

Chemical Engineering Department

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The Pipeline Returns

Welcome to the 2nd issue of the Rose-Hulman Chemical Engineering Department Newsletter, the *ChE Pipeline*. For those of you wondering if you missed the 1st issue, a brief explanation is in order. Nearly 12 years ago, in the Fall of 2001, then department head Dr. Hossein Hariri sent out the inaugural issue of the *ChE Pipeline* in the hopes of establishing a more regular connection with our graduates. While we have always enjoyed staying connected and exchanging news, the time and material costs associated with maintaining a paper-based newsletter made releasing further issues difficult. Advances in digital publication and electronic communication have reinvigorated our effort, however, and we are re-starting the newsletter in electronic format in an effort to keep in better touch with our alumni base throughout the world.

A lot has happened since 2001—too much, in fact, to attempt a full summary of department news since the 1st issue of the *ChE Pipeline*. Nevertheless, I want to attempt a brief overview of the changing face of the department over the last decade.

From 2001 to 2013, we have graduated an average of 49 bachelor's of science degree students per year. Our smallest class during that time period was the 2008 class (35 graduates) and our largest class during that period was in 2010 (73 graduates). We had 22 master's of science degree graduates over the same time frame, averaging between one and two per year. We are not expecting a small class in the foreseeable future; during the past few years, both the institute and our department have seen a sustained increase in undergraduate class size, and we are currently at a rec-

Adam J. Nolte

**Department Head and
Assistant Professor**



ord high enrollment of 321 undergraduate ChE students (we are the second-largest degree program after mechanical engineering).

Last fall, we and the other engineering departments on campus, hosted a team from ABET for our accreditation visit. This visit was part of the usual six-year cycle of visits that ABET requires for engineering programs to maintain their accreditation status. We are expecting the official outcome of this visit to be published this summer; it was rewarding to note that our program evaluator had several positive comments about the department and our students following his visit.

In terms of staff/faculty news, Dr. Hossein Hariri stepped down from duties as head of the department in 2008, and Dr. Mark Anklam served as head from 2008-2012. Last year, Dr. Anklam accepted an offer to move to California Baptist University to start a new department of chemical engineering. Last summer, I assumed the role of interim head, and I was honored this year to accept an offer to continue as the permanent head of the department. In other office news, our secretary, Mary Wade, retired in June 2012 after seventeen years of

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The Pipeline Returns *(continued from p. 1)*

service to the department. Mary and her husband John maintain a presence in the Rose-Hulman community, and it is good to see them at events from time to time. Lisa Harwood just celebrated her one-year anniversary at Rose-Hulman as our new department secretary, and she has been doing fantastic work. Frank Cuning continues to serve loyally as department technician; Frank continues to keep busy with lab and equipment planning, construction, maintenance, and service roles around the Institute.

There have been several changes among the department faculty, as well. Among the "Pre-2001" faculty, Drs. Ron Artigue, Hossein Hariri, and Atanas Serbezov remain with us; since 2001, Drs. Sharon Sauer, Dan Coronell, Scott McClellan, myself, Kim Henthorn, and Dave Henthorn have joined the faculty. We have also had a number of other tenure-track, visiting, and adjunct professors to whom we are indebted for serving the department during the past decade or so. These include Dr. Erin Phelps (RHIT ChE '03), who is currently a visiting assistant professor, and Mr. Michael Markowski (RHIT ChE '78) and emeritus professor Dr. Jerry Caskey, both of whom have been helping to teach ChE Laboratory as part-time visiting faculty. Names, faces, and professional interests of the current department lineup can be viewed on our [faculty/staff page](#).

In terms of Institute-level news, the past couple of years have presented great challenges as well as great opportunities for the school. Following President Matt Branam's untimely death in April 2012, Mr. Rob Coons assumed the interim presidency of the school and did a fantastic job maintaining momentum on our strategic planning campaign. The results of that effort were presented in the [Fall 2012 issue of Echoes](#) as a six-goal strategic plan, *The Next Steps*.... The plan is a roadmap for our mission of providing our students with the world's best undergraduate science, engineering, and mathematics education in an environment of individual attention and support. The plan goals call for increasing cultural diversity and global experiences, establishing life-long relationships with our alumni, and building a model for a fiscally sustainable future.

To help us implement these goals, this spring Rose-Hulman's Board of Trustees appointed Dr. James C. Conwell as the 15th president of the institute. President Conwell brings a diversity of experience to the campus as a former engineering educator and most recently as the vice president of Jacobs Engineering Group. We are looking forward to his leadership.

Before I wrap up this column, I want to offer you a special invitation to contact us with your thoughts and opinions on content. I want to make this electronic news-

letter a useful resource for department news, as well as simply a way to help you feel better connected to the Rose-Hulman family. I plan to have a general information column such as this one, as well as a feature column on some aspect of the department. For this issue, I have assembled a short description of our current curriculum for those of you who may be interested in what has changed and what has stayed the same since you graduated. I have also asked the student leaders of our AIChE chapter and newly-formed Chem-E-Car team to contribute articles. Finally, we are very interested in *ChE alumni news*. Please send us any personal and professional announcements you would like us to include.

I hope you enjoy this opportunity to reconnect with the department. I am aiming for a biannual newsletter. Also, for those of you who are able to visit us on campus, please stop by! Our annual ChE homecoming alumni reception always presents a nice opportunity to return and visit old friends and department faculty—this year the reception will be 11 a.m.-1 p.m., Saturday, September 21 in our Design Lab (O206) in Olin Hall. We hope to see you there. A full [schedule of events for homecoming](#) can be viewed online.

Please keep in touch and share your thoughts on how we can best serve our alumni base with this outreach effort. Thoughts, comments, feedback, and alumni news items can be sent to [Lisa Harwood](mailto:harwood@rose-hulman.edu) (harwood@rose-hulman.edu, 812-877-8430).

Are you interested in giving back to the Department of Chemical Engineering at Rose-Hulman? Many opportunities exist for those who can share their time and expertise with the department. If you wish to find out more about how you can get involved, please [contact us](#).



Designating the Chemical Engineering Department as the recipient of your financial gift to the Institute helps us continue to offer cutting-edge educational equipment and learning experiences to our students. [Click here](#) for more information on the various ways to give, or contact [Jennifer Kenzor](#) in Institutional Advancement. Thank you for your support!



American Institute of Chemical Engineers

Outgoing President: Eric Kamer
Incoming President: Elias Eteshola

The American Institute of Chemical Engineers (AIChE) is the leading organization for chemical engineers around the world. With more than 45,000 members from 90 different countries, this organization is able to provide its members with access to information from all areas of the field. At Rose-Hulman, our chapter has been in existence for approximately 60 years. While there have been changes within the department throughout this time, the mission of our chapter is to provide students with resources and opportunities that will make them successful outside of the classroom.

In the past year, our chapter has been actively working with our students to build relationships between all students in the department that encourage sharing useful lessons with one another. In addition to relationships formed, we were able to work with students and prep them for career fairs as well as provide them with opportunities that were not available through Rose-Hulman's career services. Outside of campus, students from our

chapter have taken plant trips to some of the local industries where they have been able to get up close and better understand some of the processes used. Finally, as a result of events that our chapter has hosted with the faculty and staff, the students have had many opportunities to connect with faculty and get a learning experience outside of the classroom.

As this school year comes to a close, the executive board is putting in place plans that will allow for the chapter to grow even larger and provide students with even more opportunities to grow as chemical engineering students. One goal of next year's chapter is to earn the prestigious "Outstanding Student Chapter" award. This may be possible with the improvements that have been made over the last few years.

If you or your company would like to make a presentation to our chapter, or even share information that you think would be beneficial to students, please pass it along to [Dr. Adam Nolte](#) who can connect you with our chapter. The Rose-Hulman AIChE chapter would like to acknowledge Marathon Petroleum Corporation for their financial support of our chapter.



Eric Kamer

Rose-Hulman Chem-E-Car

Outgoing President: Kabir Sodhi
Incoming President: Chandler Bass

AIChE organizes an annual Chem-E-Car competition where student teams from different zones in the country design small-scale automobiles that operate through a chemical mechanism. During the competitions, which are organized on both the regional and national scales, the cars must drive a fixed distance carrying a certain payload and stop without any mechanical brake assistance. The team is judged by how far their car is from the finish line, along with a poster describing the unique features in the car. The size of the designed car cannot exceed certain specifications and it must operate using "green" methods. Rose-Hulman's team first competed in the 2011 regional competition at Akron, Ohio, where the team placed sixth in the regional competition (the top five teams go to nationals). In 2012, Rose-Hulman placed seventh in the regional competition held in Cincinnati, Ohio.

For both 2011 and 2012, the primary power source for Rose-Hulman's car was an 8 W PEM hydrogen fuel cell. The hydrogen for the fuel cell is produced onboard by a reaction between 2 N HCl and magnesium filings. The fuel cell draws oxygen from the atmosphere. Since

the HCl and magnesium reaction produces wet hydrogen, Rose-Hulman's car employs a unique drying mechanism to dry the hydrogen before it gets to the fuel cell, in order to avoid flooding it. The hydrogen from the Erlenmeyer flask goes into a small test tube where it is bubbled through mineral oil which holds the water down and only lets the dry hydrogen get through. The car's desired distance is controlled by the amount of initial reactants (Mg and HCl) charged into the Erlenmeyer flask.

For next year, the team plans to investigate more green technologies that can run the car, such as an aluminum air battery with an iodine clock stopping mechanism. The team is also investigating the possibility of course credit for students that are working on the car, in order to encourage more involvement.

The Rose-Hulman Chem-E-Car team would like to acknowledge Marathon Petroleum Corporation and the Dow Aid-to-Education fund for their generous support. If you or your company would like to learn more about the Chem-E-Car team, please contact our team advisor [Dr. David Henthorn](#).



Kabir Sodhi





ChE Curriculum and Course Offerings

Our faculty meet regularly to discuss the Rose-Hulman ChE curriculum and course offerings, and to discuss and implement changes that we believe may better meet the needs of our students. Nevertheless, our curriculum has maintained the same basic structure for a number of years due to feedback from alumni and employers that suggests our combination of the “classic” ChE core courses with the flexibility afforded by our electives, concentrations, and minor/double-major paths still produces graduates who are well-prepared for entering the workforce and graduate school.

For those interested in the details, our full curriculum including all support courses (chemistry, physics, mathematics, humanities, etc.), may be viewed [online](#). In this brief space I would like to summarize the general engineering and core ChE courses our students are currently required to take:

- **General Engineering:** Our freshmen students take a course in graphical communications in the fall, and an introductory design course in the spring. The introductory design course is taught by ChE faculty for ChE students, so it gives students an early opportunity to begin exploring the types of problems that chemical engineers encounter. In addition to these, students take a ChE-specific shortened “baby statics” course in the fall of sophomore year.
- **Introductory ChE:** Students must take two courses in material and energy balances. These are nicknamed “Meatballs I and II” and serve as the gateway sophomore-level courses for the remainder of the curriculum. We also require students to take a ChE programming course (currently based on learning Visual Basic and Microsoft Excel) their freshman year, and a Materials Science and Engineering course their sophomore or junior year.
- **Thermodynamics and Chemical Kinetics:** Students can take Thermo I and II after completing their materials and energy balance requirements. Following Thermo II, students take Physical Chem-

istry and then our Kinetics and Reactor Design course.

- **Transport Sequence:** Students take a Fluid Mechanics course after completing their materials and energy balance requirements. They then can go on to take a Fundamentals of Heat and Mass Transfer course and an Applications of Heat and Mass Transfer course. These courses are taken in parallel with the Thermodynamics/Kinetics track.
 - **ChE Laboratory:** Starting spring term of junior year, all ChE students take a ChE laboratory lecture (refreshing concepts of statistics and teaching good data collection and analysis practices). During this term, they meet once a week and work on a laboratory project during the term. ChE Laboratory continues the first two terms of senior year, with students meeting twice a week and tackling two projects per term. Each student completes five projects by the time he or she graduates.
 - **Senior Design:** During senior year, students take Design I and II in the fall and winter, and do a capstone design project (Design III) under the mentorship of a faculty member in the spring.
 - **ChE Electives:** In addition to humanities and other approved electives, a student must pick two ChE-specific electives from a [standard list of offerings](#). Faculty members often offer additional electives during the year in their areas of expertise; these have recently included, for example, courses in interfacial engineering (Dr. McClellan), nanotechnology (Dr. Nolte), and particle technology (Dr. K. Henthorn). For students who wish to concentrate their electives in a particular area of study, we currently offer an [area minor in biochemical engineering](#), as well as the ability to obtain an area “concentration” in either advanced chemical engineering analysis, energy production and utilization, and industrial and process engineering.
- More information about our current curriculum and degree requirements and options is available on our [program page](#) in the Rose-Hulman online course catalog.

Are you interested in the United States population distribution for current Rose-Hulman students and alumni? Do you know who the top employers are for Rose-Hulman grads in each state?

[Click here](#) to see an interactive demographic of the Rose-Hulman population!



ChE Advisory Board Members (2012-2013)

Joe Alford

Eric Anders (2012 Meeting Chair)

Cameron Bagley

Todd Brown (2013 Meeting Chair)

Stephan Gillman

Lisa Hall

Greg Hevron

Jason Karlen

Gary Kelm

Bernard McGarvey

Steve Meyer

Bruce Parker

Michael Patrick

Tony Poparad

Sarah Sanborn

Brett Schmidli

John Swearingen



The Rose-Hulman ChE Advisory Board is a group of alumni and friends of the department with experience and expertise in various industrial and academic sectors. Members of this group meet annually on campus with the department to provide feedback and advice on our program. The ChE Advisory Board is a critical and valuable part of our team. Its members provide assistance in assessing our goals, planning for the future, and ensuring the relevance and effectiveness of our program. The membership of the advisory board changes from year to year; we attempt to maintain a diversity of industrial sectors, corporate representation, and alumni graduation years.

Advisory Board News

Several members of the ChE Advisory Board gathered on campus on November 9, 2012 for our annual meeting. The meeting focused on the institute's strategic plan, process safety in the curriculum, and our program educational objectives in light of the ABET visit.

We wish to thank the 2012-2013 advisory board members, some of whom will be retiring after several years of service. Finalization of the advisory board membership for 2013-14 is currently underway. If you are interested in learning more about the advisory board or would like to get involved, please contact either [Todd Brown](#) (the 2013 meeting chair) or [Adam Nolte](#) for more information.

Alumni News

- [President Obama Nominates Alumnus Robert Wilkins to Federal Appellate Court Judgeship](#)
- [Alumnus Darin Moody Helps Expand Lilly's Global Impact](#)
- [Alumnus Kenny McCleary Ready to Complete Marathons in 50 States](#)
- [Alumnus Paul German Shares ExxonMobil Chemical's Most Valuable Patent Award](#)
- [Alumna Elizabeth Hagerman Delivers Commencement Address at SMWC](#)

Alumni Babies!!

Sean Cody ('10) and his wife, Meghan, welcomed Owen Riley Cody, born March 1, 2013. Congratulations!

Kim Henthorn ('99) and her husband, Dave, welcomed Charlotte Suzanne Henthorn, born April 11, 2013. Congratulations to our two current ChE faculty!

[Contact us](#) if you have any alumni news you want to share in this newsletter!

Student Awards and Honors

The following ChE students were recognized at the annual campus award ceremony on April 20, 2013.

Graduates of the class of 2013 receiving awards included:

- **Alexander Boyd** (Archer Daniels Midland Award for Excellence in Chemical Engineering)
- **Eric Kamer** (Sam C. Hite Award)
- **Ethan Post** (William Albert Noyes, Sr. Award in Chemistry, Carl Wischmeyer Scholar)
- **Emily Yedinak** (John White Award in Chemistry)

Other undergraduate students receiving awards included:

- **Jordan Aders** (Paul N. Bogart Scholar)
- **Matthew Billingsley** (Heminway Scholar)
- **Matthew Crisler** (Heminway Scholar)
- **David Harvey** (Heminway Scholar)
- **Katherine Moravec** (Eli Lilly & Co. Clinton Laboratories Award, Paul N. Bogart Scholar)

Ethan Post was honored by Omega Chi Epsilon with the Outstanding Senior award. This award is decided annually by a vote of the graduating senior class.

Junior **Katherine Moravec** and senior **Emily Yedinak** were the recipients of prestigious national awards during the 2012-2013 academic year. Moravec was awarded a [Barry M. Goldwater Scholarship](#) and Yedinak was selected for a [Fulbright U.S. Student Fellowship](#). Yedinak graduated this May and will spend next year studying and performing research at the University of Santiago in Chile.

Faculty Awards and Honors

Dr. David Henthorn and **Dr. Dan Coronell** were awarded Summer Professional Development grants through Rose-Hulman. Dr. Henthorn is investigating hypoxia-mimicking materials for wound healing, and Dr. Coronell is developing a continuing education short course on Excel and VBA programming for numerical problem solving in science and engineering fields.

Dr. Kim Henthorn was honored by Omega Chi Epsilon with the 2013 Outstanding Professor Award. This award is decided annually by a vote of the graduating senior class.

Dr. Sharon Sauer was awarded ASEE's Spread the Word / Campus Representative award from the Illinois-Indiana section for her work in promoting ASEE membership on campus.

