Congratulations to
The Chemical Engineering
Class of 2016!

Each year the department likes to take time to recognize the accomplishments of its faculty, staff and student population. This year is no different. We have had the honor of cultivating the minds of tomorrow while simultaneously developing the technologies of today. As Orrin Hatch said, “There is a good reason they call these ceremonies ‘commencement exercises.’ Graduation is not the end, it’s the beginning.”

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A letter from Dr. Kumar, Department Chair

As another year draws to a close we look back at some extraordinary successes for the department. During this year we have hired four new faculty – Profs. Oleg Gang (Professor; from Brookhaven National Laboratories; Joint with Applied Physics and Applied Mathematics at Columbia), Kyle Bishop (Associate Professor; from Penn State), Allie Obermeyer (Assistant Professor; PhD – Berkeley, Post-doc- MIT) and Christopher Boyce (Assistant Professor, PhD – Cambridge, Post-doc – Princeton). With the official appointment of Prof. Alissa Park as a joint faculty member across Chemical Engineering and Earth and Environmental Engineering this gives us a head count of 17 – this is remarkable growth given that we had 11 full time faculty seven years ago. This evens our seniority distribution and adds vitality across all ranks of our department. We extend our thanks to our Dean for her continuing support of our department, and to the dedicated faculty, especially Alan West (Chair, Search committee) for this extraordinary success.

The Dean has additionally supported our hiring, which has three researchers in the area of Soft Matter, by agreeing to fund a new shared facility that will greatly assist researchers across the broad Columbia community who work in this “hot” area of research. This is a much needed facility and we take a moment to thank Dean Mary Boyce !! In the same vein, she has helped to pay for a critical renovation of our undergraduate laboratories, a project that was led with efficiency by Prof. Robert Bozic, our lecturer in discipline. We will share this teaching laboratory with the Earth and Environmental Engineering department, continuing in our theme of cooperation across the school and beyond. Thanks Robert !! We also share the news that the last of the major renovations, that of our shared Catalysis spaces on the 10th floor of Mudd are now in advanced stage of planning – this is slated to begin in Fall ’16 and will greatly facilitate shared research in this broad, germane area.

Several students have received fellowships for their graduate studies – Andrew Jimenez (Columbia Presidential Fellow), Ellie Buenning (NSF Fellow, DOE SGSR fellowship), Connor Bilchak (NSF Fellowship), Sarah Berlinger (NSF Fellowship), Eddie Zaia (NSF Fellowship), Sebastian Russell (NSF honorable mention), Anna Dorfi (NSF honorable mention). Dan Zhao has been selected for student award symposia at the AIChE and APS meetings. Congratulations one and all !!

As we look at these positive developments it is also good to look and appreciate the contributions of people who have served us well and will leave the department. Prof. Koberstein, who has been instrumental in reviving the department and creating/renovating our office and laboratory spaces, has announced that he will retire in Summer ’18. Prof. Koberstein is not going gently into the night – he was recently awarded the Edward and Carole Kim award of SEAS. Receiving this award is a testament to his impact as a scholar and instructor, and we want to congratulate him for this well-earned honor. Prof. Vanessa Ortiz will leave our department to take up a job at Neilson, the polling agency – Vanessa has been integral to many graduate student activities in the department and her contributions will be missed. Itanza Lawrence has decided that she can no longer tolerate the cold weather of the East coast – she officially gave her winter jacket away, and she will leave for the sunny climes of LA in June.

And finally, I will be stepping aside from my position of Department Chair in 45 days (and not a day too soon !!). It has been an interesting six years and I want to take a moment to thank the faculty and a very dedicated staff (thanks Kathy !) without whom I could not have functioned. Alan West will take over in July, and I want to take a moment to wish him well – the Department will be in good hands !!

Best wishes,
SK
**Program Highlights: Renovated Unit Ops Lab**

Robert G. Bozic joined the faculty in the Department of Chemical Engineering during the Fall 2014 semester as a Lecturer in Chemical Engineering and he continues to have an impact in the Department.

In 2015, with assistance from Facilities, Robert planned, developed, and executed the Columbia University Department of Chemical Engineering renovation and upgrade of the Unit Operations Lab through a SEAS’ supported renovation of 282A Engineering Terrace. This is the most significant upgrade to the undergraduate lab in many years. The Columbia Chemical Engineering Unit Ops lab is now equipped with top of the line Ergolab Benches from LabRepCo, that have increased bench space in the room by 100% over the previous configuration. The vertical space throughout the room was optimized as well by including new shelves and cabinetry. Each bench comes complete with adjustable steel shelves, mobile sets of drawers, splash guards, and adjustable electrical connection strips. The new bench positions were adjusted to eliminate unused space in the lab and to increase available space for students and faculty to move about the lab.

The renovation included Wi-Fi and Ethernet cable installation for greatly improved computer connectivity. Now students can easily access the internet during lab through Columbia Wi-Fi, though cable connection at the lab bench, or through the computers located in the student support room, a newly renovated area previously used for storage.

Based on a need modernize and to scale operations in the lab, two new experiments, a fuel cell experiment and a fixed bed adsorption experiment, take the place of experiments that were retired. The fuel cell experiment features a solar panel option for electrolyzing water, a dual stack fuel cell, and a variable load device as well as digital volt and amp meter. The set up includes a lamp for simulating the intensity and angle of incidence of light on the solar panel. This experiment allows for exercising the student’s ability to conduct mass and energy balances as well as the ability to examine efficiencies. The UOP15 fixed bed adsorption column is a bench top style Armfield experimental set up designed for studies of carbon dioxide adsorption from a carrier gas. This new experiment allows for study of the adsorption/desorption processes under different operational conditions: temperature, flow rate, molar fraction and pressure.

Students will be exposed to the concept of breakthrough curves of temperature profiles during the adsorption/desorption process. There are also options for study of the quasi-isothermal regime at low concentrations and pressures, study of the solute movement theory model, which describes the adsorption/desorption process, and analysis of the breakthrough curves of carbon dioxide during the adsorption, and desorption/regeneration processes.
This course introduces the fundamentals and applications of solar energy conversion, especially technologies for conversion of sunlight into storable chemical energy or solar fuels. Topics include fundamentals of photoelectrochemistry, kinetics of solar fuels production, solar harvesting technologies, solar reactors and solar thermal production of solar fuels.

**Program Highlights: New Courses**

**Esposito: Solar Fuels**

This course covers the fundamental concepts and tools of systems engineering for modeling, analyzing and managing enterprise-wide risk in complex systems. This course will allow students to understand that systematic failures in different domains cause catastrophic events. This course will help the student understand the needs to go beyond analyzing them as independent one-off accidents, and examine them in the broader perspective of the potential fragility of all complex systems. The student will study different disasters from a common systems engineering perspective, so that one can thoroughly understand the commonalities as well as the differences, in order to better design, monitor, regulate and manage such systems in the future.

**Venkatasubramanian: Managing Systematic Risk in Complex Systems**

This course was designed to teach the application of Chemical Engineering fundamentals and entrepreneurship in starting up a biopharmaceutical company and in developing a biopharmaceutical product. The course consists of the major stages of developing a biopharmaceutical product through drug discovery, preclinical and clinical development, IP, manufacturing and regulatory process.

The objective of this course is for students to work as a group and to develop a business plan for a new biopharmaceutical start up. Deliverables will include: The project outline, an abstract (one page), the proposed approach, the role of each team members, final business plan (10-15 pages long) and a power point presentation.

**Hartounian: Biopharmaceutical Product Development and Chemical Engineering**

Provides work experience on chemical engineering in relevant intern or fieldwork experience as part of their program of study as determined by the instructor. A written report describing their experience and how it relates to the chemical engineering core curriculum is required. Sponsor feedback on student performance and the quality of the report are the basis of the grade. This course may not be taken for pass/fail credit or audited.

Chemical Engineering is used anywhere in the world across the complete range of chemical engineering operations. Industrial experience can provide a means to demonstrate through theoretical concepts. The course further provides a professional component to the curriculum to prepare students for careers in the industry.
I am thrilled to be joining the Chemical Engineering Department at Columbia University. I have always admired Columbia as an institution that is focused on both world-class research and teaching. After meeting with faculty, students, and administrators over the past few months, I cannot believe that my experience on campus has exceeded my expectations. It was clear to me that Columbia supports collaborative and interdisciplinary research and attracts genuinely enthusiastic and intellectually curious students. I am looking forward to joining the Columbia community and playing a role in advancing the SEAS mission “to expand knowledge and advance technology through research, while educating students to become leaders informed by an engineering foundation.”

My research interests are at the intersection of chemistry, biology and materials science and are motivated by a goal to improve human health. My undergraduate research experience at Rice University sparked my interest in utilizing both chemistry and engineering to explore biological systems. I was introduced to the excitement of original discovery when engineering microbes to perform chemical synthesis in the laboratory of Prof. Seiichi Matsuda. After graduating from Rice, I entered the Chemical Biology Graduate Program at the University of California, Berkeley where I had the opportunity to work under Prof. Matthew Francis. My doctoral research spanned bioconjugation reaction development to the design of targeted molecular imaging agents for the detection of cardiovascular disease. Following my Ph.D., I pursued postdoctoral research in the Chemical Engineering Department at the Massachusetts Institute of Technology as an Arnold O. Beckman Postdoctoral Fellow. Under the mentorship of Prof. Bradley Olsen, I have explored methods for improving the stability and processability of enzymes by using synthetic polymers to drive protein self-assembly. I am grateful for the mentorship I have received and hope to make a similarly positive impact in the lives of the students I will advise and teach. Throughout my research career, I have been fascinated by protein biopolymers. Proteins comprise one of the most impressive categories of polymers known: they produce extremely strong and tough materials, efficiently catalyze chemical reactions, selectively bind analytes within complex mixtures, and harvest light by converting it into chemical energy. As part of my independent career, I will work to create new biomaterials that combine the incredible diversity of structure and function of proteins with the stability, chemical diversity, and processability of synthetic polymers. We will focus on creating hybrid protein-polymer materials that mimic and interface with biological systems. This interdisciplinary research program will intersect the fields of polymer science, biomaterials, synthetic biology, and immunology. As part of this research endeavor, I look forward to collaborating with researchers at both the Morningside and Medical Center campuses.

I am looking forward to moving to New York and meeting many of you in the coming months!

Best,

Allie
I am extremely excited and grateful to be joining the chemical engineering community at Columbia. I have enjoyed meeting with a variety of faculty, staff and students, and I am very confident that I will be joining a vibrant and welcoming community poised to do great things. Although I will not be joining until 2018, I would like to take this opportunity to introduce myself.

Like most engineers, I have always been fascinated by science and how it can be used to develop interesting technologies. In elementary school, for an assignment in which we were asked to draw ourselves on the cover of TIME magazine, I envisioned myself as the inventor of the flying car. In high school, I grew more aware of the problems facing the planet regarding energy and climate change, and I became determined to use my abilities and opportunities to address these issues.

As an undergraduate at MIT, I decided to major in chemical engineering and minor in nuclear science and engineering to pursue scientific principles, which fascinated me, while gaining core knowledge which could be used to solve a variety of energy problems. Later, I added a second major in physics to broaden my core scientific understanding. As a senior, I decided to apply for PhD programs in chemical engineering in order to gain a research skill-set which would allow me to help develop new energy technologies.

The next year, I went to the University of Cambridge on a Gates Cambridge Scholarship to study in the Combustion Group under the supervision of Prof. John Dennis. There I learned of the fascinating process of fluidization, and how it could be used to enable a variety of important processes, including clean combustion of coal, natural gas and biomass. I received a tremendous amount of help from many faculty members in order to learn more techniques to better understand this process, including Stuart Scott and John Davidson in fluid mechanics modeling as well as Daniel Holland, Andy Sederman and Lynn Gladden in magnetic resonance imaging (MRI).

Since finishing my PhD, I have spent over a year working as a postdoctoral researcher at Princeton University in the group of Prof. Sankaran Sundaresan. With his help, I have been able to understand fluid-particle flows on a deeper scientific level with a particular emphasis on computational modeling and non-dimensional characterization of complex flows. I am currently characterizing the role that capillary bridges formed between particles play in forming agglomerates in systems in the pharmaceutical and energy industries. Next year, I will work at ETH Zurich, using medical MRI to visualize these flows.

At Columbia, I plan to start a research group, which combines experimental and computational techniques to understand multiphase fluid and particle flow systems relevant to 21st Century problems, with a particular emphasis on clean energy. In so doing, I plan to start one of the first labs which uses MRI to study chemical engineering problems, being able to see inside the process units which drive the chemicals, pharmaceutical and energy industries. As an educator and research advisor, I look forward to empowering future generations of talented, independent and critical thinkers to tackle some of the great problems we face. With that broad vision, I could not imagine a greater community to be joining, and I am extraordinarily excited and grateful for this opportunity.
Kyle Bishop received his PhD in Chemical Engineering from Northwestern University (2009) under the guidance of Bartosz Grzybowski for his work on nanoscale forces in self-assembly. Following his PhD, Dr. Bishop was a post-doctoral fellow with George Whitesides at Harvard University, where he developed new strategies for manipulating flames with electric fields. In 2010, he joined the Department of Chemical Engineering at Penn State University where he is currently the Dorothy Quiggle Career Development Assistant Professor. Dr. Bishop is the co-author of more than 65 refereed publications and the recipient of the 3M Non-Tenured Faculty award and the NSF CAREER award. His research seeks to discover, understand, and apply new strategies for organizing and directing colloidal matter through self-assembly and self-organization far-from-equilibrium.

The future impact of nanotechnology will depend less on the structures we can fabricate and more on the functions we can engineer. Despite myriad methods for the synthesis of “small” structures, we struggle to direct and control the processes required for the realization of functional systems at colloidal scales (nanometers to microns). By contrast, living organisms harness flows of matter and energy to perform remarkable feats of engineering: they assemble dynamic multiscale materials; they capture and convert energy into complex motions; they regulate tangled networks of chemical reactions; they replicate their structures and processes in exponential fashion. Guided by this inspiration, our research seeks to characterize and control matter outside of thermodynamic equilibrium to enable new materials and technologies with capabilities that rival those of living organisms.

Our research focuses on the structure and dynamics of particulate matter (nanocrystals, droplets, etc.) dispersed in liquids with sizes ranging from few nanometers to tens of microns. This scale remains a challenging frontier in material science – often beyond the limits of both top-down fabrication strategies and bottom-up chemical approaches. Materials at these scales offer unique mechanical, electronic, and magnetic properties required by emerging applications in energy capture and storage, photonics, and electronics. The challenge is often one of organization – how can many small components be arranged in space and time to create functional systems best exemplified by the complexity of living cells? Such complexity cannot be achieved at equilibrium but instead requires flows of matter and energy to enable smart materials capable of actuating, sensing, adapting, self-repairing, and even self-replicating. We use external stimuli (e.g., electric fields, chemical reactions, shear forces) to drive colloidal systems away from equilibrium in order (i) to understand dynamic (dissipative) self-assembly and (ii) to engineer the spontaneous organization of functional materials. Building on our expertise in colloidal interactions, self-assembly, and non-equilibrium phenomena, we integrate experiment with theory and simulation to unlock the mysteries of matter far from equilibrium and realize the full potential of nanotechnology.
Since childhood, science for me was much more than knowledge, I engaged emotionally, and it amazed me how seemingly different ideas and phenomena were interconnected. That inspired me to study physics and participate in research on light emitting semiconductors, hoping to appreciate the big picture and gain a unified view of the world. I completed my M.S. in Israel, specializing in spectroscopy of deep atomic levels and peculiar electron transitions. Although those studies were intellectually stimulating, they had an “observing” character and I quickly realized that I wanted a more active role in “shaping” the systems and the ways they can be probed. Thus, I was thrilled when I uncovered the richness of soft matter materials and that they offer an “active participation”.

I was particularly attracted to self-organization processes where small differences in energy balance and entropy of elements can lead to significant effects for the entire system. I decided to do my PhD in the area of experimental soft matter and self-assembly, with Prof. Moshe Deutsch at Bar-Ilan University. During my PhD years I studied an ordering in chain organic molecules at liquid interfaces, and we have discovered a new phenomenon, called “surface freezing”, i.e. molecules at the interfaces can crystallize while their bulk is still a melt, opposite to the common behavior. The recognition that by a tailoring molecular design it is possible to induce surprising and unexpected physical effect was extremely moving for me. And now, years later, I can see that this power of controlling the phenomena through the conscious design of a system is what attracts me to chemical engineering. On the other hand, revealing an interplay of contributing factors in those phenomena continue to spark my interests in physics.

To continue my studies in soft matter, I joined as a Rothschild postdoctoral fellow Peter Pershan’s group at Harvard University, where I began studying the behavior of nano-thick liquids on topologically nano-patterned surfaces. The surface interactions, nanoscale geometry and molecular details result in fascinating effects that were merely explored experimentally at that time. After completing my postdoc, I joined Brookhaven National Laboratory as a Goldhaber distinguished fellow and soon became a scientific staff member. My work at Brookhaven was focused on a range of problems related to polymers, soft matter, and nanoparticles. Besides studying the structural aspects of soft matter, my interests also involved bio-applications of nanomaterials (sensing and nano-objects interacting with living matter), optical effects in hybrid nano-systems, and new methods to study such structures.

One of my major research efforts in the recent years was focused on the question of how to create nanoscale systems with designed architectures and controllable dynamic properties through self-assembly. We have used DNA toolbox extensively to establish the “language” of nanoparticles “communications”, to promote the structures particle form, and to regulate system transformations. Besides gaining control over systems, those approaches are fruitful for uncovering macromolecular phenomena at the nanoscale. Due to the DNA plasticity and well defined binding characteristics, it is possible to think in practical terms about realization of complex design concepts; that is quite difficult to do for other classes of macromolecules. These developments lead to the intriguing opportunities for rational fabrication of nanoparticle-based materials, for establishing new manufacturing methods at nanoscale and new platforms for tailoring material functions.

As an educator, I would like to engage undergraduate and graduate students in the stimulating process of creation, and to show them that intricate and powerful connections between ideas can be transferred to practical realizations in a lab.

I am very excited to join the scientific community at Columbia university, where both the Chemical Engineering and APAM (Applied Physics and Applied Mathematics) Departments will be my home. I am very grateful for the warm welcoming words I have received from my future colleagues and am looking forward to collaborating with my colleagues at Columbia on a broad range of aspects related to structures and applications of novel material systems.
It’s been an eventful year for the Esposito Research Group (ERG), or Photoelectrochemical Engineering Lab, which develops technology for converting sunlight into chemical energy commonly referred to as “solar fuels”. In its second year at Columbia, the ERG has had many “firsts”, including the first MS graduates, first accepted paper on original research conducted in the lab, and first year teaching a new elective course titled “Solar Fuels”. A write-up on the lab’s activities will be included in the upcoming Spring issue of the Columbia Engineering Magazine.

Since the last newsletter, the first cohort of MS students in the ERG has graduated, with 5 MS students graduating. Graduated students include Corey Christian (now working at Draper Laboratory), Xinxin Li, Yukun Lui (starting PhD in the Fall), Xinran Fan, Ji Qi (starting PhD in the Fall), and Tian Wang (starting PhD in the Fall). Saringi Agata will be the group’s first undergraduate alumnus when she graduates this coming Spring, and is planning to attend graduate school this coming Fall. Last but not least, Glen O’Neil, a postdoc who has been with the group for a little over a year, has accepted a faculty position at Montclair State University in NJ. All of these group members have made important contributions to setting up the lab, and will be greatly missed. Congrats to all, and best of luck on all of your current and future endeavors!

In other news, the first papers out of the ERG have been published or accepted. These include a review paper on in situ measurements for photoelectrochemical energy conversion (published in *Energy & Environmental Science*) and a paper on 3D printed membraneless electrolyzers for hydrogen production that was recently accepted as a part of a special issue in the *Journal of the Electrochemical Society*. This last paper involved key contributions from Glen O’Neil (lead author), Corey Christian (MS student), and David Brown (Undergraduate). Keep an eye out for this and other papers in the works on the ERG website and stay tuned to what the group is reading and thinking about on the group blog, where we post short write-ups and links to recent technological developments in all areas related to energy. If you are interested in energy-related technology and current events, you can subscribe to the blog to receive email notifications for new posts by entering your email into the left hand panel of the blog homepage just below the photograph of Low Library.

ERG Website:
https://danesposito.wordpress.com/

Group Website:
http://www.espositoresearchblog.wordpress.com/
Scott Banta is Inducted into Medical and Biological Engineering Elite

The American Institute for Medical and Biological Engineering (AIMBE) has announced the induction of Scott Banta, Ph.D., Professor of Chemical Engineering, Department of Chemical Engineering, Columbia University, to its College of Fellows. Dr. Banta was nominated, reviewed, and elected by peers and members of the College of Fellows for significant contributions in the engineering of proteins for biochemical applications including bioenergy, biocatalysis, biomaterials, and biointerfaces. The College of Fellows is comprised of the top two percent of medical and biological engineers in the country. The most accomplished and distinguished engineering and medical school chairs, research directors, professors, innovators, and successful entrepreneurs, comprise the College of Fellows.

AIMBE Fellows are regularly recognized for their contributions in teaching, research, and innovation. AIMBE Fellows have been awarded the Presidential Medal of Science and the Presidential Medal of Technology and Innovation and many also are members of the National Academy of Engineering, National Academy of Medicine, and the National Academy of Sciences.

A formal induction ceremony was held during AIMBE’s 25th Annual Meeting at the National Academy of Sciences Great Hall in Washington, DC on April 4, 2016. Dr. Banta was inducted along with 160 colleagues who make up the AIMBE College of Fellows Class of 2016. For more information about the AIMBE Annual Meet, please visit www.aimbe.org.

AIMBE’s mission is to recognize excellence in, and advocate for, the fields of medical and biological engineering in order to advance society. Since 1991, AIMBE’s College of Fellows has lead the way for technological growth and advancement in the fields of medical and biological engineering. Fellows have helped revolutionize medicine and related fields in order to enhance and extend the lives of people all over the world. They have also successfully advocated for public policies that have enabled researchers and business-makers to further the interests of engineers, teachers, scientists, clinical practitioners, and ultimately, patients.

Faculty Updates

Professor V. Faye McNeill Honored for Research on Atmospheric Chemistry and the Climate

V. Faye McNeill, associate professor of chemical engineering, was recently awarded the Kenneth T. Whitby Award by the American Association for Aerosol Research (AAAR). McNeill is being recognized for her influential research “changing the way we think about atmospheric organic chemistry, its effect on aerosol properties, and its impact on clouds and climate.” AAAR cited her extensive contributions in better understanding the heterogeneous chemistry of ice and aerosols in the atmosphere.

“I was stunned when I heard the news. AAAR is an amazing professional organization, which has felt like my intellectual home since the first annual meeting I attended,” said McNeill. “This makes receiving this award an even bigger honor. I greatly admire the past winners of this particular award and I still can’t believe I have the chance to join their ranks.”

The McNeill Group at the School investigates how to improve the predictive power of atmospheric chemistry and climate models, performing laboratory and modeling studies of the complex chemistry and physics of aerosols and ice in the atmosphere to better understand how human activities impact the environment. The group has also investigated novel, lower-impact means of cleaning up oil spills.
Faculty Updates

Jeffrey T. Koberstein is selected to receive the 2016 Edward and Carole Kim Faculty Involvement Award

Jeffrey T. Koberstein, the Percy and Vida Hudson Professor of Chemical Engineering, has been selected to receive the 2016 Edward and Carole Kim Faculty Involvement Award presented by the Columbia University School of Engineering. The Kim Award, established in 2000 by Edward and Carole Kim, was created to honor a faculty member who is not only an excellent teacher, but who also shows a special, personal commitment to students. As chair of the department from 2000-2005, Jeff led the Departments’ reorganization efforts that successfully reestablished Columbia Chemical Engineering as one of the nation’s top programs. These activities included a complete revision of the undergraduate curriculum, which took four years to implement, and creation of an undergraduate advising system that linked departmental advisors with advisors from the University Student Advising Center, a model which now serves as the basis for advising across the entire School of Engineering. Jeff served as the Faculty in Residence for the Hartley-Wallach Living Learning Center from 2002-2007 where he lived with the undergraduates and organized monthly dinners where students had the opportunity to meet and speak with a wide variety distinguished researchers, including Nobel laureates, from Columbia University and greater New York City. Jeff previously received the Columbia University School of Engineering and Applied Science Alumni Association Distinguished Faculty Teaching Award in 2011, and two earlier teaching awards from the University of Connecticut, all for teaching Thermodynamics courses. Jeff has also won several research awards, including the 2006 Stine Award from the American Institute of Chemical Engineers and is a fellow of the AIChE and the American Physical Society. He currently teaches the Department’s Thermodynamics II course for undergraduates, the Advanced Chemical Engineering course for graduate students and several graduate level Polymer Material courses.

Professor Venkat Venkatasubramanian delivered the 22nd Annual Roger Sargent Lecture at Imperial College, London, U.K., on Dec 3, 2015

This prestigious lecture is in honor of Professor Roger W. H. Sargent, widely recognized as the “Father of Process Systems Engineering”. Venkat’s topic was “Process Systems Engineering at Crossroads: Challenges and Opportunities in the Era of Watson”. In this talk, Venkat provided an overview of the challenges and the opportunities emerging from the increasing role of artificial intelligence in process systems engineering, in problems such as materials discovery and risk management.

Venkat was also invited to deliver a special lecture at the Global Systemic Risk Initiative at Princeton University on Feb 18, 2016. Venkat’s lecture was on “Can Extreme Inequality Pose Systemic Risk? Mathematical Foundations of a Stable and Fair Capitalist Society”. In this lecture, Venkat discussed a new mathematical theory of fairness in capitalist societies that integrates fundamental concepts and modeling techniques from as diverse disciplines as political philosophy, economics, game theory, statistical mechanics, information theory and systems engineering.
Fall Ice Cream Social

The Department hosted its Fall Undergrad Social on October 29th, 2015. Students had the opportunity to engage with faculty, staff, and their fellow peers while sharing laughs and ice cream! We would like to thank all who joined.

Alumni Roundtable Event

On November 17, 2015 the Chemical Engineering Department hosted its first annual Roundtable Speed-Networking Event. During the event, one to two Alumni joined 7-9 students at a (round) table to converse and discuss their experience in industry, offering insight and guidance to rising engineers. After 25 minutes, the students rotated to another table with different alumni and repeated the process. The event was enjoyed by students and Alumni alike, and we are excited for the growth and continuation of this event for years to come!

MS Graduation Celebration

The Department of Chemical Engineering hosted its End of Year Master Dinner on December 3rd, 2015. We would like to give thanks to all who joined. Here are some of the highlights in pictures from the event.
Alan West has been elected by the faculty to serve a three-year term as Departmental Chair beginning July 1, 2016. He has worked with many alumni in the past and looks forward to continuing to advance interactions with our departmental alumni and friends. Professor West says he is happy to accept the responsibilities of the chair at a time after the department has experienced extraordinary growth under the leadership of Sanat Kumar as well as our dean, Mary Boyce. Professor West said that as the department continues to grow and to provide the best possible opportunities for our students, increasing interactions with our alumni will be vital. As you look back with fond memories (even that Transport midterm with an average in the teens), you may want to give back to our current students. Please feel free to reach out to me with ideas.”

The Department Welcomes our New Staff

**Ariel Sanchez** joined the Chemical Engineering Department in October 2015 as the new Information Technology Lab Manager. He previously worked at the IT department in John Jay College as a Technical Support Specialist. There he gained valuable skills in a variety of areas pertaining to IT. Ariel has acquired a Bachelor of Technology in Computer Systems at New York City College of Technology. In addition to this, he has acquired a Master’s of Public administration at John Jay College. He is applying all the skills that he has learned and incorporating it to our needs at Chemical Engineering. Ariel currently oversees all IT operations in the department and we are very happy to welcome him to the Columbia Chemical Engineering Team!

**Rezarta Binaj** joined the Chemical Engineering Department on April 11th, 2016 as a new Business Manager. She graduated with an Associate in Business Administration from Westchester Community College and a Bachelor in Finance and Investments from Baruch College/CUNY, Zicklin School of Business. She was previously employed at Mount Sinai School of Medicine in Neuroscience Department as a Financial Analyst I and prior to that as an Accountant in Central Finance. We feel that she will be a great value to our department as she comes with a strong background in Central and Departmental Finance. We are very excited to welcome Rezarta to our team!

Alan West elected as new Department Chair
Every year, the Chemical Engineering Department is delighted to recognize three talented undergraduate students for their achievements and accomplishments during their time at Columbia.

The Robert Edward Reiss Award in Chemical Engineering is awarded annually to the student in the department who shows the greatest promise of success in applying the discipline of chemical engineering to the improvement of biological products and medical devices. This year’s prize is awarded to Olamide Omidele.

The Carl C. Gryte Prize is awarded annually for service to the Department of Chemical Engineering. This year’s recipient is Sarah Berlinger, who will be pursuing her PhD at Berkeley.

The Charles F. Bonilla Medal is an award for outstanding academic merit. It is presented annually to that student in the graduating class in the Department of Chemical Engineering who best exemplifies the qualities of Professor Charles F. Bonilla. The 2016 Bonilla Medal is awarded to Leeran Yang who will be serving in the Korean Air force before attending MIT For a PhD.

Go confidently in the direction of your dreams. Live the life you have imagined.

- Henry David Thoreau

WHERE ARE THEY GOING?

Koshu
Takatsuji
Princeton
University

Hannah Kim
University of Michigan
PhD Candidate

Michelle
Wiryadi
Columbia
University
MS Candidate

Josephine
Davis
UTC

Parker
Oka-Wong
Sumitomo
Mitsui

Sarah
Berlinger
UC Berkeley
PhD Candidate

Congratulations Graduates!!
A Special Thanks to the Seminar Speakers for the 2015-2016 Academic Year

Fall 2015
- Rakesh Agrawal
- Tom Truskett
- Ignacio Grossman
- Jordan Peccia
- Tim Anderson
- Joan Brennecke – Gaden Lecture
- Christopher N. Bowman

Spring 2016
- Jim Pfaendtner
- Daven Henze
- Ramesh Ramachandran
- Bruce Gates
- Frank Doyle
- Alexander Orlov
- Julie Champion

Chemical Engineering’s Annual Welcome BBQ

Mark Your Calendar!

On Wednesday, August 31, 2016, we will be hosting a Bar-B-Que lunch between 12:00 and 2:00pm at Avery Plaza. Join us in welcoming our new students, meeting current students, while enjoying some great barbeque!!!!! If you are interested in attending please reach out to Rezarta Binaj (rb3230@columbia.edu).

We hope to see you there!