Spring 2013

JHU Department of Biophysics
Undergraduate Newsletter

Senior Profiles

The Spring issue each year highlights our graduating seniors. Congratulations to the Biophysics class of 2013!

Leah V. Sibener

Leah Sibener grew up on the south side of Chicago, close to the University of Chicago. She is one of the captains of the varsity track team and has held positions in the Foreign Affairs Symposium and College Democrats. Initially she was deciding between majoring in International Studies and Biophysics. Ultimately she decided to study Biophysics because she was interested in basic questions in biology, but wanted to look at them from a quantitative perspective. Additionally, the faculty and students in the department were very welcoming to new students and seemed to put a lot of effort into helping the students succeed.

Through her experiences at Hopkins, Leah fell in love with biomedical research. During the first two summers she participated in an REU (Research Experience for Undergraduates) at the University of Chicago in structural immunology, and an internship at Genentech Inc., in San Francisco. Ultimately her research interests are in the biophysics of immunology. She worked in Dr. Jonathan Schneck's lab at the JHMI in the Department of Pathology, and Institute of Cell Engineering where she was interested in the effects of different co-stimulatory molecules in the development of CD8 memory T cells.

Leah has thoroughly enjoyed all of the classes in the biophysics major but her favorites were Dr Doug Barrick's *Biophysical Chemistry*, as well as Dr. Karen Fleming's *Molecular Interactions Laboratory* Dr. Fleming's course on molecular interactions was unique in its application of the material taught in class, and taught new ways to look at basic questions in molecular biophysics. Her favorite class outside of the Biophysics department was *Immunobiology*, taught by Michael Edidin (It was Dr. Edidin that introduced her to Dr. Schneck where she did her thesis research).

Outside of biophysics, Leah enjoys exploring the city with her friends. She often goes to Max's in Fells Point, Bikram Yoga in Hampden, and Pete's Grille (has not seen Michael Phelps though). Most of her free time goes into Track, but finds time to enjoy college and the city of Baltimore!

Some advice for future biophysicists from Leah, "You will get out of this major what you put in. The professors and students all want you to succeed and do well at Hopkins and beyond. Some of the best life advice is obtained from conversations with faculty members, not necessarily about class. Take advantage of this tight-knit community, it is a very special department within Hopkins and it will really shape your academic undergraduate experience."

Next year Leah will be starting her PhD as an NSF fellow at Stanford University in Immunology/ Bioengineering.

Joshua Riback

Joshua Riback came to Johns Hopkins from Livingston, a suburban town in northern New Jersey. He attended Livingston High School (with fellow Biophysics Major, Jeff Granat). During high school Josh had participated in a three year research program. Thus, for his undergraduate studies he wanted to attend a school that had a major where he could prepare himself for graduate school.

Josh majored in biophysics because it is one of the most rigorous and flexible programs at Johns Hopkins. He has found that the Biophysics Department differs from many departments because the classes focus on learning concepts above memorizing details that will not be remembered after the final exam. He has enjoyed the professors in the department who dedicate more time to their classes, including forging a relationship with their students.

One personal example for Josh is the dedication shown to him by his research mentor, Dr. Bertrand

The T. C. Jenkins Department of Biophysics Undergraduate newsletter is published twice yearly. The articles are predominantly written by current Biophysics majors and alumni. Announcements about the major are included, too. The Newlsetter is coordinated by Prof. Karen Fleming, Biophysics Director of Undergraduate Studies. Contact her at Karen.Fleming@jhu.edu to contribute articles. Previous issues can be found at http://biophysics.jhu.edu/undergraduate_newsletter.html

García-Moreno. For the past three years, Josh has worked in Dr. García-Moreno's lab where he developed computational algorithms to identify and to characterize buried ionizable groups structurally, to infer molecular determinants of the electrostatic potential of the protein, and to examine consequences of naturally occurring internal ionizable groups on thermodynamic stability. When Josh was eager to attend conferences to present his research Dr. García-Moreno nominated him to receive the Szuts travel award and funded him to present at both the 26th annual Gibbs conference on Biothermodynamics and the 57th annual biophysical society conference.

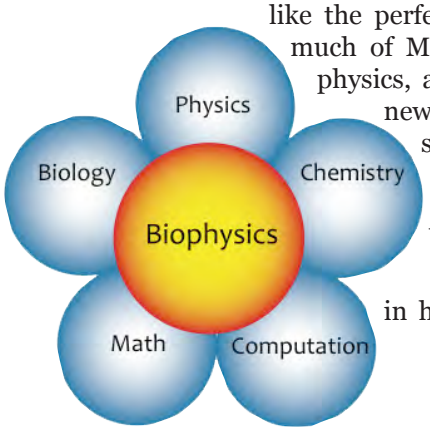
When Josh applied to graduate school, Dr. García-Moreno helped him in every part of the process, giving him feedback on his research statement and performing mock interviews with him. Josh is expecting to publish three papers on his research in the lab. He notes how the high professor to student ratio allows this type of dedication from professors to be the rule rather than the exception. Josh thanks all of the Biophysics professors, especially Dr. García-Moreno and Dr. Carolyn Fitch, for all they have done during his four years at Hopkins.

Josh's main advice to incoming biophysics majors is to follow your passions and explore your interests wherever they lead you.

After the summer Josh is moving to the Chicago with his fiancée where he will attend the University of Chicago's Biophysics Program as a PhD candidate.

Maxwell M. Rebarber

Max grew up in central New Jersey and made his way south to Baltimore for his college career here at Johns Hopkins. He arrived interested in the sciences, but unsure of what exact path to take. Biophysics thus seemed like the perfect choice – it incorporated much of Max's interests in Chemistry, physics, and biology in addition to a new computational aspect of science he had never encountered before. He reflects that his decision could not have been a better one.



What fascinated Max most in his classes was how his outstanding professors stressed biophysics was at the forefront of and promised an outstanding future for modern science and medicine. As our computational abilities start to catch up with the copious amounts of data we harvest, biophysics hopes to provide answers to questions we never thought to ask before. For Max, this was inspiring.

Max centered his undergraduate research on a cancer pathway under Dr. Joel Tolman's supervision in the Department of Chemistry. Using multidimensional NMR techniques to observe enzyme structure and dynamics, he was able to learn more about the enzyme's contributing role to the pathway.

One assignment that stands out from his college career is Max's paper on *Viral Mediated Gene Therapy*, conducted for Dr. Moreno's *Advanced Seminar* course. The interest here again for Max was the prospect of curing disease with the burgeoning technique of using viruses as medicine.

Outside the classroom Max was an avid participant in club and intramural sports, as well as an active member of his fraternity. Max served two terms as an officer of Pi Kappa Alpha here on campus, as Chapter Treasurer and Chapter President. Max hopes the invaluable skills he learned inside and outside the classroom will help him later in life.

Max has accepted a position with Deloitte Consulting, LLP in Washington, D.C. as a Federal Business Technology Analyst. He hopes to remain there for a number of years and possibly attain an M.B.A. Further down the road, Max hopes to own and operate a small biotech firm centered on individualized genome testing and therapy. All Max has accomplished can be owed to the incredible staff and support of the Biophysics Department.

Jeffrey Granat

Jeff hails from Livingston, New Jersey, a great suburban town formerly the home of Jason Alexander (George from Seinfeld) and Roger Y. Tsien (2008 Nobel Prize chemistry laureate). Jeff is a big fan of the NY Yankees, NY Giants, and science. He was thrilled when admitted to Johns Hopkins because he was excited to become part of one of the most vibrant scientific communities in the world. He originally planned on majoring in biology, but that changed after attending the biophysics open house during freshmen orientation.

At the open house, Professor Richard Cone, one of Jeff's future professors, described the biophysicist's approach to studying life: they study life in terms of forces and energy and ultimately explain biology by using principles from physics and chemistry. This exciting approach to studying biology intrigued Jeff, and he shortly thereafter declared his major in biophysics.

Jeff loves the biophysics program because of its interdisciplinary nature, small class sizes, and down to earth professors. He enjoyed having the opportunity to take enriching classes from all different departments including biophysics, chemistry, biology, physics, and mathematics. One of Jeff's favorite classes was *Intro. to Biophysical Chemistry* taught by Dr. Doug Barrick. Jeff really took a lot away from Dr. Barrick's class and enjoyed using a physical chemistry approach to studying biological macromolecules. Another one of Jeff's favorites was *Advanced Seminar in Structural Biology of Chromatin* taught by Dr. Greg Bowman. Jeff loved learning about the various aspects of chromatin biology and thought it was a great complement to his research project in Dr. Bowman's lab.

Jeff's undergraduate research project focused on quantifying the energetic contributions of histone arginine residues toward nucleosome stability. Working in Dr. Bowman's lab was the most enriching part of Jeff's undergraduate career at Hopkins as he learned to think like a scientist and was trained for a future career in science.

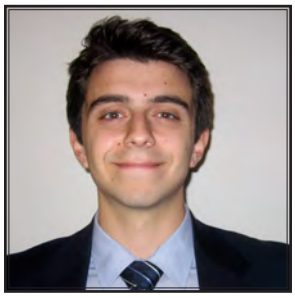
Baltimore has other great things to offer in addition to the Hopkins biophysics program, Jeff assures prospective students. He has really enjoyed spending time at the Inner Harbor with his friends and going to Orioles games. Jeff implores all biophysics students to take advantage of Baltimore's restaurant week and highly recommends dining at the Brazilian steakhouse Fogo de Chão. It's a delicious experience you won't forget!

Jeff is applying to M.D./Ph.D. programs this summer and will be continuing research here at Hopkins next year.

Philip Baddoura

Philip was born and raised in Ridgewood, New Jersey, a suburban village in the outskirts of Manhattan. As an undergraduate decided on the pre-med track, Phil wanted to pursue an academic curriculum that focused on science. He decided his freshman year that the Biophysics major would provide a well-rounded experience that catered to his interest in physics and math. Soon he realized that he made the perfect choice due to the department's helpful faculty and great professors. Phil loved the small class sizes since they made for an intimate learning environment. He also met some great friends in the major whom he studied and hung out with.

While Phil enjoyed all the biophysics classes, Dr. Pat Fleming's *Computational Biology* ranked high amongst his favorites. This subject utilizes information from multiple scientific disciplines to understand protein dynamics, so it served as a culmination in his biophysical studies. Further, he enjoyed the balance between lecture classes and interactive labs. For those contemplating biophysics, Phil says to find out for yourself how great the major is by talking to the faculty and taking the freshman seminar class.



Phil began working in Dr. Paul Hassoun's lab at the Johns Hopkins Asthma and Allergy Center the summer after his sophomore year. His project involves studying the effects of a specific protein related to disease progression in pulmonary hypertension. Phil found this research by contacting lab groups that interested him, and Dr. Hassoun's group kindly mentored him in learning the skills required for basic research.

This summer Phil is applying to medical school with a planned matriculation the following summer in 2014. In the meantime, he decided to stay in Baltimore to continue laboratory research and possibly begin clinical research. He feels that Baltimore is a great city to live in with many opportunities. He enjoys visiting the numerous unique neighborhoods like Fells Point and Hamden. Phil also thinks that Hopkins provides a great overall undergraduate experience. He even convinced his younger sister to attend Hopkins, and she is now a public health sophomore.

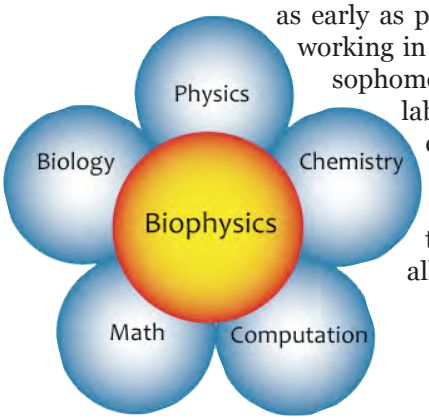
Emily Koo

Originally from Singapore, Emily moved to Hong Kong when she was 11, where her family now resides on a houseboat. Being a college student was as new to her as being in America. Not only did she have to get used to not having Chinese food for dinner everyday, she had to get used to eating more American food.

When she first came to Hopkins, selecting a major was a tough decision. One moment it was Biology, another moment it was ChemBE and yet another it was Neuroscience. There were so many interesting fields to choose from and it was too easy to switch! At the end, what got her to decide on Biophysics was really her desire to learn more about the coolest macromolecule in nature: proteins. And not only on the superficial level of the location and function of proteins, but really the folding and structure of proteins.

Aside from proteins, she was also very interested in programming (Computer Science was also on the list of maybe majors) but didn't know how it could be incorporated with biology research other than the occasional graph plotting and data analysis. Dr. Patrick Fleming, who taught the *Bioinformatics* and *Computational Biology* courses, therefore opened her to a whole new world of data mining and protein simulations, which led her to take a class by and do her research in the lab of Dr. Jeffrey Gray in the ChemBE Department and thus, also to her decision of pursuing a PhD in Computational Biology. That, as such, is the flexibility and rigor of the Biophysics program.

Emily recommends that new students joining the major should take advantage of the research requirements to gain valuable research experience, inside or outside of the department, and to do so as early as possible. She had started out working in Dr. Doug Barrick's lab after sophomore year, found out that wet lab was not for her and still had enough time to gain valuable research experience in her current lab. In addition, electives are really what allows one to explore all facets of science and mold the program into a truly unique and individual experience, so spend the extra time to pick the right ones!



Next year Emily will be purusing a PhD in Computational Biology.

Gaurav Dhar

Gaurav spent many years in Texas before moving to California at the start of college. Johns Hopkins University was an ideal choice for him because it had many researchers thinking about biology and science in new ways. He became interested in Biophysics because he found that unlike in many other fields nearly all biophysicists are trying to answer the same question: how do proteins fold and determine their structure from their amino acid sequence?

Gaurav's favorite classes in the major have been among those offered in the department. Prof. Barrick's *Intro. To Biophysical Chemistry* and Prof. Lecomte's *Spectroscopy* classes brought a lot of interesting topics in physics and chemistry into the context of biology. He was really impressed at the breadth of knowledge it takes to tackle the most fundamental questions about proteins.

While Gaurav continues to be fascinated by biophysics he found that he was best suited in mathematics. Many of the Biophysics classes introduced him to rich mathematical theories and they were always presented in a way that emphasized the role of math in science but guided the motivated student towards where they could learn more.

Next year Gaurav will be applying to graduate programs in mathematics.

Pranay Sunku

Pranay Sunku is from Pueblo, Colorado. Even though he has lived in the Rocky Mountain State for 15 years, he is an absolutely dreadful skier (fun fact!). He decided to major in biophysics after he took the *Topics in Biophysics* course the fall of his freshman year. He loved how the major integrated several branches of sciences, and he also appreciated how laid-back his peers were.

Pranay's favorite part about the Biophysics major

has been the close interactions among students as well as between students and faculty. Biophysics professors expect a level of engagement that you will not find in any other department. He also found biophysics majors to be among the most collaborative students at Hopkins.

While he has loved all of the upper level biophysics classes, his favorites have been *Bioinformatics* and *Biophysical Chemistry*. He feels that these courses challenged him to use his science knowledge in completely new ways. Plus, the programming exposure comes in really useful for any math or science course in college.

Pranay's research project in Dr. Karen Fleming's lab involved the computer modeling of chaperone protein activity and structural conformations of folding intermediates. It was an interesting challenge to develop programming skills in the context of solving a biophysical problem.

Pranay's favorite aspect of living in Baltimore was the wealth of neighborhoods within the city. If you are willing to leave Charles Village, you can find amazing restaurants, museums, and hang out spots that you cannot find in other big cities.

For those who are new to the major, congrats on your choice! The great thing about biophysics is that you can really get into a breadth of sciences. It gives you an excellent intellectual framework for anything you might pursue.

After college, Pranay plans on attending medical school.

Yuchao Chen

Yuchao Chen is from Woodstock, Maryland. Born in Guangzhou, China, he has moved around from Tokyo, Japan to Louisville, Kentucky before finally making his home in the state of Maryland. One interesting thing about Yuchao is the various nicknames friends have come up for him with one example being 'Chazly von Chazzlestein'.

He decided to major in Biophysics simply because he enjoyed both Biology and Physics classes in high school and thought he would receive the best of both worlds if he chose Biophysics as his major. Biophysics majors have a challenging curriculum but Yuchao was able to learn a great deal about diffusion, Boltzmann distribution, and even a little quantum mechanics. Although the curriculum is challenging, he felt a great deal of flexibility in selecting his classes.

Yuchao's research experience was in Dr. Mark Ostermeier's lab in the Department of Chemical and Biomolecular Engineering. The research involved mutagenesis on an engineered allosteric enzyme called RG13, a fusion of maltose-binding protein and beta-lactamase.

Next year Yuchao will be working as a research assistant for Jhpiego, a non-profit organization that works on maternal and child health issues in developing countries. He adds that he will also be a part-time MCAT instructor for the Princeton Review.

Tyler Pernes

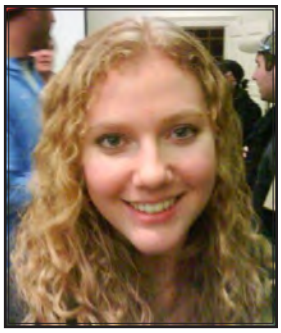
Tyler is from Fort Worth, Texas. A natural fan of solving puzzles and problems, biophysics turned out to be a perfect fit for him. He originally started off as a dreadful ChemBE, but switched to biophysics at the end of his sophomore year. ChemBE proved to be too restricting in terms of classes, facilitating a major change. A few of his friends were biophysics majors, and they mentioned the small classes with a wide variety of electives to take from. This is what ultimately caused him to switch. The problem solving nature of biophysics, through mixing mathematics to the already intriguing sciences, was easily his favorite part of the major.

This problem solving was extensively used in the class *Cellular and Molecular Physiology* under Dr. Cone, making it his favorite class. There would be days where all the class does is ask random questions, and the entire class would think about what the answer might be. Of course, Dr. Cone was always the one to get the answer, but the process of thinking about trivial, everyday questions really sparked his curiosity. Tyler actually joined Dr. Cone in his lab, doing research on the infection Bacteria Vaginosis. It was surprisingly easy for him to get the position; all he had to do was send an email.

As December graduate from Biophysics, his biggest word of advice is to constantly work with others. "Although fun, Biophysics is conceptually a tough major," Tyler says, "Take advantage of having a small, close-knit major. Work on problem sets and study with your fellow classmates. It makes studying much less stressful and provides an efficient way to understand the class topics."

Next year Tyler will be furthering his biophysics expertise by attending Duke for the Structural Biology and Biophysics PhD program.

Heather Merchut



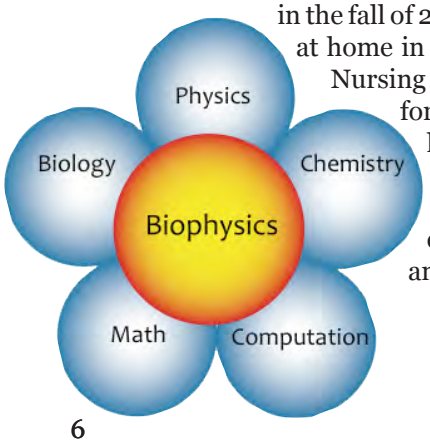
Heather comes from the dry and sunny land of Phoenix, AZ - the complete opposite of Baltimore! Despite this, she has grown to love Hopkins and particularly the Biophysics Department.

Heather came into Hopkins as a pre-med and Neuroscience major. She had never even heard of biophysics until freshmen orientation when she attended a Biophysics open house event. She was immediately drawn to the major for its friendly faculty and captivating subject matter. After taking the freshman seminar *Topics in Biophysics* course that fall semester, she was hooked. She highly recommends anyone considering biophysics to take this class, as it's only one credit and a relaxing introductory course. She would also like them to know that the Biophysics major is flexible enough that they can still pursue other interests: Heather took several neuroscience, music, and business classes alongside her biophysics coursework.

Heather's favorite thing about the biophysics major is the department's friendly atmosphere, where the students, faculty, and staff all make up a sort of "biophysics family." When it comes to some favorite classes, she loved taking *Biological Physics* and learning to apply physical laws to cellular phenomena, but she also really enjoyed electives such as *Popular Music* and *Contemporary International Politics.* For research, she worked in Dr. Venu Raman's lab at the hospital studying the cellular effects of a potential drug for breast cancer patients. Heather actually met Dr. Raman through her friend and freshman roommate, who turned out to be his daughter - never be afraid to use connections!

Heather will miss Baltimore for its lovely Tulip Garden just north of campus and for all the free concerts on and around campus (particularly those of the Hopkins Symphony Orchestra, in which Heather played violin for three years).

Heather plans to attend osteopathic medical school in the fall of 2014 and will spend her gap year at home in Arizona working as a Certified Nursing Assistant at a local hospital. As for an interesting fact: Heather loves clowns. She aspires to one day become a part-time clown named Feathers that entertains children at hospitals and plays violin for them.



Ian Yu

Ian grew up in Highland Mills, NY, and arrived at Hopkins with a strong inclination to pursue his strengths in the sciences. For him, Biophysics at first seemed like an ideal major just from the greater use of the physical and quantitative sciences to tackle biological problems. As he nears completion of his coursework, Ian sees that what really induced his fit into the major were the challenges and contextual framework he encountered in his studies and research.

Down at the medical school's Biophysics Department, Ian carried out his research in the laboratory of Dr. Cynthia Wolberger. There he was under the mentorship of then postdoctoral fellow Dr. Chris Berndsen, a passionate biochemist and inspirational mentor who is now an assistant professor at James Madison University. Ian's efforts were focused on testing the mechanistic and structural contributions of several residues in a ubiquitin conjugating enzyme, Ubc13. Employing activity assays and protein crystallography, Ian had the chance to see how different mutations affected the performance and structure of the enzyme and what it says about how Ubc13 normally operates.

Although it is difficult for him to say what specific course he truly enjoyed above all others, Ian found that certain combinations of classes complimented each other and his research quite nicely, framing a larger context. The computational techniques covered in Dr. Patrick Fleming's courses, *Bioinformatics* and *Computational Biology*, altered the way Ian perceives protein structures and gave insight in the remarkable power of computers in biological problems. When he took Dr. Doug Barrick's *Biophysical Chemistry* course alongside Dr. Robert Leheny's course on *Biological Physics*, Ian saw how some of the laws of chemistry and the Boltzmann distribution impacted biology from one angle while building up from physics in another angle.

After taking his walk down Homewood Field and a couple weeks to visit family across the country and abroad, Ian will head down to Bethesda to join the Roll-Mecak Lab at the National Institute of Neurological Disorders and Stroke as a postbaccalaureate fellow with plans to apply to medical school in a later cycle. At the NIH he will be part of an interdisciplinary group that studies the post-translational modifications of tubulin using biophysical and structural techniques among others.

Elaine Yu

Elaine was born and raised in the San Francisco Bay Area until she set out to see the Atlantic Ocean and attend Hopkins, which isn't really that close to the sea. After a disappointing first semester as a Film major and Theatre minor, she switched her concentration to her favorite high school subject: physics. Upon completing a wilderness first responder course, she decided medicine was pretty cool and started looking for a way to combine her interests. Luckily, the Biophysics major offered an interdisciplinary science curriculum that also fulfilled all the pre-med requirements. It really didn't take much more motivation to become a Biophysics major. It didn't hurt that the department also served delicious Thai food at their open house.

Over the past four years, Elaine has enjoyed being a part of the tight-knit Biophysics community. She really enjoys being able to use the skills that she learned in her favorite class, *Bioinformatics*, to conduct research in a lab on campus. It was also that class that sparked her interest in programming, which she has pursued in other classes as well as several computational projects in Dr. Vince Hilser's Lab in the Dept. of Biology. It was only due to her time in the lab that she learned that she loves to create and run computer simulations to inform scientific inquiries but really dislikes pipetting. Potential Biophysics majors should not be scared about the possibility of failing their research class if they might be klutzy in the lab – Elaine didn't.

Though Baltimore now feels like home to her, next year Elaine will be moving to neighboring Washington D.C. as a graduate student in Georgetown's Biophysics & Physiology program.

Bo Zhang

Bo hails from Louisiana. He decided to major in Biophysics after taking Topics in Biophysics freshman year because he thought the professors were very cool. He also enjoys the Thai food parties in the Biophysics department.

Bo's favorite class was *Reproductive Physiology*, because reproduction is most important, and physiology explains the process by which it occurs. Bo's research was in Dr. Cone's lab on treating vaginal yeast infections. He found out about that opportunity from his buddies in Dr. Cone lab. Other students in his lab often poke fun at him, but his desire to help millions of women around the world drives him onward.

His favorite aspect of living in Baltimore is the great deal on chicken at Giant Food.

His advice to prospective Biophysics students is to reach for the stars.

Next year, Bo will go to medical school and hopes that he will be delivering babies in the future, some of which may go on to major in biophysics.

Kenneth Han

Kenneth Han grew up in Columbia, MD, which is halfway between Baltimore and Washington, DC. Much like his decision to attend school close to home, he developed an interest in biophysics after spending weekends and summers in his father's biophysics laboratories. After years of touring the Inner Harbor with his parents, Kenneth enjoyed exploring the rest of Baltimore and its quaint neighborhoods.

Kenneth strongly advocates that the biophysics department is the best kept secret at JHU. The challenging courses provide rewarding opportunities for students to fill their hearts' content in developing discipline, critical thinking skills, and interest in the field. Kenneth's favorite courses in the major are *Wave Phenomena*, *Biophysical Chemistry*, and *Computational Biology*. Although rigorous in mathematics and computation, these courses set the foundation for studying biological problems through physical techniques, a quantitative approach that strongly distinguishes the biophysics coursework from other relevant majors, such as biology and neuroscience.

At the start of junior year, Kenneth joined Dr. Bertrand Garcia-Moreno's laboratory to study the contributions of electrostatic interactions to protein stability. Although his first project explored methods of stabilizing a model protein against acid unfolding through protein engineering and protective chemical agents, he eventually shifted his focus in the opposite direction of the equilibrium shift he sought. Kenneth worked on characterizing the denatured state of *Staphylococcal* nuclease, which can improve methods of structure-based calculations of pKa values as well as understanding prion diseases.

He recommends the biophysics major for dedicated students with an interest in critical thinking. The program demands the best of you, and will bring out the best from you. Students should take advantage of the research op-

portunities at Hopkins ASAP, as well as the faculty's genuine interest in providing students with a fulfilling, rewarding research experience.

Kenneth will attend the University of Maryland School of Medicine next fall and hopefully specialize in pediatric rheumatology.

Urian Kim

Before coming to JHU, Urian grew up in Seoul, LA, and Vancouver. Once Urian decided to attend JHU, he started looking for a major that would be suitable for his interests in sciences. Although he was very interested in the biological sciences, he also wanted to study and have a background in the physical sciences or engineering. He decided to become a Biophysics major and study biology with a mathematical and physical perspective. Urian's favorite thing about the biophysics major is the small class sizes. His favorite classes from the many interesting classes in the biophyics major include *Cellular Molecular Physiology* taught by Dr. Cone and *Intro to Biophysical Chemistry* taught by Dr. Barrick as these classes incorporate different fields of study with the study of Biology.

Urian is involved with the neuroscience research of Dr. Irving Reti at the medical campus. In this lab, they try to understand electroconvulsive therapy's rapid onset for treatment resistant depression. They used antidepressant behavioral paradigms to monitor the effect of ECS in Narp KO mice and also monitored levels of BDNF which is necessary for the antidepressant effect of pharmacologic agents. Urian simply joined the lab by sending an email. His advice for those considering the major is to fully utilize the small class size and learn from your peers and faculty.

Urian is planning to apply to medical school in Canada and the U.S. this summer with a gap year. He plans to continue research and volunteering in Baltimore or work as a ER scribe during the gap year.

Bijan Arab

Bijan was born and raised in Indiana. He moved to San Diego during his high school years and that's where his family currently resides. Bijan decided to major in biophysics because he wanted to apply physical sciences to biological problems. His favorite part of the major is that he actually gets to apply what he learns. Thanks to the required research, he gets to apply the techniques that he learns about in all of his biophysics courses. His favorite class in the major was *Wave Phenomena* with Dr. Robbins in the Physics dept., because he loves Fourier transforms. He is currently studying protein thermodynamics in the Doug Barrick's lab.

After he graduates in May, Bijan plans to stay in Baltimore and work at a hospital and continue volunteering at the Arbutus Volunteer Fire Department while applying to medical school.

William Hong

William Hong hails from Fullerton, California. Originally a Molecular and Cellular Biology major, he became interested in Biophysics after taking the *Topics in Biophysics* course. William has always been fascinated with mathematics, physics, and computer science and was interested in how they could be used to solve biological problems. After learning from then-Biophysics seniors that biophysics was a perfect blend of those fields and emphasized problem solving rather than rote memorization, William decided to make the switch and has not looked back.

William's favorite class was Dr. Cone's *Cellular and Molecular Physiology* because it emphasizes the true essence of science, which is to study the natural world around us and ask questions about it. He has also enjoyed both of Dr. Patrick Fleming's courses as well as Data Structures because of their programming and mathematical aspects. In general, William appreciates the small class sizes and friendly and cooperative environment that the Biophysics department offers.

William originally worked in the neuropathology department at the medical school during his sophomore year doing behavioral and therapeutic research on Alzheimer's disease. However, he wanted to conduct research at a more molecular level and thus joined Dr. Mario Amzel's lab in the department of Biophysics and Biophysical chemistry at the JHMI during his junior year. Under the mentorship of Dr. Sandra Gabelli, he is currently conducting structural biology research on sodium/hydrogen exchangers and their regulatory factors in hopes of gaining further understanding on the molecular mechanisms involved in diarrheal diseases.

William's advice to prospective Biophysics students is to take some sort of programming class, ask good questions and never shy away from the challenge of solving problems.

After graduating, William plans to conduct research for another year. Afterwards, he hopes to travel abroad and volunteer before entering medical school.

Alumni Spotlight

Brian Corliss

JHU Biophysics '09, Tufts MD '13

Following his graduation, Brian Corliss began his course of study at Tufts University School of Medicine in Boston. Not long thereafter, it started to become apparent that his biophysics education gave him a leg up over many of my classmates. He says, "Beginning with preclinical coursework in the first year, my knowledge of biochemistry and cell biology paid off in spades. While the rest of my class struggled to understand the difference between hydrophobic and hydrophilic amino acids, cooperative binding of oxygen to hemoglobin, or the difference between tertiary and quaternary structures of proteins; I was spending "free time" (that would otherwise have been dedicated to these tasks) seeking out research opportunities."

In his first year, one of the potential research projects that he found was in the Department of Neurosurgery, with Adel Malek, MD, PhD, whose computational lab concerned itself with fluid-dynamic modeling of cerebral aneurysms and prediction of rupture risk. Dr. Malek had not had many medical students in his lab that had any comprehension of his work. Brian's analytical, biophysics background gave him the ability to converse fluently with Dr. Malek, and clearly impressed him. Unfortunately, whereas he wanted a summer research assistant, Brian was required to spend the summer of 2010 in San Antonio, TX at Fort Sam Houston for his Basic Officer Leaders Course as the core component of his reserve officer training for the US Army.

When Brian returned to Boston in the fall of 2010, he had already committed himself to a career in neurosurgery. In addition to his classroom preclinical coursework, he was spending time with the neurosurgeons and residents at Tufts learning clinical neurosurgery. On the side, he was working with one of the residents, Jason Rahal, MD, and one of the attending neurosurgeons, James Kryzanski, MD, on another research project related to clinical outcomes and cost of minimally-invasive approaches to the lumbar spine for fusion surgeries. Yet again, Brian's analytical background came into play for evaluation of factors contributing to instability in the low back, as well as the relative stability of various instrumentation constructs; the ultimate goal being to minimize the cost and degree of tissue damage induced in order to stabilize an unstable spine.

> *"My knowledge of biochemistry and cell biology paid off in spades....While the rest of my class struggled to understand the difference between hydrophobic and hydropholic amino acids,... I was spending that "free time" seeking out research opportunities."*
>
> *Brian Corliss, JHU Biophysics '09, Tufts MD '13, Neurosurgery Resident*

While this project brewed, Dr. Kryzanski and Brian began to tackle another one, this time a descriptive case series documenting the successful use of Gamma Knife stereotactic radiosurgery for a particular type of rare tumor affecting the pineal gland – a deep structure in the brain at the confluence of several large veins and near the upper part of the brainstem, where open surgery is treacherous. Once more, his understanding of wave physics from his Hopkins education in physical chemistry, Wave Phenomena with Biophysical Applications, and of course his varied experience with spectroscopic techniques in the lab, paid off.

By the time Brian got to his clinical rotations, the work ethic and analytic though process that he had gained at Hopkins allowed him to "breeze" through (relative to some, anyway.) He was elected to the Alpha Omega Alpha medical honor society, and, in December 2012, matched to train in neurosurgery at the University of Florida beginning July 2013. Brian says he could not have achieved all the success that he has had during medical school were it not for his time in Jenkins Hall. Many people do not understand how biophysics could be related to clinical medicine (especially public health majors), but the practice of medicine requires a streamlined thought process, attention to detail, and a facility with numerical data that most undergradu-

ate majors can't teach with the level of rigor that the biophysics department does.

He finishes with "I owe a debt of gratitude to everyone back in Baltimore!"

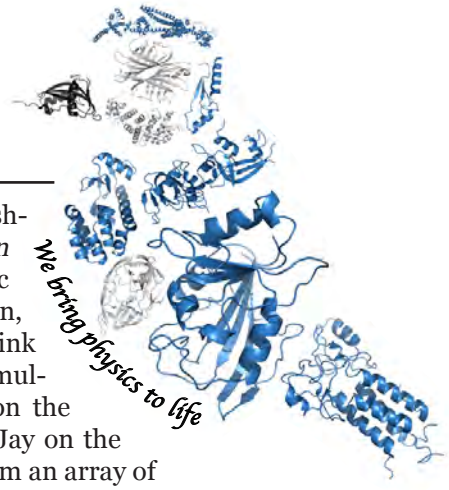
Brian Corliss will be pursuing a residency in neurosurgury at the University of Florida in Gainsville, FL and welcomes contact from undergraduates who are in the area.

Spring Party & Poster Session

Tuesday, April 30, 2013 4:30-6:00 PM, Jenkins 107. Our annual spring party with Thai Food will take place. All current and new majors are invited. Current majors will present posters on their research projects.

Graduation Reception for Seniors & Parents

Wednesday, May 22, 2013 4-5:30 PM, Sheridan Room (Levering). Biophysics Reception for seniors and their parents. Student accomplishments will be recognized, and awards will be announced.



Epic T Shirt Competition

The results of the freshman seminar *Topics in Biophysics* course epic T-Shirt competition are in, and the winning shirt is pink and has a heart shaped multidrug resistance protein on the front and a Hopkins Blue Jay on the back that is constructed from an array of PDB files. Congratulations to the winning group! This sets the bar quite high for the JHU class of 2017!

JHU BiPhi ΦΦ Group on Facebook

Contact Eugene Cho, a current sophomore, to be added to the BiPhi ϕϕ Facebook page, where you can see first hand the fourier transform of a cat.

JHU Biophysics Group at Linked-In

For more professional interactions with current JHU biophysics students and alumni, join the JHU Undergraduate Biophysics group on Linked-In to connect with Biophysics majors, past and present. Be sure to register before you graduate. Check it out online at:

http://www.linkedin.com/groups?gid=1776717&trk=hb_side_g