Message from the Department Head

Now that the pleasant days of summer are just a memory, I am glad to welcome our students back to campus. I especially hope you all had a restful summer break before returning to the Fall semester. The past academic year has been an exciting time in the department and proved to be very busy for all of us. This newsletter reflects the dynamic research and educational activities of our faculty, staff, researchers, visitors and students. It is a special privilege for me to recognize all of their hard work.

In particular, I am very pleased to announce that we have hired three new faculty members in the department. Dr. Zack Ulissi joins us this fall after finishing a postdoc at Stanford University and his PhD at MIT in the areas of computational chemistry and nanotechnology. In addition, Dr. Alan J. Russell, currently the director of the Disruptive Health Technology Institute and Highmark Distinguished Career Professor, joins our department as a senior member. Also, Dr. Coty Jen, who received her PhD from Minnesota and works in the area of atmospheric chemistry, will join us next fall after completing her postdoc at Berkeley. In addition, after long, distinguished careers and many contributions to our department, Prof. Dennis Prieve and Prof. Paul Sides retired last June. We will miss them, and wish them well in all of their future plans.

Moreover, I am very glad to acknowledge a number of faculty awards. Prof. Ignacio Grossmann received the ETH Zurich Chemical Engineering Medal for his many contributions to process systems engineering. Prof. Alan Russell received the President’s Award from the Engineering Society of Western Pennsylvania. In addition, Profs. Todd Przybycien and Lynn Walker were elected Fellows of the American Chemical Society and the Society of Rheology, respectively.

My congratulations go to the class of 2017! We have graduated an outstanding class with 59 seniors, 16 masters students and 9 PhDs. I wish you all the best in your future career plans and professional goals. My colleagues and I especially enjoyed celebrating with you at Commencement. Details of the graduating class are listed below. Among the many student awards, I was very glad that our ChemE Car Competition team distinguished themselves at the AIChE Mid-Atlantic Regional Conference last April. They will compete in the national competition at the AIChE Annual Student Conference in November.
At the same time, I would like welcome our 53 first year students, who are now declared Chemical Engineering undergraduate majors, as well as our incoming class of 33 PhD candidates. We also extend a welcome to the incoming class of 43 masters students this semester. My thanks go to James Schneider and Allyson Danley for their excellent management and organization of the recruiting process.

Finally, special thanks go to our departmental staff and faculty colleagues, who continue the high level of performance in the department. I especially appreciate their experience in covering all of the bases over the past year.

Have a great semester!

Larry
On June 16, 2017, a gala was held at Phipps Conservatory to honor retiring faculty members, Prof. Dennis Prieve and Prof. Paul Sides. In addition to the faculty and staff present, many former PhD students attended the event to share fond memories of Paul and Dennis with all in attendance. Speakers also included current Dean of CIT, Jim Garrett, and former dean, John Anderson.

In addition to the Pittsburgh celebration, a special session of the annual American Institute of Chemical Engineers meeting is being organized in honor of Dennis where many of his colleagues and former PhD students will be presenting their research. To further honor the long and illustrious careers of Paul and Dennis, there will also be a dinner reception in Minneapolis in November where the annual meeting is being held. Both Dennis and Paul will remain as Emeritus Professors, continuing various research projects, and will maintain a shared office in 3111 Doherty Hall.

Dennis and Paul are pictured below with groups of friends and alumni at this reception.
In June, 2017, the H. Robert Sharbaugh Presidential Fellowship was established to provide support to graduate students in Chemical Engineering. Robert Sharbaugh, E'48, died in January of this year and left this legacy to our department.

The Faculty Retreat was held this year on Friday, September 8 at the Pittsburgh Golf Club.

Pictured above are Neil Donahue, Kris Dahl, Ashley Ford Versypt (from Oklahoma State University), and Zack and Shaena Ulissi, all enjoying the evening.
**Staff News**

Allyson Danley has assumed the responsibility of Masters' advisor, in addition to her role as Graduate Coordinator. Her office is now in 1101 Doherty Hall.

Due to the consolidation of the CIT machine shops in July, 2017, Larry Hayhurst moved to the Dept. of Mechanical Engineering as part of the CIT Collaborative Machining Center in the Maker Wing of Hamerschlag Hall.

Please welcome Anne Angyal, our new temporary employee who will be assisting in event planning and data entry. She will be sitting either in the main office or in Heather DePaqsuale's office. Her work days are Tuesday, Wednesday and Thursday from 9:15-3:15.

We also welcome two post-doctoral researchers to the department: Abigail Ondeck and Henry Chu. Abigail joins us from the University of Texas at Austin and will be working for Ignacio Grossmann. Henry comes from Cornell University in order to work with Bob Tilton. Both Abigail and Henry will be here for at least two years.
Faculty News

Please welcome our two new faculty members who have joined us as of August, 2017:

Dr. Alan Russell, in addition to being an active full professor in our department, is the Highmark Distinguished Career Professor, Director, Disruptive Health Technology Institute and Co-Director, Center for Polymer-Based Protein Engineering. Prof. Russell received his Ph.D. in Biological Chemistry from Imperial College, London and has worked previously as the Chair of the Department of Chemical and Petroleum Engineering at the University of Pittsburgh as well as the Director of the McGowan Institute for Regenerative Medicine at the University of Pittsburgh. He has published over 200 articles and holds more than 90 patents. Among his numerous awards, he received the ESWP President's Award for Engineering Excellence, the American Chemical Society's Pittsburgh Award, and the Lifetime Achievement Award from the Tissue Engineering and Regenerative Medicine International Society. Prof. Russell will be giving a departmental seminar on November 28, 2017, so please come and meet him.

Dr. Zack Ulissi joins us as an Assistant Professor. He received his B.S. in Physics and B.E. in Chemical Engineering from the University of Delaware, his Masters of Advanced Studies in Mathematics from the University of Cambridge, a Ph.D. in Chemical Engineering from MIT, followed by a postdoctoral fellowship at Stanford University. His research includes controlling selectivity of nanoscale interfaces with co-adsorbates and soft functionalization, machine-learning based approaches to accelerate material screening, and Bayesian methods for complex reaction mechanism reduction and elucidation.

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--**Larry Biegler**. Larry was awarded the American Society for Engineering Education (Chemical Engineering Division) Lectureship Award. He presented a lecture entitled "New Paradigms for Process Optimization Modeling and Solution Strategies" at the ASEE meeting in Columbus, Ohio in June when accepting the award.

--**Kris Dahl**. Kris and her Ph.D. Student, Travis Armiger, have discovered that the cell's nucleus recovers from major deformations in part because of a spring-like, mechanical element called a spectrin protein. For more details, please see the videos listed on the last page.

--**Andy Gellman**. Andy gave the plenary lecture at the Chirality Conference held in Tokyo, Japan in July. His presentation was "Enantiomer aggregation in 2D: Conglomerates versus racemates."

--**Ignacio Grossmann**. Ignacio was named as this year's Hougen Lecturer at the University of Wisconsin, where he delivered two lectures at the Madison campus. Also, in recognition of his outstanding achievements in Process Systems Engineering, Ignacio was awarded the 2017 ETH Zurich Chemical Engineering Medal in June of this year. In addition, Ignacio received the 2017 Award for Long Term Achievements in Computer Aided Process Engineering at the World Congress of Chemical Engineering in Barcelona in October, where he gave a plenary lecture, "Evolution of Process Systems Engineering and Future Trends in Research.

--**Annette Jacobson**. Annette's Op-Ed article entitled "Why we shouldn't push students to specialize in STEM too early" was featured on the Public Broadcasting System news website in September, 2017.

--**Aditya Khair**. Aditya won the Arthur Metzner Early Career Award for his work in complex fluids from the Society of Rheology and gave a lecture for that at the recent Society of Rheology meeting in Denver. He was accompanied by his grad student, Raj Sengupta, who won first place at the poster session at that meeting.

--**John Kitchin**. John received a $510,000 DOE Office of Basic Energy Sciences grant to study selectivity in the single atom alloy limit. The grant will fund the project for the next three years.

--**Todd Przybycien**. The American Chemical Society has named Todd to the 2017 class of ACS Fellows, which includes scientists who have demonstrated outstanding accomplishments in chemistry and have made important contributions to ACS, the world's largest scientific society.
--*Alan Russell.* Alan received the President's Award from the Engineering Society of Western Pennsylvania.

--*Nick Sahinidis.* Nick has been named editor-in-chief of the journal Optimization and Engineering (OPTE), which promotes the advancement of optimization methods and the innovative application of optimization in engineering.

--*Bob Tilton.* Bob and his co-authors, Yun-Ru Huang, Melissa Lamson, and Kris Matyjaszewski, have published an invited peer-reviewed original research article "Enhanced interfacial activity of multi-arm poly (ethylene oxide) star polymers relative to linear poly (ethylene oxide) at fluid interfaces" for a special "Surface Chemistry and Interface Science" themed issue of the Royal Society of Chemistry Journal Physical Chemistry Chemical Physics.

--*Lynn Walker.* Lynn was elected Fellow of the Society of Rheology and recognized for her work on structure and rheology of soft materials. Lynn was also the keynote speaker at the University of California at Santa Barbara's 10th Amgen-Clorox Graduate Student Symposium.

**Conferences**

The latest successful Annual Meeting of the Center for Advanced Process Decision-making took place on March 13-14, 2017. It was preceded by the meeting of the Energy Systems Initiative group on March 12 and followed by the Enterprise-Wide Optimization group on March 14-15. The group had a total of 53 participants from the process industry. Copies of the slides of the meeting are available at [capd.cheme.cmu.edu/neewsletters.html](http://capd.cheme.cmu.edu/neewsletters.html).

The CAPD Short Course was held in Doherty Hall from May 10-17, with 17 participants.

The Fall Enterprise-Wide Optimization Project Meeting was held on September 20-21 and attended by representatives of 18 international corporations. [Egoncheme.cmu.edu/ewocp](http://Egoncheme.cmu.edu/ewocp).

The Institute for the Design of Advanced Energy Systems (IDAES) Meeting was conducted here on May 23-24 and on September 28-29. These meetings were hosted Nick Sahinidis and David Miller of the National Energy Technology Laboratory. The keynote speaker in September was Dr. Randall W. Gentry, Chief Technology Officer, NETL.
The 2017 Covestro (formerly Bayer) Lecture was given on September 26, 2017 by Christopher Swartz of McMaster University. Professor Swartz's many research projects enjoy industrial interaction through the McMaster Advanced Control Consortium, of which he has been Director for the past 10 years. He spoke on "Real-Time Dynamic Economic Optimization-Paradigms, Formulations and Challenges."

Welcome Visiting Scholars

Flemming Holtorf from RWTH Aachen University, Germany, Kai Liu of Sun Yat-sen University, China, and Fei Zhao from Zhejiang University, China are working with Larry Biegler’s group.

Mariana Gonzalez Prieto is a Fulbright Scholar from National University of the South, Argentina, working with Chrysanthos Gounaris’ group.

Steffen Bakker of Assensia Credit Analytics, Norway, Alba Carrero Parreno from University of Alicante, Spain, Leonardo Salsano de Assis of Universidade Federal de Santa Catarina, Brazil, and Victor Tulus from Rovira I Virgili University, Spain are working with Ignacio Grossmann’s group.

Yi Zhang from Zhejiang University, China is working with Nick Sahinidis’ group.
Undergraduate News

Gary Powers joined the faculty at Carnegie Mellon University in 1974 and his research in process systems and risk assessment justly earned world-wide recognition. For over 40 years Gary served as a mentor and friend to countless Carnegie Mellon students and faculty and the Gary Powers Memorial Scholarship was established to honor his commitment to the profession of Chemical Engineering and to the education of aspiring engineers.

The Department awards this Scholarship to a Junior Chemical Engineering student who is naturally curious, possesses deep passion for chemical engineering fundamentals, and who appreciates the engineer’s role in society. Recipients bring enthusiasm and joy to their work, show care for others, and participate in our Department’s activities and affairs. Special consideration is given to students who have persevered to overcome unusual obstacles or who demonstrate continuous improvement.

The first recipients of the Gary Powers Memorial Scholarship are Ian Donovan and Taurus Feng (pictured above).

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On September 1, the undergraduate welcome lunch was held in the Rothfus Lab, with approximately 75 students in attendance.

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Congratulations to the four ChemE Andrew Carnegie Scholars for this year:

Palak Bajaj (BS ChemE/BME 2018)
Alexandra Cerny received the Carnegie Mellon Women’s Association Award in the College of Engineering category, a scholarship given to a graduating senior who has demonstrated a commitment to the advancement of women in their academic pursuits.
The Meeting of the Minds is an all-day celebration of undergraduate research sponsored by the Undergraduate Research Office, and this year ChemE students swept the competition, winning the top three prizes! Congratulations to:

First Place: Rinko Maeshima (advised by Conrad Zapanta & Stephen Badylak) for "Generation and evaluation of porcine liver extracellular matrix as a tool for culturing human induced pluripotent stem cell (iPSC)-derived hepatocytes".

Second Place: Zachary Blonder (advised by Nisha Shukla) for "Enantiometric separation of chiral molecules accelerated with gold nanoparticles".

Third Place: Lauren Relyea (advised by Aditya Khair) for "Heat and mass transfer past slender bodies via a generalized reciprocal theorem".

Honorable Mention: Anna Bandecca (advised by Keith Cook) for "Pulmonary drug delivery using partial antibacterial perfluorocarbon liquid ventilation".

The 3rd Annual John Berg Chemical Engineering Undergraduate Research Poster Session was held in September of this year and two students were selected to participate in the AIChE Undergraduate Poster Competition at the AIChE annual Meeting in Minneapolis. This year’s Berg Scholars, pictured below, are Yue Han and Cathy Li.
Cheyenne Shankle, currently a ChemE Senior advised by Neil Donahue, has been awarded the Perryman Family Foundation Scholarship. Congratulations, Cheyenne!

Jamei Wang, Senior ChemE student, took first place in the "Speak Up!" challenge to teach students how to effectively communicate the importance of their ideas and work to a variety of audiences. She is developing a synthetic membrane to reset broken bones with MechE Prof. Kenji Shimada and Ying Ying Wu, a computational engineering and robotics lab postdoctoral research associate.
Congratulations to the following students who were on the CIT Dean’s List for Spring 2017:

**SENIORS**
- Hannah Avery
- Palak Bajaj
- Jonathan Calvello
- Emily Carvalho
- Edward Healy
- Natalie Hong
- Simone Hugh Sam
- Taigyu Joo
- Tanvi Joshi
- Neha Kapate
- Tiffney Kathir
- Jae Yeon Kim
- Andrew Lee
- Ji Yoon Lee
- Mark Lee-Shue
- Jennifer Lott
- Nicholas Medich
- Benjamin Mersman
- Matthew Palmer
- Aakash Parekh
- Himali Ranade
- Scott Rohrer
- Cheyenne Shankle
- Shridhar Singh
- Hua Zhi Situ
- Tianyi Song
- Oluwatomisin Soyebo
- Emily Tencza
- Alexandra Vendetti
- Roxana Wolfson
- Yilin Yang
- Sunjeev Kale
- Nin Rebecca Kang
- Madison Kratzer
- Christopher Lee
- G. Ping Lee
- Christopher Littrell
- Jeannie Michaels
- Anne Noonan
- Alexander Noring
- Richard Ruales
- Grant Seastream
- Chaitanya Singh
- Jacob Vries
- Guodong Zhao
- Zhen Zhou

**SOPHOMORES**
- Gage Anderson
- Dhruva Byrapatna
- Hojeong Chun
- Lavonca Davis
- Samuel Henry
- Haoyue Liang
- Sitong Lin
- Renee Morton
- Emily Parks
- Jacob Rushkoff
- Talia Solomon
- John Solomon
- Kye Stapleton-Gray
- Ian Tilton
- Isabella Vendetti
- Yu Zhou

**JUNIORS**
- Michelle Bai
- Sanjna Bhartiya
- Kevin Cai
- Teddy Cai
- Qilin Cao
- Michael Hall
- Yue Han
Congratulations and good luck to our students that graduated in Spring 2017:
Bachelor of Science in Chemical Engineering

Daniel Ah Tou

Vishal Ahuja
Additional Major: Biomedical Engineering

Tamara Amin

Anna Bandecca
Additional Major: Biomedical Engineering

Zachary Blonder
Minor: Business Administration

Frederick Buse
Additional Major: Biomedical Engineering

Brooke Carter
Additional Major: Biomedical Engineering

Alexandra Cerny
Additional Major: Biomedical Engineering

Vikramadhitya Cherupally

Gillian Crews
Additional Major: Biomedical Engineering

Michael Das (Summer 2017)

Siyuan Du
Additional Major: Statistics

Rebecca Fortner
Additional Major: Biomedical Engineering

Claire Gianakas
Additional Major: Biomedical Engineering
Minor: English
Trevor Hadick  
Additional Major: Engineering and Public Policy  
Minor: Policy and Management

James Ham  
Additional Major: Biomedical Engineering

Meave Higgins  
Additional Major: Biomedical Engineering  
and MS-Colloids, Polymers, and Surfaces

Samantha Ho  
Additional Major: Engineering and Public Policy

Anna Hoar

Maya Holay  
Additional Major: Biomedical Engineering

Xinyue Hong  
Additional Major: Human-Computer Interaction

Timothy Hui  
Additional Major: Biomedical Engineering  
Minor: Colloids, Polymers and Surfaces

Bradley Jennette  
Additional Major: Biomedical Engineering

Hyo Cheol Jeong  
Minor: Biomedical Engineering

Julie Jung

Allison Kirkby

Yein Lee

Dianna Li

Jordyn Lopez

Wei Mon Lu  
Additional Major: Biomedical Engineering

Matthew MacKinney
Additional Major: Biomedical Engineering

Rinko Maeshima
Additional Major: Biomedical Engineering

Ximena Olivares

Brandon Ortiz

Gordon Pace
Additional Major: Biomedical Engineering
Minor: Business Administration

Patricia Pan
Additional Major: Biomedical Engineering

Alexander Peterson
Additional Major: Biomedical Engineering

Jakob Przybycien
Additional Major: Computer Science

Lauren Relyea
Minor: Colloids, Polymers and Surfaces

Mariah Richardson

Johnathan Roppo

Casey Salandra
Additional Major: Biomedical Engineering

Adam Somers
Additional Major: Engineering and Public Policy

Naomi Sternstein
Additional Major: Creative Writing

Garrett Strobel

Emily Swanson
Additional Major: Biomedical Engineering

Nicole Tom
Additional Major: Biomedical Engineering
Nicholas Torres  
Minor: Business Administration

Maximilien Vachon  
Minor: Chinese Studies

Ivana Vlahovic  
Additional Major: Biomedical Engineering

Julia Wang

Sirena Wang  
Minors: Biomedical Engineering and Chemistry

Benjamin Yang  
Additional Major: Biomedical Engineering

Patrick Yang  
Minor: Computer Science

Yuxuan Yang

Ryan Yeh  
Minor: Business Administration

Sage Yort  
Minor: Environmental Engineering and Sustainability  
Minor: German Studies

Mengyang Yu

Anna Zhang  
Additional Major: Biomedical Engineering

Andrew Zheng

**MS in Chemical Engineering**

John Villarraga  
Advisor: Nikolaos Sahinidis  
*Multi-agent System for Supply Chain Automation*

**Master of Science - CPS**

Heesung Chung
Meave Higgins
Nicole Rakers
Robert Stout
David Yao

Master of Chemical Engineering
Robert Balsom
Isaiah Edmonds
Shao Ting Huang
Jee Yoon Jung
Li Liu
Carrie Qiu
Xin Sun
Vishal Vala
Shaoqian Yang

Master of Chemical Engineering/ETIM
Qin Lu

Doctor of Philosophy in the field of Chemical Engineering

Nicholas Austin
Advisor: Nikolaos Sahinidis
*Tools for Computer-Aided Molecular and Mixture Design*

Jacob Boes
Advisor: John Kitchin
*Multiscale Modeling of Adsorbate Interactions on Transition Metal Alloy Surfaces*

Nicholas Chisholm
Advisor: Aditya Khair
*Locomotion and Drift in Viscous Flows: Numerical and Asymptotic Predictions*

Markus Drouven
Advisor: Ignacio Grossmann
*Mixed-Integer Programming Models for Shale Gas Development*
Eleni Karnezi
Advisor: Spyros Pandis
*Volatility and Chemical Aging of Atmospheric Organic Aerosol*

Stephanie Kirby
Advisors: Shelley Anna, Lynn Walker
*Controlled Generation and Characterization of Multi-component Fluid/Fluid Interfaces*

Christopher Knapp
Advisor: Kathryn Whitehead
*Engineering siRNA Lipid Nanoparticles for the Treatment of Mantle Cell Lymphoma*

Robert Stout
Advisor: Aditya Khair
*Electrochemical Dynamics and Electrokinetic Particle Motion in Concentrated Electrolytes*

Justin Weinberg (September 2017)
Advisor: Todd Przybycien
*Competitive IgG Adsorption on Protein A Chromatography Resins and Improving Resin Performance with PEGylated Ligands*

Mingzhao Yu
Advisor: Lorenz Biegler
*Model Reduction and Nonlinear Model Predictive Control of Large-Scale Distributed Parameter Systems with Applications in Solid Sorbent-Based CO₂ Capture*
AWARDS PRESENTED AT GRADUATION

Ken Westerberg Award
Lauren Relyea
Presented to the senior who has shown exceptional promise for research.

Geoffrey Parfitt Award
Zachary Blonder
The Geoffrey Parfitt Award is given to a graduating senior who demonstrates excellence in chemical engineering research.
American Institute of Chemists Award

Diana Li

The recipients of the American Institute of Chemists Foundation Award are selected on the basis of ability, character, scholastic achievement and professional potential.

McCabe Society Award
Anna Bandecca, Alexandra Cerny, Rebecca Fortner, Dianna Li, Wei Mon Lu, Patricia Pan, Nicholas Torres:
These awards recognize undergraduate students who have distinguished themselves through exceptional service and noteworthy participation in activities that enhance the lives of the members of the department, the university and the community at large. This honor society celebrates the diversity of ways in which students may bring recognition to themselves and their communities, while pursuing the particularly challenging chemical engineering major.

**Kun Li Award**

**Jeffrey Siirola**

This award is given to the Chemical Engineering faculty member who has the greatest impact on the graduating class and is selected on the basis of the senior class’s comments.

![Kun Li Award to Jeff Siirola](image)

Alex Cerny and Anna Hoar present the Kun Li Award to Jeff Siirola

**Other Undergraduate information**

Placement statistics for the 2017 Senior Class are as follows:

The average starting salary was $75,161. The high was $117,000 and the low was $45,000.

Seniors were hired by the following companies:

- Accenture
- Anheuser-Busch
- Applied Predictive Technologies
- Arkema
- Augmedix
- Chewy
- DC Energy
- Deloitte Consulting
- Eli Lilly & Co.
- Enerkem, Inc.
- Epic*
- Evonik Industries
- ExxonMobil*
- Facebook
- Green Hills Software
- The Hershey Company
- IBM
- KOMO
The Class of 2017 went to the following graduate schools:

CMU
Duke
MIT
Princeton
Tufts University
UC, Davis
UC, San Diego
University of San Francisco

**Exchange Students**

**WELCOME BACK!**
Welcome back to our returning 2016-2017 Exchange Program participants:

**Imperial College, London**
Amanda Li
Alicia Ng
Megan Pudlo
Chase Webb
Maggie Yang

**Technische Universität Dortmund**
(Summer 2017)
Guodong Zhao

**Yonsei University**
Sooyeon Lim

Good luck to our students that are participating in the study abroad for this academic year:

**Imperial College, London**
Regine Choi
Jeannie Michaels

**Universidad Nacional del Litoral**
Jennifer Baik

If you are interested in participating in any of the Departmental Exchange Programs, the application deadline is January 19, 2018. See Cindy Vicker in DH1106 for application information.
A Diwali Event was held on October 20, 2017 in order to celebrate the Hindu Festival of Lights. This featured traditional Indian food and was sponsored by ChEMSA and ChEGSA. Pictured below are Aditya Patel, Anantha Ngarajan and Anubhav Khanna enjoying the festivities.

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Congratulations to Christopher Hanselman, the first fellow chosen by the National Energy Technology Center. Chris, a Ph.D. candidate advised by Chrysanthos Gounaris, was awarded the Department of Energy Fellowship to work at the NETL in Pittsburgh this past summer. He applied mathematical optimization to synthesize, characterize and model perovskite lattices at the molecular level.

**************************************************************************
Raj Sengupta (pictured below), advised by Aditya Khair and Lynn Walker, won first place at the graduate student poster session at the Society of Rheology meeting held in Denver in October.

Recent Ph.D. grad, Markus Drouven, advised by Ignacio Grossmann, tied for first place for the CMU Student Research Poster and Multimedia Competition, featuring topics on energy research. Markus' poster was "Optimization Models for Shale Gas Development: A Real-World Case Study."

Justin Weinberg, a recent Ph.D. grad advised by Todd Przybycien, is co-founder and CEO of 101, Inc., named as Inc. Magazine coolest college start-up. His company creates mobile apps for bringing the classroom into the digital age.
GRADUATE AWARDS PRESENTED AT GRADUATION

Ken Meyer Doctoral Research Award

Jacob Boes
Presented to a doctoral student who has demonstrated excellence in graduate research in chemical engineering.

Mark Dennis Karl Outstanding Teaching Assistant Award
Marissa Engle
Presented to a doctoral student who has demonstrated excellence as a teaching assistant.
Congratulations to the following students who recently presented their research proposals:

**David Molina Thierry**  
Advisor: Lorenz Biegler  
*Computational Strategies for Non-linear Model Predictive Control and State-estimation*

**Carlos Nohra Khouri**  
Advisor: Nikolaos Sahinidis  
*Novel Relaxation Techniques for Global Optimization of NLPs and MINLPs*

**Katherine Fein**  
Advisor: Kathryn Whitehead  
*A New Approach to Oral Protein Delivery Using Polymer-Based Protein Engineering*

**Zhou Yu**  
Advisor: Lorenz Biegler  
*Advanced-step Sensitivity-based Multistage NMPC*

Congratulations to our second year Ph.D. students who passed their qualifier exams:

- Bhavya Balu
- Kyle Cochran
- Andrew Fox
- Nicholas Golio
- Bowen Huo
- Natalie Isenberg
- Brad Johnson
- Spiro Jorga
- Saif Kazi Rahaman
- Daniel Lee
- Bhagyashree Lele
- Can Li
- Yanxin Li
- Junchi Ma
- Scott Pedu
- Michael Radetic
- Stephanie Stephanie
- Yijia Sun
- Kevin Tran
- Olga Vinogradova
- Yunhan Wen
- David Bernal Neira
Welcome to the following students who have joined our graduate program:

**PhD Students**

<table>
<thead>
<tr>
<th>Name</th>
<th>School</th>
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<tbody>
<tr>
<td>Martin Burton</td>
<td>Wayne State University</td>
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<tr>
<td>Zicheng Cai</td>
<td>University of California Irvine</td>
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<tr>
<td>Namit Chaudhary</td>
<td>Indian Institute of Technology</td>
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<tr>
<td>Brian Dinkelacker</td>
<td>University of Delaware</td>
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<tr>
<td>Rose Doerfler</td>
<td>University of Notre Dame</td>
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<tr>
<td>Can Ekici</td>
<td>Bogazici University</td>
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<tr>
<td>Carlos Fernandez Caban</td>
<td>University of Puerto Rico Maya</td>
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<tr>
<td>Sandra Fomete</td>
<td>Texas A&amp;M University, College Station</td>
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<tr>
<td>Zhitaog Guo</td>
<td>Tsinghua University</td>
</tr>
<tr>
<td>Luke Habib</td>
<td>Worcester Polytechnic Institute</td>
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<tr>
<td>Peter Hayes</td>
<td>University of Florida</td>
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<tr>
<td>Tsung-Lin Hsieh</td>
<td>National Taiwan University</td>
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<tr>
<td>Kimberly Hui</td>
<td>University of Southern California</td>
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<tr>
<td>Mackenzie Humes</td>
<td>Columbia University</td>
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<tr>
<td>Jason Kabarowski</td>
<td>University of Wisconsin, Madison</td>
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<td>Jihoo Kim</td>
<td>Seoul National University</td>
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<tr>
<td>Virginia Lane</td>
<td>University of Florida</td>
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<tr>
<td>Mingjie Liu</td>
<td>University of Wisconsin, Madison</td>
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<tr>
<td>Brandon Lopez</td>
<td>University of Nevada, Reno</td>
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<tr>
<td>Kaiwen Ma</td>
<td>University of Wisconsin, Madison</td>
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<tr>
<td>Eyan Noronha</td>
<td>Indian Institute of Technology, Bombay</td>
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<tr>
<td>Aini Palizhati</td>
<td>North Carolina State University, Raleigh</td>
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<tr>
<td>Jingyi Pan</td>
<td>Purdue University West Lafayette</td>
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<tr>
<td>Robert Parker</td>
<td>University of California, Los Angeles</td>
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<tr>
<td>Shivam Sahu</td>
<td>Indian Institute of Technology, Kanpur</td>
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<tr>
<td>Owais Sarwar</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>Connor Valentine</td>
<td>University of California, Santa Barbara</td>
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<tr>
<td>Hua Wang</td>
<td>Tianjin University</td>
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<tr>
<td>Deyu Yang</td>
<td>Pennsylvania State University</td>
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<tr>
<td>Yilin Yang</td>
<td>Zhejiang University</td>
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<tr>
<td>Junwoong Yoon</td>
<td>University of California, Berkeley</td>
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<tr>
<td>Noriyuki Yoshio</td>
<td>Osaka University</td>
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<tr>
<td>Ni Zhan</td>
<td>University of Texas at Austin</td>
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### MS Students

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<th>School</th>
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</thead>
<tbody>
<tr>
<td>Abhijeet Anil Alshi</td>
<td>Visvesvaraya National Institute of Technology</td>
</tr>
<tr>
<td>Pengfei Cheng</td>
<td>Dalian University of Technology</td>
</tr>
<tr>
<td>Kedar Dabhadkar</td>
<td>Institute of Chemical Technology</td>
</tr>
<tr>
<td>Anuja Deshpande</td>
<td>University of Mumbai Sanghvi</td>
</tr>
<tr>
<td>Rohan Deshpande</td>
<td>Sinhgad College of Engineering</td>
</tr>
<tr>
<td>Reshma Gajula</td>
<td>BITS Pilani</td>
</tr>
<tr>
<td>Shail Godiwala</td>
<td>University of Mumbai</td>
</tr>
<tr>
<td>Naien He</td>
<td>Hong Kong University of Science and Technology</td>
</tr>
<tr>
<td>Yanyan Hu</td>
<td>Tianjin University</td>
</tr>
<tr>
<td>Kshitij Ingale</td>
<td>Indian Institute of Technology, Bombay</td>
</tr>
<tr>
<td>Geethanztali Kamalanathan</td>
<td>Guindy Anna University</td>
</tr>
<tr>
<td>Nithish Kaushik</td>
<td>Manipal Institute of Technology</td>
</tr>
<tr>
<td>Rishabh Kumar</td>
<td>BITS Pilani</td>
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<tr>
<td>Xiandong Li</td>
<td>University of Alberta</td>
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<tr>
<td>Fanyi Meng</td>
<td>Dalian University of Technology</td>
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<tr>
<td>Chinedu Okorafor</td>
<td>Columbia University</td>
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<tr>
<td>Darshan Pandya</td>
<td>Institute of Chemical Technology, Mumbai</td>
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<tr>
<td>Nikhil Rajeev</td>
<td>Amrita University</td>
</tr>
<tr>
<td>Tushar Rathi</td>
<td>Birla Institute of Technology and Science, Pilani (BITS Pilani)</td>
</tr>
<tr>
<td>Jiachun Shi</td>
<td>University of Washington, Seattle</td>
</tr>
<tr>
<td>Ningguan Sun</td>
<td>East China University of Science and Technology</td>
</tr>
<tr>
<td>Rohit Tawde</td>
<td>Mumbai University</td>
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<tr>
<td>Sudarshan Vijay</td>
<td>Birla Institute of Science and Technology</td>
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<tr>
<td>Aman Wagadre</td>
<td>Indian Institute of Technology</td>
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<tr>
<td>Sijie Xian</td>
<td>Pennsylvania State University</td>
</tr>
<tr>
<td>Haokun Yang</td>
<td>Tsing Hua University</td>
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<tr>
<td>Zong Qian Yu</td>
<td>University of Alberta</td>
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<tr>
<td>Xin Zhang</td>
<td>Zhejiang University of Technology</td>
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<tr>
<td>Hanqin Zhao</td>
<td>University of Houston</td>
</tr>
<tr>
<td>Lilin Zhao</td>
<td>University of Massachusetts</td>
</tr>
<tr>
<td>Wen Zhong</td>
<td>Purdue University</td>
</tr>
</tbody>
</table>

### Master of Chemical Engineering (MChE)

<table>
<thead>
<tr>
<th>Name</th>
<th>School</th>
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</thead>
<tbody>
<tr>
<td>Dong Qin</td>
<td>East China University of Science and Technology</td>
</tr>
<tr>
<td>Paraskumar Patel</td>
<td>Dharmsinh Desai Institute of Technology</td>
</tr>
</tbody>
</table>

### Integrated Masters-Bachelors Students (MChE)

<table>
<thead>
<tr>
<th>Name</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vik Cherupally</td>
<td>Carnegie Mellon University</td>
</tr>
<tr>
<td>Mariah Richardson</td>
<td>Carnegie Mellon University</td>
</tr>
</tbody>
</table>
Master of Science in Colloids, Polymers, and Surfaces Students (MSCPS)

<table>
<thead>
<tr>
<th>Name</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yiqun Fu</td>
<td>Qingdao University</td>
</tr>
<tr>
<td>Krystle Koe</td>
<td>Carnegie Mellon University</td>
</tr>
<tr>
<td>Matthew MacKinney</td>
<td>Carnegie Mellon University</td>
</tr>
</tbody>
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**CHEGSA**

2017 ChEGSA Awards

Congratulations to the new ChEGSA Officers:

- President: Nick Golio
- Vice President: Andrew Fox
- Symposium Chairs: Kathy Fein, Ben Sauk, Charles Sharkey
- Social Chairs: Jason Kabarowski, Marty Burton, Brandon Lopez, Pari Palizhati, Brian Dinkelacker, Robby Parker
- GSA Representatives: Qin Gu, Luke Habib, Bowen Huo
- Fundraising Chair: Brad Johnson
- Outreach Coordinator: Natalie Isenberg
- Webmaster: Marissa Engle
Alumni News

Shyam V. Dighe (ChemE '79), founder and president of AquaSource Technologies Corporation, is the 2017 recipient of the Inventor of the Year Award from The Pittsburgh Intellectual Property Law Association. Dighe founded ATC in 2011 and has been designing a treatment system utilizing his patent-protected plasma technology for use in cleaning and commercializing water that is not fit for human consumption.

Lalit Chordia (ChemE'85), President & CEO of Thar Process, Inc. received the 2017 Entrepreneur of the Year Award in the Technology category from the Entrepreneur of the Year organization. Thar Process develops and markets new extraction and purification processes and equipment primarily for the food, nutraceutical and chemical industries.

Michelle O'Malley (ChemE, Biomed.'04), currently as Assistant Professor at the University of California, Santa Barbara, received a 2017 Camille Dreyfus Teacher-Scholar Award from the Camille and Henry Dreyfus Foundation. The program supports the research and teaching careers of talented young faculty in the chemical sciences.

Fengqui You (Ph.D., ChemE, ‘09) has been cited as a 2017 Class of Influential Researcher by the Industrial & Engineering Chemistry Research Journal. A global team of 14 editors identified influential, early career researchers on the basis of the quality and impact of their research.
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Title</th>
<th>Date of Seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rachel Getman</td>
<td>Clemson University</td>
<td>Molecular-Level Insights into How the Structure of Liquid Water Influences the Catalysis of Sugar Alcohol Conversions in Aqueous Phase Heterogeneous Catalysis</td>
<td>August 29, 2017</td>
</tr>
<tr>
<td>George Bollas</td>
<td>University of Connecticut</td>
<td>Design of Built-In Tests for Fault Detection and Isolation</td>
<td>September 12, 2017</td>
</tr>
<tr>
<td>Esther Gomez</td>
<td>Penn State University</td>
<td>Mechanobiology of Epithelial-myofibroblast transition</td>
<td>September 19, 2017</td>
</tr>
<tr>
<td>Christopher Swartz</td>
<td>Covestro (Bayer) Lecture (McMaster University)</td>
<td>Real-Time Dynamic Economic Optimization – Paradigms, Formulations and Challenges</td>
<td>September 26, 2017</td>
</tr>
<tr>
<td>Ubaldo Cordova Figueroa</td>
<td>University of Puerto Rico at Mayaguez</td>
<td>Colloidal Janus particles under shear flow</td>
<td>October 3, 2017</td>
</tr>
<tr>
<td>Athanasios Nenes</td>
<td>CHEGSA Symposium (Georgia Tech)</td>
<td>Challenges of Understanding Aerosol-Cloud-Climate Interactions</td>
<td>October 26, 2017</td>
</tr>
<tr>
<td>Daniel Pack</td>
<td>University of Kentucky</td>
<td>(Re)Engineering Gene Delivery: Toward Construction of Artificial Viruses</td>
<td>October 29, 2017</td>
</tr>
<tr>
<td>Clark Glymour</td>
<td>CMU-Philosophy</td>
<td>TBA</td>
<td>November 9, 2017</td>
</tr>
<tr>
<td>*Christopher Wirth</td>
<td>Cleveland State University</td>
<td>The Motion of a Janus particle very near a wall</td>
<td>November 10, 2017</td>
</tr>
<tr>
<td>Athanassios Panagiotopoulos</td>
<td>Princeton University</td>
<td>Free energies, solubilities, and nucleation rates of aqueous electrolyte solutions</td>
<td>November 14, 2017</td>
</tr>
<tr>
<td>Alan Russell</td>
<td>CMU-Chemical Engineering</td>
<td>TBA</td>
<td>November 28, 2017</td>
</tr>
</tbody>
</table>

*Indicates CPS Seminar
Save the Date—Upcoming Events

The AIChE Annual Meeting will be held this year in Minneapolis on October 29-November 3, 2017. In lieu of a reception, there will be a private dinner held for Emeriti Professors Dennis Prieve and Paul Sides on Sunday, October 29.

The 39th Annual ChEGSA Symposium will be held on Thursday and Friday, October 26 and 27, 2017, in the Rangos Ballroom in the Cohon University Center so make sure to mark your calendar for this event!

Prof. Athanasios Nenes of Georgia Tech will deliver the keynote address this year, "Challenges of Understanding Aerosol-Cloud-Climate Interactions. Prof. Nenes is a graduate of the National Technical University of Athens (B.S.), Greece, the University of Miami (M.S.), and the California Institute of Technology (Ph.D.). As an expert on atmospheric aerosol and the interactions between air pollution and climate, he is the author of more than 200 papers and has received numerous honors, including: the Kenneth Whitby Award from the American Association for Aerosol Research, the Henry Houghton Award from the American Meteorological Society, and the National Science Foundation Career Award. In the meantime, keep an eye on the ChEGSA Symposium website (chegsa.cheme.cmu.edu/symposium/) for more details regarding the schedule, abstract deadlines and judging requests.
On August 21, 2017, a solar eclipse was visible from Pittsburgh and many members of the CMU community waited outside Doherty Hall to view this momentous event. The picture above was taken just prior to the time of maximum coverage (2:35PM).

The Facilities Management Service at CMU launched a trial program in landscaping in support of the Green Practices Committee and the university's commitment to a healthy environment by having goats spend a few days on campus recently. The goats were brought in as a pesticide-free alternative to clear the steep hillside between the Gates Center and the Purnell Center, which had become overgrown with Kudzu vines. The goats, easily visible from the Pausch Bridge, were kept contained by an electric fence during their time here. The hillside is now clear!
Faculty Profile

Right now does not seem like an opportune time to introduce myself to those who do not know me, since I plan to retire at the end of the semester, but I suppose better late than never. I was raised in a small town about 18 miles east of here and returned there, where I live in a 114-year-old house that once belonged to my grandparents and that greatly resists change of any kind.

I attended the University of Pittsburgh, majoring in Chemistry. While at Pitt, I developed an interest in what was then an up-and-coming field, forensic science, and did coursework in a program that was jointly sponsored by the Chemistry Dept. and Pitt’s Law School. I had completed all of the Chemistry courses and was finishing up the law courses when the Program Director, who was also Director of the Allegheny County Crime lab, discovered when I signed up for the Crime Lab on-site course, that I was just an undergrad and politely showed me to the door.

I stayed at Pitt for grad school, focusing on Analytical Chemistry. At that time, so very long ago, there were only 6 women in a group of 100 grad students. I was the only woman in any of the Analytical Chemistry groups and so I learned to become very assertive, very fast. The only nod to my femininity from my lab mates was the pink soldering iron they bought me so I could make cables for the computer we were constructing to run the atomic fluorescence spectrophotometer that we were building. There was no Best Buy or Amazon then….no internet actually.

In the middle of all this fabrication, the Firearms Examiner from the Allegheny County Crime Lab came calling: they had purchased an Atomic Absorption Spectrophotometer in order to do in-house analysis of gunshot residue, but no one knew anything about the instrument. Next thing I knew I was invited to do my graduate research at the Crime Lab, developing a protocol for the lab to use that would be accepted in a court of law. And guess who was still the Director there? I happily stopped by his office on my first day to say hello and refrained from any rude hand gestures.
While in grad school, I got married and had my first child. Since it appeared that my husband intended to be a professional student, I decided that one of us needed to be employed and so I wrote up a Master’s Thesis and took a job at Western Psych., analyzing blood metabolites to determine the effectiveness of a new antidepressant drug. When the P.I. told me that the next phase of the project involved determining the area of the brain that the drug acted upon and showed me a microwave with a little harness to restrain and “cook” live mice, I politely showed myself to the door. Shortly after that, one of the Chemistry professors at Pitt gave my husband a note with a name and phone number on it. He suggested that I call his dear friend, Ethel Casassa, Professor and CPS Lab Director at CMU, who was having a hard time finding the right person to develop the curriculum for a new undergraduate option in Colloids, Polymers and Surfaces that would mirror the graduate program. I think we both actually did a little dance around her office because I had the skills she needed and the flexibility of the job was just perfect for a young mother. The following year the inaugural class had 18 students, among them Annette Moff Jacobson. Another who did the CPS option was Matt Cline. Both are now gainfully employed. After a 5-year maternity leave to have my second child, I returned at Ethel’s request and am still here. The option has grown into a CIT minor and the graduate program has greatly expanded. My early assertiveness training came in handy when I was asked to be the department troubleshooter during the $26 million renovation of Doherty Hall – Phase II. The 5-hour job progress meetings every Tuesday brought new challenges each week. Those who lived through it received many emails from me, not all of them pleasant, as the Construction Manager put me in charge of office and space relocations, demolition and work schedule coordination, furnishings, and scheduled shutdowns of utilities. The daily line outside my office was never less than 3-4 people long, all with inquiries or complaints. In the end, the renovation turned out pretty well (we won two awards!) but I can still say “I told you so” about a couple of things that I said not to do and “nobody listened to me.” I still retain an interest in Forensic Science and over the years have received grants from the Society of Analytical Chemists of Pittsburgh and Hewlett Packard to develop K-12 activities with a forensic twist. These activities were used by the PA Dept. of Education at a Professional Development Program for K-12 Science teachers held here on campus for a number of years and they are now available for public use on the CMU Gelfand Center web site. Since the early 1990’s, Annette Jacobson and I have presented STEM–based activities here on campus and in the Pittsburgh area. Joining us are Susana Steppan and Ilhem Hakem. Along with the ChEGSA, and ChEMSA grad student volunteers and undergraduate Chem. E. volunteers, we continue to represent CIT and Chem. E. /CPS at Outreach activities throughout the year. In my life away from here, I have done all of the Mom things…PTA President, Boy and Girl Scout Council member, soccer mom, band parent, and head of costume design for all of those high school musicals. Presently, I serve as Treasurer on my community’s Recreation Board and am President of its Youth Commission. This group is an agency of the Westmoreland County Family Court and Juvenile Probation Office which provides volunteer probation officers for first-time youthful offenders to try to get them back on the right path. In retirement, my plans include spending time with my grandkids, travel, and finally getting around to writing that book that Annette and I have been talking about for the past 8 years. And I will take the new skills I learned during the renovation to try to convince my very stubborn house that a little change can be good.
**Social Media**

**Follow** us on TWITTER: [http://www.twitter.com/cmu_cheme](http://www.twitter.com/cmu_cheme) (@CMU_ChemE)

**Like** us on FACEBOOK: [http://www.facebook.com/cmucheme](http://www.facebook.com/cmucheme)

**Subscribe** to us on YOUTUBE for current updates: [www.youtube.com/used/CMUEngineering](http://www.youtube.com/used/CMUEngineering)

**Watch** the following:
- Travis Armiger: Demonstrating Nuclear Mechanics with a New Element, Spectrin
  [https://youtube.com/watch?v=fUS4gLTwxkc](https://youtube.com/watch?v=fUS4gLTwxkc)
- Kris Dahl: Discovering Spectrin: A New Mechanical Element
  [https://youtube.com/watch?v=FvRMnvFhXiY](https://youtube.com/watch?v=FvRMnvFhXiY)
- Bob Tilton: Engineering More Efficient Emulsifiers
  [https://www.youtube.com/watch?v=IunttAJdUSw](https://www.youtube.com/watch?v=IunttAJdUSw)
- Bob Tilton: Creating New Technology Using Complex Fluids
  [https://www.youtube.com/watch?v=jB2Onx6IByY](https://www.youtube.com/watch?v=jB2Onx6IByY)
- John Kitchin: Using Machine Learning to Improve Molecular Simulations
  [https://www.youtube.com/watch?v=ibELoCSf3cE&feature=youtu.be](https://www.youtube.com/watch?v=ibELoCSf3cE&feature=youtu.be)

**Others of interest from CIT:**
- Graduate Engineering at Carnegie Mellon University as Told by GEM Fellows
  [https://www.youtube.com/watch?v=6u4pjpP4zro](https://www.youtube.com/watch?v=6u4pjpP4zro)
- College of Engineering Highlights
  [https://www.youtube.com/watch?v=jiqOWCBQKLg](https://www.youtube.com/watch?v=jiqOWCBQKLg)