

Chemical Engineering Department

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Notes from the Department Head – Dr. Adam J. Nolte



Dr. Adam J. Nolte

Hello to all of our alumni and department friends! The return of the fall season means the beginning of another academic year, and we have plenty of exciting developments and news to share.

After a successful spring commencement ceremony (and bidding well-wishes to the 66 new chemical engineering alumni), the department is pleased to welcome two new faculty members this fall. Dr. Heather Chenette, joining us as an assistant professor, recently completed her Ph.D. at Clemson University with a thesis focusing on surface modification of membrane adsorbers for bioseparation applications. Heather also maintains a research interest in engineering pedagogy, and is an alumna of Harvey Mudd, another esteemed primarily undergraduate institution. Heather's husband Nathan also joins RHIT this year as a visiting assistant professor in mathematics. Heather and Nate have a 9-mo old daughter, Sylvia.

Dr. Anju Gupta, who joins us as a visiting assistant professor, comes to us most recently from Texas A&M International University. Anju's recent professional interests have included oil spill mitigation and biomimetic spider silk peptides for drug delivery applications. Anju completed her undergraduate work at the University of Mumbai, a Master's at Worcester Polytech, and her Ph.D. at the University of Rhode Island. Anju enjoys working with students and is highly active in AIChE, particularly on the Young Professionals Committee.

In other news, our department was again honored by U.S. News and World Report as the #1 ranked, non-doctoral granting chemical engineering program in the country. Rose-Hulman was also again ranked #1 overall among non-doctoral granting engineering schools. Although we do not define ourselves by these honors, such recognition from our peers is always welcome news to hear, and it reflects positively on the wonderful accomplishments of you, our alumni, in your respective fields.

We had several capital projects completed this

summer in order to continue to improve the quality of the spaces in which our faculty and students work and learn. Our unit operations laboratory received a long-overdue upgrade in lighting, and that area is now brighter and more energy-efficient thanks to the installation of a custom LED-based system. I would like to acknowledge and thank Dr. Patsy Brackin from mechanical engineering and students from the HERE program (Home for Environmentally Responsible Engineering) who worked to design that system and make it a reality. In addition to the lighting project, we also renovated two other project laboratory spaces and upgraded several pieces of laboratory equipment. I look forward to sharing more about those projects in future newsletters.

Before I wrap up this column, I want to again invite you to share your ideas for content and your alumni news items. These should be passed on directly to Lisa Harwood (harwood@rose-hulman.edu, 812-877-8430). By the time this newsletter is distributed, Homecoming 2014 will likely have wrapped up. A separate invitation will have been sent for our annual open house—I'm hoping to see as many of you there as possible. You're always welcome back at Dear Old Rose. If you are unable to travel, but are still interested in engaging the department, I particularly invite you to consider Dr. Atanas Serbezov's call for senior design mentors (see page 2). This was a very successful program last year, and we are looking forward to continuing it in the spring. Thank you for all you do to make our department great!



Dr. Heather Chenette



Dr. Anju Gupta

Alumni Mentoring Program for Senior Capstone Design Projects



Dr. Atanas Serbezov

Overview

The alumni mentoring program was proposed at the 2013 Advisory Board meeting as an avenue to better engage alumni and at the same time enhance the students' learning experience during the senior capstone design project.

The first implementation of the mentoring program was in Spring 2014 and it significantly raised the industrial (real world) relevance of the capstone design project in many areas, such as:

- Chemical process equipment selection and design
- Health, safety and environmental considerations
- Engineering economics
- Documentation and presentation of engineering work
- Uncertainty and contingencies
- Project management
- Communication with project constituents

Alumni Mentors in Spring 2014

A call to the alumni was sent out just a few weeks prior to the beginning of the Spring 2014 quarter but the response was overwhelming. The number of alumni volunteers significantly exceeded the number of student groups! I would like to once again thank all of the alumni who responded to the call. At the end, fourteen alumni were matched to student groups. Each mentor worked with one group only.

Alumni mentors for senior capstone design projects in Spring 2014:

Christopher Hintz (1995, 1998)	Jacob Fuerst (2006)
Sarah A. Sanborn (2004)	Nick Adams (1975)
Kyle Caplinger (2005)	Thomas A. Gilman (1981)
Jerry Traylor (1987)	Don Cole (2000, 2004)
Mark Kircher (1974)	Paul Sechrist (1979)
Adam Strom (2010)	Scott Oblander (1985)
Blase Keegel (1987)	Carrie McDonald (2012)

Implementation Details

Each mentor called in once a week for an on-line meeting with the student team and the course instructor using Microsoft Lync. The weekly meetings were organized and moderated by the course instructor. At the beginning of each meeting students reported on their progress, unresolved issues and plan for the coming week. After that, the instructor and the mentors provided feedback, asked questions, suggested alternative strategies, gave report writing and presentation tips, and offered career advice.

Mentoring Program Feedback

Based on the feedback from all participants (students, instructors and mentors) the mentoring program was very successful. In their course evaluations students praised the alumni mentors time and again. They listed their interactions with the mentors as one of their most valuable experiences at Rose-Hulman. All mentors went above and beyond their core mentorship responsibilities.

Path Forward – Call for Mentors and Projects

The Department would like to offer the mentorship program again in Spring 2015. We currently have a list of 35

alumni who responded to our initial call. If you did not respond but would like to be a mentor, please contact Prof. Atanas Serbezov so that your name can be added to the mentor's database.

We would also like to solicit project suggestions from alumni. The course can accommodate a vast range of projects, from very broadly defined, such as front end engineering for a production facility based on a patent or published technology (see the example from 2014), to more narrowly defined, such as process improvement of an area or unit operation in an existing process. If you have ideas for capstone design projects, please contact Prof. Atanas Serbezov at serbezov@rose-hulman.edu.

Mentor's Responsibilities

Mentors are not expected to be subject matter (technical) experts in the project topic. Familiarity with the particular technology involved in the project is beneficial, but not a condition to participate in the mentoring program.

The core responsibilities of the mentors are:

- Participate in a weekly online project meeting and provide constructive feedback on the technical/presentation/communication/management skills demonstrated by the students. In this, the mentors will draw from their own professional experiences. It is understood that the mentors may miss some weekly meetings due to travel, emergency or other conflicts. In such situations the mentors are expected to notify the project team ahead of time (if possible).
- Review the project meeting notes and report inaccuracies / deficiencies to the project team.
- Review the weekly project memo and project schedule prior to the weekly meeting and provide constructive feedback on the content/format.

The mentors' weekly time commitment for the core responsibilities is not expected to exceed 1.5 hours.

Example of Project Definition for Senior Capstone Design Course

Propylene Production via Propane Dehydrogenation

Propylene is the second most important intermediate in the petrochemical industry after ethylene. The availability of cheap propane (mainly in the U.S due to the rising exploitation of shale gas) makes the propane dehydrogenation (PDH) reaction a promising alternative to meet the rising global propylene demand.

One approach to PDH is a process developed by UOP LLC and marketed under the trade name Oleflex. A second approach developed by Lummus Technology, is marketed under the trade name Catofin.

Estimate the NPV at 12% interest rate of a plant to produce 550,000 metric ton per year propylene via propane dehydrogenation.



Department Snaps from Last Year



Dr. Adam Nolte happily participated in Tau Beta Pi's charity pie event held on Pi Day (3/14) last Spring. A donation of one dollar earned the donor one raffle ticket, which offered the chance of throwing a pie in the face of an RHIT department head. Funds raised went towards supporting the Terre Haute Children's Museum.



Dr. Adam Nolte and Katerina Yang, Lecturer/Academic Mentor from Singapore Polytechnic and former professor to alumna Denise Phua. Katerina stopped by Rose-Hulman and the Department for a visit after the ASEE Conference in Indianapolis in June.



Dr. Atanas Serbezov enjoyed the great outdoors during Spring Break at Vail Ski Resort.



Department Snaps from Last Year



Dr. Adam Nolte carrying out a personal investigation of momentum transfer and fluid dynamics near Gulf Shores, AL.



Dianna Overmyer (2004, 2010), daughter of Dr. Ron Artigue, was honored with a memento for her work as a Process Control Mentor with the department.



Brad Herbig, Outstanding Graduate Thesis Award winner, with Dr. Adam Nolte at 2014 Commencement.



The Department enjoyed a nice end-of-year dinner at their favorite sushi bar, Umi Grill.



Dr. Sharon Sauer's new Shih-Tzu puppy, Raphael, paid a visit to the department this summer. Cute!!



American Institute of Chemical Engineers

The American Institute of Chemical Engineers (AIChE) is coming into this year with a revitalized spirit. A number of new activities have been incorporated into our calendar and are currently in the works. These range from professional development opportunities to social gatherings to volunteer service initiatives.



Brent Hukill,
President, AIChE

We began this year with a 'Welcome Back' cookout and recently sponsored a Coop/Internship/REU Seminar where three students from the department were invited to give a brief presentation on their time spent in an industrial workplace or academic research setting. In the near future, we will be hosting a resume/career fair workshop, happy hours, plant tours, and are hoping to organize company info sessions. This is also the inaugural year for our beautifully designed website, rh-it-aiche.weebly.com, which will serve as an information hub for members, alumni, and sponsors alike.

Our executive board aims to change the culture of our organization by adding a community atmosphere, with a focus on professionalism. Accordingly, we have adopted a new motto, "AIChE: Where Professional Meets Social", which will be featured on this year's t-shirts (below). We are very excited about this year and hope to make great strides!

If you or your company is interested in sponsoring or getting involved with plant tours/info sessions etc., please contact me by email at hukillbj@rose-hulman.edu.



Chem-E-Car

Chem-E-Car club is an organization that gives students the opportunity to design and build a model car that operates via chemical mechanisms. The car designs must fit within a certain specification and must abide by safety rules set by AIChE. The club participates in AIChE's regional competition each year, competing against other teams from across the nation. The top five winners of the regional competition move on to the national competition. During the competition, the cars drive a fixed distance carrying a certain payload, both of which are decided the day of the competition. The teams are judged based on how far the car is from the finish line.



Casey Mihal,
President, Chem-E-Car

The 2014 Rose-Hulman Chem-E-Car club has just started for this year. The first meeting had about 40 people in attendance, which is a large increase from last year. The club is going to completely redesign the car this year. If enough students continue to come to meetings, two different cars will be designed with hopes of bringing two teams to the competition. The club is going to have a very strong focus on safety this year, being sure to abide by all AIChE safety rules, as well as practicing safety in experimentation and building. A new leadership position, called Head of Safety, has been introduced in order to help the team focus on safety.

The Rose-Hulman Chem-E-Car club would like to thank Eli Lilly, Dow Chemical, and Marathon Petroleum Company for their generous support of the team. If you or your company would like to learn more about the Chem-E-Car team, please contact the team advisor, Dr. David Henthorn, at henthorn1@rose-hulman.edu.

Omega Chi Epsilon

Omega Chi Epsilon, or OXE, is a national academic honor society for chemical engineering students. The organization was founded in 1931 at the University of Illinois to promote the goals of recognition, investigation, service, comradeship, and professionalism in chemical engineering.

We aim to be more visible on campus in the upcoming school year while continuing to aid our members in their professional careers. During the fall quarter, we will be hosting an event for chemical engineering students to present their summer internship or REU experiences to their peers. In doing so, we aim to give students a better understanding of their post-graduate options. If you are interested in hosting an information session about different opportunities for chemical engineers, please don't hesitate to contact me by email at hiattkm@rose-hulman.edu.



Kayla Hiatt,
President, OXE



ChE Advisory Board Members (2014-2015)

Joe Alford

Eric Anders

Cameron Bagley

Brad Berron

Todd Brown

Rich Hale

Lisa Hall

Greg Hevron

Kyle Kamischke

Jason Karlen

Dustin Martin

Bernard McGarvey

Steve Meyer

Bruce Parker

Tony Poparad

Sarah Sanborn

John Swearingen
(2014 Meeting Chair)



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.

Alumni News

Dustin DuBois ('92) is among alumni entrepreneurs encouraging students to dream big. Click [here](#) for the complete story.

Darrell Staggs ('78) earns third place among 18,000 national park photo contest entries. Click [here](#) for the complete story.

Robert L. Wilkins ('86) is driven to make a difference as a Federal Appeals Court Judge. Click [here](#) for the complete story. He [received an honorary doctorate](#) at the 2014 Rose-Hulman Commencement. Judge Wilkins was recently sworn in as the 61st judge on the U.S. Court of Appeals for the D.C. Circuit.

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 at Jennifer.Kenzor@rose-hulman.edu. Thank you for your support!

Student Awards and Honors

The following ChE students were recognized at the annual campus award ceremony on May 10, 2014.

Graduates of the class of 2014 receiving awards included:

Katherine A. Moravec (Archer Daniels Midland Award for Excellence in Chemical Engineering)

Zhang (Teddy) Wang (Sam C. Hite Award)

Gunther W. Wong (Sam C. Hite Award)

Other undergraduate students receiving awards included:

Matthew R. Billingsley (Eli Lilly & Co. Clinton Laboratories Award)

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



Faculty Awards, Honors and News

Dr. Adam Nolte 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. Adam Nolte is part of a group of faculty researchers striving to improve early breast cancer detection procedures. Click [here](#) for the complete story.

Dr. Scott McClellan and **Dr. Hossein Hariri** received summer multimedia/web-tool grants and worked to develop online modules and course materials for thermodynamics and petrochemical processes.

Dr. Atanas Serbezov attended a process safety short course at the Chevron Energy Technology Company in Richmond, CA.

Dr. Ron Artigue, Dr. Atanas Serbezov, Dr. Kim Henthorn, Dr. Dave Henthorn, and Frank Cunningham worked to introduce new experiments and data acquisition and control features into the chemical engineering laboratory.

Dr. Scott McClellan is on sabbatical this Fall quarter. His work is focused on investigating the use of liquid crystals as biosensors.