STUDENT SPOTLIGHT

STUDENTS AND FACULTY PRESENT AT AMERICAN CHEMICAL SOCIETY NATIONAL MEETING, SHARE GREAT CHEMISTRY

Dr. Lee presented a talk titled “Droplet Interface Bilayer: A Model for Biomembrane Water Permeability Studies” at the Division of Colloid and Surface Chemistry.

The students presented four posters summarizing their research results:

- “Effects of Solvent and Method of Preparation on Artificial Biological Membrane”;
- “Influence of Tail-Group Lipid Chain Structure on Water Permeability in Artificial Biological Membrane”;
- “The Formation of Symmetric and Asymmetric Droplet Interface Bilayers: Water Permeability Studies”; and
- “Tuning of Membrane Permeability via Various Ion Interactions”.

The student presenters and attendees were:
- Chemistry: Alessandra Armetta ’18, Samuel Braziel ’18, Geoffrey Cawley ’16, Gabriella Di Domizio ’18, Maria Lopez ’17, Jacqueline Martinez ’16, Melissa Morales ’16, Michelle Muzzio ’15, and Jake Villanova ’16
- Biochemistry: Jacqueline Denver ’17, Sue Ellen Evangelista ’17, Peter Milianta ’16 and Kalen Sullivan ’17
- Physics: Michael McGlone ’17

2015 CHEMISTRY AWARDS WINNERS

Each year, the Department of Chemistry recognizes excellent achievement among the chemistry community, by awarding the following honors:

**CRC Press LLC Freshman Chemistry Achievement Award:** Samuel Braziel ’18

**Westchester Chemical Society Student Award:** Alessandra Armetta ’18

**Chemistry Rising Star Award:** Gabriella Di Domizio ’18, Rachel Garn ’18

**ACS Division of Analytical Chemistry Undergraduate Award:** Kalen Sullivan ’17

**ACS Inorganic Chemistry Award:** Jake Villanova ’16

**Organic Chemistry Award:** Maria Lopez ’17

**The Levkov Prize in Physical Chemistry:** Zachary Snopkowski ’16

**Ionic Bonds Award:** Scott Friedbauer ’15
THREE CHEMISTRY RESEARCH PAPERS PRESENTED AT THE NATIONAL CONFERENCE FOR UNDERGRADUATE RESEARCH IN SPOKANE

Three Iona chemistry research projects were presented as examples of high-quality undergraduate scholarly activities at the National Conference for Undergraduate Research (NCUR) in April. These presentations were made by Michelle Muzzio, Omoakhe Tisor, Peter Milianta, Melissa Morales and Jacqueline Denver at the University of Eastern Washington University. The mission of the NCUR is to promote undergraduate research, scholarship and creative activity done in partnership with faculty or other mentors as a vital component of higher education. In addition to the chemistry research projects, 20 more Iona undergraduate students presented 11 projects in fields such as psychology and computer science.

FIVE CHEMISTRY RESEARCH PROJECTS PRESENTED AT THE SIXTH IONA SCHOLARS DAY

Every April, Iona College students engaged in undergraduate research and creative scholarship present their findings through poster and panel presentations. Since its beginnings in 2010, participation has grown substantially, and in 2015, the 6th Annual Iona Scholars Day involved more than 100 participants.

Five research projects were contributed by students from two faculty research groups:

Dr. Lee Group – Michelle Muzzio, Omoakhe Tisor, Peter Milianta, Jacqueline Denver, Sue Ellen Evangelista, Melissa Morales, Geoffrey Cawley, David Lopez (New Rochelle High School)

Dr. Kristian group – Kristen Ferencz, Scott Friedbaurer, Jennifer Barajas. It was truly remarkable to see such a display of high quality research from chemistry students and their mentors.

SCHOLARLY ACTIVITIES

FIVE STUDENTS INDUCTED TO NATIONAL CHEMISTRY HONOR SOCIETY (ΓΣΕ)

Iona College’s National Chemistry Honor Society Chapter inducted seven chemistry and biochemistry majors at a ceremony held at the College on April 24, 2015. The inductees for 2015 are:

Jacqueline Denver (Biochemistry ’16)
Sue Ellen Evangelista (Biochemistry, ’16)
Constance Maurer (Biochemistry ’15)
Melissa Morales (Chemistry ’16)
Jake Villanova (Chemistry ’16)
SCHOLARLY ACTIVITIES FOR FACULTY AND STUDENTS, AY 14-15

PEER REVIEWED JOURNAL ARTICLES
(Undergraduate student coauthors are underlined)


CONFERENCES AND PRESENTATIONS
(Undergraduate student coauthors are underlined)
CONGRATULATIONS GRADUATES OF THE CLASS OF 2015!
THE CHEMISTRY DEPARTMENT IS PROUD OF THE 10 GRADUATES, WHO COMPLETED THEIR STUDIES AT IONA IN 2015, AND WE WISH THEM THE BEST OF LUCK IN THEIR CAREERS!

Among the graduates, four received ACS certification for their BS degree in chemistry.

- Safiat Ayinde (Biochemistry)
- Rosario Giacomini (Biochemistry)
- Scott Friedbauer (Chemistry)
- Michelle Muzzio (ACS Chemistry, English)
- Omoakhe Tisor (Biochemistry)

Devin Green (Chemistry)
Jennifer Gomez (ACS Chemistry)
Constance Maurer (Biochemistry)
Andrew Uresk (Chemistry)
Kevin Towler (Minor in Chemistry)

HONORS THESES
Michelle Muzzio: Advances of the Droplet Interface Bilayer (DIB): Modeling the Biological Membrane and Beyond
Omoakhe Tisor: The Effect on Specific Anions and Chain Splay on Monoglyceride-Templated Crystallization

GRADUATE SCHOOL AND FULL-TIME JOB PLACEMENTS (AS OF THIS PUBLICATION DATE)
Michelle Muzzio, Ph.D. program in chemistry at Brown University
Safiat Ayinde, Ph.D. program in pharmacology and molecular sciences at Johns Hopkins University School of Medicine
Andrew Uresk, Ph.D. program in chemistry at SUNY Albany
Scott Friedbauer, BASF Corporation
Devin Green, MBA program, Hagan Business School, Iona College

MICHELLE MUZZIO Valedictorian 2015

It is hard to imagine that four years ago I was in my first semester of general chemistry, learning what a covalent bond is and how to calculate molarity. Never having taken a rigorous chemistry course before, I didn’t know what to expect. If you asked me then, I never would have thought that this class with Dr. Lee would be the first class of not only my major, but the first class of the rest of my professional life.

Now at the beginning of a Ph.D. program in chemistry at Brown University, I can’t help but reminisce about my beginnings at Iona: a lot can happen in four years!

One of the most important things I learned during my journey through my chemistry classes at Iona was to keep an open mind. All of my favorite memories in chemistry stem from unexpected experiences. I joined Dr. Lee’s research group, and spent many hours in and out of the lab gaining an understanding of concepts that I never in a million years thought I might seek to understand. In this endeavor, I met my closest friends, was able to co-author three scientific articles (the same kind of articles that scared me half to death in the winter of my freshman year), and began to fall in love with chemistry.

In my quest to become a better communicator of chemistry, I decided to double major in English, something I also would not have expected four years ago. I became a chemistry tutor, and was able to hold study sessions with my peers as well as for younger students, and I grew very close to them as I discovered I loved teaching. This, perhaps, was the most important moment of my undergraduate career; when I decided to go to graduate school with the hope of someday coming back to a school like Iona to teach.

Everyone’s journey is different, especially when it comes to chemistry. And, just because a journey begins one way does not mean it cannot change, develop or be opened up to new possibilities along the way. As I’m starting a new beginning at Brown, I’m trying very hard to remember this and also think about how far someone can travel from general chemistry with the help of long nights spent with textbooks eating Ramen noodles while learning about Raman spectroscopy, cultivating a genuine love of the subject, and keeping an open mind to the fact that a lot can change in four years.
JAPAN RESEARCH REFLECTION
by Peter John Milianta

It was both a tremendous honor and an exceptional delight to collaborate with the Takeuchi Group, one of the leading research teams at the University of Tokyo Institute of Industrial Science during the summer.

I was welcomed by a kindhearted and hospitable group of individuals that helped me acclimate to the customs and environment of their laboratory, as well as to my life in Tokyo. Working on a novel microfluidics device, I was exposed to the intricacies of chemical engineering and challenged to use my knowledge of biochemistry and surface chemistry to overcome a range of obstacles. Through our collaborative endeavor, I was successful in optimizing it for further experimentation in the United States.

Though my time at Kanagawa Academy of Science and Technology (KAST) was relatively short, the four weeks I spent immersed in research taught me what it means to be a graduate-level scientist. I worked both day and night, striving to accomplish the goals I had set for myself. Moreover, despite working about 12 hours every weekday, I was able to explore many historic sights, befriend a variety of remarkable people, and even attend a party in celebration of my birthday. My experiences in Japan were so much more than those of an average research collaboration; I listened to the many stories of those I worked and lived with, familiarized myself with a culture that was completely foreign to me as an American born to European immigrants, and matured as a scientist and individual through the myriad challenges I faced. From commuting to KAST via subway and bus to navigating the bustling streets of downtown Tokyo, I was faced with an array of unexpected situations to which I was forced to adapt. However, although these situations were unanticipated, like attempting to commute concurrently with subway construction or making a wrong turn in the middle of Shibuya, they positively contributed to the visit as a whole and added uniqueness and excitement to an already extraordinary venture.

My time in Tokyo was an incredible experience, one that I am sure will continue to reveal its rewards to me throughout my life. It facilitated my development into a more seasoned scientific professional and a more cultured person, which will undoubtedly aid me in my future endeavors. I feel remarkably privileged to have represented my team (Dr. Lee’s Research Group called “Project Symphony”) as I turned 21, my college, and my country on the other side of the world. I am looking forward to strengthening this new bridge between our institutions and the further advancement of our collaborative efforts.

ULTRADIAN DIAGNOSTICS INTERNSHIP EXPERIENCE
By Ricardo A. Oliveira

This summer I participated in an internship at Ultradian Diagnostics LLC, where CEO and Iona alum Dr. John Willis served as my mentor. Dr. Willis’s research consists of continuous glucose monitoring in people with diabetes using a minimally invasive glucose biosensor. The technology is also applicable to several other fields of medical interest. Currently, the monitoring device is undergoing human clinical studies, and has shown to be more sensitive than many other glucose sensors on the market, as well as giving readings that are closer to real-time glucose levels in the body.

My involvement with Dr. Willis’s company allowed me to gain a better understanding of this technology and its applications. Specifically, we were interested in using Ultradian’s glucose biosensor to observe real-time synchronization of glycolytic oscillations in the yeast strain S. cerevisiae. That is, could the yeast cells’ glycolytic cycle reach equilibrium and produce observable, regular oscillations in biosensor response current indicative of glucose metabolism? Upon reviewing many articles on the subject, I saw that the most common ways of producing these oscillations are under anaerobic conditions, but not in real time.

Yet, the focus of my research was seeing if the yeast could synchronize under relatively “normal” and aerobic conditions, and not in real time. Yet, the focus of my research was seeing if the yeast could synchronize under relatively “normal” and aerobic conditions, and not in real time. My data showed this was possible. Furthermore, we added glycolytic metabolites to test for changes in biosensor response, glucose concentration, and oscillations in current. The target goal for this specific area of research is finding which metabolites or intermediates are crucial to the synchronization of cellular glucose metabolism, and the glycolytic cycle in general. This work is directly related to cellular glucose oscillations in human cells because the glycolytic pathway in yeast and human cells is the same. Yeast cells are easy to grow so they served as an ideal proxy for human cellular glucose metabolism.

In addition to research experience, my internship at Ultradian exposed me to an entrepreneurial environment. Through working with Dr. Willis, I learned that communication is imperative to running an organization, particularly in setting up investment meetings and being prepared for a bombardment of questions. Of all tasks, it was quite obvious that gaining support from research organizations and venture capitalists is the most challenging part of designing and researching a product. And, of course, there is always patent filing to add a bunch of paperwork!

Overall, I feel fortunate to have worked side by side with Dr. Willis. Since Ultradian is not a giant conglomerate corporation, my internship allowed me to work next to a CEO! This is something I may or may not come across in my future career, but I am glad to have observed the high level of leadership required for running a company before entering an advanced degree program and then career path. My internship this summer proved to be a phenomenal experience as a whole, and was a great example of gaining opportunity through the vast Iona alumni network.
Dr. Mychel Varner began doing computational chemistry research as an undergraduate at Truman State University in Missouri, performing quantum chemical calculations on a modified base to be used in modeling the binding of a tRNA anticodon stem-loop. It was the biological application that initially drew her to the project, and a growing appreciation for physical chemistry led her to graduate school at the University of Texas, Austin. She then conducted postdoctoral research in atmospheric chemistry at the University of California, Irvine. As a computational physical chemist, Varner uses computational methods to predict properties of molecules or complexes that can describe fundamental physical processes and aid the interpretation of experimental results. For example, by calculating the energy along a reaction path, we can determine whether a hypothesized reaction mechanism is feasible. Or, by predicting the vibrational spectrum we can confirm the identification of a molecular species. The systems studied by Varner have been most relevant to reactions in the Earth’s atmosphere, such as those leading to the formation of particles or to the formation of ozone at ground level, but these methods can also be utilized in a wide variety of applications such as the breakdown of sugars in the process of making biofuels.

Looking for the perfect balance between the ancient dark secrets of chemistry and the computational power of technology, Dr. Rodney Versace just joined the Chemistry Department with the goal of showing students the mysterious and magical world of science—and trying to convert some minds to the chemical side of the force. After discovering that everything around us, including ourselves, is chemistry, Versace earned his undergraduate degree at the Peruvian Universidad Cayetano Heredia and Versace accepted a research assistant position in biochemistry at the City College of New York. There, he realized that biochemistry is a multidisciplinary field where chemistry, biology and physics work together to dominate the microscopic world. He went on to earn his Ph.D. there, discovered his passion for teaching chemistry to undergraduate students, and also found that computer science is a loyal sidekick to biochemistry. Versace developed a computational method to find native interfaces between ligands and receptors, and then as a postdoctoral associate modeled the best conditions to study proteins: micelle systems in implicit water by molecular dynamics simulations. Versace currently focuses on understanding how water and solute transport is carried out in biological membranes. “I am so delighted to be part of the chemistry team at Iona, where I have the opportunity to both teach and do research,” he said. “I am looking forward to working with students and collaborating with my colleagues. Together we will have fun and we will conquer science. Let the journey begin!”

Dr. Heidi Fraser received her undergraduate degree in chemistry from Quinnipiac University in 1994. She then completed her graduate work with Dr. Gordon Gribble at Dartmouth College, studying indole chemistry and other heterocycles and receiving her Ph.D. in 1999. Fraser then entered the pharmaceutical industry with Wyeth Research, where she worked as a medicinal chemist for 15 years designing pharmaceutical drugs in the therapeutic area of cancer research. During this time, she worked on quinolones and quinazolines as ATP mimics to inhibit kinases in cancer cells. Fraser’s research interests still lie in the area of heterocyclic chemistry, specifically fluorinated heterocycles. She teaches organic chemistry, and enjoys sharing her love of the subject with her students.
To say that Iona, and particularly the Chemistry Department/science departments and facilities, have changed since I arrived in 1970 is an understatement that can only be fully appreciated by the three or four of us whose tenure dates back that far.

In those days, the basement of Cornelia Hall housed the general chemistry, physical chemistry and organic chemistry laboratories. And the lavatories. The men’s bathroom actually had a large constant-temperature bath in it. No one ever told me whether experiments were ever carried out in this space, but I had it removed. The low ceiling had so many visible plumbing pipes that it evoked the interior of a submarine. There were no individual faculty offices; only a large room with shared spaces.

Over the years, the College has made significant investments in the infrastructure and instrumentation, as well as in hiring first-rate faculty and supporting student-faculty research. This has been very fruitful, as evidenced by numerous publications and presentations, and increased enrollment in the chemistry and biochemistry programs. The American Chemical Society has certified the high quality of our chemistry program with ACS accreditation.

Over the years, whether we had few or many majors, we always strove to help students realize their potential and prepare them for successful careers. Many students have earned advanced degrees in prestigious universities, become physicians or dentists, or succeeded in other career paths. We in the chemistry department contributed to these successes, and I take pride in that.

Another reward of teaching has been my ongoing learning, especially my realization that the natural world is even stranger than we can imagine; think of quantum mechanics. Textbooks present much as permanently established “truths.” But there is more of nature that is unknown than known. What is accepted today may be significantly altered by new experiments. One of the most remarkable examples of this is the ability to image individual atoms and molecules. It is amazing that the shapes of molecules as revealed by atomic force microscopy correspond exactly to the structures we draw. Historically, these structures were derived from a combination of experimental evidence and ingenious insights. During my student years, and for most of my professional career, the assumption was that the structures we drew were too small to ever be “seen.”

Teaching is the best way to learn a subject. This included Physical Chemistry, Introductory Chemistry, and Scientific and Technological Literacy. Developing a laboratory course in Criminalistics for the Criminal Justice program was an unusual experience. At that time, in the late 1970s, my knowledge of the subject was pretty much limited to what was presented in movies and on television. But, together with the late Anthony Califana, who was the fingerprint and photography expert for Westchester County, we created the course and wrote a successful textbook on the subject that was published by the McGraw-Hill publishing company.

Because there was independent financial support for police to take college courses we expected full enrollment. However, when we met for the first day of the class we were taken by surprise by the overwhelming number of enrollees, so many that we had to open a second section. That was not the only surprise for me. These guys, and I don’t recall any female enrollees, were packing serious hardware. They had guns in holsters, in their waistbands, in their ankle holsters, all pretty obvious. This was quite different from the undergraduates I was used to teaching. I won’t say whether the weapons influenced my grading, but they turned out to be quite serious students and fun to teach.

One evening I was driving on Fordham Road when an unmarked car behind me began flashing its roof lights indicating it was a police vehicle. I began to get nervous, wondering what infraction I had committed, and pulled over to the curb. The police car drove alongside me and, when the window opened, I was greeted by “Hi, Dr. Levkov, how’re you doing?” It was one of my students who had recognized me and wanted to say hello.

A fun event I liked to put together usually around Christmas time, was a chemical “magic show” for students, faculty, administrators, and anyone else who showed up. These were a lot of work so I always enlisted student assistants to help me prepare the demonstrations. A particularly spectacular demonstration involves placing a Gummi Bear in molten potassium dichromate. I had read about this but thought it wise to test it before introducing it as part of a show. So, along with a student assistant, we tried it out. As a precaution, we placed the apparatus in a hood, melted the potassium dichromate in a test tube and dropped in a Gummi Bear. The result was truly spectacular. Flames shot into the air, smoke poured out and we were wide eyed as we watched and realized this was far too dangerous to perform for an audience. Our fun was interrupted by the piercing sound of the fire alarm. I turned around and much to my dismay, saw the ceiling completely obscured by smoke. At this point I realized that the hoods work best when they are turned on which I had forgotten to do. The firemen who arrived shortly thereafter didn’t seem impressed or amused by my embarrassed explanation. Everyone was quickly allowed to reenter the building and, of course, learn of my error. They were amused.

So, even though I am now retired, I plan to continue contributing to the department and to learning and teaching and enjoying it all.
OUR NEWEST INSTRUMENTATION IN CHEMISTRY DEPARTMENT

CONFOCAL INVERTED RAMAN MICROSCOPE (XPLORA INV, HORIBA SCIENTIFIC)

The recent addition to the Chemistry Instrumentation includes confocal Raman microscope, which combines a Raman spectrometer with a confocal optical microscope. This instrument is now fully installed in Cornelia Hall Rm GR12A. This instrument provides qualitative and quantitative vibrational information for structural and molecular determination at both the microscopic and bulk level. Raman microscopes allow fast non-destructive chemical micro-analysis and high definition Raman chemical imaging. The acquisition of this instrument was made possible through the recent NSF award to the Chemistry Department.

DIFFERENTIAL SCANNING CALORIMETER (Q2000 DSC, TA INSTRUMENTS)

The Differential Scanning Calorimeter (DSC) determines the temperature and heat flow associated with material transitions as a function of time and temperature. It also provides quantitative and qualitative data on endothermic (heat absorption) and exothermic (heat evolution) processes of materials during physical transitions that are caused by phase changes, melting, oxidation, and other heat-related changes. This was made possible through the Iona College Science Capital fund.

CALLING ALL IONA CHEMISTRY ALUMNI!

Iona Chemical Society is a member of ACS Student Affiliates (SA) Chapter. Members participate in a wide range of programs and activities that enhance their college experience and prepare them for successful careers. The Iona College SA chapter has a wonderful track record for conducting exceptional programs and activities during the academic year.

To be a member, please contact the president, Mr. Ricardo Oliveira at ROLiveira1@gaels.iona.edu.

IONA CHEMICAL SOCIETY

Iona Chemical Society is a member of ACS Student Affiliates (SA) Chapter. Members participate in a wide range of programs and activities that enhance their college experience and prepare them for successful careers. The Iona College SA chapter has a wonderful track record for conducting exceptional programs and activities during the academic year.

CHEMICAL SOCIETY E-BOARD MEMBERS FOR 2015-16

President: Ricardo Oliveira
Vice President: Peter John Milianta
Secretary: Angelica Szeller
Public Relations: Taylor Ilasi
Treasurer: Rebecca Bone

CALLING ALL IONA CHEMISTRY ALUMNI!

The CSI program was established in 2004 to provide information about career opportunities in the sciences and in science related fields. This is the 12th year of this program in which we invite speakers to meet with our students, in an informal setting, to describe traditional and non-traditional science related careers.

We invite alumni to share rewarding career experiences with current Iona undergraduates majoring in science by speaking in the CSI: Careers in Science at Iona lecture series. Professionals from industry, government and academia who have majored in a science at Iona are invited to make presentations and share a light lunch with current students and faculty. Please also send us any updates you want to share with us by writing to Dr. Sunghee Lee (slee@iona.edu).

Visit the Chemistry Department website for more details about CSI Events.
www.iona.edu/chemistry