Director Mark Banaszak Holl’s Message

Dear Alumni and Friends,

2016 was a great year for the Macro program! To get a sense of the accomplishments, efforts, and fun turn to the news section where we’ve highlighted our research breakthroughs, startups, outreach efforts, and awards that our students and faculty received over the year. Wow! These scholarly achievements are the core of our efforts upon which everything else is built.

Our 40th Anniversary symposium focusing on “Macromolecules & Innovation – From Discovery to Product” began with a set of presentations from the students on Wednesday morning to address an Innovations in 3D Printing challenge. This unique start to the symposium activities engaged students from across the university with P&G researchers and provided a window into how major corporations think about and respond to disruptive technologies.

Wednesday continued with a special set of presentations and workshops from industry and academic leaders in innovation including Macro’s very own Crystal Morrison (PhD 2003). The Wednesday session ended with a networking event at the new Zingerman’s Greyline space in downtown Ann Arbor (this is the site of the old Greyhound bus stop on Huron St.) We had a great turnout from our industrial partners and it was a wonderful opportunity for starting new conversations and renewing old ones. With over 100 students participating from U-M and 18 other universities and colleges and over 20 representatives from 12 companies, Wednesday was a fun, informative, and exciting day. We’ll be including special presentations, workshops, and an evening networking event again for the Fall 2017 symposium. If you want to touch base with the program or get re-engaged with Macro’s scholarship, I encourage you to stop by!

The new additions to this year’s symposium were made possible by generous support from P&G for the Innovations in 3D Printing challenge, the Wednesday evening networking event, and the new team science & engineering award. PPG generously provided scholarships for students to attend the symposium.

This fall we added fourteen impressive new graduate students to the Macro program.
Director’s Message (CONTINUED FROM PAGE 1)

Many of them are taking advantage of our new approaches for the selection of research groups for PhD research. They can join a group immediately upon arriving in the fall (our traditional approach), they can join a group after a single semester long research rotation, or they can join a group after two semester long research rotations.

The purpose of the research rotations is to allow students to explore new research areas that they discover after arriving at UM and to better understand the culture of different laboratories prior to joining for 4-5 years. We also know that research rotations have a substantial impact on student-driven collaborations between research groups. This year, eight of our eleven entering PhD students elected to have a first semester rotation. I’ll keep you updated on the student choices and approaches in future Messengers.

We also welcomed three new faculty members this fall to the Macro family. Brendon Baker (Biomedical Engineering), Somin Lee (Electrical Engineering & Biomedical Engineering), and Charles McCrory (Chemistry) bring exciting new research opportunities in cell microenvironment and tissue, biological sensors, and catalysis. Along with Corey, Eniola-Adefeso, and Stegeman that comes to total of six new faculty joining in the last year. If you haven’t perused the website lately, it is good to catch up on all the changes.

Finally, we also have one faculty member moving on. Shuichi Takayama, a wonderful member of Macro since he arrived at UM as an assistant professor, is taking a new position at Georgia Tech & Emory. We wish him the best of luck in his future endeavors.

Happy Holidays and Best Wishes for the New Year!

Mark Banaszak Holl
Macro Welcomes Three New Faculty Members in Fall 2016

Professor Charles McCrory Corey is an Assistant Professor of Chemistry who joined the U-M faculty in 2015. Professor McCrory was previously a member of the research staff at the Joint Center for Artificial Photosynthesis. His lab group uses a combination of surface science and electrochemistry to study the mechanisms and kinetics of electrocatalytic transformations of small molecules for energy storage and environmental remediation.

Professor Somin Eunice Lee is an Assistant Professor of Electrical & Computer Engineering and Biomedical Engineering. Her Bioplasmonics research group focuses on advancing innovations in nanoscale-dependent properties to enable unique spatial and temporal capabilities needed for quantification in biology and medicine. Working at the interface between life science, physical science, and engineering, the group designs and develops biophotonic technologies to uncover biological complexities in development and in cancer.

Professor Brendon Baker is an Assistant Professor of Biomedical Engineering. The Baker lab focuses on how structure and mechanics of the cellular microenvironment influence fundamental cell processes such as migration, proliferation, and extracellular matrix (ECM) synthesis. In particular they develop novel, tunable biomaterials that mimic the 3D and fibrous nature of ECMs, can be dynamically re-modeled by cells, and have the potential to be scaled to implantable tissues directly.

P&G Innovations in 3D Printing Challenge

This fall Macro collaborated with Procter & Gamble to bring an exciting challenge on additive manufacturing to campus. P&G tasked students with proposing material, molecular, or machine approaches to additive manufacturing that could attain 100-10,000 times faster production rates than current methods. In total seventeen students created four dynamic teams. Students participated from Macro, Chemical Engineering, Chemistry, Materials Science & Engineering, and Mechanical Engineering.

P&G team members Dr. Lee Ellen Drechsler (Corporate R&D Director), Dr. Scott Stanley (Principal Scientist, Consumer Goods) and Claudio Matos (Open Innovation Manager) visited campus in September to conduct a half-day Serial Innovation workshop with participating students. P&G provided students access to the company’s collaborative tool, InQBet, so that they could easily share ideas and receive feedback from P&G scientists while developing their proposals.

Each team presented on Wednesday, October 26th to a panel of P&G and U-M faculty reviewers. Winning team members, pictured below, each received an $800 award from P&G and their proposal is under consideration for up to $150,000 in support from the U-M/P&G Materials Innovation Collaboration.

Pictured from left to right
Mohsen Taheri (Mechanical Engineering)
Kazem Ardakani (Chemistry)
Derick White (Chemistry)
Ying Liu (Macro)
Abhishek Dhyani (Macro)
40th Annual Macro Symposium
Macromolecules & Innovation: From Discovery to Product

This October Macro celebrated a milestone with the 40th Annual Symposium. Much like the first symposium in 1977 this year’s event took place over two days and had active support from industry and academia. New for 2016 were a series of innovation focused short-courses and an industry networking dinner on Wednesday, October 26th.

Over 100 students participated in the short courses; they came from 10 U-M departments and 18 external institutions. Undergraduate and graduate students alike came to learn from industry and academy leaders on a wide range of topics.

INNOVATION! Short Courses

Dr. Lee Ellen Drechsler and Bruce Lavash from Procter & Gamble offered two sessions of their “Serial Innovation” workshop. Students learned about the challenges of industrial innovation and problem solving approaches needed to navigate breakthrough technologies from idea to market.

Dr. Drechsler speaks on Wednesday with visiting students

Dr. Crystal Morrison, a Macro alum (2003, Rasmussen) visited from PPG to present “A Different Drummer”, a session that focused on the importance of a workplace that values and encourages employee diversity and uniqueness. Not just applicable to managers, Dr. Morrison stressed the importance of this message, and its related responsibilities, for all.

Dr. Morrison with Macro student Omkar Gupte

Professor Jessica Kramer, winner of the ACS Henkel Award for outstanding research in polymer chemistry and a new professor at the University of Utah, presented to students about public speaking in “You Did the Work - Now Present It!” Professor Kramer shared invaluable techniques to engage audiences from diverse backgrounds that are essential to success at any career stage in academia or industry.

Professor Kramer, at right

Professor Milan Mrksich from Northwestern University spoke on “Translating Academic Discoveries” and how to leverage positions within academic to commercialize discoveries made in the lab. Professor Mrksich shared detailed information from his experiences founding SAMDI Tech, Inc., offering a wide array of practical advice for students.

Dr. Mrksich, center
40th Annual Macro Symposium
Macromolecules & Innovation: From Discovery to Product

Dr. Paul Rauch, a founder of the Evan Law Group, gave two presentations focused on the experiences that led him to a career in intellectual property (IP) and commercial litigation. “Choosing Your Career’ detailed Dr. Rauch’s path from Ph.D. to attorney and how he identified and selected different career paths. In “Value of IP to the Entrepreneur” Dr. Rauch spoke to students about different forms of IP and how they can be used to start and advance companies.

Dr. Rauch, center, and Dr. Sriram, left, with Dr. Mrksich

Professor S. Sriram, a Professor in the Stephen M. Ross School of Business at U-M, discussed “Going to Market” and approaches to reduce risk associated with developing new products and brands. Designing and launching new products is a risky venture and Professor Sriram highlighted the importance of proper market analysis, execution, and pursuing the most optimal ideas.

On Wednesday night following the short courses Macro hosted an industry networking dinner, made possible with generous support from P&G. Over 110 students, faculty, and industry representatives attended the event. The evening provided students from Michigan and beyond a valuable chance to connect with local and national leaders.

Participants included:
Axalta Coating Systems Plastic Technologies, Inc.
BASF PPG
Continental Structural Plastics Procter & Gamble
Plastics Wacker Chemie
Dow Chemical Xenith
Evans Law Group Xerox

Thank You!

Mikhail Zolikoff, Director of Graduate Programs at the U-M Center for Entrepreneurship, discussed the vital importance of “Picking People” for a start-up. Mr. Zolikoff has a vast well of experience to draw on as the founder of three Michigan based start-ups and he provided students with valuable dos and don’ts for selecting partners, founders, employees, and venture capitalists.

Professor Nicole Steinmetz of Case Western presented “The Nanoman!”, a discussion on the public communication of science and how she has utilized a tiny superhero, The Nanoman, to share advances in cancer nanotechnology. Professor Steinmetz told her story of developing videos, music, and games to make science more accessible.

Dr. Steinmetz with CoE Associate Dean Mary-Ann Mycek

Axalta Coating Systems
BASF
Continental Structural Plastics
Dow Chemical
Evan Law Group
Plastic Technologies, Inc.
PPG
Procter & Gamble
Wacker Chemie
Xenith
PPG
Procter & Gamble
Wacker Chemie
Xenith
Xerox
40th Annual Macro Symposium
Macromolecules & Innovation: From Discovery to Product

The Thursday symposium drew over 250 participants this year including visitors from 32 institutions across the country. In addition to the invited talks 70 undergraduate and graduate students presented their research. The following research talks were presented:

**Dr. Valeriy Ginzburg, Dow Chemical Company**
“Modeling Anisotropic Self-Assembly of Isotropic Objects: from Hair Nanoparticles to Methycellulose Fibrils”

**Kevin Golovin, Ph.D. Candidate (Tuteja), Materials Science & Engineering**
“Designing Durable Icephobic Surfaces”

**Professor Jessica Kramer, University of Utah**
“Synthetic Polypeptides: From Drug Delivery to the Cancer Glycocalyx”

**Professor Milan Mrksich, Northwestern University**
“Preparation of Megamolecules and Synthetic Antibodies”

**Professor Timothy Scott, University of Michigan**
“Exploiting Reversible Covalent Bonds in Polymeric Materials”

**Professor Nicole Steinmetz, Case Western Reserve University**
“From Black-Eyed Peas to Nanotechnology: Engineering Plant Virus-Based Therapeutics”

**Jihyeon Yeom, Ph.D. Candidate (Kotov), Macromolecular Science & Engineering**
“Paramagnetically Enhanced Optical Activity of Chiral Nanoparticles”
40th Annual Macro Symposium
Macromolecules & Innovation: From Discovery to Product

On Thursday night Macro recognized student excellence in research and service with a series of awards. New for 2016 was the P&G Team Innovation Award, given to a multidisciplinary team of researchers.

Professor and Mrs. Albert Yee Poster Awards

Prajkatta Mulay
University of Akron

Lisha Zhang
Sodano Group

Brandon Bout
Vanderbilt University

Taeyong Ahn
Banaszak Holl Group

Caymen Novak
Michigan, BME

Ramya Kumar, Dr. Domenic Kratzer, Kenneth Cheng, Irina Kopyeva

Midori Maeda
Takayama Group

Leanna Foster
Kuroda Group

Jihyeon Yeom
Kotov Group

Ramya Kumar, at right
In an effort to make safer, longer-lasting lithium-ion batteries for technologies like electric vehicles, smartphones and laptops, a University of Michigan startup has formed a $1.5 million joint venture with two major players in the industry. Ann Arbor-based Elegus Technologies recently announced their new partnership with Michigan-based lithium-ion battery manufacturing companies XALT Energy and Energy Power Systems.

Elegus has developed an advanced battery separator that allows for increased energy density in lithium-ion cells without compromising safety. Increased energy density means longer battery life, which translates to greater range-per-charge for an electric vehicle, for example.

Elegus’ separator is made from nanofibers extracted from Kevlar, the tough material in bulletproof vests. It blocks the formation of dendrites—metal tendrils that can grow and bridge across the electrodes, short the circuit and even cause a fire. Limiting dendrite growth is one of battery developers’ biggest challenges.

“I think this joint venture will showcase the power of collaboration between Michigan companies towards a common goal,” said Elegus CEO John Hennessy, a 2014 U-M Master of Entrepreneurship graduate. “In our industry, it’s a bit rare for a startup like us to pair up with large manufacturers. And it’s great that we have overlap in what we’re all trying to solve.”

Dennis Townsend, chairman of the XALT’s board of directors, is equally enthusiastic. “The Elegus separator will be the solution that will enable XALT to achieve its higher energy roadmap while maintaining safety,” Townsend said. A long list of U-M people and programs helped Elegus arrive at this milestone. The technology was initially invested in the lab of Nick Kotov, the Joseph B. and Florence V. Cejka Professor of Engineering. Kotov was introduced to Hennessy and the eventual Elegus CFO Long Qian through a Master of Entrepreneurship program offered jointly by Michigan Engineering and the Ross School of Business.

During the master’s program, the team refined the technology and took the first step toward commercialization, which led them to participate in the National Science Foundation’s I-Corps program. I-Corps helps fledgling companies discover their customer base and focus their products. U-M’s Tech Transfer office helped the team formally launch the company and license the technology.

Hennessy specifically credited the Michigan Translational Research and Commercialization Transportation program, run jointly by the U-M Center for Entrepreneurship and Tech Transfer.

“The MTRAC program was there for us for the longest amount of time,” he said. “Beyond the funding the program offered, the countless hours of advising and industry connections made were invaluable and crucial to securing this investment.”

Elegus has also received $175,000 in funding as a part of the Michigan Economic Development Corporation’s Entrepreneur and Innovation initiative, which focuses on establishing Michigan as the place to create and grow a business by providing high-tech startup companies with access to a variety of resources.

U-M Battery Startup Enters $1.5 Million Venture

Nicole Casal Moore, Michigan News

Pictured at right is Macro Ph.D. Candidate Siu On Tung, a co-founder and CTO at Elegus Technologies. Siu On is an inventor of the battery separator technology that Elegus has commercialized, utilizing aramid nanofiber based separators to create safer high-energy and power lithium-ion batteries.
Nanoshells: Potential Catalysts and Cradles of Life
Kate McAlpine, Michigan Engineering

A way to coax simple, inorganic nanoparticles to spontaneously assemble into shells has been discovered, potentially paving the way for more efficient industrial chemical processing, gene delivery and clean-up of chemical contaminants in the environment, researchers say. And it explores how life may have started.

“This work brings up the deeper questions linking self assembly and the origin of life,” said Nicholas Kotov, the Joseph B. and Florence V. Cejka Professor of Chemical Engineering. “Cells, viruses—all life relies on compartmentalization.”

Kotov’s team demonstrated the self-assembly of simple nanoparticles into spherical shells about 20 to 50 nanometers across, or about half the diameter of a virus. The nanoparticles are made of cadmium sulfide, a semiconducting material that can be used to make solar cells. To clarify how the self-assembly occurred, Petr Král, a professor of chemistry at the University of Illinois, Chicago, and colleagues made detailed simulations of the self-assembled nanoparticle shells, down to the level of individual atoms.

This high-fidelity modeling takes months to simulate less than a millionth of a second, so the Chicago team could not show the entire one-second process of the shells assembling. Still, they could show that once a shell had formed, the forces on the particles kept it together.

The individual cadmium sulfide particles, roughly shaped like four-sided pyramids, have a negative charge. This causes them to repel one another. But in close quarters, this repulsion is overcome by an attraction between the surfaces: The electrons on each particle run away from one another, creating positively and negatively charged regions on the atoms that are aligned so that the particles attract one another.

But when many particles come together, the repulsion from the overall negative charge becomes strong enough that despite the close-range attraction, they can’t form a solid sphere—particles on the inside get pushed out. Instead, they form shells. Peijun Zhang, a renowned expert in the shells of viruses and professor of structural biology at the University of Pittsburgh, and her group obtained precise three-dimensional images of the nanoshells with an electron microscope.

In order to cause the shells to form, the team needed to adjust only the pH, making the water moderately basic, which causes the negative charge on the nanoparticles. “The nanoparticles formed compartments without careful chemical organization. There was no need for peptides, amino acids or any organic molecules,” said Kotov, explaining how the work connects to the origin of life. “If there are particles from rocks, and liquid for mobility, compartments can form.”

Nanoshells could be catalysts, creating shortcuts in industrial chemistry by cutting the energy required to produce useful chemicals or reducing the waste products. The self-assembly mechanism may enable the shells to self-repair if they are damaged by the reactions, a common problem for catalysts. As catalysts, they may also be useful for cleaning up chemical spills.

Kotov is particularly interested in their potential for gene delivery, mimicking the natural viral shells currently used. His lab is exploring the viability of the nanoshells as capsules for gene therapy, a treatment for cancers and other disorders. The genes must be protected until they reach their target site in the body.

As for the origin of life, the nanoparticles leave holes in the shells large enough for small molecules to pass through. Kotov plans to explore whether the shells can catalyze reactions to build organic molecules.
An Industrial Strength Learning Experience
Matt Davenport, Chemical & Engineering News

It started with a casual dinner and an honest question: “What could we have done better for you?” recalls Mark Banaszak Holl. That night, the University of Michigan inorganic chemist got his answer from his dinner guests, Matthew Remy and Timothy De Vries, former students who now work for Dow Chemical. Nine months later, that answer blossomed into a project to address shortcomings for current and future chemistry graduate students.

Banaszak Holl’s former students wished they had had more opportunities to understand how industrial chemistry worked before they graduated and started their jobs. And this desire isn’t unique to Michigan’s Ann Arbor campus. Chemistry grad students across the U.S. feel underinformed about careers outside academia.

To help fill this gap, Dow researchers partnered with University of Michigan chemistry professors and students to develop a case study project that gives graduate students a full-color glimpse of the realities of industrial chemistry. Although it isn’t uncommon for schools to work with companies to provide students with professional development opportunities, this project had several features built in to set it apart, its organizers tell C&EN.

For one, the case study demanded that students do work, unlike a colloquium delivered by an industry insider, for instance. Such presentations are beneficial, but there are no guarantees or requirements that the students are engaged with the speaker, says Remy, a research scientist with Dow R&D. In the case study, Remy, De Vries, and other Dow researchers presented a problem they had successfully overcome: scaling up a metal-catalyzed polymerization process. The Dow team initially withheld its solution and challenged more than 20 University of Michigan students to develop their own approaches working in small teams.

About a month later, the teams reconvened to present their solutions to each other and the Dow researchers. Thus, students who participated in the case study were committed to producing something, Remy says. “The engagement was built in.” To ensure that the students could develop plausible solutions to this real-world problem, the Dow researchers shared proprietary data and information with the students—another distinguishing feature of the case study. “I was really impressed with their willingness to do this,” Banaszak Holl says. “I had never seen anything like that before.”

A third hallmark of the case study was its emphasis on working across academic disciplines, says Dow researcher Jessica L. Klinkenberg, who took the lead in developing the case study’s technical content. After the Dow researchers presented the problem at the first session of the case study event, they encouraged the students who were there to recruit other grad students from different departments. As a result, the final teams included students from not only chemistry but also engineering, materials science, and other disciplines, Klinkenberg says. Designing the case study in this way allowed the project to “bring to light the highly collaborative nature of problem solving in industry,” she adds.

Dow’s Jessica Klinkenberg speaks with U-M students at a case study session. Photo credit: U-M Department of Chemistry
An Industrial Strength Learning Experience

Although academic labs do afford chemistry students the chance to work alongside researchers from various educational backgrounds, Remy comments that when he started at Dow he was nonetheless surprised by how interdisciplinary industrial R&D proved to be. Some of the most important skills he developed early in his career involved learning to effectively work and communicate with a diverse array of experts at Dow, he says.

And the students got to experience the benefit of such skills firsthand: The teams that came closest to Dow’s solution to the scale-up problem represented the widest range of disciplines, Banaszak Holl notes. However, no one interviewed for this story disclosed those solutions.

As the students presented their proposals, the Dow researchers provided feedback on the approaches, an interaction that’s typically missing from more traditional presentations of industry to chemistry students, Remy says. The discussion allowed the Dow researchers to reveal how industrial chemists approached the same problem—and that most of the teams had developed solutions that Dow considered. “The students kind of glowed when that happened,” Banaszak Holl says.

Graduate students Mina Jafari, Alicia Welden, and Derick White confirm that the experience was validating for students. The trio, who helped organize and promote the case study, belongs to a group called Chemistry Aligned with Life & Career at the University of Michigan, stylized as CALC|UM, which is pronounced like the element. The group is about a year old and organizes events for undergrads, grad students, and postdoctoral researchers who are interested in learning more about careers in industrial chemistry. The level of student input and involvement in coordinating the case study was key to its success, Banaszak Holl says.

By virtue of its existence, CALC|UM provides a base of willing and interested student participants. Its members concede that they had other advantages in getting the case study off the ground compared with what other schools might face. Dow’s Midland, Mich., offices are only about 180 km from Michigan’s Ann Arbor campus. And CALC|UM’s faculty directors, including Banaszak Holl, have close ties to Dow employees.

Furthermore, Banaszak Holl has a joint appointment in Macromolecular Science & Engineering. Traditionally, engineering departments are more likely than chemistry departments to support students spending time on real-world industrial problems, says David A. Schiraldi of Case Western Reserve University. Schiraldi—a chemist in an engineering department—has been helping students work on industrial problems for more than a decade.

Chemistry departments tend to shy away from industrial problems, treating them as “too applied,” and instead devoting their educational efforts to more theoretical problems, Schiraldi says. But the Dow case study goes against that trend, and he can express his feelings toward the project with just two words: “Love it.”

The way Schiraldi sees it, the students and the department are helping address an educational shortcoming. Meanwhile, Dow gets nearly free promotion, new approaches to consider from the students, and an opportunity to evaluate talented young chemists as prospective employees. CALC|UM’s student members helped validate that last claim. White recently accepted a job with Dow; he credits the case study with helping him secure his first interview. Schiraldi hopes the case study will inspire more schools to try similar projects. “It could be a wake-up call for people to say, ‘Hey, we can do this, too.’”
Macro Faculty News

**Lola Eniola-Adefeso** - Professor Adefeso received the 2016 Harold R. Johnson Service Award from the Office of the Provost. The award served as well deserved recognition for her work as chair of the ChE Graduate Committee, improving the quality and diversity of students in the ChE Ph.D. program.

**Sharon Glotzer** - Professor Glotzer was named a fellow of the American Institute of Chemical Engineering and received the Alpha Chi Sigma Award for Chemical Engineering Research from the AIChE.

**Nicholas Kotov** - Professor Kotov was named the 2016 recipient of the Stephanie L. Kwolek Award from the Royal Society of Chemistry. The award recognizes exceptional contributions to the area of materials chemistry by a scientist working outside the United Kingdom. Professor Kotov was also recognized with the 2017 ACS Award in Colloid Chemistry for his foundational work on self-organization of nanoparticles in dispersions and on surfaces.

**Anne McNeil** - Professor McNeil was promoted to Full Professor, she is a Arthur F. Thurnau Professor Chemistry. She was one of five U-M faculty selected to receive a U-M Faculty Recognition Award. The award is given to faculty who have demonstrated substantive contributions to the university through achievements in scholarly research, creative endeavors, and excellence as a teacher, advisor, and mentor.

**Henry Sodano** - Professor Sodano received the Energy Harvesting Best Paper Award from the American Society of Mechanical Engineering for his publication, “ZnO Nanowire Interfaces for High Strength Multifunctional Composites with Embedded Energy Harvesting.” The paper detailed the “simple, scalable, and cost-effective process” developed for making energy harvesting systems more physically robust.

**Michael Solomon** - Professor Solomon was elected as a 2016 Fellow of the American Association for the Advancement of Science. The selection recognizes his distinguished contributions to the field of colloid science, particularly for creating and understanding colloidal self-assemblies with new symmetries and new functions.
Ph.D. Graduates


Scott Zavada (Timothy Scott) - Scott defended his dissertation, “In Situ Polymerization via an Environmentally-borne Initiation Stimulus” at the end of July. This fall he accepted a position as a Research Engineer at the National Institute of Aerospace in Virginia.

ACS POLY/PMSE Student Chapter

During the Fall 2016 term the ACS POLY/PMSE Student Chapter hosted four seminars, continued their outreach to area schools, and submitted a manuscript to The Journal of Chemical Education.

The paper, written by the chapter’s leadership team, is titled, “Augmenting Primary and Secondary Education with Polymer Science and Engineering” and would be part of a special issue of the journal. Outreach visits to brought Macro students to almost 30 classes at 6 schools, helping them connect with close to 800 students. The group has 17 visits lined up for the Winter 2017 term.

Professor Francois Ganachaud, National Institute of Applied Sciences (France) - Professor Ganachaud was the first faculty speaker of the fall term, his talk covered “Anisotropic Silicone Films”.

Professor Lei Jiang, Beihang University (China) - Professor Jiang was hosted as part of a joint event by the Kotov Lab and the student chapter. Prof. Jiang’s talk, “Smart Interfacial Materials from Super-Wettability to Binary Cooperative Complementary System” drew a large crowd of Chemical Engineering, Materials Science, and Macro students.

Professor Stephen Cheng, University of Akron - Professor Cheng’s seminar was the third of the term, he presented on “Precisely Functionalized Molecular Nanoparticles Are Unique Elements for Macromolecular Science: From ‘Nanoatoms’ to Giant Molecules”.

Professor Shu Yang, University of Pennsylvania - Professor Yang’s seminar, “Foldable and Responsive Soft Materials” was the final of the term and drew wide interest from several disciplines in the College.


Rosy Cersonsky (Sharon Glotzer) - Rosy continued her involvement with the ACS POLY/PMSE chapter outreach work, and placed 3rd in the Materials Science category at the November Engineering Graduate Symposium. Her poster was titled, “Understanding Spatial Packing through Variable Shape”.


Abhishek Dhyani (Lab Rotations) - Abhishek was a member of the winning team for the P&G Innovations in 3D Printing Challenge.

Leanna Foster (Kenichi Kuroda) - This term Leanna advanced to candidacy and served as the Peer Mentorship Coordinator for Macro. Now in its second year, this program pairs new Macro students with a current student mentor who they meet with regularly during the year. For her extensive commitment to Macro students and the program, Leanna was the 2016 recipient of the Nonna L. Hamilton Student Service Award.

Derek Frank (Adam Matzger) - Derek completed his oral prelims and advanced to candidacy for Winter 2017.

Ryan Hall (Ronald Larson) - Ryan advanced to candidacy this term and is in the process of jointly earning his Master’s degree from Materials Science & Engineering.

Nisha Hollingsworth (Ronald Larson) - Last month Nisha presented at MRS Boston, “Bacteria-Responsive Hyaluronic Acid-Penicillin Conjugates as Highly Effective, Versatile Antibacterial Polymers”.
Macro Student News

Nathan Jones (Joerg Lahann) - Nathan has had many opportunities to present his research in recent months and has earned very well deserved recognition. This summer he received the Colgate Research In Prevention Travel Grant award which enabled him to travel to the meeting of the International Association for Dental Research in Seoul. His work, “Dental Caries Diagnosis with Fluorescent Biopolymer Nanoparticles” was selected as the top young investigator’s project in prevention research in North America. At right Nathan is pictured with IADR President Marc Heft and Colgate-Palmolive VP Marsha Butler.

Last month Nathan presented his work at both the Enamel 9 Conference in Harrogate, UK and at the MRS Fall Meeting in Boston. He participated in the Fast Forward Medical Innovation Early Technology Development Course where his start-up team, GreenMark Biomedical Inc., was the overall winner for their project on a starch nanoparticle for detection of early-stage cavities. Lastly, his paper “Nanoparticle-based targeting and detection of microcavities” was recently published by Advanced Healthcare Materials.

Dan Li (Timothy Scott) - Dan spent the summer at P&G working to develop novel strategies for using photosensitive materials to induce motion in polyolefin substrates.

Ying Liu (Lab Rotations) - Ying was a member of the winning team for the P&G Innovations in 3D Printing Challenge.

Midori Maeda (Shuichi Takayama) - Midori was named a 2016 Scholar by the Hispanic Engineering National Achievement Awards Corporation, and received support from the Chrysler Foundation. During the summer she interned for Boeing in South Carolina, fabricating carbon fiber composite test laminates towards the Boeing 787 program.

Sam Navarro (Peter Ma) - Sam advanced to candidacy for the Fall 2016 term.

Apoorv Shanker (Jinsang Kim) - Apoorv’s work received a MRS Silver Award at the Fall 2016 Meeting. He has received an Excellence in Graduate Polymer Research award from the American Chemical Society and will present his work on thermal conductivity in amorphous polymers at the April 2017 ACS meeting.

Harry van der Laan (Timothy Scott) - Harry recently advanced to candidacy and was an important and dynamic member of the 40th Annual Symposium planning team.

Nathan Wood (Timothy Scott) - This summer Nathan worked at Idaho National Laboratory researching methods to stabilize wood-derived bio-oils.

Jihyeon Yeom (Nicholas Kotov) - At the Macro Symposium Jihyeon was selected as the winner of the 2016 Overberger Student Research Award. Also this fall she was a 1st place winner of the Graduate Student Award given by the AIChE, and received a Gold Award at the U-M MSE Graduate Symposium.
Support Macromolecular Science & Engineering

Each year we strive to offer our students the best possible education and research opportunities. Your gift to the program provides the funding for that margin of excellence that prepares our graduates to compete in today’s world and make substantial contributions to society.

We are grateful for your continued support of the Macro program and count on you to help us offer these exceptional opportunities!

Macro has several endowed scholarships and awards that are given in honor of Macro founder Charles G. Overberger, former Director Frank E. Filisko, and longtime Macro Coordinator Nonna Hamilton.

We invite you to visit macro.engin.umich.edu/giving to contribute and learn more about the ways in which your gift can support Macro. You may also give by calling 888-518-7888.