

GOESSMANN gazette

A Publication of the Chemistry Department
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INSIDE

Alumni Reunion	2
Points of Pride.....	4
Lab Notes	5
Seminar Program	20
Dissertation Seminars	21
Senior Awards Dinner	22
Degrees Awarded	22
Research Symposium	23
Friends of Chemistry	26
Letter from Head	28

EVENTS for 2017

Marvin Rausch Lectureship
Prof. Stephen Buchwald
MIT
March 23, 2017

Five College Seminar
Prof. Samuel Houk
Iowa State University and
Ames National Laboratory
April 13, 2017

Senior Awards Dinner
April 26, 2017

Alumni Reunion 2017
June 3, 2017

ResearchFest 2017
August 29, 2017

William E. Mahoney Annual Lecture
Prof. JoAnne Stubbe
MIT
October 19, 2017

Stein-Covestro Seminar
Prof. Karen Wooley
Texas A&M
November 30, 2017

NEW FACES

*Get to know Chemistry's newest faculty members—
Trisha Andrew, Jianhan Chen, Eric Strieter
and Mingxu You!*

PROFESSOR TRISHA ANDREW (TA) Research endeavors are in: (1) creating solar textiles and other monolithically-integrated wearable technologies using vapor phase organic chemistry; (2) effecting subdiffraction optical lithography using organic photochromes; and (3) synthesizing organic analogs of diluted magnetic semiconductors and characterizing spin-dependent charge and exciton transport in these materials. (BS University of Washington, PhD Massachusetts Institute of Technology)



GG: What convinced you to go to the grad school you attended?

TA: MIT is filled with ambitious, creative nerds who work hard and work collectively to solve big problems. There is no better work place environment.

GG: What did you study for your PhD?

TA: Materials Chemistry

GG: What was your proudest moment ever (chemistry related or otherwise)?

TA: When my technology was adopted by the TSA to screen passengers for liquid explosive residues in domestic airports.

GG: What is the most useful tool in your lab? TA: A torque wrench

GG: Do you use any novel techniques or tools, or work with any unique materials for your research?

TA: We use a number of vapor deposition methods, such as physical vapor deposition and reactive vapor deposition, to coat rough surfaces, thus turning non-traditional materials, such as a textile, into substrates on which we grow nanostructured devices.

GG: Do you work in any collaborations?

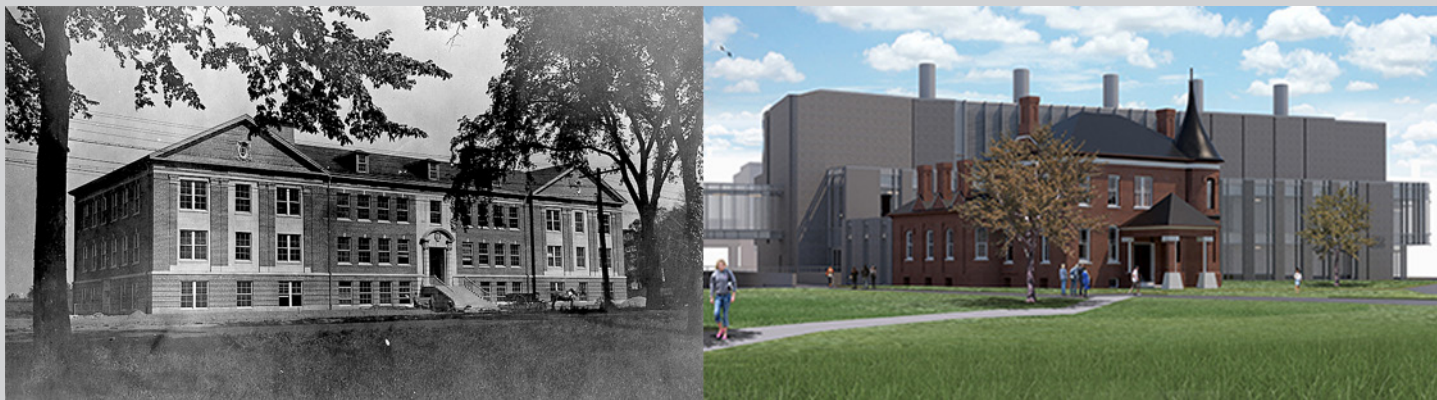
TA: We work with a weaver/fabric artist to marry traditional textile processing methods with electronic device fabrication. We also work with optical engineers to push the resolution limits of optical lithography.

GG: Assuming your research is wildly successful, how will it impact society?

TA: Our lab works on textile electronics. We aim to build up the materials science so you can give



Chemistry Alumni Reunion 2017



The original Goessmann Laboratory (opened in the fall of 1924) and the new Physical Sciences Building (opening in the spring of 2018).

The Chemistry Department 2017 Alumni Reunion was held on Saturday, June 3rd as part of a larger campus-wide Alumni Weekend.


Our reunion was held at the beautiful Integrated Science Building with the following schedule:

1:30 p.m.-3:00 p.m. Reception and Social Hour – ISB Atrium

3:00 p.m.- 4:00 p.m. Talks – ISB 221

“UMass Amherst: Chemistry and Richason Lead the Way,” presented by retired Chemistry Professor David L. Adams ‘67
“The Future of Materials Chemistry at UMass,” presented by Professor Kevin Kittilstved

4:00 p.m.- 4:30 p.m. Reception – ISB Atrium

In celebration of their 50th reunion, the Class of 1967 has launched their 50th Reunion Gift Campaign. The goal is to raise \$175,000 for the naming rights to the main lobby of the newly renovated Old Chapel in honor of Chemistry Professor Emeritus, George R. Richason, Jr. ‘37, ‘39 MS, ‘91 HON. The Class of 1967 welcomes your donations to the Class of 1967 Old Chapel Lobby Fund and hopes you will join their efforts in reaching their goal of honoring one of our iconic faculty, George R. Richason, Jr. To access the giving page, please go to: umass.scalefunder.com/gday/giving-day/901 

*alumni*NEWS

Local resident, **George Epstein** (CHEM ‘48 BS, ‘52 MS) has been honored with the Kushner Award from the International Society for the Advancement of Material and Process Engineering (SAMPE). Formerly known as the SAMPE Space Award, it recognizes outstanding, dedicated individuals who have provided exceptional service in promoting the ideals of the society, extending over many years. Epstein has also received a number of other awards and commendations for his many contributions related to composite materials, including their use in major U.S. space and defense programs, including the GPS, various communications satellites, and launch vehicles. Especially significant were his inspired efforts in creating the Air Force Manufacturing Problem Prevention Program (MP3) that has helped U.S. Space and Missile systems avoid costly anomalies and operational failures. The Society of Plastics Engineers (SPE) has a college scholarship in his honor. In 1990, he was honored with the Fred O. Conley Award by the SPE for his “Outstanding Achievements in Plastics Engineering/Technology;” and, he was named a Fellow of the Society in 2009. In 1963, the Society of the Plastics Industry (SPI) honored him with the Western Plastics Distinguished Service Award; and, in 1992, its Man-of-the-Year Award. Other awards include the SAMPE Lubin Award in 1963 for “his consistent and sustained high level of technical contributions and his pioneering efforts in composites and adhesives technologies.” He was elected a SAMPE Fellow in 1987. In 2008, Epstein was named “Senior Citizen Volunteer of the Year” by the Westside Optimist Club, primarily for his efforts in introducing senior citizens to the game of poker as a recreational activity for retirees. Recently, he was elected to the Seniors Poker Hall of Fame.

alumniREUNION 2016


The 2016 Chemistry Alumni Reunion focusing on chemical education was held on Saturday, June 4, 2016 in the Integrated Sciences Building (ISB). This event was part of the university-wide Alumni Weekend open to all alumni, students, faculty, staff, and friends.

A reception was held in the ISB Atrium, followed by talks from two of Chemistry's outstanding educators. **Gabriela Weaver**, Professor of Chemistry and Vice Provost for Faculty Development and Director of the Institute for Teaching Excellence & Faculty Development (TEFD), spoke about her research in chemical education, in a talk titled "In the spotlight: STEM education and the National Academies."



Prof. Gabriela Weaver and Raina Kittilstved

Raina Kittilstved, staff in our organic chemistry labs, spoke about summer outreach programs she has developed at UMass that harness her prior career experience as forensic chemist in a state crime laboratory: "Elementary: Promoting UMass Chemistry Through Forensic Courses and Other Outreach Efforts."

Turnout for the event was solid and alumni, faculty, and staff had a wonderful time catching up on old times, while marveling at the current successes of their alma mater. To view more photos from the event, please go to www.chem.umass.edu/alumni/AlumniReunion2016/index.html 

Hunt Receives ACS Analytical Chemistry Award



Donald F. Hunt, University Professor of Chemistry and Pathology at the University of Virginia, has received the American Chemical Society award in Analytical Chemistry for 2016. Don earned his BS (1962) and PhD (1967) degrees at UMass Amherst. His PhD work, jointly directed by Profs. Marvin Rausch and Peter Lillya was in the area of organometallic chemistry, but he followed his fascination with mass spectrometry to a postdoctoral year with Klaus Biemann at MIT which led to his pioneering work at Virginia in application of mass spectrometry to important problems in protein analysis and structure and in medicine. His award citation reads, "For pioneering efforts to develop mass spectrometry methods and instrumentation that facilitated characterization of peptides and proteins and provided the foundation of the field of proteomics."

POINTS *of* PRIDE in Chemistry

- ❖ **S. Thai Thayumanavan** awarded Chemical Research Society of India's Medal of Honor.
- ❖ **Vince Rotello** wins Royal Society Award for pioneering research.
- ❖ **Michael Maroney** inducted as a newly elected AAAS Fellow at the 2016 annual meeting.
- ❖ **Lila Gierasch** was formally inducted into the American Academy of Arts and Sciences on October 8.
- ❖ The Institute for Applied Life Sciences (IALS) was officially launched on Friday, October 21.
- ❖ Chemistry rated within the top 150 chemistry programs internationally according to the QS World University Subject Rankings.
- ❖ **Vince Rotello** listed on the 2015 Thomson-Reuters Most Cited Researchers list.
- ❖ **Min Chen** received an R01 grant award from NIH for her work on the OmpG nanopore for single molecule protein sensing.
- ❖ **Igor Kaltashov** (PI) and **Paul Dubin** received an NIH grant for their work on "An Integrated Mass Spectrometry Approach to Study Heparin Structure-bioactivity."
- ❖ **Lynmarie Thompson's** NIH CBI Training grant has been renewed with eight trainee slots.
- ❖ **Vincent Rotello** received Research Corporation for Science Advancement's TREE Award (Transformational Research and Excellence in Education) Award, recognizing the outstanding research and educational accomplishments of Cottrell Scholars.
- ❖ **Paul Dubin** received a BASF grant for his work on "Use of Coacervation Based on Polyelectrolyte Complexes to Deliver Actives."
- ❖ **Ezra Wood** awarded a four-year, \$800,000 National Oceanic and Atmospheric Administration grant to participate in one of the largest studies to date of atmospheric chemistry in wildfires.
- ❖ **Brigette McKenna**, Undergraduate Program Manager, received the 2016 CNS College Outstanding Staff Award.
- ❖ **Trisha Andrew** is collaborating with a fabric designer to weave solar panels into fabric.
- ❖ **Julian Tyson** and Chemists Without Borders team up to produce new low-cost kit to test arsenic levels in Bangladesh's rice crops.
- ❖ **Edward Voigtman** (emeritus) published a book entitled, "Limits of Detection in Chemical Analysis."
- ❖ **Howard Stidham** published a book entitled, "Statistical Thermodynamics for Beginners."
- ❖ **Lila Gierasch** is the new editor in chief of the *Journal of Biological Chemistry*, the nonprofit's peer-reviewed journal.
- ❖ **Michael Barnes** and colleagues report in *Nature Communications* this week that they have for the first time identified an unexpected property in an organic semiconductor molecule that could lead to more efficient and cost-effective materials for use in cell phone and laptop displays, for example, and in opto-electronic devices such as lasers, light-emitting diodes and fiber optic communications.
- ❖ **Bret Jackson** and his group made the cover of *The Journal of Physical Chemistry Letters* with their publication on the effects of lattice motion on dissociative chemisorption.
- ❖ **Gabriela Weaver's** article in *J. Chem. Ed.* was chosen by *Science* as an "Editor's Choice."
- ❖ **Michelle Farkas, Jeanne Hardy** and **Vince Rotello** have each received a 2016 Inaugural IALS Seed Grant.
- ❖ **Vincent Rotello** gave a talk at Monash University in Melbourne, Australia, about the "chemical nose" he has helped develop that can smell changes in cancer cells using a sensor array of gold nanoparticles and protein to detect changes in cells.
- ❖ **Scott Auerbach** was featured on the The Massachusetts Green High Performance Computing Center website for his research optimizing fuel production using plant biomass instead of from petroleum.
- ❖ **Joelle Labastide** (PhD Chem '15, Barnes group; current postdoc in physics) has been awarded a \$138,000 NSF fellowship to examine the dynamics of "cargo transport," the act of carrying organelles, proteins and other material around inside the cell.
- ❖ Chemistry alum, **William A. Lee '77**, received the 2016 University Distinguished Alumni Award.
- ❖ **Scott Auerbach** received the Manning Prize for Excellence in Teaching which recognizes outstanding teaching across all five UMass campuses for sustained excellence in teaching, exemplary contribution to the campus community, and supporting students' educational and career achievements.
- ❖ **Justin Fermann** named iCons Program Director.
- ❖ **Scott Auerbach** and team members from the 2015 NAFKI conference were awarded a grant to improve health and education with music.
- ❖ **Scott Auerbach** and **Justin Fermann** present iCons Pedagogy at workshop in Globalizing Liberal Arts.
- ❖ **Dhandapani Venkataraman (DV)**, one of Amherst Regional Middle School's Science Club faculty advisors, helps students discover the best preparation process for keeping cafeteria apples fresh and bacteria free.
- ❖ Congratulations to **Alex Barbato** and co-presenters **Kanae Sasaki & Tristan Tay** whose posters were chosen to receive the Uche Anyanwu Memorial Award at the Undergraduate Research Poster Session. 

labNOTES

In the AUERBACH LAB ...

The Auerbach group had another exciting and productive year in 2016 with articles published in the fields of biofuel production (offering the promise of renewable, carbon-neutral liquid fuels), fuel cell materials (offering a much more efficient way to produce electricity), and inorganic network/zeolite formation (shedding light on how nanoporous materials actually form in solution) – all from a theoretical chemistry perspective. A new collaboration with UMass mechanical engineer **Dr. Ashwin Ramasubramanian**, co-advisor along with Dr. Auerbach for chemical engineering graduate student **Hongbo Shi**, bore fruit in 2016 with the publication of an article in the *Journal of Physical Chemistry* on “First-Principles Predictions of Structure–Function Relationships of Graphene-Supported Platinum Nanoclusters.” This article sheds important light on the realistic structures of platinum nanoparticles, important catalysts in fuel cells. Many researchers have studied platinum nanoparticles, tiny collections of 100-1000 atoms of platinum where most atoms are surface exposed and hence catalytically active in making electricity. However, for simplicity most researchers have assumed that these nanoparticles adopt high symmetry structures. In our work we tested that hypothesis by optimizing nanostructures with a genetic algorithm – a mathematical approach that mimics natural selection in biological genetics – to determine that real nanoparticle structures are quite distorted and far from symmetric. This finding has allowed new predictions of optimal platinum nanoparticle sizes – 50-100 atoms – for fuel cell applications. We are excited to continue collaborating with **Dr. Ramasubramanian**, and congratulate **Hongbo** for this impressive accomplishment. **Hongbo** is expected to complete his PhD in 2017; good luck!

In June 2016, Prof. Auerbach stepped down as director of the Integrated Concentration in Science (iCons) Program after acting as its founding director and serving in that role for over seven years. At about the same time, Prof. Auerbach was awarded with the *Inaugural Manning Prize for Teaching Excellence*, awarded by the UMass System to one faculty on each of the five UMass campuses. Prof. Auerbach was lauded for his creation of the UMass iCons Program, and for excellent teaching and advising in Chemistry.

In other exciting news, chemistry professor **Dr. Justin Fermann** is stepping up to become the 2nd director of the UMass iCons Program. Prof. Auerbach remains active in the UMass iCons Program by continuing to teach his iCons 2 Energy course, and by acting as senior advisor (aka, grandpa) to the iCons Program faculty and students. Prof. Auerbach is now giving a series of workshops around the New England area on bringing the iCons case study approach to teaching real-world science into as many high schools and colleges as possible. The Department of Chemistry has played a vital role in the success of iCons over the years, and for that, Prof. Auerbach is eternally grateful. For more information on iCons, please see the update on page 18.

In yet more exciting news, Auerbach group alum **Dr. Vishal Agarwal** (PhD '12) has accepted a faculty position in the Chemical Engineering Department at the Indian Institute of Technology, Kanpur, to begin in January 2017. We wish **Prof. Agarwal** all the best as he launches his teaching career and continues his high-octane research program into catalyst structures and reaction mechanisms important for advanced energy applications.

We wish all Auerbach group alums a wonderful year, and hope they'll stay in touch and visit campus whenever possible. Remember: Go CRUNCH = Chemistry Research Using Nice Computer Hardware!

In the CHEN LAB ...

In the past year, the Chen's group continued the work on the functional mechanism of pore-forming membrane proteins and their applications in biosensing and drug delivery. Our project aiming to “create a OmpG nanopore toolkit for biosensing” has received a 5-year R01 funding totaling of \$1.5 M. We are very grateful for the support from NIH.

Monifa Fahie successfully defend her thesis in May 2017. She has published five first-author papers in peer-reviewed journals as *JBC*, *ACS nano*, *J Phy Chem*, *Anal Chem* and *ACS Sensors* since she joined our group in June 2012. While waiting for her graduation in September, she will continue to work on two more manuscripts. We will certainly be sad to say good bye to her.

Bib Yang and **Bach Pham** both received *William E. McEwen Fellowship Awards* for Outstanding Poster Presentation at ResearchFest 2016. **Bib** also received

the prestigious ACS Women Chemist Committee/Eli Lilly Travel Award 2017 for her work on “Selective detection of protein homologues by outer membrane protein G nanopore.”

We also welcome three new group members: **Fanjun Li** and **Xin Li**, both from Chemistry and **Spencer Shorkey**, from the MCB program.

In the GIERASCH LAB ...

2016 was a fantastic year for the Gierasch lab, especially due to Lila's accomplishments: she was not only awarded a *'Maximizing Investigators' Research Award* (MIRA) from the NIH that granted the lab another five years of funding, but she was also elected to the American Academy of Arts and Sciences together with some of the world's most accomplished scholars, scientists, writers, artists, business and philanthropic leaders. More good news? Lila started her appointment as Editor-in-Chief of the *Journal of Biological Chemistry*, a leading journal in the biochemistry and cell biology field. We are all very excited about all these great events!



Karan Hingorani and Lila Gierasch

We said goodbye to two long time lab members, postdoctoral fellow **Abhay Takhur** and MCB graduate student **Karan Hingorani**. **Abhay** left the lab to take a senior scientist position at LakePharma in Worcester, and **Karan**

defended his Ph.D. (see picture) and embarked on an MD program at BU. **Karan** was awarded the *Byron prize* for “best thesis” in the UMass MCB graduate program. We miss **Abhay** and **Karan** very much, but are excited to see our friends being successful. We wish them the best of luck. On the other hand, **Alexandra “Sasha” Pozhidaeva** began her postdoctoral fellowship with us in December. **Sasha** completed her PhD at UConn Health Science Center and got married, all in the same month! We are thrilled with the opportunity to have **Sasha** doing research with us and look forward to a successful collaboration.

As usual, we have a very active crew of undergrad members that keep the lab busy:

Ha Dang presented her thesis at Mount Holyoke College with the research work she did in our lab and joined other Gierasch lab alumni in the west coast in the Biochemistry graduate program at the University of Washington. **Ha** was a very lively member of the lab, and we miss her very much, although she keeps in touch and keeps us posted about her whereabouts. **Chloe McCollum** returned from a junior semester abroad in the Netherlands to continue her CHC honors research in our lab, while **Natalie McArthur** and **Todd Morse** continue their honors research in the lab: **Natalie** presented a poster at the undergraduate research symposium at WPI in Worcester, and **Todd** presented a poster at the Massachusetts Statewide Undergraduate Research Conference. We also welcomed two new undergraduate students, **Nick Fordham** and **Constantine Petrides** who are both studying the molecular mechanisms of Hsp70 proteins. We love having the undergraduates around, keeping the lab young and busy.

Gierasch group members presented their research at local meetings (such as the CBI/BMB/BMP Joint retreat with UMass Medical School in Worcester and the UMass MCB Graduate Program Annual Retreat), and traveled to other important conferences, including: the FASEB Summer Research Conference, “Protein Folding in the Cell” in Saxton's River, VT and the Cold Spring Harbor, “Protein Homeostasis in Health & Diseases” meeting. As she does every year, Lila traveled all over the globe to speak about the lab's research: including at the “2016 GRC on Disordered Proteins” in Les Diablerets, Switzerland; at the workshop on “Molecular Chaperones in Cellular Proteostasis” held in Baeza, Spain; and at the “Protein Folding” meeting in Bangalore, India.

The lab was very productive publication-wise as well; we published two book chapters, one article in *PNAS*, an article in *Nature Chemical Biology*, and a commentary in *Molecular Cell*. We submitted more articles at the end of the year and more are nearly submitted! And Lila has been writing editorials to the *JBC* community (four so far).

We celebrate a great 2016 and look forward to another year of successes!

In the HARDY LAB ...

This has been an exciting year for the Hardy Lab. This year **Scott Eron** and **Kevin Dagbay** successfully defended their dissertations and published great papers in *Cell Structure* and *JBC*. **Scott** is now working as a scientist at C4 Therapeutics in Cambridge and **Kevin** is a post-doctoral fellow with **Prof. Hao Wu** at Harvard Medical School. Alumni **Samantha Nicholls** joined the biotech company ScholarRock and **Witold Witkowski** welcomed a new son to his family!

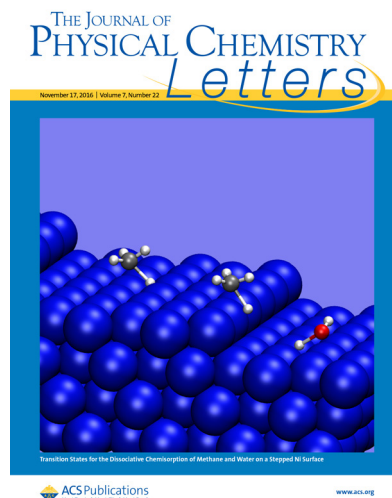
Bay Serrano won a poster award during the International Symposium of the Protein Society in Baltimore for her work uncovering a novel mechanism of caspase-9 inhibition by phosphorylation by PKA. **Maureen Hill** attended the Gordon Research Conference on Proteolytic Enzymes & Their Inhibitors and won best poster award at the associated Gordon Research Seminar. She was also invited to the St. Jude National Graduate Student Symposium (NGSS) where she presented her work to post-doctoral students and faculty. **Derek MacPherson** received the *Protein Science Young Investigator Travel Award* for the 30th Symposium of the Protein Society in Baltimore, MD. **Derek** also presented at the University of Massachusetts Amherst Researchfest and was awarded the *Dr. Paul Hathaway Terry Graduate Scholarship Award* for Outstanding Presentation about his work on the characterization of caspases' unique mechanisms for substrate recognition. **Maureen** and **Derek** co-authored their first paper, published in *ACS Chemical Biology*. **Francesca Anson** started in the Hardy lab, co-advised alongside **Prof. S. Thayumanavan**, with fellowship funding from the UMass Biotechnology Training Program (BTP) that allows her to work to deliver caspases to cancer cells. **Ishan Soni** has just passed his second year prospectus examination, and excited about his project in collaboration with ActivX BioScience Inc. to understand the functional implications of caspase-6 by various nucleotides. **Yifei Pei**, currently a second-year graduate student in the Hardy lab, is working with **Kevin Dagbay** and **Narasimha Rao Meka** on the project of design and synthesis of caspase-6 inhibitors to develop a potential treatment for neurodegenerative diseases such as Huntington's and Alzheimer's disease. **Meka** has synthesized more than 70 analogues, some of which have unprecedented specificity towards caspase-6 and nanomolar activity.

Leah Woldegiorgis, a Postbaccalaureate Research Education Program scholar, joined the research team as a member of the NEAGAP. **Carolyn Huang**, a third-year biochemistry major, also joined the lab and has been collaborating with **Prof. Larry Schwartz's** lab to test the interactions between a new protease, to characterize its potential as a cancer drug target. In addition to pursuing allosteric and exo-sites in caspases and viral proteases, Hardy is also invested in growing the NIH-funded Biotechnology Training Program (btp.umass.edu) for graduate students in Chemistry and across campus and jointly leading the Models to Medicine center (www.umass.edu/m2m) within the Institute for Applied Life Sciences.

In the JACKSON LAB ...

Our group continues to explore the dynamics of gas-surface reactions, with a focus in recent years on understanding methane dissociation on transition metal-based catalysts. This is the rate-limiting step in the steam reforming of natural gas. We have developed quantum mechanical methods that allow us to compute the dissociative sticking probability of methane as a function of the temperature of the

metal and the translational energy and vibrational state of the methane. Graduate student **Han Guo** has examined the dissociative chemisorption of CH₄ on both Pt(111) and Ni(111) surfaces. Working closely with experimental groups at Tufts



University and EPFL, **Han** has explained why the reaction dynamics differ on the two surfaces, and how different vibrational excitations of the methane can modify the reaction probability. Graduate student **Azar Farjamnia** has been examining the dissociative chemisorption of CO₂ on both smooth and stepped Ni surfaces. This is an important step in the reverse water-gas shift reaction, as well as other processes that attempt to make useful chemicals from CO₂. **Azar** and **Han's** work made the cover of *J. Phys. Chem. Letters* this past year, where they published an invited Perspective article.

In the KALTASHOV LAB ...

2016 was a very busy year in the Kaltashov laboratory, which included publication of five papers, as well as several presentations given by the group members at numerous scientific meetings and conferences. **Khaja Muneeruddin** defended his PhD



Khaja Muneeruddin

dissertation and moved to UMass Medical School. A new graduate student (**Miaowei Xu**) joined the group in December 2016. The group also hosted two visiting scientists, **Wenhua Yang** (from the

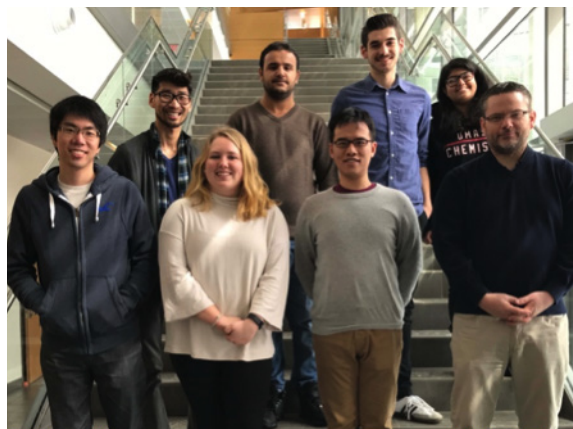
State Key Laboratory of Food Science and Technology at Nanchang University in China) and **Gregoire Bonvin** (from the École Polytechnique Fédérale de Lausanne in Switzerland).

In the KITTILSTVED LAB ...

2016 was a year of many interesting research discoveries and change in the Kittilstved group. The spring semester was spent by Kevin traveling to present invited seminars at 18 universities, national labs, and conferences. One of the highlights was being invited to present a “hot topic” on Magnetic Aliovalent Dopants in Oxide Semiconductors at the Colloidal Semiconductor Nanocrystal Gordon Research Conference in Mount Snow, Vermont in July. March also witnessed the inaugural PhD degree from the group, awarded to **Swamy Pittala** (“Magnetic Doping of Semiconductor Molecular Models and Colloidal Nanocrystals”). In November, **Keith Lehuta** followed suit with his work on “Dopant-defect Engineering in Strontium Titanate-based Materials.” Both **Swamy** and **Keith** have moved on to jobs at Intel and Honeywell, respectively, and we wish these official UMass Chemistry PhD alumni the best.

Remaining members (**William Harrigan**, **Fumi Kato**, and **Dongming Zhou**) have been productive in the lab. While we lost **Swamy** and **Keith** to graduation

and gainful employment, we gained three new group members in December (**Jillian Denhardt**, **Haneen Mansoor**, and **Abdullah “AB” Muhammad**). **Jillian** completed her undergraduate training at Saint Michael’s College while **Haneen** and **AB** both came to UMass from Lahore University of Management Sciences (LUMS) in Lahore, Pakistan. In addition to ending the year with six graduate students, we also had our steady state of undergraduate researchers in the lab, including **Chris Roy**, **Nick Russo**, **Kathleen Dreher**, **Anubhab Halder**, **Justin Campbell**, **Steve Capo**, **Kyle Schaff**, **Kristen Newton**, **Peter Kelly**, **Michael Mortelliti**, and **Sam Michaud**. Both **Michael** and **Sam** were co-authors on separate articles in 2016, and both also left after graduation to begin their graduate training at UNC Chapel Hill and Michigan, respectively.



Kittilstved group

In the METZ LAB ...

The Metz group has had an exciting year studying structure and bonding in gas-phase metal ion complexes and exploring the photodissociation dynamics of metal-containing ions. Graduate students **Chris Copeland** and **Muhammad Affawn Ashraf**, along with undergraduate **Emily Boyle** (BS ’17) are studying the initial step in C-H bond activation by transition metal cluster ions. By measuring vibrational spectra of $\text{Fe}_3^+(\text{CH}_4)_n$ and $\text{Fe}_4^+(\text{CH}_4)_n$ they determine the extent to which binding to the metal weakens the C-H bonds in methane. This extends work done by our group on methane activation by iron dimer and atomic metal ions. **Chris** and **Muhammad**, along with undergraduate **Nicole Kirby** (BS ’17) also looked at the first step in activation of C-H bonds in ethane by aluminum and aluminum dimer cations, measuring vibrational spectra of $\text{Al}^+(\text{C}_2\text{H}_6)_n$ and $\text{Al}_2^+(\text{C}_2\text{H}_6)_n$. We welcome graduate student **Schuyler Lockwood**, who along with graduate student **Dave**

Johnston and undergraduate Matt Gentry (BS '17) is using our photofragment imaging instrument to study bonding in small, metal-containing ions such as MnO^+ and Al_2^+ . By measuring the amount and direction of the kinetic energy released when these ions photodissociate, they can measure bond strengths and study photodissociation dynamics. In the visible, near 400 nm, Al_2^+ dissociates promptly, whereas in the UV, near 250 nm, the excited molecules survive for several rotational periods before dissociating. They also, surprisingly, observe that Al_2^+ preferentially dissociates to form spin-forbidden products, despite spin-allowed products being energetically favored. By measuring kinetic energy release, they measured the Al^+-Al and Mn^+-O bond strengths, resolving a long-standing controversy.

In the ROTELLO LAB ...

2016 featured comings, goings and many other happenings in the Rotello lab. Vince was named a 2016 recipient of the RCSA's TREE Award (Transformational Research and Excellence in Education), along with Bioorganic Lectureship from the Royal Society of Chemistry, (U.K.), the Australian Nanotechnology Network Traveling Fellowship and the President's International Fellowship for Distinguished Researchers award from the Chinese Academy of Sciences, Vince finished his third year as Editor-in-Chief of *Bioconjugate Chemistry*, with Federica Scaletti taking over the social media website ("like" us at www.facebook.com/bioconjugatechemistry!) from Yingying Geng.

In early 2017 the group celebrated a milestone, publishing our 500th paper. We are on our way to 1000, with 35 publications in 2016, and Vince's h index is up to 81. The group has continued with new funding from the NIH, along with grants from the USDA, NSF, Rays of Hope and the Air Force.

Three group members won prizes at the 2016 ResearchFest. Congratulations to Joseph Hardie, Ryan Landis and Ngoc Le for their Outstanding Poster Awards. During the 252th ACS national meeting in Philadelphia, Gülen Yesilbag Tonga won the outstanding student poster award in the colloidal and surface chemistry division while Ryan F. Landis was nominated as a distinguished poster in the PMSE division. In addition, Ryan Landis was awarded \$3,000 (one of two of the largest awards) for his startup venture proposal at the Innovation Challenge Seed Pitch competition hosted by the Berthiaume Center on November 30, 2016. Also, our

undergraduate students, Kanae Sasaki and Tristan Tay working under Rubul Mout and Moumita Ray won the *Uche Anyanwu Memorial Award* at the UMass Amherst Chemistry Department Undergraduate Research Poster Session.



Rotello group

On the departure side, Ying Jiang and Rui Tang received their Ph.Ds, with Ying heading to the University of Florida and Rui joining Case Western Reserve University. Postdoctoral researcher Dr. Tatsuyuki Yoshii has left the group to join the Nagoya Institute of Technology as an assistant professor. Visiting scholars Dr. Somrita Mondal, Jessica F. A. de Oliveira, Dr. Bianca Sandrino, Friederike Schlüter, Dr. Feng Zheng, Zill-e-Huma, Attasith Parnsubsakul and Maiara Emer have returned home. We have had a strong influx of new faces including Puspam Keshri, Sanjana Gopalakrishnan, David Luther, Xianzhi Zhang who have officially joined our group as graduate students, Dr. Federica Scaletti and Dr. Roberto Cao-Milán as postdoctoral researchers and several visiting scholars. Welcome to the group!

For up-to-date news, please check out www.umass.edu/rotellogroup/ or see what's up or our less formal Facebook page www.facebook.com/rotellogroup.

In the THAYUMANAVAN LAB ...

It has been a productive and exciting time in the Thayumanavan group. Here are a few highlights of the last year.

New graduate students Ann Fernandez, Hongxu Liu, Manisha and Khushboo Singh were welcomed into the group. They bring with them a lot of intellectual curiosity and new energy.

Kudos to our award-winning current graduate students! Ziwen Jiang received the *Dr. Paul Hatheway*

Terry Award for Outstanding Poster Presentation and a prize of \$500. **Poornima Rangadurai** received the **Marvin D. Rausch Scholarship Award** for Outstanding Presentation with a prize of \$1,000. **Uma Sridhar** has won two awards: second prize for the UMass Innovation Challenge Minute Pitch Competition with an award of \$750 and second prize for the UMass Seed Pitch Competition with an award of \$2,500.



Thayumanavan group

Graduate student **Celia (Frieler) Homyak**, headed out to the West Coast from June through September to complete an internship at Applied Materials in Santa Clara, California.

Former graduate student, **Dr. Hui Wang** received his PhD and is now an NRC Postdoctoral Research Associate at the US Army Natick Soldier Research, Development and Engineering Center in Natick, Mass. Three students received their MS degree: **Sara Wojtas**, who is now working as a Bio/Chem Lab Coordinator at Springfield College in Springfield, Mass., **Zheyi Yi** and **Dongsik Yang**, who are both continuing their education: **Zheyi** at Northeastern University and **Dongsik** at Brandeis University.

Dr. Jiaming Zhuang, a former graduate of the group, has continued here, now as a research assistant professor. Alumna **Dr. Kratae (Sompit) Wanwong** visited this past summer for a couple of weeks and did some work in the lab. She is currently based at KMUTT University in Thailand. She will be back in town in April to July to work with **Prof. Trisha Andrew's** lab in the chemistry department.

There are some family updates from our graduate student alumni as well. Former graduate students, **Dr. Reuben Chacko** and **Dr. Andrea (Della Pelle) Chacko** have recently welcomed a baby daughter,

Amelia Marie. **Dr. Longyu Li** and his wife **Zhu** have welcomed their new baby daughter, **Erin**.

We said goodbye to **Dr. Wei Bai**, postdoctoral researcher, who has gone on to a postdoctoral position at the University of Tennessee, Knoxville. Former postdoc, **Dr. Mijanur Rahaman Molla**, is now assistant professor at the University of Calcutta in India and now has a wife, **Najmun**.

Dr. Sreenivas Peddolla joined the group as a new visiting scholar from India. **Zeno Fickenscher**, an exchange student from Germany, has also been doing research in the group. Visiting scholars, **Xiaochi Liu** and **Ya Zuo** returned to China; **Xiaochi** to graduate work and **Ya** as lecturer at the Inner Mongolia Agricultural University in Hohhot. **Dr. Hatice Seçinti** continued as a research associate here for an additional six months past her initial time commitment as a visiting scholar through the Scientific and Technological Research Council of Turkey (TUBITAK). Former visiting scholar **Pingsheng Huang**, recently married, and is currently working as assistant research fellow in the Institute of Biomedical Engineering at the Chinese Medical Sciences and Peking Union Medical College.

Undergraduates in the group this past year included: **Matthew Caissy**, **Megan Crane**, **Daniel Estabrook**, **Marina Franc**, **Margareta Ianosi-Irimie**, **Bailey Ingalls**, **Benjamin LaLiberte** and **Lauren Okamoto**. We said goodbye to graduating undergrads **Matt Caissy**, **Dan Estabrook** and **Lauren Okamoto**. **Dan** is currently a chemistry graduate student at UCLA. **Lauren** is working as a medical scribe at an emergency orthopedic center and as a volunteer medical assistant and has plans to go to medical school.

Just after Memorial Day weekend in May 2016, the whole group got together for a very successful retreat in Orleans at Cape Cod, Mass. The retreat provided a perfect opportunity for group members to do some innovative and creative thinking about science and to practice some better ways to work together.

Thai is currently co-leading the Center for Bioactive Delivery (CBD) in the Institute for Applied Life Sciences (IALS) with **Prof. Barbara Osborne**. He also headed up the Faculty Mentoring Group for CNS while **Prof. Nilanjana (Buju) Dasgupta** was away last semester.

UMass has published a special article online at ResearchNext featuring the partnership of the research group with Cyta Therapeutics, Inc. Check it out at www.umass.edu/researchnext/feature/forefront-health.

Stay in touch with us through frequent visits to the group webpage: elements.chem.umass.edu/thaigroup/, liking us in Facebook, following us in Twitter, (links provided in our website) and e-mailing the group. If you are alumnus of the group and we do not have your updated whereabouts, please let us know.

In the THOMPSON LAB ...

It's been a great year in the Thompson lab. Our research investigates transmembrane signaling mechanisms in native-like signaling nanoarrays of bacterial chemotaxis receptors. Graduate student **Libbie Haglin** has discovered a novel approach to assemble these complexes and has been taking advantage of biophysical methods in the IALS (Institute for Applied Life Sciences) core facility to understand this assembly process, while graduate students **Maryam Kashefi** and **Xuni Li** have been interrogating structure and dynamics in similar complexes using solid-state NMR and hydrogen exchange mass spectrometry, respectively. Lynmarie presented this work at conferences last summer, the FASEB meeting on Molecular Biophysics of Membranes in Colorado and a small chemotaxis meeting in Santa Barbara, and in recent seminars at UConn Health and Worcester Polytechnic Institute. **Maryam** presented her work at the Experimental NMR Conference in Asilomar, California in March, **Xuni** was awarded a Finn Wold and Protein Science Travel Award to present her work at the upcoming Protein Society Meeting in Montreal in July, and **Libbie** was selected to give a talk on her work at the CBI Retreat at UMass Worcester in May.

We welcomed chemistry major **Dominique "Kiki" Carey** into the group this spring. She is working on a new project to use DNA origami to assemble and control bacterial chemoreceptor arrays. Congratulations to **Kiki** who received the Undergraduate Award in Analytical Chemistry from ACS at the Chemistry awards dinner in May. Congratulations and a fond farewell to senior **Karen Li** who worked with us since her freshman year on an ABC transporter project: she was also one of ten students in her graduating class at UMass to be selected a 21st Century Leader! Finally, we

congratulate lab alumnus **Meaghan Molloy** who will soon be a medical student at UMass Medical School.

The NIH-funded UMass Chemistry-Biology Interface Training Program (CBI, www.umass.edu/cbi/) celebrated its 20th birthday with seminars in each of the four participating graduate programs. It was hard to say goodbye to long-time CBI program assistant **Carrie Morrison-Penland**, who luckily has not gone far – she is now the MCB program coordinator. Lynmarie is very happy to welcome our excellent new CBI program coordinator, **Nyudlia Araeva**, and is looking forward to the synergistic benefits of having her work with both CBI and the new Biotechnology Training Program (BTP).

Finally, the major new biomolecular NMR capabilities in the IALS NMR Facility will soon be supported by a co-director for Biomolecular NMR, **Dr. Jasna Fejzo**. Her NMR training and pharma experience will enable her to collaborate with UMass research groups as well as facilitate drug discovery for industry users.

In the TYSON LAB ...

In the spring semester, continuing undergraduates **Cassandra Martin**, **Jem Sibbick** and **Anton El Khoury** were joined by **Michael Bresnahan**, **Patrick Moquin**, **Ishtique (Rafi) Rafiyu**, and **Patrick Tonne**, who continued the work from our collaboration with Chemists Without Borders, CWB (www.chemistswithoutborders.org/), who want to develop a (much) cheaper version of the Hach test kit for the determination of arsenic in groundwater that can be deployed in a project in Bangladesh involving college students working with high-school students. **Cassandra** and **Jeb** continued to work on a method for the determination of the arsenic compounds in a single rice grain, **Michael** picked up the threads of the t-test calculations, and **Patrick** continued his work on establishing whether a volatile arsenic compound is lost on drying. The Hach test kit development was also studied by one of the groups in the arsenic project, in which 21 students (six groups) participated. **Prof. Hans Mentzen** (PhD '06) acted as mentor for the groups. **Dr. Richmond Ampiah-Bonney** (PhD '06) who is a professor at Amherst College, worked on the "arsenic in rice in the kitchen" project in the spring, and in summer brought an Amherst College student, **Wisdom Yevudza**, along to help. We also had input from students at Four Rivers Charter School in Greenfield, who worked under the guidance of their chemistry

teacher, **Andrew Patari**. CWB challenged us to develop a method for the arsenic compounds in rice, based on the arsenic-in-water test kit, that could be implemented by students at the Asian University for Women in Chittagong, Bangladesh, which was the obvious project for **Rafi**, who grew up there. This amazing coincidence was featured in a video and press release by the UMass News & Media Relations Office (www.umass.edu/newsoffice/article/measuring-arsenic-bangladesh%E2%80%99s-rice-crops). Prof. Tyson gave presentations at the Biennial National Atomic Spectrometry symposium in Liverpool in July, featuring (a) **Cassandra** and **Jem**'s work, (b) **Mike**'s work, and (c) an on-going critical evaluation of the analytical chemistry community's ability to measure arsenic compounds in rice. **Cassandra**, now a graduate student in Boston, presented the work at the ACS National Meeting in Philadelphia, at which Prof. Tyson gave an invited lecture on the work with CWB, in a special symposium that was featured in C&E News (cen.acs.org/articles/94/i36/CEN-profiles-Chemists-Without-Borders.html). He also presented **Mike**'s work and gave a talk about his general education course CHEM 101-How much arsenic do we eat?. Among many enjoyable events was lunch with **Peter Yehl** (PhD '97). He gave an invited talk about the collaboration with CWB at the SCIX Conference in Minneapolis in September. In the fall, continuing students **Rafi**, **Jem**, and **Patrick Moquin** were joined by **Nicholas Fragola**, **Alex White** and **Paul Sinno**, all of whom are working on aspects of the extraction and measurement of arsenic compounds in rice. A key reaction whose kinetics need to be controlled is the generation of arsine by reaction with tetrahydroborate: agar-based hydrogels are looking promising. **Paul** and **Alex** are pioneering alkaline extraction, and **Patrick** has evidence that a volatile arsenic compound is lost on drying. Prof. Tyson officially retired in May 2016, and is now an emeritus professor with a part-time administrative appointment in the Commonwealth Honors College. He plans to continue the arsenic-in-rice research and to teach CHEM 101 online. He wishes to thank all those who came to a retirement party in June, especially those that brought generous gifts of single malt whisky, and especially those who connived behind the scenes to make it happen, including **Chris Hanna** (PhD '93), **Stuart Chalk** (PhD '94), **Chris Palmer** (PhD '01), **Holly Davis**, and **Jennifer Tyson**. It was a particular pleasure to see **Roger Echols** (PhD

'94). He also wishes to thank everyone who joined an official departmental celebration in early October and contributed to another generous gift and a wonderful souvenir booklet of pictures and good wishes.

In the VACHET LAB ...

Research in the Vachet group continued in the areas of protein amyloid formation, detection of nanomaterials in cells and tissues, and biomarker detection by mass spectrometry. We published five papers on these topics in 2016, and Prof. Vachet and his group made almost 20 presentations at various conferences, meetings, and universities. We continued our successful collaboration with QuarryBio, who is licensing technology from our lab and using it to assess the structural integrity of protein therapeutics.

In other group news, we said good-bye to **Alyssa Marsico**, **Gokhan Elci**, and **Zhe Zhang**, who all successfully defended their dissertations in the fall. **Alyssa** is now an Assistant Professor in Forensic Science at the University of New Haven; **Gokhan** is back in Turkey seeking a faculty position; and **Zhe** took a position at Novartis in Cambridge, MA. Long-time undergraduate researchers **Katrina Kelly** and **Kate Daborowski** also graduated in May.



Current and former Vachet group members at lunch in San Antonio at the annual American Society for Mass Spectrometry meeting.

We welcomed one new graduate student into the group – **Laura Castellanos**. Laura did undergraduate and Master's research at the Universidad Industrial de Santander in Colombia, working with UMass Chemistry alums **Yajaira Combariza** (PhD '04) and **Cristian Blanco** (PhD '04). Laura will be developing new approaches to image the biodistributions of nanoparticles in biological samples.

In alumni news, **Nadnudda ‘Tan’ Rodthongkum** (PhD ’11) won a prestigious L’Oréal-UNESCO For Women in Science Fellowship, which will allow her to expand her research as a professor at Chulalongkorn University in Thailand. Several former group members transitioned into new jobs. **Bo Yan** (PhD ’14) started a new position as a Senior Scientist at AbbVie Bioresearch Center; **Vanessa Mendoza Gill** (PhD ’10) moved to Acceleron; **Jia Dong** (PhD ’14) began a new position at Bristol-Myers Squibb in California; and **Jon Wilson** (PhD ’05) left the world of mass spectrometry instrumentation for the world of medical equipment at Smith & Nephew. Finally, **Yuping Zhou** (PhD ’14) and her husband **Dong** welcomed their second daughter **Serena Yan** in September.


In the VENKATARAMAN LAB ...

The DV Group had a great year in terms of research and recognition. **Larry Renna** received the *Marvin D. Rausch Award* for excellence in presentation in the 2016 Researchfest. **Larry** also successfully defended his PhD dissertation in December 2016. **Connor Boyle** was awarded the *Outstanding Teaching Assistant Award* by the Department of Chemistry. **Donnie Rollings**, an undergraduate in the group, received a 2016 Celso Avelar Honors Research Grant. The DV group had a productive year in terms of publications. Our paper on the characterization of percolation in binary nanoparticle assemblies provided the necessary tools to probe connectivity in these assemblies (DOI:10.1021/acs.jpcb.5b11716). This comprehensive paper required us to learn graph theory, percolation theory, resistor networks and network theory. **Larry** developed many of the MatLab codes for analysis. In collaboration with the **Maroudas** group in chemical engineering, we were able to establish models for charge transport in nanoparticle assemblies. We also made several advances in the understanding of Perovskite-based solar cells. **Christie Cutting** and **Monojit Bag** also found that many organic photovoltaics and perovskite cells outperform silicon cells under indoor lighting (see figure and DOI: 10.1039/C6TC03344J). You can visit thedvgroup.com to keep updated on some of the exciting science.

We welcomed **Emily Smith** and **Hamza Javaid** as graduate students. We also welcomed **Donnie Rollings**, **Steven Capo**, **Gabrielle Berns** and **Haote Li** as undergraduate researchers. **Sashi Debnath** from Prof. **Zade’s** group in IISER Kolkotta was a visiting scientist in Fall 2016. He worked on making novel conjugated polymers based on naphthalenediimides.



Dr. Tim Gehan left after completing his Manning Postdoctoral Fellowship.

From the alumni side, **Nag Gavvalapalli** his independent career as an assistant professor at Georgetown University in Washington DC. **Dana Algaier** is now an R&D Ink Chemist at Hewlett Packard. **John Charest** is Forward-osmosis Membrane Scientist at Oasys Water, MA. He and I are still trying to figure out a time to meet! **Tom Hill** is a Senior Product Development Chemist and Technical Response Lab Team Leader at FLEXcon. We happened to be in the same meetings at least twice this year. I get annual Christmas cards from **Travis Benanti**, **Derek Van Allen** and **Jay Field**. Thank you! DV is proud of your achievements and likes to hear from all of you. So drop a line when you can to dv@umass.edu. For group updates and news, visit us on the web at thedvgroup.com and follow us on twitter @dvgroupumass or on Instagram at dvgroup_umass. 

Like us on Facebook at
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Join our LinkedIn group at
www.linkedin.com/groups/2288114

PHYSICAL SCIENCES BUILDING TAKING SHAPE!



DV and his group getting ready to tour their new lab!

Construction of the new Physical Sciences Building (PSB) is proceeding rapidly and the building is on track to open in Spring 2018. In addition to specialized, “high bay” space for physics, the 80,000 square foot building will house 22,000 square feet of

state-of-the-art synthetic chemistry labs on Levels 1 and 2 – enough space for 80 graduate students and postdocs. The labs will be home to 6-8 chemistry research groups, including the Andrews, Kittilstved, Thayumanavan and Venkataraman groups, as well as new faculty.



Exterior view of the new West Experiment Station and PSB.



Interior view of laboratory space.

Project manager Joe Balzano notes that this past spring, the focus was on completing the exterior envelope (walls, roof, windows) and on finishing up the rough-in phase with all the major mechanical, electrical, plumbing, and fire protection systems on the inside. That paved the way for painting and epoxy flooring the chemistry labs by late spring. Installation of the lab casework (benches, hoods, tables, etc.) began in June. Finish work will continue thru the summer and into the fall. As fall drifts towards winter the focus will be to complete the rest of the landscaping & hardscaping around the building on the outside and the inside focus will become the commissioning of all building systems.

inMEMORIAM

It is with sadness we share that Professor Emeritus Bernard “Bernie” Miller passed away Friday, February 10, 2017, at his home in Amherst. Bernie graduated from the Bronx High School of Science and City College of New York, and received his PhD in chemistry from Columbia University in 1955. After a decade as a researcher with American Cyanamid working on insecticides, Bernie joined the chemistry department at the University of Massachusetts in 1967. The reason: Bernie found insects to be ‘unexpectedly tough adversaries.’ During his 35 year career as a faculty member Bernie educated thousands of students and authored two textbooks, “Organic Chemistry, the Basis of Life,” and “Advanced Organic Chemistry” and many scholarly articles. As a researcher, Bernie was interested in the area of organic reaction mechanisms. His focus was on reactions involving sigmatropic rearrangements. He was particularly fascinated with reactions that involved unusual and exotic rearrangement pathways. His work on the rearrangements in cyclohexadienones (‘blocked aromatic molecules’ as termed by Bernie) brought out the underlying and fascinating rearrangement chemistry in these systems. He captured the complexity of this chemistry in his Accounts of Chemical Research article “Too Many Rearrangements of Cyclohexadienones.” His research papers also brought out Bernie’s New York sense of humor. For example, in the biography of his Accounts article, Bernie wrote “In addition to his research papers, he is the author of some 20 patents, none of which has ever increased his income.”

chemistryRETIREMENTS



A retirement celebration was held on Wednesday, October 5, 2016, at the University Club honoring two of chemistry's outstanding colleagues.

PROFESSOR JULIAN F. TYSON obtained his PhD in Prof. Tom West's group at the Imperial College of Science and Technology in London and his subsequent academic career had advanced to international acclaim. Tom West had earlier received a doctorate and was a faculty member at the University of Birmingham where Peter Uden subsequently also taught. We pursued this possibility and were assured that both his research and academic pedagogy would be an excellent complement to our program. After a 2-3 year process, efforts were successful and Julian joined UMass Amherst in the fall of 1989. He had considerable prior experience in academia, having been a faculty member, for 13 years, at Loughborough University of Technology (LUT) in the UK. Julian's start at UMass turned out to be prescient: he had just been awarded the Distinguished Service Award by the Analytical Division of the Royal Society of Chemistry.

Julian is highly regarded in the field of analytical chemistry. He delivered truly outstanding performance at UMass over his 27 years as an active faculty member and, despite retiring in 2016, he has continued to do so as Coordinator of Honors Program Directors in Commonwealth College at UMass. As a faculty member, Julian excelled on all fronts: research, teaching and service. What especially stands out is the well-roundedness of his talents and accomplishments.

Julian is well known for his long-standing interests in pedagogy and curricular developments at both the undergraduate and graduate levels. He was an NSF Discovery Corps Senior Fellow, an award that acknowledged not only his research standing, but also his unique accomplishments in the integration of research with

teaching and learning as well as his considerable outreach activities. He made a particular effort to enhance the impact of his undergraduate courses by including exercises and activities that involve group interactions and proper writing. He is highly knowledgeable about the status of research into the pedagogy of science teaching and consistently made an effort to incorporate these ideas into his teaching.

As an active, funded researcher, Julian has been strongly committed to the integration of research with teaching and learning, and has developed a highly successful and innovative program in which first-year students taking chemistry classes were involved in an authentic research experience. He had considerable classroom teaching experience, both at LUT and at UMass, where he has taught freshman chemistry, the junior-year writing course, three undergraduate analytical chemistry courses (CHEM 312, 315, 513) as well as CHEM 515 (theory of analytical processes). Julian Tyson has done more teaching overloads, by far, than any other faculty member in the department of chemistry.

In the classroom, Julian strove to introduce student-centered active-learning, most frequently involving scientific writing as well. He was a participant in the UMass Collaborative for Excellence in Teacher Preparation program (STEMTEC), as a result of which he even asked students to visit local K-12 classrooms and present chemistry-related lessons. He took the lead on a successful proposal to NSF's Instrumentation and Laboratory Improvement program, obtaining funding to support a major revision of the analytical chemistry teaching laboratories. His highly innovative and successful "arsenic project" program, that creates an authentic research experience for first-year students, has been running for over a decade, with hundreds of participants. Despite being officially retired, Julian's arsenic project continues to run, and does so very actively. As well, the project has provided professional development opportunities for graduate student and senior undergraduate mentors. This research has earned UMass favorable national and international exposure. Julian has also mentored well over 50 undergraduates in summer and semester-long research experiences.

Julian also made a substantial contribution to graduate teaching, both in the master's course at LUT and at UMass. In addition to teaching advanced chemistry content courses, he obtained external funding to create a Preparing Future Faculty program of seminars and workshops, and internal funding to create an Ethics for the Professional Chemist course, as well as funding for several graduate student mentoring activities.

Julian is well known around campus, as he has served on a large number of committees and task forces that have representation from a variety of departments and colleges. These include, for example, Graduate Council and a number of subcommittees and task forces, the Writing Committee and the associated task force on assessment, and the Academic Honesty Board. More recently, in his capacity as Associate Dean, he served on a number of committees including the General Education Task Force and the Commonwealth College Curriculum Committee. Of course, he made extensive service contributions within the Department and College, having been the graduate program director and chair of the recruitment committee for many years. He also served as Associate Head for graduate affairs, has been Acting Head, has served on the Department Personnel Committee, and was on the College Personnel Committee for four years (including one year as Chair).

Julian's record at UMass clearly demonstrates his leadership abilities and these are also recognized by a number of outside constituencies. He was the first US Editor of *The Analyst*, a highly ranked general analytical chemistry journal published by the Royal Society of Chemistry (a prestigious professional organization in which Julian holds Fellowship status) and he was, for many years, a member of the Governing Board of the Federation of Analytical Chemistry and Spectroscopy Societies and took several leadership roles in the organization of the annual conference, one of the world's premier analytical chemistry conferences. He turned down the offer of the editorship of *Spectrochimica Acta* part B (a major specialist journal) and more recently he turned down the offer of running for President of the Society for Applied Spectroscopy.

He also has considerable management and administrative experience, not just from his various leadership roles in Chemistry and the two Colleges in which he has been associate dean, but he has run large, externally funded programs. He was a co-PI of the highly successful NE Alliance for Graduate Education and the Professoriate, and was the PI of the 4-year NSF Graduate Student in K-12 Education program that involved 6 faculty, about 30 graduate students, and over 30 K-12 teachers, as well as the office staff in the STEM Education Institute and members of the staff of the Superintendent of the Springfield School District. He was the acting Director of the Arts and Sciences Advising Center until it dissolved, with oversight of both the Center staff and the academic deans from three colleges (NSM, SBS and HFA). And, of course, he managed a research group that over the years produced 52 PhD graduates and a number of master's graduates. All this while hosting international visitors, post-docs, and a very large number of undergraduate workers.

MARGARET SNAPE-KOLODZINSKI Technical Specialist I, retired September 1, 2016.


To many she was known as msk, to those who knew her well (faculty, staff, graduate students and student workers) she referred to herself as 'Large Marge' and it is only those who knew her that will smile broadly at that name.

Margaret was a UMass Alum, having garnered a BS in Zoology in 1980. In 1981 she joined the Food Science Department before to our good fortune she joined the Chemistry Department in April of 1987. In 2007 Margaret received the Chancellor's Citation Award.

There are many other significant dates that I am leaving out of this in order to attempt to personalize Margaret's retirement and the unsung role she fulfilled within the department. If I may quote from a letter I wrote on her Chancellors Citation Award Nomination: "Many times when writing a letter of recommendation one has to stop and think of the attributes associated with the person in question. For Margaret Snape-Kolodzinski the problem lies in what to leave out for she is truly one of UMass's gems."

The vast majority of the 29 years that Margaret spent in the Department she was the sole prep person for the General Chemistry Laboratory Program – a program that serves 2,000 students each semester. Of those 29, 21 were spent in the basement of Goessmann, whose labs were prone to floods and there is an urban legend that once Margaret was seen shoveling snow from the laboratory floor out the window prior to the start of an 8 AM lab. Despite the snow, the show went on as it always did under Margaret's tutelage. In my 21 years here only one obstacle – other than inclement weather – forced us to abandon a lab and that was a power outage.

As an alum Margaret took fierce pride in UMass, she was an avid ice-hockey fan and rarely if ever missed a home game, no matter the record of the team. When hosting events – such as the Regional or National High School Olympiad – she went out of her way to make sure that the labs were spic and span and that the catering was of the highest caliber for the 400 High School students from Western Massachusetts who attended this yearly event. No mean feat when 21 of those were hosted in Goessmann.

The Department truly wishes Margaret health and a long retirement. Thanks seem so inadequate for the service she provided. For her caring nature, wit – that kept us all sane – and above all the numerous times she went above and beyond in her duties, we thank her. 

staffNOTES

ISB LAB STAFF CHANGES

We have had a couple of changes to our ISB laboratory positions. **Aidan McKenna** joins us after the retirement of **Margaret Snape-Kolodzinski** (2016) in the general chemistry lab. **Amanda Bennett** (who wears multiple “hats:” prep lab, orgo, and GCLB) has been hired into the organic teaching lab support position replacing **Supamon (Mint) Singkankachen**.

IT STAFF CHANGES


We are pleased to announce that we have hired **Nicole (Nikki) Tebaldi** as the third member of our IT team, replacing Sam DeLaughter. She comes to us from the Departments of Journalism and Communications, by way of UMass-IT. Nikki brings a wealth of experience and enthusiasm. She completed her Master of Science in Library Technology in May 2017. A while ago but not previously announced in the Gazette, we hired **Gary Rehorka** to join the IT team. Gary previously worked over in Computer Science and has a tremendous experience base he brings to the position.

Together with John Maher, Gary & Nikki make up our highly regarded IT support team.

OFFICE STAFF CHANGES

In Lederle Towers, Assistant to the Head is now held by **Katherine (Katy) Martin**. **Susan Stinson** is our new Personnel Coordinator, replacing **Brigette McKenna** who is now the Undergraduate Program Manager. We also welcome **Nyudlia Araeva** as administrative assistant for both the Chemistry-Biology Interface (CBI) and UMass Biotech Training (BTP) programs.

FACULTY CHANGES

Julian Tyson retired May 2016, but continues to work with the Commonwealth Honors College. In September we welcomed four new faculty members to the department: **Trisha Andrew** creating solar textiles and other monolithically-integrated wearable technologies using vapor phase organic chemistry, **Jiahua Chen** using computational methods to study biomolecules and biomaterials, **Eric Strieter** studying ubiquitin which is critical for the development of new therapeutics and enzymes that lead to human disease, and **Mingxu You** interested creating synthetic DNA- and RNA-based tools for analytical and biomedical applications. 

Letter from the Head—continued from page 28

Looking to the near future, we are excited to report that the new Physical Sciences Building (PSB) is still on track to open during the Spring of 2018. This state-of-the art research space will be a major upgrade for faculty and students doing research in synthetic and materials chemistry. In the coming year, we also hope to use this brand new space to attract new materials chemistry faculty.

Finally, we are deeply grateful to all of you who have generously contributed to our Department. Your support goes a long way toward enhancing our teaching and research facilities and providing scholarships to our students. With your support, we continue to educate and train the next generation of chemists while pushing the boundaries of knowledge.

Sincerely,



Richard Vachet, Department Head

iCons IS EXPANDING

The Integrated Concentration in Science (iCons) program at UMass Amherst is proud to be graduating its fourth cohort of leaders this May. Students in the iCons program hail from 25 different STEM majors within four UMass colleges. They spent the year honing their disciplinary skills in their majors and applying these skills in interdisciplinary teams to solve problems in iCons. Problems such as: coral bleaching, access to clean drinking water, and systems designed to increase solar panel efficiency. Meanwhile, our seniors have been working on their independent research making progress in areas such as: creating nanowires to improve memory storage in everyday devices, looking at the connection between diet and breast cancer risk, and investigating the effects of climate change on aquatic insects. The work of iCons is expanding to broader fields, more people, and bigger ideas. We are happy to highlight a few examples of this expansion.

NEW LEADERSHIP IN ICONS

Steve Goodwin, dean of the College of Natural Sciences, appointed Justin Fermann director of the iCons program. Fermann, a senior lecturer in the chemistry department, was involved in the initial design and development of the iCons program in 2009-10 and has been teaching in the iCons 1 course, "Global Challenges, Scientific Solutions" since its inception in Spring 2011. Fermann was ready to take on the challenge of bringing iCons to the next level academically –as the program looks to open a third track and to redevelop the biomedicine lab course.

Fermann takes over for Scott Auerbach, who founded and launched the program. Auerbach, professor of chemistry and adjunct professor of chemical engineering, will remain involved with iCons as a senior advisor. Auerbach will continue to teach the iCons 2 energy communication course, and will also continue to facilitate various iCons-related outreach projects that broaden the impact of iCons.

"I am thrilled to take the reins of the iCons Program, with its potential to transform how we teach science, engineering and beyond," Fermann says.

"I am delighted that Dr. Fermann will be stepping in as director of iCons," says Goodwin. "He has been an important part of the iCons team since the program's inception. A recipient of the university's Distinguished Teaching Award and the CNS Outstanding Teacher Award, Justin's deep commitment to students and to innovative education is impressive and much appreciated on campus."

"I am thrilled to take the reins of the iCons Program, with its potential to transform how we teach science, engineering and beyond."



The Donovan project including iCons student interns, Stephanie Purington (their TA/supervisor/grad student), and Bill Donovan (donor and Chemistry alum).

Fermann holds bachelor's degrees in chemistry and in physics, both from Hartwick College, and a Ph.D. in theoretical chemistry from the University of Georgia.

ICONS SCHOLARS PUSHING THEIR WORK OUTSIDE THE CLASSROOM

Last summer, four iCons students created the first set of iCons Case Study materials for use in the high school science classroom. Interns Dominique Kiki Carey, Rebecca Howard, and Corrine Losch (all iCons class of 2019) joined iCons alumna, Erica Light (Class of 2016) to form a team charged with the mission of creating and executing high school curriculum that prepares students to be leaders in solving the world's challenges through problem solving and critical thinking.

To learn more about the iCons program, please visit www.cns.umass.edu/icons-program

In order to determine how best to engage the students on issues in their community, the iCons team began by researching Chicopee. Using the five steps of an iCons case study as their guide (Inception, Engagement, Research, Create, and Reflect) – the interns developed four case studies that they would later teach in four Chicopee high school classrooms, with a range of topics: Environmental Sustainability, Ocean Acidification, Oil Spills, and Antibiotic Resistance. In the true spirit of iCons – this team was integrated and student-driven. Each of the four students come from various majors (Biology, Biochemistry & Molecular Biology, Math, and Environmental Science).

The feedback from the high school students was encouraging --- hearing comments like, “This was the first time I got to do a presentation in science” and the case study experience “put the science in real-life” let the interns know that they were on to something. The students’ products were pushed outside the classroom (just as they are in iCons) – reaching places such as the United Nations, the Mayor of Chicopee, and the CDC.

After integrating the feedback from the high school students, the interns adjusted, packaged, and published their work for use by teachers around the world. They also presented their work at the annual MA STEM Summit 2016!

To see their work, please follow this link: <https://spark.adobe.com/page/MgkGm/>

LEARNING FROM THE GREAT INVENTORS OF OUR TIME

On November 8, while many were at the voting booth, Professor Dan Nocera from Harvard University led iCons students through his groundbreaking research solutions in the field of artificial photosynthesis.

The iCons Fall Workshop is an annual event that brings together the campus community and iCons current and prospective students around an issue of great societal importance. Students get a chance to ‘try on’ the iCons method – by working in teams to move the needle on a real-world problem. In this case, students worked on solutions to energy capture and storage.


Nocera’s lab developed an artificial leaf that uses a semiconductor combined with two different catalysts to capture sunlight and use that harvested energy to split water molecules (H_2O) into H_2 and oxygen (O_2). Students were wowed by Nocera’s indomitable spirit of persistence and creative solutions to resolve the global energy crisis. An iCons 1 team of students is working to create a microbial fuel cell inspired by Prof. Nocera’s talk.

MODELING A SUSTAINABLE ATTITUDE TOWARDS GIVING

One of our valued program supporters has generously funded the first iCons specific student award: The Crowley-Nowick Award for iCons Student Philanthropy and Leadership.

This alumni donated award is intended to recognize two rising iCons Seniors for outstanding leadership within their iCons class and promote a spirit of continued philanthropy, helping sustain the iCons program and guarantee that future students have the same - or better - opportunities as the current students. The recipients of the award will organize the senior class gift. To model a sustainable attitude towards giving, the Senior Class Gift will be matched by the donor and in turn awarded to a rising iCons sophomore in recognition of their outstanding achievement and promise for continued excellence in the program.

In the spirit of iCons, the donor asked that the criteria for selecting these outstanding members of the iCons class be determined and the recipients ultimately voted on by their peers.

We thank all Chemistry alumni for their support and interest in our program! We could not do it without your help. We look forward to another year of improving iCons and creating the next generation of leaders in science and technology. 



iCons Third Wave-Class of 2016

2016 SEMINAR SERIES

The 2016 UMass Amherst Department of Chemistry seminar series brought many outstanding scientists to our campus to share their insights and recent developments. Some of the highlights of the 2016 seminars included several distinguished speakers from various fields in chemistry.

We had the pleasure of hosting the inaugural *Graduate Student-Hosted Seminar in Chemistry*, with Professor Daniel Nocera of Harvard as its first lecturer. Prof. Nocera's work is focused on renewable energy and has been recognized by receiving the ACS Award in Inorganic Chemistry and being named to the National Academy of Sciences and the American Academy of Arts and Sciences, among others.

Each year UMass Amherst, Smith, Mt. Holyoke, Amherst and Hampshire Colleges co-host the *5-College Lecture Series in Chemistry*. For 2016, we welcomed Professor Veronica Vaida from the Department of Chemistry at the University of Colorado, Boulder as the *5-College Lecturer*. Prof. Vaida has won numerous prestigious awards including the ACS E. Bright Wilson Award in Spectroscopy, and is a member of the American Physical Society and American Association for the Advancement of Science.



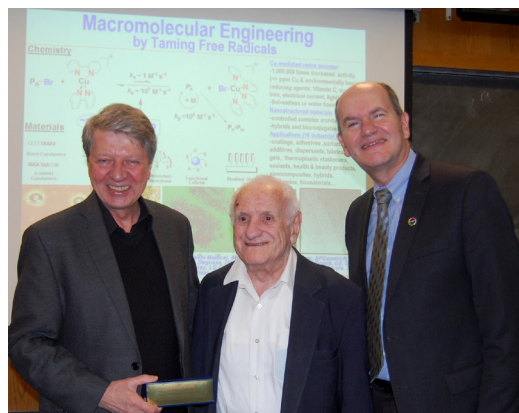
Professors Wolfgang Herrmann, Jane Rausch, and Kevin Kittilstved

Professor and President of the Technical University of Munich (TUM), Wolfgang Herrmann was the *Marvin D. Rausch Lecturer in Organometallic Chemistry* this year. Prof. Herrmann is a leader in inorganic chemistry, specifically in the formation of carbon-carbon bonds.

Professor Krzysztof Matyjaszewski from Carnegie Mellon University presented the *Stein-Covestro Honorary Seminar in Polymer Chemistry* on November 15. Prof. Matyjaszewski is an internationally recognized polymer chemist, whose work has yielded significant innovations in polymer chemistry. He is perhaps best known for the discovery of atom radical transfer polymerization (ATRP), a method of synthesis that changed the way


polymers are made. He has received numerous awards, including the Benjamin Franklin Medal in Chemistry, the International Dreyfus Prize in the Chemical Sciences, and the Wolf Prize in Chemistry.

The 2016 *William E. Mahoney Annual Lecture* was given by Professor Stuart Schreiber from Harvard University. Prof. Schreiber is a pioneer in the field of chemical biology, using small molecules as probes of biology and medicine. He has been instrumental in both the discovery of biological pathways and new drugs. Among others, he has received the ACS Award in Pure Chemistry, ACS Award in Synthetic Organic Chemistry, the Arthur C. Cope Award, and the Wolf Prize. In addition



Professors Richard Stein, Krzysztof Matyjaszewski, and Don Wardius (Covestro)

to the 'named' seminar speakers, the department had many luminaries within the field of chemistry participate in our seminar program in 2016, including Prof. Jeffrey Long (UC Berkeley), Prof. Theodore Betley (Harvard University), Prof. Anna Mapp (U. Michigan), Prof. Thomas O'Halloran (Northwestern University), Prof. Floyd Romesberg (Scripps Research Institute), and Prof. Matthew Bogoy (Stanford University).

We are grateful for the generous contributions of our alumni and corporate sponsors, who make the success of the seminar program possible. More information about the upcoming seminars and events can be found at www.chem.umass.edu/events/. We look forward to another exciting seminar series in the next year! 



Professors Michelle Farkas, Stuart Schreiber, and Craig Martin.

dissertation DEFENSE SEMINARS

GRADUATE STUDENT	SEMINAR TITLE	DATE	RESEARCH ADVISER
Khaja Muneeruddin	<i>“Novel Analytical Methods Combining Non-Denaturing Chromatography and Mass Spectrometry to Study Biopolymer Structure and Interactions”</i>	January 13, 2016	Igor A. Kaltashov
Adam Gann	<i>“Photolysis of Triazenylbenzoic Acids for Click Chemistry”</i>	January 14, 2016	James Chambers & Nathan Schnarr
Jing Huang	<i>“Mechanistic Studies of Peptide-Mediated Protein Transport Across Droplet-Interface Bilayers”</i>	January 22, 2016	Matthew Holden
Swamy Pittala	<i>“Magnetic Doping of Semiconductor Molecular Models and Colloidal Nanocrystals”</i>	March 2, 2016	Kevin Kittilstved
Hui Wang	<i>“Design, Synthesis, and Applications of Nano-assemblies Based on Amphiphilic Macromolecules”</i>	March 25, 2016	S. Thai Thayumanavan
Rui Tang	<i>“Cell Modulation Using Functionalized Nanoparticles”</i>	April 29, 2016	Vincent M. Rotello
Ying Jiang	<i>“Engineering the Nano-Bio Interface of Gold Nanoparticles for Biomedical Applications”</i>	May 6, 2016	Vincent M. Rotello
Sukru Gokhan Elci	<i>“Gold Nanoparticle Biodistributions and Stability In Vivo from Mass Spectrometric Imaging”</i>	September 22, 2016	Richard W. Vachet
Zhe Zhang	<i>“New Mass Spectrometric Methods for Studying Proteins in Solution and in the Gas Phase”</i>	September 26, 2016	Richard W. Vachet
Carolyn Elise Carr	<i>“Investigating the Relationship Between Structure and Function in Nickel Proteins and Enzymes”</i>	October 20, 2016	Michael J. Maroney
Keith A. Lehuta	<i>“Dopant-defect Engineering in Strontium Titanate-based Materials”</i>	November 7, 2016	Kevin Kittilstved
Scott J. Eron	<i>“Exploitation and Regulation of Apoptotic Caspases”</i>	November 17, 2016	Jeanne A. Hardy
Alyssa Marsico	<i>“Analysis of Gold Nanoparticles and Their Use with Laser Desorption/Ionization Mass Spectrometry”</i>	November 18, 2016	Richard W. Vachet
En-Hsin Lee	<i>“Mechanistic Studies of Proton Gradient-Driven Protein Translocation by Droplet-Interface Bilayer Techniques”</i>	December 2, 2016	Matthew A. Holden
Lawrence A. Renna	<i>“Characterization of Electronic and Ionic Transport in Soft and Hard Functional Materials”</i>	December 15, 2016	Dhandapani (DV) Venkataraman

undergraduate SENIOR & AWARDS DINNER



The 2016 Senior Class.

On April 27, 2016 we held our annual Undergraduate Honors and Awards banquet in the Amherst Room at the Campus Center to honor our students who have proven themselves to be among the very best this University has to offer. During the spring, the Undergraduate Honors and Awards Committee had the pleasure of examining the records of students who had chosen to be a part of our department in order to determine who would be recognized for their achievements. Last spring we recognized the hard work and dedication of 44 graduating seniors. In addition, many students were recognized for their work within the department: see the complete awards list. These awards are only possible because of the generous support the department receives from our alumni, industrial partners and professional organizations. With considerable pride and gratitude, the committee wishes to thank our outstanding students for their contributions to the department and university and wishes to thank those who, in turn, support our students.

The following students received awards:

Dominique Carey, Nicolas Gupta, Vishnu Prasad—CRC Freshman Chemistry Award

Abdul Basabrain, Stephanie Choi, Andrew Keezer—Robert Maxwell Williams Memorial Scholarships

Donnie Rollings—ACS Analytical Chemistry Award

Katrina Kelly, Anton El Khoury, Nicole Kirby,

Zachary Kirsch, Alexandra Sahagian—Edward Shapiro Scholarship

Thomas Barrasso—Jay A. Pirog Scholarship

Jeffrey Tsai, Peter Antonucci—American Chemical Society-Hach Fellowship

Alexandra Barbato—John A. Chandler Memorial Scholarship Award

Kanae Sasaki—George R. Richason, Jr. Memorial Scholarship Award

David Kouvchinov, Nathaneal Park—Oliver Zajicek Memorial Scholarship Award

Michael Mortelliti—ACS Inorganic Chemistry Award

Daniel Estabrook—ACS Organic Chemistry Award

Jonathan Dullea—Hypercube Scholar Award

Alexandra Barbato, Kanae Sasaki & Tristan Tay—Uche Anyanwu Memorial Award for Outstanding Research 2016

Samuel Michaud—Mr. Tompkins Award

Alexandra Barbato—Bates Research Fellowship

Ishtiaque Rafiyu—Bradspies Research Fellowship

Kathleen Dreher—Professor Jack Ragle Research Fellowship

Bailey Ingalls, Thomas Barrasso—Departmental Recognition Award

Lauren Okamoto, Cassandra Martin—Richard W. Fessenden Award

Samuel Michaud—Connecticut Valley Section of the American Chemical Society (CVS/ACS) Student Award

Juliana Tordella—American Institute of Chemists Award


Thomas Barrasso—Senior Class Award

Thomas Barrasso—Positron Award

Katrina Kelly, Soo Lim Park—American Chemical Society Membership Awards

Richard Vachet—Distinguished Undergraduate Instructor Award in Honor of Earl J. McWhorter and George R. Richason, Jr.

Connor Boyle—Distinguished Graduate Teaching Assistant Award in Honor of George R. Richason, Jr.

Puneet Singh—Distinguished Undergraduate Teaching Assistant Award in Honor of George R. Richason, Jr. 

BA/BS degrees AWARDED

Thomas Barrasso	05/2016	Jonathan Dullea	09/2016	Alexander Liquori	05/2016	Seo Yeon Orite	02/2016
Michael Bresnahan	05/2016	Daniel Estabrook	05/2016	Jacob Lytle	05/2016	Soo Lim Park	05/2016
Kevin Byrne	05/2016	Maura Gallagher	05/2016	Megi Marina	05/2016	Robert Pino	05/2016
Leah Caffrey	02/2016	Alyssa Gordon-Ross	02/2016	Cassandra Martin	05/2016	Nicholas Salalayko	05/2016
Matthew Caissy	05/2016	Nicholas Hoffman-Klaucke	05/2016	James McMillian	02/2016	Taylor Smith	05/2016
Paul Cheney	02/2016	Vanamrung Isaragumpot	05/2016	Samuel Michaud	05/2016	Colleen Szeto	05/2016
Allison Coutu	05/2016	Brian Jing	02/2016	Kyle Missaggia	05/2016	Connor Theg	02/2016
Roger Crocker	05/2016	Katrina Kelly	05/2016	Michael Mortelliti	05/2016	Patrick Tonne	05/2016
Kate Daborowski	05/2016	Peter Kelly	05/2016	Eric Newton	05/2016	Juliana Tordella	05/2016
Jeffrey Dewey	05/2016	Bridget Kilkenny	02/2016	Anna Novikova	05/2016	Ian Truebridge	05/2016
Michael Driscoll	05/2016	Charlotte Lawson	05/2016	Lauren Okamoto	05/2016	Artur Wysoczanski	05/2016

RESEARCHFEST 2016

The chemistry department welcomed the 2016-2017 academic year with the 26th annual research symposium, Researchfest. This event was held on August 30, 2016 and was a huge success thanks to the support of participants, organizers, and sponsors. The event featured four oral presentations by graduate students who were selected by a faculty committee through a nomination/evaluation process. **Mahalia Serrano** (Vachet group) was chosen to receive the **William E. McEwen Graduate Scholarship in Chemistry** for her work on “Selective Enrichment of Biomarkers Using Amphiphilic Polymers for Enhanced Mass Spectrometric Analysis.” **Derek MacPherson** (Hardy group) received the **Dr. Paul Hatheway Terry Graduate Scholarship Award** for Outstanding Presentation for his work on “Caspase-7 with Reprogrammed Specificity Allows Identification of Exosites for Substrate Recognition.” **Poornima Rangadurai** (Thayumanavan group) received the **Marvin D. Rausch Scholarship Award** for Outstanding Presentation for her work on “Non-equilibrium Behavior in Artificial Nanoassemblies - Mechanistic Investigations and Implications.” **Lawrence Renna** (Venkataraman group) received the **Marvin D. Rausch Scholarship Award** for Outstanding Presentation for “The Discovery of Ionic Transport in Hybrid Organic-Inorganic Perovskites and its Implications on Solar Cell and Non-Volatile Memory Applications.”

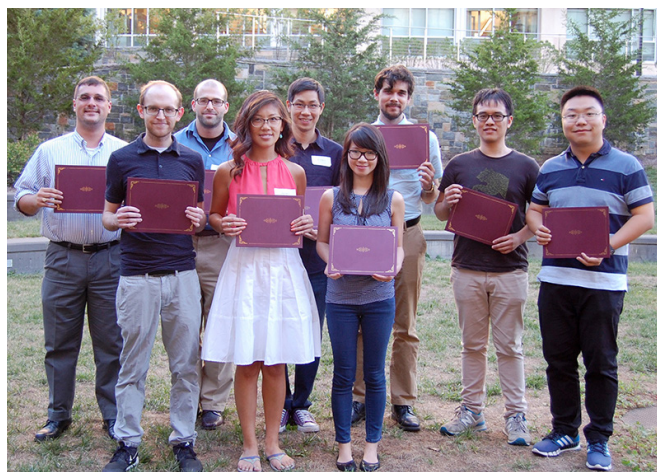


Mahalia Serrano, Derek MacPherson, Poornima Rangadurai, Lawrence Renna.

Well over 60 posters were presented this year. The **Dr. Paul Hatheway Terry Award for Outstanding Poster Presentation** went to **Ziwen Jiang** (Thai Group), “Smart Organic Two-Dimensional Materials Based on a Rational Combination of Non-covalent Interactions.”

The following eight students received **William E. McEwen Fellowship Awards** for Outstanding Posters:

- **Jordan Elliott** (Farkas Group), “Toward Macrophage-Based Reporters for Reeducation”
- **Joseph Hardie** (Rotello/Farkas Group), “Simultaneous



Joseph Tilitsky, Ryan Landis, Bach Pham, Joseph Hardie, Dongming Zhou, Ziwen Jiang, Jordan Elliott, Bib Yang, and Ngoc Le.

- cytosolic delivery of a chemotherapeutic and siRNA using nanoparticle-stabilized nanocapsules”
- **Ryan Landis** (Rotello Group), “Crosslinked Polymer-Stabilized Nanocomposites for the Treatment of Multidrug-Resistant Biofilms”
- **Ngoc Le** (Rotello Group), “Array-Based Cancer Sensing Using Host-Guest Doubled Arrays”
- **Bach Pham** (Chen Group), “Single Molecule Detection of Proteases Using OmpG Nanopore”
- **Joseph Tilitsky** (Gierasch Group), “How DnaK Binds a Client Protein”
- **Bib Yang** (Chen Group), “Selective Detection of Protein Homologues by Outer Membrane Protein G Nanopore”
- **Dongming Zhou** (Kittilstved Group), “Perturbation of semiconductor reduction potential by Aliovalent dopant”

A whole day with chemistry and scientific discussions was brought to an end with a delicious cookout served outside in the beautiful LSL amphitheater by the Association for Professional Development in Chemistry (APDC – formerly SDC), graduate students and staff members. The BBQ brought the students, faculty, staff, and their families together to socialize.

We gratefully acknowledge the financial support we received for this event from the UMass Amherst Department of Chemistry, **Marvin D. Rausch Scholarship Fund**, **Dr. Paul Hatheway Terry Scholarship**, **William E. McEwen Endowment Fund**, the Graduate Chemistry Association, Graduate Employee Organization, and alumni support. We also thank the following vendors who came to show us what their company had to offer: Thermo Scientific, Eppendorf, Beckman Coulter, Celltreat Scientific, Waters, Chemglass Life Sciences, Genesee Scientific, GE, TCI and Westnet Inc.

If you are interested in contributing to this event, please contact Vicki Hubby at vicki@chem.umass.edu 

New Faces—continued from page 1

us any garment you want, any fabric, any weave type, and turn it into a wearable electronic device. We've made fabrics that generate power every time you move, and underwear that can monitor your heart rate. We'd like to make clothes, curtains and tents that can convert sunlight into useable energy and also store this energy when not in active use.

GG: What do you do when you're not being a chemist?

TA: Recently, I've been gardening.

PROFESSOR JIANHAN CHEN (JC) an IALS hire with a joint appointment in Biochemistry & Molecular Biology (BMB) working in the development of advanced computational methods and their applications to the study of biomolecules and biomaterials. (BS University of Science and Technology of China, PhD University of California at Irvine)



GG: Where did you grow up?

JC: Putian, Fujian China (in southeastern China)

GG: When did you realize you love

chemistry?

JC: Around middle school, but I really loved physical chemistry (or chemical physics) more than anything else.

GG: Does the love of chemistry run in your family?

JC: Likely not. My father taught high school Chinese and my mother never went to school.

GG: What convinced you to go to the grad school you attended? JC: California sunshine.

GG: What did you study for your PhD?

JC: Chemical and Material Physics

GG: What was your proudest moment ever (chemistry related or otherwise)?

JC: Hard to choose a single one. I remember several moments where we made some conceptual breakthroughs in our computational method development after long struggles. They were very fulfilling.

GG: Who do you admire and why?

JC: Leonardo da Vinci. His ingenuity and diverse talents are otherworldly and ultra-inspiring.

GG: Who in chemistry and related fields do you admire and why?

JC: Ludwig Boltzmann. He is the grandfather of statistical mechanics, which provides the theoretical foundation of modern molecular modeling and simulation.

GG: What is the most useful tool in your lab?

JC: Computers.

GG: Do you use any novel techniques or tools, or work with any unique materials for your research?

JC: GPU computing. It is a game changer and allows us to simulate 10-100 times faster at a fraction of the cost of traditional CPU-centric high-performance computing.

GG: Do you work in any collaborations?

JC: Yes. Close collaboration with experimental labs is particularly important for us.

GG: How does industry impact your science?

JC: Not in a direct way, but needs in biotech and pharmaceutical industry have provided motivation for us to study problems of practical significance.

GG: Assuming your research is wildly successful, how will it impact society?

JC: We would have superior ability to describe the structure and energetics of biomolecules and their interactions, which would in turn allow us to rationally modulate their functions for therapeutics and biotech applications.

GG: What are the biggest barriers towards your research being wildly successful?

JC: The inherent complexity of biological systems.

GG: Have there been any major advances in chemistry or the technologies used in research since you were a grad student?

JC: There have been many important advances in computational chemistry since when I was a graduate student (1998-2002), including ever improving computer hardware, more sophisticated simulation algorithms and better mathematical models of biological systems.

GG: Do you ever find yourself telling your students, "Well, when I was in school, we didn't even have..."?

JC: Sometimes. I think it is useful to have some perspective.

GG: Bio focuses seem to be all the rage among the young chemists; is this a trend among chemists, in general? What could this be attributed to?

JC: Indeed, there are so many important problems in biology where young chemists can really leverage their skills to make critical contributions.

GG: Which is more stressful, grant proposals, research or teaching?

JC: Definitely grant proposals (or the extraordinary difficulty of having a proposal funded).

GG: What do you do when you're not being a chemist?

JC: Family, hiking, and reading.

PROFESSOR ERIC STRIETER (ES) overarching goal of research is to understand, on a molecular level, how the small protein ubiquitin controls the dynamics of biochemical pathways to maintain normal cellular function. (BS University of Wisconsin-Madison, PhD Massachusetts Institute of Technology)

GG: Where did you grow up? ES: Ann Arbor, MI

New Faces—continued from page 1



GG: When did you realize you love chemistry?
ES: During my high school chemistry class.

GG: Does the love of chemistry run in your family?

ES: I wouldn't say chemistry runs in my family, but science does.

GG: What was your worst job ever?

ES: I've only worked outside a lab once and it was a smoothie bar, so I haven't had a bad job.

GG: What convinced you to go to the grad school you attended?

ES: I chose to attend MIT for grad school because it is an intellectually stimulating place filled with hard-working people.

GG: What did you study for your PhD?

ES: I studied the mechanisms of palladium- and copper-catalyzed carbon-heteroatom bond forming reactions.

GG: What was your proudest moment ever (chemistry related or otherwise)?

ES: It was a Saturday morning when one of my first students, Ellen Valkevich, came running into my office to show me that her reaction was successful.

GG: What is the most useful tool in your lab?

ES: Our fast protein liquid chromatograph (FPLC).

GG: Do you use any novel techniques or tools, or work with any unique materials for your research?

ES: Yes, we develop both chemical and analytical methods for interrogating the functions of enzymes.

GG: Do you work in any collaborations? ES: Yes.

GG: Bio focuses seem to be all the rage among the young chemists; is this a trend among chemists, in general? What could this be attributed to?

ES: Biology has the most pressing questions that need to be addressed.

PROFESSOR MINGXU YOU (MY) interested in creating synthetic DNA- and RNA-based tools for analytical and biomedical applications (BS Peking University, PhD University of Florida)

GG: Where did you grow up?

MY: I grew up in Heihe, Heilongjiang, right next to Russia, one of the coldest place in China.

GG: Does the love of chemistry run in your family?

MY: My father was a high school chemistry teacher, while I don't know if he loves chemistry.



GG: What convinced you to go to the grad school you attended?

MY: Probably the mentor, Prof. Weihong Tan. I read a lot of his research when I was in college.

GG: What did you study for your PhD?

MY: The title of my thesis is "Engineering multifunctional DNA nanomachines for analytical and biomedical applications." Basically, it is about how to engineer and apply nucleic acids.

GG: Who do you admire and why?

MY: No particular one. I feel that everyone may have something I admire and want to learn from.

GG: What is the most useful tool in your lab?

MY: Our brain and imagination is the most useful tool in my lab.

GG: Do you use any novel techniques or tools, or work with any unique materials for your research?

MY: We have some unique tools for cell membrane lipid-lipid interaction studies, and novel tools for intracellular small molecular imaging.

GG: Do you work in any collaborations?

MY: Yes, we are having some collaborations with mechanical engineering people at UMass, microbiologists at Harvard Med, chemists at UMass and Georgia Tech, and X-Chem biotech company.

GG: How does industry impact your science?

MY: We are actively looking for collaborations with industry people to apply our tools and technology. I also hope the scientific training of graduate/undergrad/postdoc in my lab will benefit their future career in industry.

GG: Assuming your research is wildly successful, how will it impact society?

MY: We will "then" understand how life functions, and be able to prevent and treat different diseases, at least partially.


GG: Have there been any major advances in chemistry or the technologies used in research since you were a grad student?

MY: I will say CRISPR, optogenetics and advanced high-throughput sequencing.

GG: Which is more stressful, grant proposals, research or teaching?

MY: At this stage, probably the grant proposals

GG: What do you do when you're not being a chemist?

MY: Play with my daughter or enjoy dinner time with family. 



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College of Natural Sciences
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122 Lederle Graduate Research Tower
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DEAR ALUMNI AND FRIENDS OF THE DEPARTMENT OF CHEMISTRY,

This note is the first time that I am able to greet you as the new Department Head in Chemistry. After seven years leading our department, Craig Martin has stepped down as Head. Craig's excellent service helped our department become stronger in the midst of some challenging, yet rewarding times. While I was always very proud to be a faculty member in the Chemistry Department at UMass, my short time as Head has already made me keenly aware of the breadth of our excellence. We have excellent staff, excellent faculty, and excellent students. Want some examples? There's Bailey Ingalls, a senior Chemistry major who was named one of the 21st Century Leaders, an award that is given to 10 of the most talented and accomplished graduating seniors. Or, Bib Yang in Min Chen's laboratory, who was one of 10 graduate students nationally to win an Eli Lilly Travel Award to the ACS National Meeting. Or, perhaps Vince Rotello, winner of the Royal Society of Chemistry's 2016 Bioorganic Chemistry Award. I should also mention the 2017 University Distinguished Teaching Awards (DTA) won by Scott Auerbach and Nathan Schnarr, giving UMass Chemistry the most DTA winners of any department on campus. I could go on and on. . .

I think Craig would agree that one of the most important successes during his time as Head was the hiring of some outstanding new faculty. This year's Gazette introduces you to four new faculty who just finished their first year in our Department. Jianhan Chen, Eric Strieter, and Trisha Andrew came to us, having already established outstanding research programs. We were incredibly fortunate to lure them to UMass. Their presence further strengthens our research profile, one of the strongest in the College of Natural Sciences. Jianhan's creative work in computational biochemistry, Eric's innovative research in ubiquitin-related protein degradation, and Trisha's transformative work in renewable energy, particularly energy harvesting fabrics, dramatically expand the already outstanding research in our department. Add Mingxu You's work on RNA nanotechnology into the mix, and it is easy to see that UMass Chemistry has a bright future.

Sadly, we also say good-bye to Prof. Julian Tyson and Margaret Snape-Kolodzinski. After 27 years at UMass as an internationally recognized leader in the area of elemental analysis, an outstanding mentor to graduate students, and a highly effective educator, Julian has formally retired. I say 'formally' because he is still on campus, actively involved in the Commonwealth Honors College and directing undergraduates in arsenic speciation research. Margaret's departure was a blow to the General Chemistry program as she was a key person who kept our outstanding and ever-growing Gen Chem lab enterprise running smoothly.

Telephone: 413-545-2318

Fax: 413-545-0011

Email: depthead@chem.umass.edu

