Build a Vast Digital Forensic Data Base

Dr. Ibrahim Baggili, Kyle Anthony, and Jason Moore. Scientists and practitioners around the world will soon have a vast, first-of-its-kind digital forensic database to submit digital forensic artifacts, a resource vital to investigators solving crimes. The Artifact Genome Project (AGP), being developed by Dr. Baggili, Kyle Anthony, and Jason Moore, is funded by Purdue University's VACCINE program with support from the Department of Homeland Security. VACCINE specializes in creating visual analytics to analyze and provide information during a crisis. Much like trace evidence, anything left behind on a computer system or Smartphone – browser history, user name, and password – can become evidence. Dr. Baggili envisions using the database to develop a tool to triage a computer or mobile device in order to quickly uncover digital evidence.



NSF Funds Research Study on How Non-Traditional Engineering Students Learn

Dr. Maria-Isabel Carnasciali and Audrianna Rodriguez. How do non-traditional adult engineering students learn? How does their prior work experience in manufacturing, the military, or other fields impact their design decisions? How can universities leverage their leadership skills and life experiences to create a more diverse field of engineers and improve engineering teaching? These are questions Dr. Carnasciali and Audrianna Rodriguez, a graduate student in Industrial/Organizational Psychology, are asking non-traditional undergraduate engineering students as part of a three-year National Science Foundation grant studying undergraduate engineering education. The goals: to broaden the population of engineering students and to support students through degree completion.

NASA Funds Design of Next-Generation Deceleration Devices Used in Space Exploration

Maria-Isabel Carnasciali and Anthony Mastromarino. A 33.9-million-mile journey to Mars requires so much fuel that making the satellite or space vehicle as light as possible is paramount. As part of a Connecticut Space Consortium grant funded by NASA, Dr. Carnasciali and undergraduate student Anthony Mastromarino are studying how the shape of deceleration devices – think parachutes and balloons – help put the “air brakes” on space mission devices, slowing them as they land. They are studying airflow and developing computer models to impact designs for the next generation of deceleration devices used in space exploration. In November, Carnasciali presented their findings at the American Physical Society, Division of Fluid Dynamics Conference in San Francisco.

15 of 38 Summer Undergraduate Research Fellows are TCoE Students

Typically, 20 undergraduates spend their summer as undergraduate research fellows in the SURF program. But this past summer, 38 students took part, and 15 were from the Tagliatela College of Engineering, said SURF Coordinator Carol Withers. To align the program with the National Science Foundation's Research Experiences for Undergraduates (REU) model, weekly research seminars were held, including: “Responsible Conduct in Research,” “Resume Building,” “Branding and Pitching Research,” and “Creating Presentations and Posters.” Withers said the seminars helped build community and provided opportunities for undergraduate researchers to work together across colleges and disciplines. Four SURF projects are described below.

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Integrating and Collecting Wind Data to Harness Renewable Energy

Dr. Maria-Isabel Carnasciali, Dr. Samuel Daniels and Andrew Hearn. Andrew Hearn is integrating the Buckman Hall wind turbine with other instrumentation and sensors to harness this valuable renewable energy source. Hearn spent his SURF summer integrating the sensors to collect RPM, voltage, and current data. This semester, he is using a weather station to gather data on wind speed, direction, humidity, barometric pressure, and rainfall to understand how environmental conditions affect the turbine's performance.

Seeking Answers in Leukemia Research

Dr. Dequan Xiao and Joseph Daou. In his SURF project and current research, Joseph Daou performed computational studies of protein and RNA interactions to find molecular predictors for leukemia. In collaboration with a Yale post-doctoral fellow in hematology, Daou used atomistic molecular dynamics simulation and statistical mechanics theory to determine which mutation on the protein bound most strongly with the RNA. They have homed in on a mutation that appears promising as a leukemia predictor.

Slowing Down the Release Time of Drugs so that Patients Take Fewer Doses

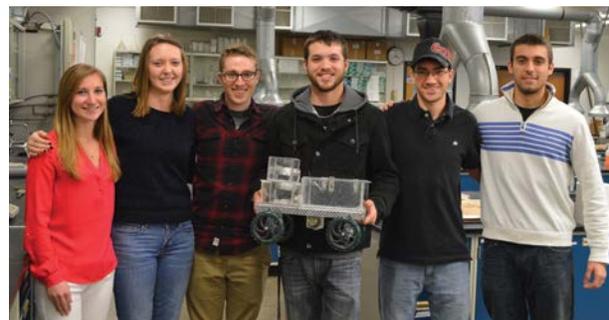
Dr. Dequan Xiao, Dr. Pier Cirillo and Jenna Rabadi. Undergraduate student Jenna Rabadi, a nutrition and dietetics major whose focus is on nutritional toxicology, spent her SURF summer making polymer nanospheres for drug delivery. The nanospheres would be used to slow down the release time of drugs so that patients can take medicine less frequently — for example, every eight hours instead of every four.

An Efficient Equation of State for Polymer Melts and Solutions

Dr. Art Gow, Jonathan Smolen and Anna O'Malley. In one SURF project — one that could someday have a major impact on the field of chemical engineering — Jonathan Smolen and Anna O'Malley worked to develop an efficient equation of state for screening polymer melts and solutions, seeking a mathematical relationship between pressure, temperature, volume, and other physical, measurable properties of matter. Smolen's study continues as he aims to create an equation based solely on chemical structure. Two papers based on this work were presented at the 2014 AIChE Annual Meeting in Atlanta, GA.

Road Warriors: TCoE Cars Park It In Third Place and Smash Previous Records in Competitions

The car buffs in the Tagliatela College of Engineering have done themselves proud again. In the Chem-E-Car competition, UNH's "Pandora's Charger" finished third at the regional event held March 7 at the University of Connecticut. Three months later, another UNH vehicle — a small bullet-shaped three-wheeler about the size of a go-cart — finished in ninth place overall at the 35th Annual Society of Automotive Engineers' Supermileage Competition in Marshall, Michigan. It was the second year in a row that the UNH team had a top-ten finish.



Chem-E-Car team members were: Kayla FitzGerald '15; Sadie Redman '15; Parker Mathis '15; Jeffrey Parsons '16; David DuPont '15; and Robert Errichetti '16.

For the Chem-E-Car competition, a team of chemical engineering students design and build a car — about the size of a shoebox — that runs and stops through a chemical reaction. It must travel a pre-determined distance and carry a pre-determined cargo. Speed and power are irrelevant. Instead, judges focus on the accuracy of the chemical reaction that stops the vehicle and how close the car comes to the finish line. What makes things really interesting is that the pre-determined distance and cargo aren't

revealed until one hour before the competition, so finding the optimal chemical reaction in advance becomes two parts skill and one part crossed fingers.

Meanwhile, the Supermileage team, after breaking last year's record by moving up to ninth place from tenth — is flat-out refusing to rest on its laurels. After revamping the vehicle's engine for this year's competition, the team has now decided to re-design the entire vehicle for next year's. Two of the new features will be an aluminum frame to replace the vehicle's current



Supermileage Vehicle team members were: Erik Wengenroth '14; Jonathan Attruia, MSME '14; Mohammed Alkatheeri '14; Ahmad Alsaigh '14; Ghanim Almahmoud '14. Missing from photo: Brittanie Albera '16 (driver).

carbon-fiber shell and a suspension system — a much needed first, as this year's driver was much more banged up than the car was.

One definition of a dilemma: Two students from an underdeveloped region suddenly have the financial freedom to choose any engineering college in the world.

Where do they go?

Micronesia is a 2-million square mile region of the Pacific Ocean, about 2,800 miles southwest of Honolulu. Most of it is ocean. The Federated States of Micronesia is an independent island nation within that region, consisting of four states – the island groups of Yap, Chuuk, Pohnpei, and Kosrae.

One of those states – Chuuk – is home to an elite private secondary school, Xavier High, run by Jesuit priests. Recently, two students in that school were given the opportunity of a lifetime when they were selected to be Gates Millennium Scholars*, an award that bestows good-through-graduation scholarships and carte blanche to choose any college in the world.

How did two Gates Millennium Scholarship-winners, 7,800 miles from Connecticut, come to consider the Tagliatela College of Engineering? It began with two men – David Adams, currently a consultant to the Project to Initiate Technical Communications Habits (PITCH) at the TCoE, and Father Rich McAuliff, Director of Xavier. Adams had assisted colleges in Micronesia for eight years and during that time had met and become friends with the priest.

Father McAuliff had a vision: Micronesians becoming the engineers for the projects in their own country. Because of the scarcity of native-born engineers, almost all of the projects in this third-world region were going to engineers from other countries. To remedy the situation, the priest was encouraging promising students to study engineering when they entered college.

When Father McAuliff notified Adams that he had several students who showed real potential, Adams immediately asked Dean Ron Harichandran to mail him a couple of UNH admissions packages. Two students – Brenden Yamase and Rumong Yobech – pored through the material and enthusiastically decided that the TCoE was where they belonged. Father McAuliff was equally sold on the College, since his hope was for the students to become working engineers instead of primarily researchers.

“I explained to Father that teaching is central here,” said Adams, “and that the College’s multi-disciplinary approach and its emphasis on hands-on experience is designed to help prepare working engineers, which is exactly what the students want to be.”

Brenden and Rumong applied to UNH and were accepted. As it turned out, though, all the facts weren’t in when they applied. One was missing, and it was a big deal: Brenden and Rumong hadn’t yet heard that they were Gates Millennium Scholars, with the freedom to study engineering anywhere in the world. Would they change their minds about the TCoE when they found out the entire world beckoned?

They did not. Both are now first-year students at UNH, with Brenden majoring in civil engineering and Rumong a forensic biochemistry major. Rumong, who hails from Palau, a separate island country in Micronesia, veered from his original plan to study chemical engineering when he discovered that one of his heroes – Dr. Henry C. Lee – teaches at UNH. “For Rumong, it’s ‘CSI Palau,’” Adams said with a smile.

Rumong adds, “The classes that I’m taking in the TCoE are amazing. My chemistry instructors genuinely want their students to understand the material, not just know it, so they offer help both in and out of class. Classes are difficult, but most of them are small, so the professors get to know you better.” How does he feel about being so far from home? “The friends I have made so far make it easy to be in New Haven,” he continues.

“I’m still adjusting but, so far, I can’t really see myself anywhere but here.”

Brenden agrees that the courses are challenging but is enjoying every bit of it, crediting the hands-on learning experiences. “There is a great gap in learning between electronically building a bridge and building it in real life,” he explains. “The College has created a richer learning experience for us by incorporating hands-on projects and assignments into the courses.”

The Federated States of Micronesia and Palau are still tied to the U.S. by treaties that were signed after WWII, so the students have Visa waiver status with the freedom to come and go in the U.S. That also means they can get American financial aid, so even if Brenden and Rumong hadn’t been chosen as Gates Millennium Scholars, they could have received Pell Grants.

But more important than how the students got here is that they did get here, with Father McAuliff’s vision well on the way to being realized. Said Adams, “I’ve been out there enough to see how much poverty there is, and the only way that’s ever going to change is if they start developing people with these kinds of skills to take charge when they come back and build. Infrastructure is a big problem.”

“What we have established here is a pipeline,” he went on. There are other talented students in Xavier High who are lining up right now to follow in Brenden’s and Rumong’s footsteps.”

** The Gates Millennium Scholars Program, funded by a \$1.6 billion grant from the Bill & Melinda Gates Foundation, was established in 1999 to provide greater access and opportunity to higher education for outstanding students from underrepresented backgrounds. One thousand promising students are selected each year of the program’s twenty-year commitment. The program promotes academic excellence and encourages students to pursue and complete an undergraduate education in all disciplines and a graduate education in computer science, mathematics, life/physical science, engineering, education, public health, library science and/or information science.*



Brenden Yamase (left) and Rumong Yobech (right).

Dequan Xiao: Designing dream molecules that work harder, greener, and more efficiently.

Where do you start when you want to more easily break down the tough, rigid cellulose in a 100-foot fallen oak and turn it into a greener form of liquid fuel? The same place you start when you want to design a 50-nanometer molecular capsule that could more efficiently deliver cancer medicine inside a patient's body. On a computer.

Or, in Dr. Dequan Xiao's case, on a computing cluster comprising 30 interconnected computers with 240 physical cores, all working simultaneously on the same task. It's called parallel computing. In the year he has been teaching at UNH, Xiao has spent six months assembling that cluster and making sure all the computers are on the same page, so to speak.

Dr. Xiao's area is computational chemistry, a branch of chemistry that uses computer simulation to help solve practical or challenging chemical problems. The end goal for Xiao and his students is to design or discover optimal and sustainable chemical structures that show improved properties over existing materials.

Although all engineering and science disciplines require exceptional powers of concentration, computational chemistry gives new meaning to the word "intense." Before the computing cluster even starts doing its thing, the human brainpower required is considerable. In Xiao's Integrative Materials Discovery



Lab, his students typically spend hours preparing the calculation jobs or creating the "smart" computational algorithms that they then submit to the cluster. The calculations are of two main types, which help Xiao and

his students arrive at the various properties of molecules: quantum chemistry calculations that can, for instance, pin down where a specific electron is located and calculations for molecular dynamics simulations that look at how atoms move around.

Into the woods

Currently, one of the projects that Dr. Xiao and his group are deeply immersed in is the design of a new biomass conversion catalyst — one that would convert woody biomasses like dying woods or dried crops, falling trees and other woody detritus in the forest into renewable energy — in this case, liquid fuel for transportation purposes.

The big molecules in woody material — cellulose, lignin, and hemicellulose — are tough customers — they staunchly resist being reduced to a more cooperative state, i.e., cracked down into useful small molecules. Not that it hasn't been done. All one needs is 600 – 900°C for the burn to turn the

collected gases into liquid fuel through a process called gasification or 120 – 200 times normal room pressure to extract crude bio-oil from the biomass in a process called liquefaction. It also takes a pile of money — to buy the rare earth elements that, up to now, have provided the catalysts that move the conversion process along. All of that is in addition to an acceptance of the enormous amount of energy wasted in the process — self-defeating by any standard of greenness.

Dr. Xiao and his group are working to bring in some new catalytic muscle that will more easily and efficiently break down cellulose, and do it in a greener way. Using a unique computational methodology based on tight-binding electronic structure theory called inverse molecular design, which Dr. Xiao began developing during his Ph.D. work at Duke University, the group has designed a structure for a highly promising catalyst that uses cheaper, earth-abundant elements — and which puts within reach a conversion process that needs only 100°C and relatively low pressure.

What looks good in computer simulation, however, needs to translate well in the real world. So, from there, it's on to the "wet lab." Through connections that were forged during his post-doctoral work at Yale University, Xiao is collaborating with the Center for Green Chemistry and Green Engineering at Yale to actually make the catalyst. "We would propose a new catalyst structure and our collaborators at Yale would verify it experimentally," he said, explaining how the relationship would work. "Once Yale verifies, they might say 'maybe you can look at it from another angle.' So then we would go back and redesign. They'll give us the experimental evidence we need to build up or improve our model for inverse molecular design."

This project is being conducted with the support of Xiao's start-up package at UNH and the Summer Research Grant Award he received in 2014. He recently developed a joint proposal to the National Science Foundation (NSF) with Yale University to carry out further collaborative investigations along this direction.

When it comes to biofuel sources, some might question the ongoing struggle to more efficiently break down stubborn woody biomass when corn- and sugar-based ethanols are so much easier to produce. The answer to that lies in an unintended consequence of diverting those crops to fuel production: food shortages. "It's not so much of an issue in the U.S. because we have enough food here," said Xiao, "but in a third-world place like Africa, there are already food shortages in some regions. Using land for biofuel would exacerbate the problem. Even in a country that did not originally have a food shortage — Brazil — a food shortage was created when they exported a lot of their corn to the U.S. to make biofuel."

Designing vehicles for better drug delivery

With a resume that includes a background in polymer chemistry in addition to computational chemistry, Xiao is also collaborating on a project with Dr. Pier Cirillo at UNH to make molecular-level capsules that could be filled with medicine. The capsules are literally assembled from polymer molecules into a spherical shape and are about 50 nanometers in size. One nanometer is

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The TCoE Annual Alumni Dinner

Two Welcomes. Three We'll Miss You's.



TCoE Distinguished Lifetime Alumni Award: Mike Hartnett with his wife Veronica (Ronnie), son Stephen, and daughter Lauren

Two outstanding friends of UNH were welcomed into the TCoE's inaugural Hall of Fame on Saturday, November 1 at the Annual Alumni Dinner. Dr. Michael J. Hartnett, Class of '66 was honored with the TCoE Distinguished Lifetime Alumni Award, and Sikorsky Aircraft received the TCoE Exemplary Partner Award.

Dr. Hartnett graduated from the University of New Haven with a B.S. in Mechanical Engineering, going on to serve as a machinist in the U.S. Army's Second Armored Division, which patrolled the Mexican border during the Vietnam War. After his tour, he earned a scholarship to Worcester Polytechnic Institute and was hired by The Torrington Company, where he began working in a branch of mechanical engineering and materials science called tribology – the science and engineering of interacting surfaces in relative motion.

Promoted to Director of Research and Development after Ingersoll-Rand purchased the company, he eventually left to purchase RBC Bearings, setting out to make it one of the nation's leading producers of bearing products. Under his leadership, the company became one of the most successful and fastest growing firms in the machine industry, with 24 plants in three countries.

Dr. Hartnett has maintained close ties to UNH through the years, demonstrating extraordinary generosity through serving as a member of the TCoE Advisory Board, establishing an endowed scholarship at the College, and sponsoring Mechanical Engineering Senior Design Projects for many years through his company.

The second award-winner, Sikorsky Aircraft Corporation, has been a valued industry partner of the University for decades. The Sikorsky Engineer-in-Residence program, established in 2009, has trained numerous interns and resulted in the hiring of several. In fact, 10% of Sikorsky's technical workforce consists of UNH graduates.

The company also has sponsored Senior Design Projects and provided significant funding to support the TEAM Summer Camp for high school students, which was developed at Georgia Tech and is held at UNH. In addition, engineers from the company have been members of the TCoE's Advisory Board and the Mechanical Engineering Advisory Council for many years.

It just won't be the same...

Adding a bittersweet flavor to the Dinner were the fond farewells extended to three faculty members who were embarking on a new career: retirement.

Dr. William Adams, Dr. Ira Kleinfeld, and Dr. David Wall were off to explore that path to the fullest.

Dr. Adams, an alumnus of New Haven College, the University's forerunner, has had a rich and varied career that includes nuclear physics research at Yale, consulting and product development through his own companies, lecturer and Practitioner-in-Residence of physics at UNH, and computer science professor, also at UNH. In 1994, after defining the responsibilities of the head of computing at UNH at the request of the Board of Governors, Dr. Adams was persuaded to fill the new position as Vice President and the University's first Chief Information Officer, a position he held for four years. Dr. Adams also heads up the freshman engineering study abroad program and has led two cohorts at UNH's campus in Prato, Italy. He is looking forward to continuing the Prato assignment in his retirement.

Dr. Ira Kleinfeld has been a pillar of the UNH community for nearly forty years serving on the TCoE faculty and as a member of the UNH central administration. In addition to numerous articles on engineering economy and computer applications for industrial engineering, he authored the text "Engineering Economics: Analysis for Evaluation of Alternatives," which was used by a generation of TCoE students of all majors. In 1992, UNH's president invited Dr. Kleinfeld to join the central administration. He held several posts, culminating as Associate Provost for Graduate Studies, Research, and Faculty Development. Because of his extensive experience, Dr. Kleinfeld received continual invitations to serve as an accreditation team leader and member of the New England association of Schools and Colleges.

Dr. David J. Wall joined the UNH family in 1987 as an associate professor and Chair of the Department of Civil and Environmental Engineering after holding faculty positions at Pennsylvania State University and the University of Pittsburgh and practicing civil engineering in both the public and private sectors. At UNH, he taught undergraduate and graduate programs in engineering hydrology, hydraulic engineering, and professional practice issues in engineering. Dr. Wall was also extremely active in the American Society of Civil Engineers and dedicated much time to serving on various committees. One of them was the Committee on Curricula and Accreditation, which developed the criteria used to evaluate civil engineering programs. He also served as a civil engineering program evaluator for the Accreditation Board for Engineering and Technology and later was elected to represent civil engineering on the Engineering Accreditation Commission of ABET, a responsibility he fulfilled from 2001 to 2006.

Next addition to all three resumes? Many, many years of enjoyment.



TCoE Exemplary Partner Award: Nicholas Lappos and Mike Ambrose of Sikorsky



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one billionth of a meter, so this is no ordinary pill. Instead, millions of these medicine-packed nanospheres together would be converted into a powder and used to fill what the layperson thinks of as a capsule – the one you swallow.

Such molecular capsules have exciting potential. One promising application is in slowing the release time of drugs, so that doses can be spaced further apart.

But polymer chemistry is wet chemistry – chemistry that’s generally done in the liquid phase. Where does Xiao’s area of computational chemistry fit into this picture? Does it, too, have a part to play with the long-chain molecules of polymers?

As he looks to the future, Xiao’s answer is a clear yes. Or, in other words: “Computational simulations can be done to understand the fundamental mechanisms behind the experiments done in the wet lab. That will help us to design better polymers for making the polymeric nanospheres for drug delivery.”

The computing cluster awaits.



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CFRE lab dedication
Left to right: Ali Golbazi (ECECS Chair), Andy Bernhard (TCoE Advisory Board Chair), Ron Harichandran (Dean), Dora Schriro (Commissioner of Emergency Services and Public Protection), Henry C. Lee, and Abe Baggili

With the infusion of new faculty the college’s productivity is also growing. Faculty are more active than ever before in seeking external grants to support academic programs, research and outreach, and students are more engaged than ever before in research, competitions, and serving the community. In this context, I am very pleased to mention that we have received an anonymous endowment of \$2 million to support engineering graduate students. This gift will provide a significant boost to student engagement in research.

Both faculty and students are beginning to embrace online teaching and learning to supplement and enrich traditional classroom techniques. I firmly believe that the future of engineering education will neither be completely online – as some proponents of MOOCs (massive open online courses) contend – nor completely on the ground, as those who live in “ivory towers” might think. Instead, it will be a blended approach that combines the strengths of both approaches. In the TCoE we are exploring many options to deliver an outstanding education to our students.

R. Harichandran

Ron Harichandran, *Dean*