FALL 2013

ELEMENTS

The Alumni Magazine of the Department of Chemistry at Virginia Tech

In this issue

Contact Information

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Tell us your story

Do you have an interesting story that might be featured in Elements? Do you know someone who should be featured? Or, would you simply like to say hello?

Contact the Department Chair, Prof. Jim Tanko (jtanko@vt.edu)

The Chair's Corner

J. M. Tanko

Welcome to the Fall 2013 edition of Elements! The renovation of Davidson Hall remains on schedule, and Phase I (*i.e.*, the new building that replaces the dilapidated middle and back sections) opens in January. There will be a lot of moving going on in Spring 2014 as we reoccupy Davidson Hall, re-organize labs in Hahn Hall South, move various administrative offices, and abandon our temporary space in the Corporate Research Center. Davidson 281—a modern lecture hall that will accommodate nearly 350 students—has replaced Davidson 3, the lecture room that so many of our alumni remember fondly. Classes will be taught in the new lecture hall this coming spring. With some luck, work on Phase II (renovation of the historic front section) may begin as early as July 2014. If your travels take you to Blacksburg, I invite you to visit the Department and have a look at our wonderful new facilities.

In the Spring issue of Elements, I mentioned that the Department of Chemistry Advisory Council (DCAC) is organizing a Davidson rededication ceremony to be held when Phase II is completed (hopefully as early as Spring 2016). We want this celebration to be an alumni reunion with a blend of good science, good company, and a lot of fun and shared memories. To help with the planning, we are conducting a survey of alumni to assess interest, determine the best time of year to schedule the event, and get some ideas for possible activities. If you are interested in participating, please go to:

http://goo.gl/XbXrdx

While on the topic of DCAC, the Fall 2013 meeting held earlier this month was well attended and successful. In addition to contributing to the rededication ceremony, DCAC will become more involved with student career counseling, and will also assist the Department in developing an Industrial Affiliates Program.

Chemistry faculty continue to be innovative, developing new ways to promote student success in our courses in general, but particularly in general chemistry where there have been a lot of changes. Common-time/common-content examinations have been introduced to ensure a level playing field for the

The Chair's Corner...

3000 students who take this class. Additionally, we know that many students do poorly in this class because of inadequate math skills. To address this deficiency, the Department developed a math readiness exam that appears to be an outstanding predictor of student success. To assist students who do poorly, a new course was developed and offered for the first time in Summer 2013. It is our hope that this class will dramatically improve student success in CHEM 1035.

The University Strategic Plan, "*A Plan for a New Horizon*," places a significant emphasis on the importance of undergraduate research, stating "Research—broadly conceived to include discovery-based and creative activities—can be a hallmark experience for every Virginia Tech student. As an experiential learning activity that synthesizes knowledge and skills acquired in the classroom, research provides a unique opportunity for students to contribute to knowledge creation." This past year, over 90 students were involved in undergraduate research for course credit (CHEM 4994, 4994H), and others participated over the summer either as wage employees or as participants in the long running Summer Undergraduate Research Program (SURP). Through these venues, students have diverse opportunities to communicate their results in writing and orally at regular research group meetings, departmental symposia, as well as at professional meetings. The Department has been doing this for a long time: Undergraduate research is part of our fabric, our DNA—and was the basis for us receiving the University's Exemplary Department Award in 2009. When it comes to undergraduate research, the Chemistry Department is leading the way to the new horizon.

At the graduate level, the most significant development this past year was the elimination of the classical "major," *i.e.*, analytical, inorganic, organic, physical, or polymer chemistry. Students and their advisory committees now have the latitude to design a program of study that best addresses the needs and interests of students. While students can still specialize in any of these areas, this curriculum change obliterates traditional boundaries and fosters the development of students whose research and interests are at the interdisciplinary frontiers of chemistry.

The Chemistry Department has an outstanding international reputation for research, as is clearly shown by the number and quality of the papers produced by our faculty. Overall research productivity remains strong and on an upward trajectory. And, faculty members in chemistry have been doing interdisciplinary research well before it became fashionable. Several notable collaborations have been established with investigators at other universities on STEM and STEM-H topics such as malaria prevention, drug discovery, and fuel cells. Again, Chemistry is forging the path to the new horizon!

In this issue of Elements, we profile two of our students: Eugene Camerino (who is a graduate student earning his Ph.D. under the direction of Paul Carlier), and Olivia Renaldo (an undergraduate who is the recipient of the Ogliaruso Family Scholarship). I am certain you will find their stories captivating. Also, there is an article about one of our assistant professors, Amanda Morris. Amanda is quoted in this article as saying something about the Chemistry Department that I believe many of our faculty, staff, and students would endorse: joining our department is like "joining a family." In that sense, one of our longstanding and strongest traditions continues. (And I am especially pleased to announce that Amanda was just awarded her first major grant from the Department of Energy.)

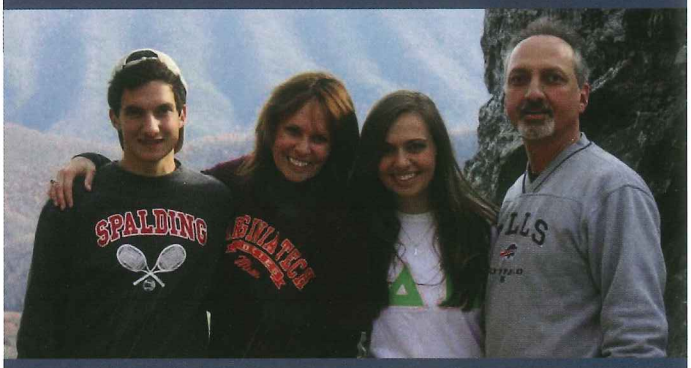
This issue also features a story about one of our many successful alums, Lenore Rasmussen, who earned her Ph.D. with Jim McGrath. Lenore has developed synthetic muscle for medical and other applications.

Finally, we lost two of our emeritus professors this year: Paul Field (whose passing was briefly mentioned in the Spring edition of Elements), and Jack Graybeal who passed away in September. Both of these men were superb physical chemists; Jack served as Associate Department Chair for many years (including 1986 when I was hired). In this edition of Elements, we remember them fondly with profiles written by Harold Bell and Jimmy Viers.

Babs and Mike Ogliaruso, with Ogliaruso Family Scholarship recipient Olivia Renaldo (center). Olivia is profiled in this edition of Elements.

"Getting to know the first recipient of our family scholarship, Olivia Renaldo (and her family!), has been a wonderful experience. In addition to her obvious academic abilities, Olivia possesses an infectious personality that makes her a joy to be around. We could not be more pleased with the Chemistry Department's selection of the newest member to our family, our first scholarship recipient, Olivia Renaldo."

Mike and Babs Ogliaruso



Antonio (Tony), Karen, Olivia, and Charles Renaldo

Hanging out with Olivia Renaldo

Undergraduate Student Profile

Laurie Good

When Chemistry major Olivia M. Renaldo heard that she would be receiving the inaugural four-year Ogliaruso Family Scholarship, she probably had no idea how aptly the award was named. Former chem professor Michael Ogliaruso and his wife "Babs," who established the scholarship for students of Italian descent, have practically adopted this multi-talented engaging student—and with good reason. Now in her junior year, Olivia is an outstanding representative for both the award and the department.

The daughter of an electrical engineer (her mother) and a middle school vice principal (her father), Olivia calls Annapolis, MD, home. However, she has little time to head north to visit her parents or younger brother, who she is not-so-subtly trying to recruit to VT as a 2014 freshman. When not in class, Olivia has plenty of other balls to keep in the air. For starters, she works part time at Kroger as a pharmacy technician—partly to help with expenses but also in preparation for entry into pharmacy school once she graduates in 2015. Behind that smiling, approachable exterior is one determined young woman. Olivia decided on pharmacy as a profession even before she entered Tech as a chemistry major. Since that time she's been actively pursuing opportunities to strengthen her resume before applying for her PharmD degree—ideally at UNC or Maryland. Last summer, for example, Olivia took part in the LEAD program at UNC's Eshelman School of Pharmacy where she engaged in a mentoring partnership with a current pharmacy student. Last semester, she joined the VT chapter of Alpha Chi Sigma, the national co-ed professional chemistry fraternity. Not surprisingly, she's hoping to take on a leadership role within the organization next year—as she has with her sorority, Alpha Delta Pi, for which she serves as New Member Coordinator.

Although she admitted to some nervousness beforehand, Olivia now considers herself fortunate to also be working with Prof. Richard Gandour and his group doing undergraduate research. According to Gandour, "Olivia brings enthusiasm, punctiliousness, and commitment to her research team who is separating homopolymers of low-molar-mass poly(ethylene glycol) lipids. These polymers will be used as spacers in bionanoconstructs for drug delivery. Her research work reflects the same dedication and training that led to her completing her first half marathon this fall."

Olivia's talent for multi-tasking was instilled early on. She has loved all kinds of sports for as long as she can remember and could easily have put all of her free time into her childhood favorites, soccer and downhill skiing. However, her parents laid down the law from the get-go: No instrument…no sports. Thus, Olivia is a classically trained pianist and accomplished guitarist. She has recently discovered yet another activity to fit into her busy day—running. Demonstrating her usual commitment to any pursuit, Olivia has already participated in the Hokie Half Marathon in September and intends to complete a full marathon in 2014. Go Hokie!

Excellence and Humility: Eugene Camerino

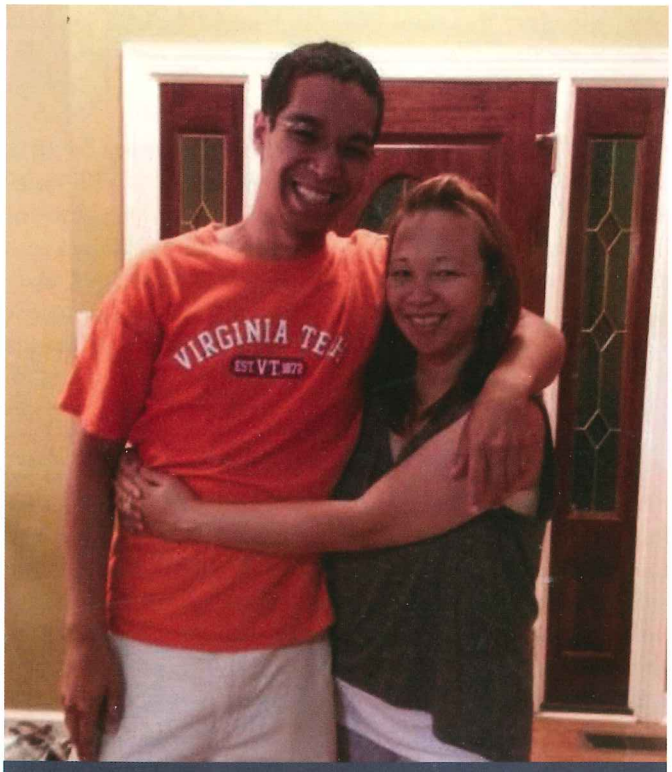
Graduate Student Profile

Laurie Good

Fourth-year graduate student, Eugene Camerino, was surprised to hear that he'd been suggested for an Elements story—he didn't think he'd done anything to merit particular recognition. However, after talking with Eugene, his Ph.D. advisor Paul Carlier, and Department Chair Jim Tanko, it's clear he has underestimated himself.

Born in Norfolk, VA, Eugene is of Filipino heritage—his grandparents and mother moved to the U.S. from the Philippines in the early 80s. His grandparents played a huge role in his early life, teaching him values that he considers to be among the most important lessons he's learned. Most of his K-12 schooling occurred in the Norfolk/Virginia Beach area until the family moved to Florida where he graduated from high school a year early. Eugene entered Tech as a member of the Corps of Cadets, but decided that a military career wasn't in his future so he left Blacksburg after a year. (Interestingly, years later when Eugene applied to graduate school at Tech, Prof. Carlier recalled the name and remembered him as an organic chemistry student!). Because his parents had relocated to Charlotte, Eugene then enrolled a little closer to home at NC State, where he did undergraduate research, mostly on the synthesis of dendrimers with Prof. Christopher Gorman. Although the research was interesting, it was the whole instructional process that really fascinated him. "I just liked what the professor was doing...how he taught the class and interacted with students." Returning to Tech as a Ph.D. candidate, Eugene joined the Carlier group the summer prior to his first year.

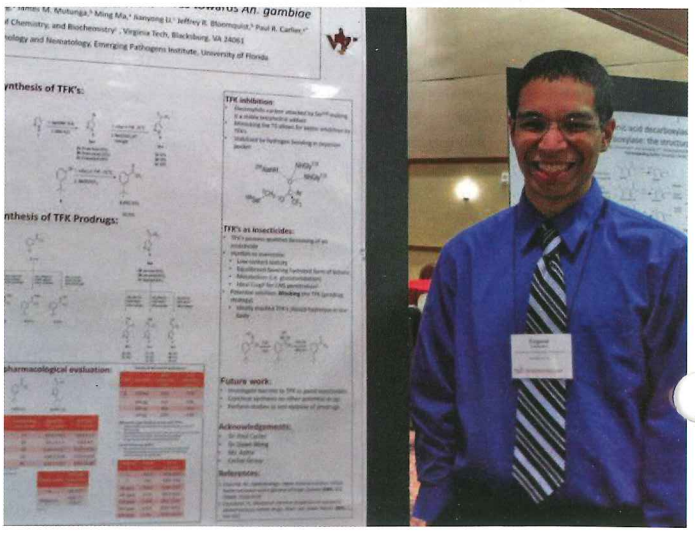
Eugene Camerino's current work in the Carlier Group concerns the development of new human-safe insecticides for limiting malaria transmission. In this work, Eugene has explored use of the trifluoromethylketone (TFK) pharmacophore to inhibit a critical enzyme in the mosquito, acetylcholinesterase (AChE). As Eugene began to explore these compounds, a paradox emerged. Although they proved very effective in inhibiting the enzyme in vivo at a level that should have been toxic for the mosquito, somehow the mosquitoes remained unaffected. Thinking that the physical properties or chemical structure of the molecules somehow prevented effective transport through the mosquito exoskeleton to the central nervous system, Eugene began structural modifications of these compounds intended to improve penetration. This strategy proved very successful, producing a series of compounds that are toxic to both normal ("wild-type") Anopheles gambiae, as well as a strain that carries several different resistance mutations. He is currently drafting a patent application this work.



Eugene and his mom, Carmina Mateo

"In addition to being a talented and hard-working graduate student, Eugene is one of the nicest people you'll ever meet. I've truly enjoyed interacting with him, and getting to know him better."

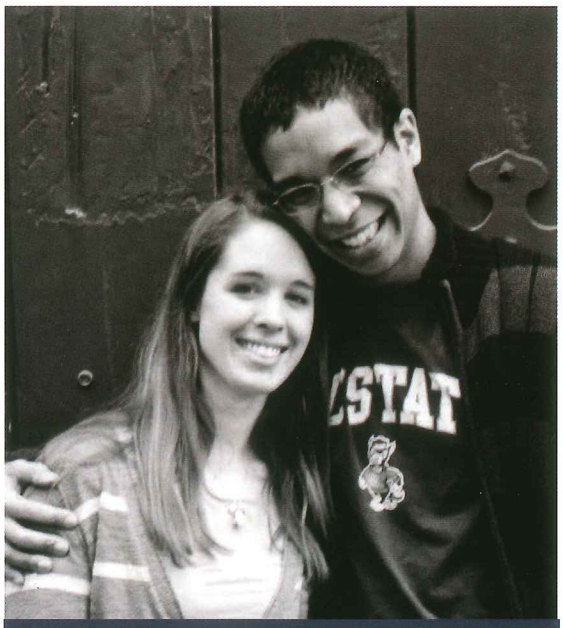
Jim Tanko, Chemistry Department Chair



Eugene Camerino...

When asked if he wanted to stay in research at a major research university, Eugene hesitated. Even though he loves the discovery aspect of laboratory investigations, he is truly energized by teaching organic chemistry. Thus, he sees himself at a smaller teaching institution—and he's getting plenty of teaching experience through the tutoring he does with undergrad organic students.

As for off-campus pursuits, Eugene enjoys golf and tennis; he's an avid griller; and he has formed a pretty serious relationship with fellow graduate student, Emily Morris, from the Webster Santos group. What is particularly striking about Eugene are his warmth, his enthusiasm, his candor, and his dedication to the department. As an example of the latter, Eugene recently organized a hike for chemistry department members. He also spearheads the occasional softball game during which the grad students do their best to punish their advisors...if only on the playing field.



Emily Morris and Eugene Camerino

In Memory: Jack Graybeal

A good friend who will be missed

Harold Bell

Emeritus Professor Jack Graybeal, age 83, died September 7, 2013, after a long battle with cancer. Jack came to Virginia Tech in 1968, and I still remember meeting him for the first time in the front of Davidson Hall. Alan Clifford was giving him a tour; Jack was 38 at the time, but his youthful appearance confused me. I thought Alan was hosting a prospective graduate student! Those of us who knew Jack remember him not only as a teacher and researcher, but also as the person who kept track of departmental finances during austere times and who watched over the design and construction of Hahn Hall. It is not well known that Jack was a vigorous supporter of Phi Lambda Upsilon. He was National President from 1996-2002. He also held the offices of Secretary, Historian, and Editor of The Register. He almost single-handedly saved PLU from going belly up in 1999. He was a native West Virginian, and he loved those "country roads." He had a good collection of West Virginia glass. He also collected minerals during his extensive travels--on one occasion he hiked from the north rim of the Grand Canyon to the south rim--and he was an accomplished woodworker and an avid stamp collector until chemotherapy ruined his eyesight. He was a good friend and I miss him.

Synthetic Muscle Scientist Partners with Federal Laboratories for Military and Medical Applications

Alumni Profile: Lenore Rasmussen

Now a skilled synthetic polymer chemist, Lenore was a laboratory technician at Virginia Tech when she had an "Edison moment." As she was shooting electrical current through a slab of polymer gel for protein analysis, the blob seemed to come alive. Hit with 50 volts, the gel convulsed, shrinking. When the current stopped, the gel returned to normal. "That was weird," she remembers thinking. Still an undergraduate at Virginia Tech, she couldn't fully investigate what had happened, other than knowing she had mixed the gel incorrectly. If a gel could contract and recover, she wondered, why couldn't it be used as a muscle?

Coming up with robust and responsive electroactive materials has been on her mind ever since a cousin had a devastating farm-machinery accident that nearly cost him a leg. Rasmussen's quest to harness that early gel's peculiar traits is now her fulltime pursuit. As the CTO, acting CEO, and founder for Ras Labs, LLC, working with scientists and engineers at the US Department of Energy's Princeton Plasma Physics Laboratory (PPPL) at Princeton University and at the US Army Armament Research, Development, and Engineering Center (ARDEC), Dr. Rasmussen is making synthetic muscle – electroactive polymer (EAP)-based materials and actuators – that controllably contract and with reversed electric polarity, expand. Contraction-expansion can be cycled repeatedly. The core business is making Ras Labs Synthetic Muscle, which is readily scalable. Fourth generation EAP materials are even more electroactive. The Ras Labs mission is to use synthetic muscle to create robotics and prosthetics, particularly for the hand and arm, which work, feel, and appear human.

Ras Labs was selected from 1,200 companies around the world as a 2013 MassChallenge Global Finalist.

With a BS/BS in Chemistry/Biochemistry, and both her Master's degree and Ph.D. in Chemistry Lenore Rasmussen is embodying the VT mantra, "Inventing the Future."

MassChallenge is the world's largest start-up accelerator and the first to support high tech, high impact, early-stage entrepreneurs from any industry and from anywhere in the world, awarding over $ 1 million in cash prizes to winning start-ups. Additional benefits include free office space in Boston's Innovation District, world-class business and legal mentoring, and networking in Boston's strong entrepreneurial community.

In October, Ras Labs received a MassChallenge Center for the Advancement of Science in Space (CASIS) Award. The funded CASIS project will place selected samples of Ras Labs Synthetic Muscle on the International Space Station (ISS) for 30 days in 2014! Ras Labs contractile EAPs have already been tested for extreme temperatures at Princeton University, even down to 2 K (-271oC), with no adverse effects. The value of the CASIS-ISS-Ras Lab Project will be advanced materials, actuators, and robotics capable of life-like performance that can operate in extremely challenging environments in space and on earth.

A cooperative research and development agreement was initiated between Ras Labs and PPPL in 2007. The Department of Energy is encouraging its labs to develop such partnerships to help innovative scientists. A similar agreement was initiated in 2012 with ARDEC, which provides partial funding and state-of-the-art testing facilities and expertise for their specialized project.

Left: Dr. Rasmussen testing EAPs with an engineering co-op student

Center: Carbon fiber infused synthetic muscle

Right: Dr. Rasmussen analyzing synthetic muscle

Lenore Rasmussen...

Electroactivity is a rapidly evolving, high growth field and Ras Labs is driving this evolution. Dr. Rasmussen has emerged as a leading expert in electroactive materials, including as editor of "Electroactivity in Polymeric Materials," with a global compilation of authors, published by Springer-Verlag GmbH & Co. KG, © 2012. Robust contractile EAP based actuation is breakthrough science, promising to transform the treatment of debilitating injury and disease.

Since her cousin's farm injury, another close relative has returned to her hometown in West Virginia as a disabled American veteran. "For many young people in disadvantaged areas across America, the military is one way to get out into the world," Rasmussen noted. For the first time in American history, 90% of wounded soldiers survive their injuries, but at great cost. The percentage of amputees returning home from Iraq and Afghanistan is the highest since the Civil War. "They're our unsung heroes," Rasmussen added, "And most folks don't realize this, but agriculture is right behind the military and police work in terms of life-altering injuries. Farm work is hard work, it's gratifying work, and it's dangerous work." A prosthesis that works, looks, and feels human would be an absolute game-changer for amputees.

Ras Labs is seeking funding, partnering, and collaborating opportunities to fast-track these shape-morphing EAP based materials, valves, and actuators for real world applications. "I'm obsessed with synthetic muscle," Rasmussen added, "Electroactivity is making science fiction a reality. We are inventing the future. And we – all of us – we can change the world for people who have lost limbs." If she is successful, many people will benefit.

Drs. Henrik and Lenore Rasmussen, NASA astronaut Col. Mike Finke, and future Hokie Carl Rasmussen. The Rasmussens' older two sons are currently attending Virginia Tech.

In Memory: Paul Field

Gruff exterior but a heart of gold

Jimmy Viers

Paul Field worked hard to project a gruff exterior, but deep down it was always obvious that he was just a softie with a heart of gold. My first exposure to this side of Paul occurred in 1972 soon after I was hired at VT. Paul approached me in the early spring of our first year and opined that as a young faculty member with a wife and 6 month old son, I really should consider purchasing a house. "You don't want to rent for long," he said. "You need to build equity in a home. Furthermore, I have discussed this with Jewel and we'd like to offer you and Ginny a loan so that you could have a down payment on a house." As it turned out, Ginny and I are both very frugal so we did not need the loan, but I'll never forget the kind offer made by this "supposed ogre." This was not the only act of friendship shown by Paul and Jewel to me and my family over many years of a very special friendship, but it is certainly one that sticks in my mind today some 40+ years after the offer was made.

Sustainable Energy with a Passion

Faculty Profile: Amanda Morris

Laurie Good

Hollywood's loss is Blacksburg's gain. Amanda Morris, assistant professor of inorganic chemistry, originally set her sights on a career as a movie director.

Amanda Morris had always done well in chemistry at her Buck's County (PA) high school, but wasn't, as she put it, "in love with it." That all changed when she was an undergrad at Penn State and had an opportunity to see "chemistry become real" in connection with new highway construction near State College. During her sophomore year, her inorganic chemistry professor, Tom Mallouk, had his students complete an independent research project. Amanda had noticed the rust-colored ooze from the rock walls adjacent to that new road and decided to learn more about the problems of acid runoff from environmental disturbances—which is a huge problem in the coal-mining areas of northeastern Pennsylvania. The opportunity to get away from chalkboard chemistry and see how it could come alive through active, meaningful research on ways to remove common pollutants from water pretty much cemented her decision to become a chem major. Amanda also engaged in a summer internship working at Rohm & Haas on architectural paint coatings that could stand up to contaminants while still maintaining their color and integrity. (Amanda recalled the thrill of watching paint chips soaking in beakers of lard.) With her eventual chemistry B.S., she applied to the graduate program at Johns Hopkins—mostly because of their dynamic program in clean water chemistry. As luck would have it, however, that program was defunded and Amanda ended up working in solar energy, an area of research that continues to intrigue her today.

Interestingly, Prof. Morris had no real intention of becoming a professor—she had an industrial career in mind. Again... fate intervened in the form of the economic downturn of five years ago—right around the time she was earning her doctorate. Industrial hiring freezes right and left propelled her to Princeton on a two-year postdoc working on a new system of organic compounds capable of reducing CO_2 to methanol. At Princeton she also got to teach, which she absolutely loved. In fact, when one of her undergrad students won a poster award at a national ACS Meeting, Amanda described feeli like a proud momma. Nonetheless, the two-year postdoc still hadn't sold her on an academic career. What it finally came down to was being able to pursue her own interests instead of what industry would have wanted her to do.

Instead of life behind a movie camera, Amanda Morris followed in her father's footsteps to pursue a career in chemistry. (Her dad is a retired chemist from Rohm & Haas, now known as Dow).

Prof. Morris joined the Chemistry faculty in 2011, which she equated to "joining a family" since that's exactly what the department feels like to her. Amanda, last year's recipient of a Ralph E. Powe Junior Faculty Enhancement Award, continues to work on aspects of solar energy conversion. Her research group studies both solar energy conversion with the design of next generation solar cells and solar energy storage – the development of a "leaf in a beaker." For next generation solar cells, Amanda works on quantum dot sensitized solar cells and, capitalizing on the immense expertise of her polymer colleagues, hybrid bulk heterojunction solar cells. Both cells have the promise to decrease cell cost, but current modular efficiencies leave much to be desired. The Morris group works to control interfacial properties within these working devices to maximize solar-to-electric conversion efficiency and recently discovered a solar cell additive that in small scale laboratory testing is capable of doubling cell efficiency. Ultimately, for solar to be a viable energy source, we must find a way to store the energy for delivery on demand. The Morris group also works to tackle this issue by developing catalysts that can convert carbon dioxide into fuel. Currently, they are investigating the use of metal-organic framework thin film electrodes to drive carbon dioxide reduction and water oxidation. Her research team just submitted their first research publication on the mechanisms of electron transport through these catalytic films.

Her research caught the attention of the American Chemical Society and she is now an "ACS Expert in Sustainable Energy"—one of only 20 so-designated spokespeople nationwide who can address media inquiries on chemistry-based policy issues on behalf of the Society. In fact, Amanda recently completed a one-day workshop at the Indianapolis ACS Meeting facilitated by staff of the "Alan Alda Center for Communicating Science" (a SUNY Stony Brook organization). Although she doesn't appear to have any difficulty communicating science to a lay audience, Amanda was instructed on the use of improv techniques (e.g., body language and intonation) and the importance of a couple of "hit-home" sentences to ensure that her message is remembered.

When not tinkering in the lab, Amanda can be found restoring her older home in Blacksburg. She is a huge football fan—Penn State, naturally, but also the Indianapolis Colts because from the age of 6 she liked their team colors (blue and white, by the way, for the uninitiated). Prof. Morris is also actively engaged in diversity issues on the VT campus. She is a "SafeZone" trainer supporting the VT LGBTQ community, and has completed the Diversity Ally Certification Program related to broader diversity issues (race, disability, ageism, etc.). For this work, she was recently awarded the College of Science Diversity Award. She also is active in undergraduate activities and outreach as the advisor for both Alpha Chi Sigma and oSTEM and a judge at local science fairs. In addition to her Chemistry Dept. family, her immediate family is also about to expand. Amanda recently completed foster parenting training and she is anticipating the addition of a sibling group of 2-3 kids to that work-in-progress home not too far from campus.

Upon further reflection, Amanda Morris has, in fact, achieved her directorial dreams. Prof. Morris's current cast of five graduate students and four undergrads no doubt consider themselves fortunate to be included in her latest production of developing of an artificial photosynthesis system that would harvest the sun's energy to transform carbon dioxide into a chemical fuel such as methane, methanol, or isopropanol.

Davidson Hall Rededication:

The Department of Chemistry Advisory Council (DCAC) is planning a "rededication" and alumni reunion ceremony to coincide with the completion of the renovation of Davidson Hall. We are conducting a survey to assess interest in this event and to get suggestions about possible activities. To participate, please go to:

http://goo.gl/XbXrdx

Thank you for your continued support!

Donors to chemistry for the period January 1 - June 30, 2013

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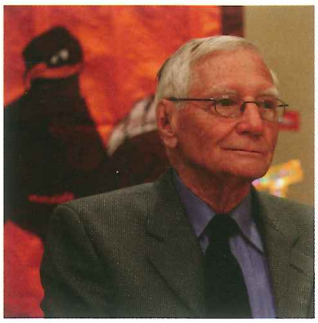

In honor of Harold McNair's 80th birthday, many of his former students gathered in person, via Skype, phone, or e-mail from around the world for a birthday bash. They also contributed heavily to the excellence fund named in Harold's honor, and as a result of their efforts and contributions, the fund is now fully endowed and will be used to support graduate education.

Harold M. McNair Alumni Endowed Fund
Axion Analytical Labs, Inc.
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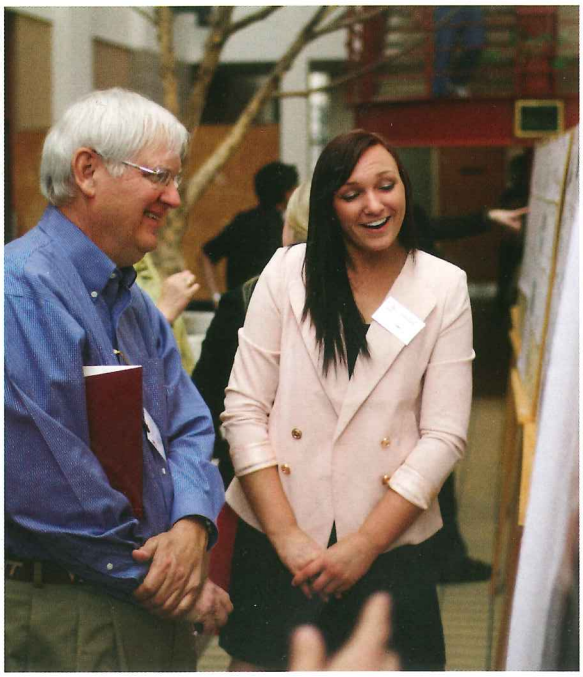
Donations to the Chemistry Department General Fund are used to support activities such as the Undergraduate Student Poster Session.



Giving Back

Support from alumni, corporate sponsors, and friends allows us to continue to invent the future

Every institution of higher learning is faced with increasing costs and diminished state funding. The Department of Chemistry at Virginia Tech benefits greatly from donations from its alumni, corporate sponsors, and friends in helping to bridge the funding gap. Unrestricted contributions to the department's general fund have an immediate impact on day-to-day operations. Working with its advisory council, the department has also established several endowed funds to address specific needs over the long term. Depending on their priorities and interests, donors may designate their gifts to one or more of these funds knowing that their gifts will go directly to that area of departmental need.

Donations to both the general fund and the endowed funds are needed and appreciated, helping the department in the short and long term. Contributions to the general fund are a primary source of discretionary funds at this time. Contributions to an endowed fund provide a steady, sustained stream of funding for the purpose supported by their fund.

The table below provides a brief rationale for each area, along with the information needed to direct donations to that area of need.

When you receive your College of Science Annual Fund letter or phone call, please earmark your support for the Department of Chemistry to the general fund and/or one or more of these special funds. Simply make a notation on the gift card or let the caller know that you want to direct your donation to the Department of Chemistry, and then include the specific fund name and number.

To make an immediate contribution by mail, print out and complete the following form available online at: http://www.givingto.vt.edu/PDF/gift-pledge-form.pdf

When completing the form, please click the button marked "Applied to a college, department or area designated below," and then enter the name and number of the desired fund from above on the line(s) provided. Finally, mail the completed form and your pledge to:

University Development (0336)
University Gateway Center, Virginia Tech
902 Prices Fork Road
Blacksburg, VA 24061

Alternatively, you can donate online via the following link: https://webapps.es.vt.edu/givingto/academic/gift

When donating online you must first click the blue button marked "Enter Your Own," then type in the number and name of the fund you wish to donate to.

For more information about these funds or to learn more about other ways to give, please contact Jenny Orzolek, Director of Development for the College of Science, at (540) 231-5643 or jorzolek@vt.edu

We thank you for your support!

Name of Fund	Impact	ID Number
Chemistry General Fund	Provides immediate discretionary funding for a range of activities including graduate and undergraduate recruiting and scholarships, commencement, faculty, staff, and student activities and awards, faculty recruiting, seminar program, alumni newsletter, and more.	881327
Larry Taylor Excellence Fund	This endowed fund provides long-term support for a range of departmental activities including scholarships, recruitment, awards, and more.	886047
Harold M. McNair Alumni Endowed Fund	Supports graduate education and recruiting in the Department of Chemistry by augmenting stipends for graduate students to make them more competitive, funding visits of prospective students to campus, providing travel funds for professional meetings, and more.	885802
James P. Wightman Lecture Series Excellence Fund	Brings outstanding speakers to campus, benefitting students, faculty, and the university community.	860634
Chemistry Friends Scholarship	Undergraduate scholarships awarded according to potential and need.	885487
Dallas Kinser and R.T. Johnson Scholarship		885628

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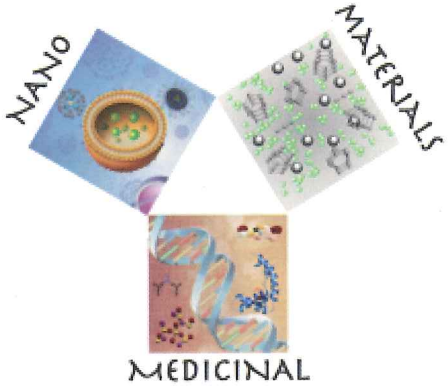
Meet Chemistry's Newest Faculty Member: Jatinder Josan

The Department of Chemistry is pleased to welcome Assistant Professor Jatinder Josan as our newest faculty member. Jatinder earned his Ph.D. at the University of Arizona (working with Prof. Victor Hruby), and did a postdoc at the University of Illinois with Prof. John Katzenellenbogen. Jatinder's research interests are in the areas of medicinal chemistry, natural products synthesis, and synthetic methods, with an emphasis on developing drugs for the treatment of cancer.

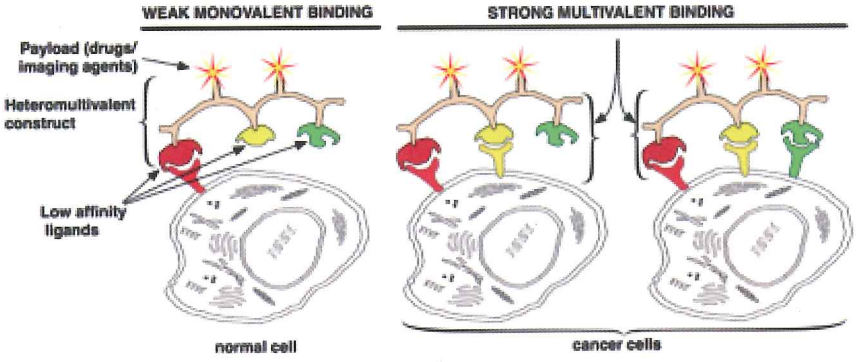
Cancer is a complex and multifactorial problem that is often treated with one-dimensional solutions, not surprisingly with limited practical gain in overall patient survival. Work in the Josan research group aims to harness the power of organic synthesis to develop materials and approaches that address the problem underlying current mono-targeted cancer approaches – the rapid resistance emergence, the evasive cancer stem cells, and the brief period of positive clinical outcome for cancer patients. This approach is highly interdisciplinary, combining organic synthesis, combinatorial chemistry, computational modeling, chemo- and bio-informatics, high-throughput screening, structural, molecular and cell biology, with the ultimate goal of revealing new basic biological mechanisms and disease treatments. His group currently works on three different aspects of drug design and delivery.

Research in the Josan Group

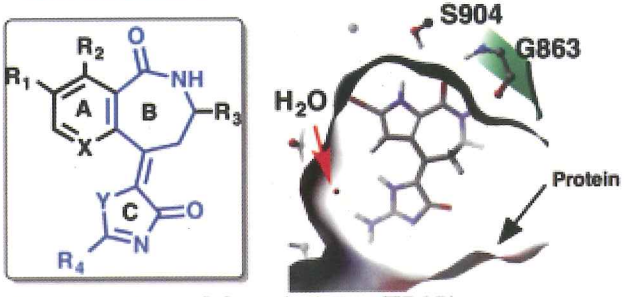
Multivalent and Multifunctional Ligands for Cancer Targeting



PRECISION MEDICINE

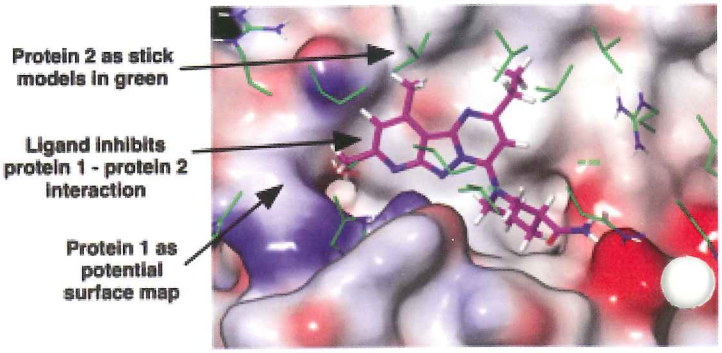


CHEMICAL SYNTHETIC LETHALITY



Tetrahydro-benzo[c]azepin-1-one (TBAP)
Multifunctional core for CDK1/PARP1 inhibitors

DRUGGING THE UNDRUGGABLE



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