BINGHAMTON UNIVERSITY, STATE UNIVERSITY OF NEW YORK

BIOCHEMISTRY NEWSLETTER

2014 EDITION

Written and Designed by Binghamton’s Biochemistry Club
Dear Students, Alumni, and Friends,

Welcome to the 2014 Biochemistry newsletter! This newsletter is written and edited by undergraduates in the Biochemistry Club.

I’m happy to say that several new faculty related to biochemistry have joined Binghamton University! You can read about three of them on page 4, and there are more detailed features on pages 12 and 14. I’d also like to welcome two new additions who joined this semester, Dr. Laura Musselman in the Department of Biological Sciences and Dr. Sozanne Solmaz in the Chemistry Department. Dr. Musselman is currently teaching the Biochemistry senior seminar. Her research focuses on understanding metabolism using fruit flies, which can lead to a better understanding of obesity and aging. Dr. Solmaz is teaching a new course called Protein Biochemistry, which has an emphasis on protein structure. Her research focuses on structural biology, with particular interest in nuclear pore proteins. In Spring 2015, Drs. Musselman and Solmaz will be co-teaching Biochemistry (BCHM 302).

This issue of the Biochemistry newsletter includes an article about the benefits of doing undergraduate research with a new professor (p. 9) and within the HHMI program (p. 10). The reflections of alumni on their time at Binghamton also aren’t to be missed (p. 16-17). Alumni, if you would like to contribute your stories to the next edition of the biochemistry newsletter, please get in touch with the students at biochemistry@binghamtonsa.org!

Some alumni have asked about making contributions to the Biochemistry program in honor of Dr. Anna Tan-Wilson, Dr. Karl Wilson, or both. There are two funds at the Binghamton University Foundation that support the program. Long ago, Anna and Karl themselves established the foundation account #10940 for the Excellence in Biochemistry Award, which is presented to a graduating senior each academic year. A second account, #10463, is the Biochemistry Advancement Fund, which supports general activities of the program including hosting visiting lecturers. Thank you to the alumni who have made donations to these funds in their honor!

I’d like to thank the Biochemistry Club for putting together this newsletter. Like the “Binghamton Biochemistry Club” page on Facebook to keep up with all their activities. For current students, they have helpful seminars such as how to choose classes and how to find internship and research positions. Their peer advising and mentoring programs help numerous biochemistry students navigate their way through college. They also hold fun events, such as an academic tournament (see p. 8) and the elementary school science outreach through their miniBridge program (see p. 7).

Feel free to contact the club at biochemistry@binghamtonsa.org for more information.

Enjoy the newsletter!

Best wishes,

Susan Bane
Welcome, New Professors!

Reported by Jenny Tse

This past year, three new professors have joined the Biology and Chemistry Programs. Welcome!

**Professor Howard Chang**

From the Biology Department, Dr. Howard C. Chang leads two central courses in the Biochemistry Major: Biochemistry Laboratory and Senior Seminar. Dr. Chang, who joined the faculty at Binghamton University in Fall 2013, is interested in neurobiology, molecular genetics, and host-parasite behavior.

**Professor Mathew Vetticatt**

Dr. Mathew J. Vetticatt, Assistant Professor of Chemistry, began in Fall 2013. His research interests lie in rational design in asymmetric organocatalysis and computer-aided drug design. Dr. Vetticatt currently teaches Physical Organic Chemistry and Asymmetric Organocatalysis.

**Professor Wei Qiang**

Dr. Wei Qiang, Assistant Professor of Biophysical Chemistry, entered Binghamton University in Spring 2014. Dr. Qiang studies the biological applications of solid-state NMR spectroscopy, molecular mechanisms of disease, and cell-penetrating peptides for cancer treatment. In addition to Frontiers in Chemistry, Dr. Qiang instructs undergraduate and graduate students in Spectroscopic Methods, Quantum Chemistry, Spectroscopy, and Kinetics.
Oftentimes, college students find themselves lost or unsure of their goals or future paths. Many clubs and organizations at Binghamton University serve to provide students with the support and guidance they need to solidify their aspirations. By attending events, students not only gain valuable advice, but also build their social network, which can open up new possibilities or assist in their decision-making process.

For students looking into the science and engineering fields, various campus organizations share a common goal: to advise and unite peers with similar ambitions. On Wednesday April 2, the Biochemistry Club and The Society of Asian Scientists and Engineers (SASE) co-hosted a Graduate Student Panel, where six graduate students from the science and engineering fields attended to share their experiences and opinions through a series of questions. Each graduate student, with their own distinct story, presented undergraduates with useful pointers and what to expect in graduate school.

Mei-Yi Zheng, a Biology PhD candidate, currently works in a laboratory exploring the roles of proteins and how they make their way into the inner membrane of mitochondria. She knew since her undergraduate career that she wanted to become a teacher for higher education, and therefore recognized the importance of attending graduate school. Mei adds that being able to work independently and completing tasks under a less-structured schedule becomes significant in graduate school. She adds, “You have to make a lot more decisions

"The transition may be easy for some and daunting for most, but have confidence that you belong in the program. Failures are inevitable, and success almost always follows. Remember to seek help when necessary—your advisors and peers want to see you succeed.”

—Mei-Yi Zheng
about course choices, how to structure your studies, and how to balance your research.” She stresses the importance of being positive, “The transition [from undergraduate to graduate school] may be easy for some and daunting for most, but have confidence that you belong in the program. Failures are inevitable, and success almost always follows. Remember to seek help when necessary—your advisors and peers want to see you succeed.”

Mahdi Farahikia is a second year PhD student in the mechanical engineering field. He enjoys research and entered graduate school for enhanced learning opportunities, as well as to gain more skills as a researcher. He indicates that graduate school has the potential to boost your knowledge in a specific field of interest to the point of expertise. Additionally, he believes that graduate school stimulates students to think outside the box and to figure out problems through a different perspective.

Xue Liu, a first year PhD candidate in the biomedical engineering field, advises undergraduates to identify where their passions lie before applying to graduate school because different graduate schools may not offer certain programs. Since she is from China, she finds that attending graduate school in the United States is an eye-opening experience. It is a great opportunity to see more of the world and to gain additional wisdom, which is more limited when staying in one area.

Shane Persaud is a first year PhD candidate in the electrical engineering field and focuses on speech recognition. He describes graduate school as being more hands-on and specialized; the working environment often consists of fewer people, which allows for a more efficient approach in terms of skill development and one-to-one communication with professors. Shane finds graduate school to be more enjoyable because every student has something unique to contribute.

Diana Hnedzko, a chemistry department PhD candidate, views time management as one of the most important skills to have or develop throughout one’s undergraduate school career. She explains how graduate school expects students to handle more on their plate as they will need to take classes, teach classes, and conduct research. “You present your results to your professor, and they will expect you to explain your results; instead of asking “why” questions, you’re often starting with “because,” she reveals. “You definitely have more responsibilities and must think critically.”

Michael Chung is working on his master’s degree in Biochemistry, and will be enrolled in medical school in Fall 2014. Having completed his undergraduate degree at Binghamton University as well, he sees more autonomy as a graduate student. He enjoys the social atmosphere at Binghamton because peers are generally supportive of each other. However, he emphasizes that the ability to self-direct matters as a graduate student does not erase the repetitive lab work, such as washing glassware.

These science and engineering graduates agree that graduate school is a smart choice, assuming that students are motivated and determined to work hard in the pursuit of their passions to become successful. Overall, the Graduate Student Panel provided first-hand advice to undergraduates, who deemed them valuable and inspirational.
The miniBridge program has become one of many significant events to the Binghamton Biochemistry Club. Upon its founding by former president Lance Kong, the traditions and values of this promising program have been graciously upheld. We, the Biochemistry Club, sought to reach out to our Binghamton community on the basis of a language we speak very well: science. Coming from a university so devoted to civil engagement and public outreach, the Biochemistry Club’s miniBridge program is an excellent opportunity for an aspiring scientist to meet with and influence the life of another.

Throughout the duration of the 2013-2014 academic year, the Biochemistry Club visited two schools: Binghamton West Middle School in the fall semester and Johnson City Elementary School in the spring semester. Both visits began and ended with the same purposeful goal. We sought to inspire and ignite a passion for science within the youths of Binghamton’s community. At such a young age, the promise and potential that each child holds is unlimited. Science is so often dismissed as too daunting or too competitive for the timid adolescent to explore. Our club engaged with each student on a personal level, bringing creativity and excitement to the subject field, with the hopes of sparking any interest that may be lying dormant within.

We performed the experiments at each school in organized manner. With numerous meetings to ensure preparation, we coordinated and executed a series of scientific experiments. Each experiment was designed to convey a fundamental scientific law or concept in a graspable manner. We gathered Biochemistry Club volunteers to begin going over each experiment, focusing on details, such as the comprehensibility of major concepts and the use of language that will be understandable to our young audience. Ranging from a variety of experiments, such as using a “magic wand” to demonstrate electrostatic interactions, each was elaborate and exciting, straying from the typical experiments.

The presentations were met with receptions of amusement and awe. At the beginning of the lesson, I asked each student what he or she wished to pursue in the future. I heard an array of responses, anywhere from fireman to ballerina. As plausible as each dream and aspiration was, there were a few who wished to pursue the sciences. At that young age, such a goal is admirable, yet scarce. After the series of experiments and explanations were conducted, the number of students who now wished to explore the sciences increased. I asked the students if there was any hint of interest in the sciences now that they’ve had some fun with the science experiments. The number of students who were jumping up and down in their seats was anything but scarce. That very response is exactly why we, the Biochemistry Club, continue with the miniBridge Program every academic semester. Given the opportunity to inspire and spread the passion and joy each club member feels about the scientific world is an opportunity well granted and not to be missed.
On November 11, 2013, the Binghamton Biochemistry Club held its first Academic Tournament. The purpose of this event was to create a stress-free yet competitive environment for reviewing key science topics. Questions were taken from all introductory science classes: physics, chemistry, biology, and organic chemistry, which are also the major science sections on the MCAT. The first half of the tournament featured physics and chemistry questions while the second half focused on biology and organic chemistry.

Teams were divided into two groups of four. Members of Team Cysteine included Matthew Petryk, Frederick Hance, Sophie Russ, and Zara Shah. In the opposing team, Team Methionine, the members were Steve Kwon, Asvin Sivapalan, Ben Kleinstein, and Jayanti Rao. Each team was given a bell to ring in order to answer the questions in a style similar to Jeopardy. As the title slide of the physics section lit up, each team switched to their competitive mode and anticipated the first question.

Within just a few seconds, Team Cysteine rang the bell, confidently answering the first question correctly. One after another, Team Cysteine sped through the questions, with the ease of taking candy from a child. It is safe to say that they dominated the physics section. Team Methionine needed a major comeback in the chemistry section for any chance at winning. Unfortunately, the chemistry section was unable to provide the much needed aid for them, as Team Cysteine once again answered the majority of the questions. At the end of the chemistry section, there was an intermission for participants to relax and regroup.

As the intermission came to an end, the teams readied themselves for the next half of the tournament. The biology section proved to be difficult for both teams. Some questions were tricky, while others were too detail-involved to remember. Organic chemistry seemed comparable in complexity. Since some team members were undergrads, unfamiliarity with the subject was quite predictable. For upperclassmen, these sections represented a call to review and retain key points.

Needless to say, neither team significantly surpassed the other in the second half of the tournament. When all the points were finally added up, Team Cysteine was declared the winner. While their victory may have seemed apparent, the score was surprisingly closer than expected: 17 points for Team Cysteine and 13 points for Team Methionine. All team members were awarded medals and Sophie Russ was awarded the special MVP award for correctly answering the most questions.

The first Academic Tournament was a great success, proving to do exactly what it was designed for: creating a stress-free, competitive, and exciting event for anyone who needed a quick review in the sciences. It was a great way for attendees and participants to familiarize themselves with key MCAT topics, and an excellent refresher of major introductory science classes at Binghamton. As a participant, I am excited for the next Academic Tournament, and I encourage all interested club members to take part in this friendly, educational competition!
If you were to ask me two years ago if I felt research were for me, I would have said my place is in the classroom and not in the lab. I had certainly looked into joining labs during my freshman and sophomore years but I never seemed to be able to find my place. Then one day, just when I had given up all hope, a close friend of mine suggested that I try asking a professor who was new to the school for an opportunity to learn in his lab. I decided to give it a shot and after a few brief correspondences, I realized that I have found the right place for me. In the fall of my junior year, I began working with Dr. Brian Callahan and studying Hedgehog Proteins.

Initially, the work was slow as the lab was being set up, but this provided the perfect opportunity for undergraduates to begin learning relevant research techniques. After some time, Dr. Callahan gave us our own project to work on throughout the semester. This is when I really began learning the importance of a laboratory education; I was learning more in a week at the lab bench than I was in a whole month of some of my other courses. Taking the protein from the gene level and working with it every step of the way up to its purified form opened my eyes to the vast number of techniques that biochemists have available to them to aid them in their research. As we were constantly introduced to new methods to analyze our reactions, it seemed like there were an infinite number of ways to find and subsequently confirm our results.

I would definitely say that my experience in the lab has been an essential part of learning biochemistry for me. Laboratory research has allowed me to practice techniques taught in class and apply the theories in a real setting to understand how they actually work. I would tell any biochemistry student who is interested in research to try it and to look at various professors’ works in order to see what interests them. There are many research areas relevant to biochemistry, so it is up to the student to seek out a professor whose research aligns with his or her personal interests.

After Binghamton, my plans include attending medical school. I certainly believe that the skills I acquired in the lab will benefit me as I move on to this next step in my life. The emphasis on patience and perseverance that come with performing and re-performing experiments has given me the ability to stay calm and collected in even the most trying of situations. When I become a physician, I am positive that I will often look back at my time spent with Hedgehog Proteins and remember that my work with them played a major role at making me the scientist that I am today.
Expect the Unexpected

By Syris Winge Barnes

Coming into Binghamton University as a transfer student, I had one particular goal in mind: to gain some research experience. I was elated when I was accepted into Dr. Ming An’s lab through the Binghamton University Howard Hughes Medical Institute (BUHHMI) program, which I highly recommend Biochemistry majors to apply for. At first, I expected that research would consist of jumping right into exciting experiments and getting results considerably quickly, but that was not the case. I needed to read scientific articles, learn techniques, and familiarize myself with the machines. Although I was not able to partake in experiments right away, I later realized that the tedious tasks stated above were necessary to accurately analyzing and understanding the data obtained.

In the lab, we are currently focusing on how a pH-low-insertion-peptide (pHLIP) interacts with various cancer cell lines by conjugating fluorescent dyes and quencher molecules. pHLIP has the potential to be an innovative drug delivery system for various cancers due to its target specificity of low pH cells, such as cancer cells. The creative methods involved in research, such as the inventive strategy used to investigate how pHLIP interacts with cells, positively impacted my choice to pursue a career path in pharmaceuticals.

Therefore, after graduating from Binghamton University with a Bachelor of Science degree in Biochemistry, I intend to apply to numerous programs for a PhD in Pharmaceutical Sciences.

Working in Dr. Ming An’s lab has taught me that the results obtained do not always correspond to the predictions. In fact, they often tell you something completely contradictory to your expectations. For instance, my lab hypothesized that the control was going to serve as just that, but it in fact served an alternate purpose, and consequently opened more doors and created more questions for further research. In other words, research is not all about getting successful results. Sometimes, your hypothesis or rationale of thinking may not be supported by the data collected. Ultimately, what you learn while conducting experiments and how you create solutions for the problems and complications that arise is more valuable in the long run.
Goals and Chance

By Nikki Naim

To students taking courses such as Molecular Genetics, Nutrition, Pathophysiology, or Cell Biology, Professor Lina Begdache is an energizing and effective lecturer. With her wide range of interests in commonly divided fields, Dr. Begdache’s classes are known for memorable connections between diet and cellular consequence. Therefore, while her classes could reveal surprising truths behind luncheon meat or caffeine, this professor and mother of two is also a role model for scientists with broad interests. Since multi-talented students may feel pressured to minor or double-major, Dr. Begdache’s academic path can provide insight, as she has found success through setting goals as well as taking chances.

Currently studying neurodegeneration, epigenetics, nutrigenomics, and nutrigenetics, some would be surprised to learn that Dr. Begdache’s career began by an event of chance. This “chance” came in the form of a dietician internship, and ultimately inspired her to pursue a Bachelor of Science degree in Nutrition and Dietetics. Then, upon having no option of dietetics in her choice graduate school, SUNY Buffalo, Dr. Begdache put faith into another chance and explored Nutrition Sciences. Although dropping dietetics may not have been planned, Dr. Begdache notes that her adaptation to study one subject also marked her exploration of depth for nutrition. So, when it came time for her PhD at Binghamton, Begdache knew she could take a risk to achieve her biggest goal of increasing her scientific scope in addition to depth. This became Dr. Begdache’s active choice of Cell and Molecular Biology to complement a background in nutrition and to mark her unique identity as a scientist. So, once she set and met the goals of her graduate project in neurodegeneration, Dr. Begdache’s path of ambition and risks became her deep and wide-ranging knowledge as a professor. In fact, while noting a personal commitment to family, Dr. Begdache suggests that both graduate and undergraduate students set realistic goals and allow room for chances to explore different topics, as they are potentially useful for the future. After that, as long as the student maintains his or her grades and attains experience, he or she can become a diversified scientist who is both competitive and marketable.

Professor Begdache has previously participated in great programs, such as “Ask a Scientist” and Employee Assistance Program (EAP) webinars. Thus, as she currently teaches a new nutrition course for Decker School of Nursing graduate students, Dr. Begdache continues to lead by example and give effective advice to students.
Follow your Passions

By Betty Chu

A new addition to Binghamton’s Chemistry Department, Professor Wei Qiang arrived in Binghamton in January 2014. He is an assistant professor in biophysical chemistry and is studying the biological applications of solid-state Nuclear Magnetic Resonance (NMR) spectroscopy.

Influenced greatly by his chemistry teacher in high school, Dr. Qiang decided to pursue a higher degree in the field. He received his bachelor’s degree in chemistry from Tsinghua University in Beijing, China and a PhD in chemistry from Michigan State University. He was first introduced to the solid-state NMR technique in Michigan and ended up joining a group that focused on it. His advisor, Dr. Weliky, specialized in the technique and worked with an HIV fusion protein. Professor Qiang’s experience as a graduate student in Dr. Weliky’s lab was the stimulus that led to his decision to dedicate his career to working with solid-state NMR.

Dr. Qiang explains that solid-state NMR is useful for analyzing samples that do not dissolve. Compared to solution NMR, which is commonly used in the organic chemistry field, the solid-state NMR technique can analyze a broader range of samples, including gels, tissues, and bones. It is a highly practical method that is used by scientists in the biophysical and biochemical fields.

Dr. Qiang completed his post-doctoral research at the National Institutes of Health (NIH) in Maryland. He expressed that NIH was an excellent place to complete his post-doc, as the sole focus of the institution was research, not teaching. He learned a lot from his advisor, Robert Tycko and worked on a number of projects, including studying the structure of beta-amyloid fibers from brain tissue.

Here at Binghamton University, Professor Qiang is studying the structure of amyloid plaques that are involved in the degeneration of neurons in relation to Alzheimer’s Disease. The use of solid-state NMR for this research is crucial, as membrane samples cannot dissolve in water. By analyzing different amyloid plaques from patients with distinct clinical history, it may be possible to identify a correlation between clinical history and the structure of the plaques. Professor Qiang is also interested in designing molecular markers that can bind to the amyloid plaques for diagnostic and treatment purposes. He suggests that the long term goal of this research would be to develop therapeutic applications.

Having had excellent experiences in his graduate and post-doctoral research labs, Dr. Qiang advises undergraduate students who are interested in science and research to join labs early in order to determine their true interests. He states that it may take several lab rotations to do so, but he encourages students to put in the effort to discover their passions, so that the subsequent time and energy dedicated to that research will truly be a rewarding experience.

Passionate about solid-state NMR spectroscopy, Professor Qiang plans to continue to work with this technique, as well as to learn and apply new spectroscopic techniques to completely understand the biological systems of his interests.
FACULTY FEATURE

Research for the Common Good

By Phillip Sander

Few professors at Binghamton University have had a bigger impact on the greater scientific community than Dr. Omowunmi Sadik of the Center for Advanced Sensors & Environmental Systems (CASE) Lab. Starting her career as an undergraduate student at the University of Lagos in Nigeria, Dr. Sadik developed a passion for the sciences at an early age. Despite an initial push towards the medical field from her parents, she chose chemistry as her concentration. Her decision has allowed her to focus on basic science, rather than focusing on a specific end product, as is often the goal in medicine and related sciences.

Dr. Sadik has made the most of each opportunity, drawing from her experiences at different universities and applying them successfully here at Binghamton. In her final year as an undergraduate at the University of Lagos, Dr. Sadik obtained an honors research position that exposed her to the field of electrochemistry. At CASE, electrochemistry is a large part of our research and one of the first techniques often learned is cyclic voltammetry, which can be used to investigate the chemical reactivity of a species. Later, at the University of Wollongong in Australia, her mentor Gordon Wallace introduced Dr. Sadik to the world of ‘intelligent’ conducting polymers. This position also had a lasting impression on Dr. Sadik’s work. One of the core projects at CASE Labs is the design of conducting polymer membranes utilizing Polyamic Acid (PAA). According to Dr. Sadik, PAA is unique in that it gives the researcher ultimate control over many physical properties, including flexibility, conductance, electroactivity, and even biodegradability. This research has led to collaborations with the Harvard School of Environmental Health and in the future, these membranes may be utilized for anything from nanoparticle filtration to water filters with the ability to inhibit the growth of pathogens incorporated directly into the membrane.

While membrane and surface chemistry is an important part of Dr. Sadik’s research, one particular project stands out as being the most memorable. The Ultra-Sensitive Portable Capillary Sensor (UPAC), developed while working with a student at the Naval Research Lab, is a portable analytical system that is used for highly selective and sensitive detection of biomolecules by means of optical fluorescence. The glass capillaries act as a sensor template on which biomolecules are covalently attached to the inner wall. The selectivity of the immobilized antibody allows for molecular recognition of various bioaffinity reagents. Utilizing the glass capillary as the sensor template ensures that the sensor surface will never be contaminated by exposure to the outside environment; this is a simple yet brilliant design that ultimately led to multiple patents. Not to say that any single project is more important than another, but in regards to food safety, this portable device had an immediate impact and was a tangible result of Dr. Sadik’s ethos: research for the common good.

Having called Science 2 home for the last 18 years, Dr. Sadik and CASE Labs will move to the Center of Excellence within the new Innovative Technologies Complex buildings starting in Fall 2014. While the aging Science II facility has never hindered her research, Dr. Sadik hopes that the higher profile of the new space will help showcase her research and assist in the never-ending quest for fresh funding. As there is a strong work ethic in the lab, under Dr. Sadik, CASE will continue to grow and be a force in the research community for years to come. Her advice for students is straightforward, but powerful: whether your field is research, medicine or academia, pursue what you are passionate about and when the inevitable roadblocks present themselves throughout your career, you can draw on that passion to overcome them.

Professor Omowunmi Sadik
PhD, Chemistry
Organic chemistry is a core class for some science majors, frequently being cited as a prerequisite for upper level biology, chemistry and biochemistry classes. For most students, typical memories of the class include learning reactions and memorizing reaction mechanisms. Trying to memorize every single reaction between various compounds in a cut and dry manner is simply impossible due to the atomic changes that could be made to a molecule, which could, in turn, drastically change the reaction. Inevitably, students come to understand this and look for patterns in reactions, with some asking the very important question of “how” reactions happen. The simple answer would be to show the mechanism. But beyond that, how many students have asked the equally important question of “why” with regards to reaction mechanisms? Most students have learned to simply accept the mechanisms printed in textbooks and taught by instructors as undeniable truth.

What if an assistant professor at Binghamton University dared to challenge and disprove the accepted mechanistic paradigms? Dr. Mathew J. Vetticatt, a recent addition to the chemistry department at Binghamton University is investigating the mechanisms behind many asymmetric organo-catalytic reactions and studying how many of these catalysts interact with their substrates. Typically, when a new reaction is established and published, the underlying mechanism may not be well understood, which could severely hamper repeat attempts as well as future research. The applications of his research are eccentric, ranging from mechanistic enzymology to computer-aided drug design. After all, questioning and understanding the crucial aspect of “how” many of these reactions occur are the basis for development of future reactions.

However, Dr. Vetticatt’s path through chemistry has been an unconventional one. Originally from India, Dr. Vetticatt knew that he would ultimately strive for a PhD in chemistry and tried to plan his undergraduate studies around it by studying chemical engineering at the Institute of Chemical Technology in Mumbai, India. His decision to go into the field of chemistry was due to his fascination and interest with organic chemistry since high school. His choice of going into academia was influenced by his mother, an English professor, giving him firsthand insight to the inner workings of academia. He continued with his doctorate degree at Texas A&M University and postdoctoral positions at the Albert Einstein College of Medicine and Michigan State University.

Despite all his relocations, Dr. Vetticatt believes he has found a good fit here at Binghamton University: “The [chemistry] department does really well [in] taking care of their junior faculty. In your first two years here, you don’t have to teach a large class and [the department] really lets you focus on getting going (in terms of research).” When asked about his views on the future, Dr. Vetticatt sees himself staying and emphasizing the organic aspect of the chemistry department with the interest that has been generated by his group. Without a doubt, another important factor for his choice to remain at Binghamton was the quality of research the undergraduates were capable of performing. In the past year alone, Dr. Vetticatt has had about 15 undergraduates cycle through his research group. He takes pride in the accessibility of his research in that he “isn’t inventing new complex methods,” but rather “studying basic reaction mechanisms where students don’t need a whole lot of training or background.”

With so many students, Dr. Vetticatt admits that it can sometimes be tough managing all his students and have a work-life balance. To resolve those issues, he keeps a strict separation between each of the following: working with his students, conducting research, teaching, grant writing, and tending to his family. So far, it seems to be working for him and he attributes his success, as well as the successes of his students to internal motivation.

For any student with similar drive and direction, Dr. Vetticatt would like to remind us all: “while publications are a big deal and a great boost for undergraduate students who are going to graduate school,” it is not the only thing. In fact, he states: “During graduate school, I did not get a single publication,” and yet still serves as an ongoing example of what an adamant and undaunted individual can do.
Recent Publications by Undergraduates in the Biochemistry Program*


*Publication citation is presented in an informal fashion for the purpose of recognizing Binghamton students.

Student Presentations at Research Conferences


Graduates of the Class of 2014 with Honors in Biochemistry

Benjamin Laraway
Thesis Title: Method for Expression, Purification, and Cholesterol Modification of Recombinant Human Hedgehog Proteins
Research Advisor: Dr. Brian Callahan

Kurnvir Singh
Thesis Title: Activation and Inhibition of Alanine Serine Cysteine Transporter 2
Research Advisor: Dr. Christof Grewer

Honor Society Inductions

"Congratulations to Brandon Bordeau, junior Biochemistry major and shot putter for the Men's Track and Field Team, on his induction into the Chi Alpha Sigma National College Athlete Honor Society. Selection criteria for student athletes include a cumulative GPA of >3.4, endorsement of the head coach, and completion of at least one year in a varsity level sport sponsored by the NCAA. Brandon was inducted into this prestigious Honor Society on April 7th, 2014. Great job!"

—Dr. Brian Callahan, Assistant Professor of Biological Chemistry
In 2012, I graduated with my Bachelor of Science degree in Biochemistry as a pre-medicine student. Most, if not all, of the requirements for pre-medicine were also required for my major, so this was very convenient for staying on track. Declaring my major in the second semester of my freshman year was considered a rather early decision, but I found that it was not wrong; in fact, my passion for biochemistry has only increased with time. My favorite Biochemistry courses in Binghamton were those that were the most challenging for me and required the most studying time, including Organic Chemistry II with Dr. Rozners and Biochemistry with Dr. Anna Tan-Wilson. My professors encouraged me to think critically, which is the most important skill I had gained as an undergraduate student.

During my gap year after graduation, I took my MCAT and applied to medical school for the first time and engaged in various service events in the Binghamton community. The events included teaching basic computer literacy to adults at the Broome County Public Library, delivering meals to Binghamton residents through Meals on Wheels, and completing Basic Emergency Medical Technician NYS certification through Broome County EMS. Towards the end of my gap year, I decided to apply to various post-Baccalaureate programs related to medicine and biochemistry. I was accepted into the one-year, non-thesis Master’s program in Biochemistry and Molecular Biology at Tulane University School of Medicine, located in New Orleans, LA. The three-hour drive to Binghamton from my home in Queens, New York was the farthest I had ever gone to receive my education at that time, so needless to say, I was, at first, reluctant about going all the way to New Orleans to receive a Master’s degree. As no Binghamton alumni had gone to Tulane University for Master’s degrees in the Biomedical Sciences graduate program, I could not consult with anyone. However, several factors affected my decision to enroll in the Master’s program.

First, my background and interest in Biochemistry was ideal for succeeding in a Biochemistry Master’s program, which would otherwise be challenging for those without the experience. Second, the program was only one year, did not require a thesis, and was incorporated into Tulane’s School of Medicine. Several of my courses were the same classes that the medical students took at Tulane, including the Human Metabolic Biochemistry course. This gave me a unique advantage—I was able to learn more medically-relevant biochemistry as a graduate student, while simultaneously challenging myself to take the same course as a first-year medical student. Third, I wanted the experience of adapting to a big city that is completely different from New York. New Orleans is a unique location to study medicine because the typical patient demographic is quite different from the rest of the United States. On top of that, the lure of delicious food, a rich cultural history, and great music of New Orleans certainly helped finalize my decision to enroll by the end of May 2013. I moved to New Orleans in July and immediately fell in love with the city. Then, as classes started in September, I knew my rather rushed decision to complete my Master’s in Biochemistry was the right one.

The last seven months have gone by so fast, and somehow I find myself graduating in a few weeks. The experiences I have acquired as a graduate biochemistry student in a medical school have satisfied my passions for both biochemistry and medicine. After graduating with my Master’s degree, I plan to retake my MCAT and reapply to medical school. I am still unsure of my plans for my next gap year, but I know that whatever I do, it will be something I can put my whole heart into.

My advice for undergraduate students is to figure out what your passion is by getting as many new experiences as you can, by prioritizing learning something new over getting an A, by challenging yourself with different courses, and by always giving back to the community. This strategy has worked for me, and I was lucky to find early on that biochemistry is more than a subject to which I dedicated four years of my college life. Biochemistry is a way of thinking that I have learned to apply to everyday situations, and it has greatly influenced my decision to pursue a career in medicine.
In the past, I believed that hard work and talent were the most important factors in allowing an individual to find success. However, I soon discovered that there are ample examples in the world in which hard work, talent, or the combination of the two does not yield the anticipated outcome. In my case, I previously attributed each success to hard work or talent but began wondering if other factors also played a role. For me, I realized that three important qualities were crucial in enabling me to find success.

My research advisor Dr. Ming An once stated, “We have to learn to become best friends with disappointment in life.” And indeed, I had to encounter this feeling countless times during my academic career. Although the word disappointment has a negative connotation, I came to embrace disappointment because it can teach us more valuable lessons than our successes can. It was through disappointment that I learned my personal flaws in work ethic or knowledge of a subject and worked to improve them. I also discovered that mistakes and failures can serve as powerful indicators for which direction to head next. During my research career, for example, there were countless experiments that failed to produce the anticipated results. Instead of dwelling in disappointment, I asked myself instead what I learned from failure. Incorporating these lessons gave me new visions to guide me in designing future experiments that were successful. This I came to embrace resilience to overcome times of disappointment.

Although I learned the importance of possessing a strong mindset in times of hardship, I soon realized that the ways we conduct ourselves in times of success are also just as important. During my first semester of my undergraduate career, I allowed myself to be flooded with happiness and confidence in times of success. The confidence was initially helpful but built the foundation for complacency. Complacency was especially dangerous since I refused to improve and felt better prepared than I actually was. Being complacent led me to my worst academic performance at Binghamton University. In the aftermath of the debacle, I knew I had to change my attitude and came to embrace humility. Humility enabled me to not only balance my positive emotions but also convinced me to place my best efforts for everything I do. As long as I gave my best effort, I never felt regret for any task even if the results were not what I initially desired.

Gratefulness is the last but the most important of the three qualities. I value gratefulness since it can seed a deep sense of motivation in times of apparent hardship. In a typical day, it is easy to remember the negative events. If we take a step back, however, we will see that there are countless things that are often taken for granted. Being grateful allowed me to succeed on various tasks since I spent less time complaining and more time focusing on the goal. For example, being grateful helped me overcome my most difficult academic tasks. Although I often wanted to complain, I realized that education and the knowledge that I gain are a privilege. There are countless individuals who desire to pursue quality education but cannot due to financial, family, or other external pressures. Being grateful also enabled me to realize how trivial some of my disappointments were. Although receiving a poor grade seemed like the end of the world, I also reminded myself that there are worse mistakes that can be committed in the world that lead to loss of jobs, wealth, and even family. Lastly, being grateful allowed me to appreciate who I am. Comparison of one individual to others is a common practice in our society. However, I realized that my worth and identity are not affected if I lack an achievement or skill compared to a peer. Instead, I saw that I possessed my own unique set of skills and personality that can help me succeed. Taking nothing for granted gave a clear and motivational perspective for me to find success.

Thus, my secrets to achieving a successful undergraduate career did not happen through hard work alone. In fact, the synergistic combination of resilience, humility, and gratefulness is what enabled me to endure challenges and successes alike. For me, my gradual metamorphosis from an immature freshman to a knowledgeable student was the most rewarding experience during my time at Binghamton University.
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Letter from the President

Dear Fellow Students, Faculty, and Alumni,

It has been both an honor and privilege to serve as the President of the Biochemistry Club. With our past events running smoothly and successfully, I look forward to the innovations that our committees and executive board have been developing. All the work and logistics that go behind planning and executing our events and publications would not be possible without all of our willing and committed members. As a result of their diligence, starting next semester, we will be hosting a new research seminar and academic tournament in addition to most of our usual events.

Support comes in many forms. Repeatedly over the last few semesters, the student body and faculty have been gracious with their attendance and participation at our events, as well as their following of our publications. The student association and faculty members such as Dr. Bane have given us greater financial backing to make our publications and events possible along with even more potential. As our club continues in its endeavors, it is important that we do not lose the balance between either forms and have one outgrow the other.

With all of this said, I know I leave the future in great hands.

Sincerely,
Morgan Zhao

Letter from the Newsletter Coordinator

Dear Students, Faculty, Alumni,

It has been an honor to serve as the Newsletter Coordinator for the Binghamton Biochemistry Club for the 2013-2014 academic year. I would like to thank Dr. Susan Bane for her administrative and academic support, the University Communications and Marketing Office of Creative Services for collaboration, and the Binghamton Alumni Relations Office for administrative help. Thank you: Lance Kong for the cover; the writers, the interviewees, and all the members of the Biochemistry Club! I hope you all enjoyed the newsletter!

Sincerely,
Betty Chu

Binghamton Biochemistry Club Eboard 2013-2014

Back row (left to right): Jenny Tse, Phillip Sander, Frederick Hance, Winman Lei

Middle row (left to right): Betty Chu, Lindsey Corbin, Gabriella Hecht, Kurnvir Singh, Jiyeon Park, Sophie Russ, Morgan Zhao, Johnny Wong

Front row (left to right): Stephanie Jiang, Travis Lageman, Steve Kwon