Spring 2017

JHU Department of Biophysics Undergraduate Newsletter

Senior Profiles

The Spring issue each year highlights our graduat- ing seniors. We had a Marshal Scholar, PURA and DURA Awardees, peer-reviewed publications au- thored by majors, and Phi Beta Kappa members. Congratulations to the Biophysics class of 2017!

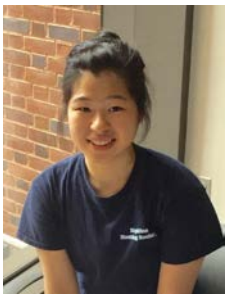
Damon Ceylan

Prior to coming to Hopkins, Damon spent his whole life in Norwood, a small suburb in New Jersey. Being used to the tight knit community of his hometown, he had to adjust to the new college environment. He initially did not start his undergraduate career as a Biophysics major, but heard many great things about the major and its approach to understanding living systems.

He decided to try the department's Biochemistry I course and it became his most enjoyable course at Hopkins. He was also able to enjoy the close relationships many Biophysics professors have with their students and credits much of his learning experience to that characteristic of the Biophysics community. In his following years as a Biophysics major, he gained a greater appreciation for the staff of Biophysics after having worked as a TA under Dr. Fleming. Later, he joined Dr. Taekjip Ha's lab and assisted in the lab's single-molecule experiments. As an undergraduate researcher, Damon learned how to apply the Biophysical techniques he learned to solve real world problems. After graduating, Damon plans to conduct research as a post-baccalaureate researcher during his gap year while he applies to medical schools.

Athena Chen

Hailing from the Dallas, Texas where the motto is "Everything is bigger (and better) in Texas," Athena developed an appreciation for the smaller things throughout her undergraduate career in biophysics.

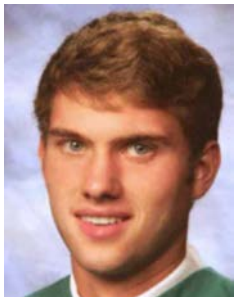


Swayed by the personable faculty and her interest in a quantitative understanding of biological systems, Athena decided to major in Biophysics. The close, familial-like character of the department was one of her favorite aspects of her time as an undergraduate Biophysics major; the tight-knit relationships among the faculty and students provided the essential support for students' success.

Her favorite learning experience in Biophysics was not from her classes, but from her research in Dr. Margaret Johnson's lab studying single-particle methods of modeling. While concentration-based modeling methods are essential modeling tools for simulating biological systems, the more detailed resolution provided by single-particle modeling methods can provide insight into the rich details of the reaction dynamics that cannot be seen through concentration-based methods. She also thoroughly enjoyed her coursework with Dr. Patrick Fleming where she felt as if she not only understood the concepts but also retained the analytical thinking for problem-solving.

Athena thinks the animal that represents her the best is an owl since her work schedule is quite nocturnal and she enjoys intellectual challenges. Next year, she will be pursuing her PhD in Biostatistics at the Johns Hopkins Bloomberg School of Public health.

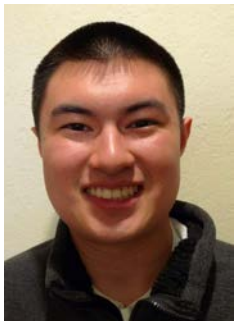
Jack Korleski



Jack was born and raised in Newark, DE, a small town around 90 minutes from Hopkins. Jack have two brothers: one older and one younger. Jack's older brother, Mike, is a dental hygiene student and graduated from Gallaudet University in 2016. His younger brother, Ben, is a junior in high school, an avid runner, and can solve a rubix cube in under a minute. If you ever want to learn more about who Jack is, ask him about his childhood stories from how he once cut down his mother's tulip garden while playing pretend or about how terrified he is of sharks.

Family is what made him choose biophysics. He came into Hopkins wanting to study Chemistry, and changed this decision after taking PEBL his freshman year. He felt a community in this lab both with his lab group (AKA green team, dream team) and with all the other biophysics majors. It is a unique community where he can talk in depth about energetics of protein folding, but at the same time create a basketball team that wins the co-ed intramural championship. This is a group of people he is grateful to have met and he looks forward to developing our friendships even as they go their separate ways after graduation.
His plans for next year are to either spend time in Germany doing research in a biophysics lab, or continuing his work here at Hopkins in infectious diseases. After that, he plans to enroll in an MD/PhD program and peruse his goal of becoming a physician scientist.

Aaron Chum



Aaron is from Palo Alto, California. He was born in Toronto, Canada, and moved to California when he was 3. He was drawn to the biophysics major due to its interdisciplinary focus and the opportunity to take classes in a variety of scientific fields. Another important factor was the small class sizes and the overall friendliness of the people in the department, both students and faculty.

His favorite class in the department was *Systems Biology* with Dr. Elijah Roberts. He is interested in the computational modeling of biological systems and *Systems Biology* taught him the theory behind modeling and provided plenty of practice coding. Dr. Patrick Fleming's *Computational Biology* class was also a great introduction to computational modeling; Aaron took the class his junior year and was the teaching assistant his senior year.

Aaron also conducted research under Dr. Roberts. He stochastically modeled calcium pathways in cells and worked on a modeling software developed in the lab. Next year, Aaron will be working in Dr. Karen Fleming's lab while applying to medical school.
His advice to incoming majors is the get to know both your fellow students and the faculty. Also, when selecting electives, majors should definitely consider some of the smaller upper-level classes offered in the department.

Diego Zegarra

Diego was born in Washington D.C. and he lived in Gaithersburg, MD until he moved down to Florida when he was 10 years old. Diego's hometown of Oviedo, FL is about 30 minutes away from the place "Where Dreams Come True": Disney World! Fun fact: Diego's first job was at Disney World.

One of his favorite moments in Biophysics was his one-season career as the captain of the Bi Phi Ballers. This was a co-ed intramural team in the Spring of 2017 that took home the championship title undefeated. Honestly, the championship final game was as nerve-wracking as the Biochem II final, but it felt great to play a sport he loves with his fellow Biophysicists. It also felt really good to not talk about proteins for once!

Diego works in Dr. Sarah Woodson's lab on the Twister ribozyme project. Twister is a small 54 nucleotide ribozyme found in many species. The particular kind he is working with is from *Oryza sativa*, otherwise known as rice. Diego has been working on several projects that aim to probe the structure of the ribozyme in order to test its activity and folding.

Next year, Dieogo is going to work at a hospital either as a medical scribe or a patient coordinator. This is part of his gap year, so Diego is actually in the process of applying for medical school this cycle. After completing medical school and the appropriate residency, he would like to be a surgeon for the United States Navy.

Zack Smith

Zack is a graduating senior from Perry Hall, Maryland. Zack has been doing research with Ana Damjanovic for Bernie Brooks' NIH computational biology lab. Zack feels lucky that he got to work with Ana because she was a mentor to him for both teaching and research. Next year he plans to continue his research and finish the papers he is working on while applying to graduate school. Zack's long term plan is to become a professor and to do computational research. He initially just wanted to do research but he fell in love with teaching after TAing Intro to Computing.

Zack's favorite class in biophysics was Computational Biology taught by Pat Fleming since this class introduced him to molecular dynamics which is his favorite computational method. His favorite moment was the intramural basketball game where Biophysics played the Catholic Community because it was really fun to see two of his friend groups face off against each other. After four years in Biophysics, Zack's favorite scientist is Ludwig Boltzmann. Statistical mechanics influences so much of what Zach does that he has become a big Boltzmann fan..

Sam Workman

Sam is originally from Charlotte, NC but his family currently resides in Richmond, VA. In addition to majoring in Biophysics he also majored in Mathematics. Following graduation he will be applying to medical school and looking for opportunities to gain experience in the biopharmaceutical industry. His long term goal is pursue a career in pharmaceutical research and development. He enjoyed my experience as a Biophysics major at Hopkins, and it is difficult to pick any one favorite class. He appreciates the department's emphasis on undergraduate research, which led me to get involved with my research lab. He worked in the Hristova Lab in the Institute for NanoBioTechnology, where they studied the oligomerization of transmembrane proteins, and the proteins' interactions with cofactors through the use of FRET. Aside from academics, he has been involved on campus with the community service group Thread.

Vikas Daggubati

Vikas is from the sleepy suburb of Marlboro, New Jersey, but was originally born in India. His broad advice for incoming students and underclassman is to "follow uncertainty and let your passions guide you".

It was with this philosophy he selected Biophysics as a major. All he knew was he did not want to be part of the Biology department or the Public Health department. It was a "try it and see" situation. In the end, Vikas appreciated the depth that Biophysics explores, and is a living testament that even a "horrible math student" can still succeed. His favorite Biophysics class was Biochemistry II, taught by Rokita and Woodson. He felt the class exemplified the interdisciplinary nature of the major as it is taught through the lens of both a chemist and biophysicist.

As a major, Vikas enjoys the camaraderie between the students When Vikas was not in class or studying, he basically lived in the Holland laboratory on the medical campus. There, he helped discover a novel cell cycle arrest following a loss of centrosomes and identified the molecular components that signaled for such an arrest. He finds his research to be the most rewarding aspect of his undergraduate career, where he was given unbridled opportunity to pursue biological questions.

Next year, Vikas will begin his MD/PhD at the University of California at San Francisco. He has no certainty in what he wants to pursue in the future, but uncertainty is not necessarily a bad thing.

Patrick Keating

Patrick was born in Fort Hood, TX but he considers his hometown to be Herndon, VA

because he has lived there since 2000. The Northern Virginia area has been a great place to live, not just because there is so much to do, but the majority of Patrick's family lives in the area as well. Actually, most of his family grew up in the same area so they know it very well (he even went to the same high school as his parents). Having lived in different states for the first five years of his life (Texas, Indiana, and Ohio), due to being in a military family and his dad being stationed at different bases, it has been nice to settle down and not worry about moving a lot. Being so close to DC has been amazing, from visiting many of the museums and monuments on school trips to attending sports games with family and friends. There has always been something to do and now that he has started exploring the area more with friends, his love for his hometown has only increased more.

Patrick's favorite biophysics course was PEBL. Like everyone else, it was one of the first biophysics courses he took and really introduced him to the major and what biophysics works was like. He took PEBL as a fall Junior because he spent freshmen and sophomore year taking all the prerequisite courses. He liked every aspect of the class. Compared to the other lab courses he has taken, it was more fun and rewarding to study the same protein all semester rather than perform a string of random and unrelated experiments. Learning how to design a protein and the process of producing, purifying, and characterizing, PEBL has been vital to his experience here at Hopkins. Patrick has used that knowledge in the research he is doing in Dr. Garcia-Moreno's lab as well as the work he does in MBL. Learning how to operate the instruments to take different spectra, and see how the variants responded to different environmental stresses like pH and guanidinium, as well as all the other biochemistry experiments he ran was something that really peaked his interest in proteins. As he went on to take more biophysics courses and gained more knowledge about studying proteins, Patrick realizes that PEBL really was the perfect introduction to the major.

Patrick's favorite biophysics moment has to be during his freshmen year when the department hosted a faculty student dinner and he got to meet some of the other biophysics students and faculty. He remembers the presentation Dr. Garcia-Moreno gave about the work biophysicists do. What really stuck out to Patrick was his emphasis on how water is a powerful material for science, especially water's ability to dissolve compounds and solvate proteins. This was his first introduction to the major, and it was a very meaningful experience. Patrick knew that Hopkins offered Biophysics when he applied, but didn't understand what Biophysics exactly was. He could tell that it involved a log of math, science, and computing based off of the course requirements, but the actual major was still unclear. Attending this party and seeing how close the department was, reaffirmed his choice to be a Biophysics major. Now, as he is graduating, he can say with confidence that he is glad he stuck with it.

Patrick is currently doing research in Dr. Garcia-Moreno's lab on designing protein switches. This is part of the new course, Research in Protein Design and Evolution, offered by both Dr. Garcia-Moreno and Dr. Lecomte. Patrick knew this would be a special opportunity because he had to interview to be put into the class by both professors. His team works with *thermos thermophilis* ribonuclease H, an enzyme that cleaves bonds of the DNA/RNA complex. Their goal is to turn this protein into a switch, a protein that will change conformations from folded to unfolded or *vice versa* over a narrow pH range. To do this, he introduced lysine point mutations into the proteins interior. By doing so, he takes advantage of the protein depressing the pK_a of these lysines so that it remains in the neutral state in the hydrophobic core. From the twelve variants they made, they took combinations of them to make variants with two lysine mutations, in order to achieve the sharp folded-unfolded transition they want. Although this is his second experience working in a lab at Hopkins, he has enjoyed this lab experience much more. Since most of the work he has done has been similar to what he did in PEBL. Taking information that he already knew and applying it to a new protein and studying it all year in an actual lab has been one of his favorite experiences here.

Kirk Butler

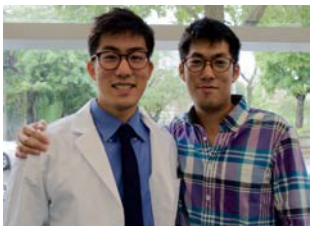
Originally from Washington Township, NJ, Kirk has thoroughly enjoyed his education here at Hopkins. His favorite biophysics classes were

Molecular Biophysics Lab and Systems Biology. As an undergraduate he did research for the Betenbaugh Lab in ChemBE, working with Tingting Li on cocultures of cyanobacteria and yeast; their results are in press in *Biotechnology for Biofuels* under the title "Mimicking lichens: incorporation of yeast strains together with sucrose-secreting cyanobacteria improves survival, growth, ROS removal, and lipid production in a stable mutualistic co-culture production platform." "Truly, brevity is the soul of wit," Kirk surmises.

His favorite scientist is either George Church or Craig Venter, whose work inspired him to pursue synthetic biology while in high school. Kirk plans to work in that field in the future, either as a postdoc at a university or at a private research institute, as he currently has no preference between industry and academia. His immediate goal is to obtain a PhD in bioengineering, which Kirk hopes will allow him to seize better opportunities than he could with an MS or BS only.

He sends his regards in particular to Drs. Elijah Roberts and Carolyn Fitch, who kindly recommended him to several graduate schools. At the time of this writing, Kirk has an acceptance at SUNY Binghamton (Biomedical Engineering PhD) and is waiting to hear from two other programs. He thanks them for their expertise and inspiration, which he plans to keep in mind as he pursues his goals.

Shohei (Sean) Yamakawa

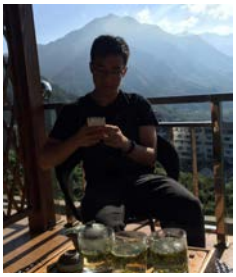


Hailing from the Northwest Chicago suburbs, Sean has enjoyed the change of pace of the East Coast culture at Hopkins. In his time as a biophysics major, Sean's favorite class has been systems biology with Dr. Roberts due to Sean's interest in the intersection of biology and computer science. Though the problem sets were difficult, each week had tremendous learning value, and Sean had fun working with his friends. It is one of the few classes where Sean felt he retained the knowledge he gained. Close seconds for his favorite class were Dr. Karen Fleming's seminar in membrane proteins and Dr. Barrack's biophysical chemistry.

Outside of class, his favorite biophysics moment each year has been the Ice Cream Social organized by Dr. Fitch. Whether students go for the ice cream made with liquid nitrogen or to meet new biophysics peers, the social is guaranteed to provide an exciting time. Personally, Sean enjoyed the combination of chocolate syrup, M&M's, and a touch of coffee. When mixed, they formed the perfect shake!

Sean would like to envision himself as a magnificent animal like a cheetah or giraffe, but he admits his personality is more like a koala- cute, but a little slow. Still, every animal serves an important role in their ecosystem, and Sean hopes to find his value to others. Sean plans to pursue in a career in medicine. Next year, Sean will work under Dr. Wasserstrom at the Feinberg School of Medicine as he applies to medical school. Fingers crossed!

Will Xiao



Will hails from the Chinese island of Hainan, which is 92% the size of Taiwan but only a fraction of its conspicuity. Since 3rd grade, Will has lived in Shanghai, before moving to Baltimore for college and for the city's many charms. At Hopkins, after much agony, Will picked the biophysics major because he finds it to be "the best way to stay undecided." With biophysics, a student can really take any class in the natural sciences, math, and computer science and relate it to the major, as long as he or she can finish the arduous albeit intriguing major requirements. In the immediate future, Will plans to attend a PhD program in Boston. Will finds it all, in the long run, to relate to his interest in exploring the philosophical questions of consciousness, existence, and mind-body from a scientific perspective. Will thanks these wacky ideas to the extensive anime watching of his youth, animes such as the mind-boggling Neon Genesis Evangelion (新世紀エヴァンゲリオン). Other untheorized proclivities of Will's include his very specific spirited animal: the Night Fury dragon Toothless from How to Train Your Dragon. Will just thinks it's a very cool dragon.

Camila Villasante

Camila was born in Bethesda, Maryland and grew up in Cairo, Egypt and Germantown, Maryland. If she were an animal, she would be a meerkat because then her name could be 'Cameerkat'.

Camila has enjoyed many of my Biophysics classes, so it's hard for her to pick a favorite. She

really liked Protein Engineering and Biochemistry Lab with Dr. Fitch, so much so that it drew her into the Biophysics major after she took it as a freshman. She also really enjoyed Biophysical Chemistry with Dr. Barrick and Spectroscopy with Dr. Lecomte, because those classes have been incredibly integral to her understanding of the natural world.

Camila has done research in the Hilser Lab since her sophomore year, and she received a PURA grant to study E. coli adenylate kinase dynamics using single-molecule force spectroscopy. In her senior year, Camila switched to a computational project studying the relationship between frameshifts and protein thermodynamics.

Her favorite Biophysics moment was actually not in the lab or classroom—it was on the courts, when the Bi Phi Ballers (colloquially known as 'T.C. Jenkins' Finest') beat out the Newman Knights 38-37 in the intramural basketball championship!

Beginning in July, She will be pursuing an MD-PhD in NYC—at the time she had to submit this article, Camila had not yet chosen a school, but she does know that she will be in Manhattan. She is incredibly excited for the next chapter of her life and is thankful for my time with JHU Biophysics!

Billy Kim

Billy is originally from Los Angeles, California. His favorite biophysics class was molecular biophysics laboratory because it was the most hands-on class that he has taken in biophysics, but more importantly, it required a lot of independent and critical thinking. Billy's favorite biophysics moment has to be when their intramural co-ed basketball team, Bi Phi Ballers, won the championship this Spring semester. He thinks it really brought a lot of biophysics students together. As for research, he worked in the Epidemiology Research Group in Organ Transplantation at the Johns Hopkins Dept. of Surgery in his freshman and sophomore years as a research assistant. He conducted surveys with study participants for his longitudinal study on the health of kidney donors post-transplantation. He then did his biophysics major research in the Sumner lab at the Johns Hopkins Dept. of Neurology where his project involved studying the efficacy of a small molecule drug in treating Spinal Muscular Atrophy (SMA), an inherited neurodegenerative disease, in their mouse model. He plans to work in a research lab next year and eventually pursue medical school.

Diana Li

Diana is a Biophysics and Writing Seminars senior. She has lived in the DMV area for all her life, growing up in Northern Virginia and living in Baltimore, and has truly loved my experience here. Her family has since moved to New Jersey, which she knows little about other than the fact that there are a lot of cornfields next to her house. (Note, Diana is very confused and concerned about the blood feud between North and South Jersey, and is looking for an explanation.)

In Diana's next life she wants to be a shiba inu because they look so relaxed and happy all the time! She follows multiple shibas on Instagram, and is happy to share the goodness, so ask her!

Her favorite class has probably been Molecular Biophysics Lab, if only to watch Peregrine and Sean constantly heckle each other.

After experiencing a quarter-life crisis last year, she decided to pursue a Masters of Fine Arts in poetry, and is incredibly excited to be attending Rutgers University-Newark Program in Creative Writing for the next two years! Diane will also be applying to medical school in the next application cycle! She looks up to Dr. Leana Wen, the current health commissioner of Baltimore, and admires the tremendous things Dr. Wen has done, such as successfully implementing community prevention methods and campaigns for public health issues, such as opioid overdoses. Diana hopes to give back to my community in similar ways after becoming a physician.

Diana sends this message to everyone graduating: "***This has been an amazing cohort to be a part of—shoutout to BiPhi Ballers!—and I can only hope the students after us will be as great as the intramural basketball champions!!! ☺ Good luck with everything, and I'm sure we're all headed towards amazing things!"***

To Diana and all of our excellent graduates:

We agree that you are an amazing cohort on the court and especially off the court. We agree you are all heading toward amazing things, and are looking forward to seeing what those things are. Please keep in touch!

Sincerely,

The Faculty of the Department of Biophysics.

Bi Phi Ballers: A Story of Triumph

15. March.2017

On a cold and windy night, in the Ralph O'connor recreation center packed to the rafters

with basketball fans and biophysics enthusiasts alike, the unbeaten Bi Phi Ballers (biophysics majors) played tonight for the intramural basketball title against the team from the Newman Center. The Jenkins Bi Phi Ballers had trashed-talked the opposition all afternoon in MBL in an effort to pump themselves up to try to even the playing field. Not to be outdone, the NC team showed up with their mascot – a Dominican brother in robes ready to facilitate divine intervention.

Perhaps channeling a higher source, the opponents took early control of the game, and the BPBs fell woefully behind. Down by many buckets at the end of the first quarter, the Ballers displayed composure and nerves of steel on par with Tom Brady's super-bowl LI effort. Constant changes directed from the sideline and the field by coaches Zegarra and Villasante paid off. The scrappy team in blue clawed their way back.

With the game tied at the half, and with the ballers starting to drag, Dr. Garcia-Moreno dug deep into his treasure trove of inspirational quotes and shared some motivational oratory: "no win, no degree!" It looked hopeless for most of the second half, with the Bi Phi team always behind in the score, but faced with the possibility of returning to Jenkins empty handed and having to endure shame and to stick around for another year, the ballers found the heart and the strength to play with an intensity of gave seven of the Cavs against the Warriors 2016.

Despite this newfound intensity through the third quarter, which was marked by much sweat, high tempers, colliding bodies, and a fat lip or two, the BPBs simply could not get ahead. The crowd (and in particular, Dr. Garcia-Moreno) continued with motivational sentiments: 'if you don't win I will make sure you take Prof. Barrick's or Prof. Lecomte's course again'. Perhaps with even more impact, some of the Ballers said they could make out 'win or take another upper level physics course, you decide', over the roar of the crowd. Yet these threats of encouragement were simply not enough.

Then with 10 seconds left on the clock and still 2 points behind, in a desperate attempt to salvage the Department's honor, Dr. Fitch finally broke down, promising to share with the MBL students the identity of their mystery proteins if they could grind out a win. That provide the needed spark. In a finale worthy of an NCAA final, Jack 'the beast' Korleski drove past mid court, went up into the air, shot, and delivered the cleanest three points of the night. Against a smothering BPS defense, the NC Dons failed even get a shot in the final seconds. The buzzer rang, the crowd erupted, the players were mobbed and carried out of the Rec Center on shoulders, back to the labs where they came from, ready to work on their lab reports due the next day, with the satisfaction that they would soon know whether they had Pro 131 -> Val or Lys 57 -> Arg.

Though the BiPhi Ballers were only ahead in this game for 3 seconds, it was the only 3 seconds of the game that mattered. Once again, biophysics majors reigns supreme at Hopkins, and

thanks to the efforts of the Bi Phi Ballers, the senior biophysics majors will be graduating after all. Congratulations to the BPBs for a job well done and for their amazing display of camaraderie and team spirit. Their feat will be memorialized in the walls of Jenkins Hall. May they emerge victorious from MBL as well. Junior and sophomore biophysics majors are hopefully practicing their three-pointers and their no-looks, and disguising their covert elbows. A dynasty of biophysics basketball is born!

Story by Bertrand Garcia-Moreno,
Sports-writer and Chair, Department of Biophysics

Where are they now? The lives of Jenkins graduates.

by Doug Barrick, Professor,
Department of Biophysics gossip desk.

In this issue of the Jenkins newsletter, we are launching a new series focusing on recent alumni, their current activities, and some reflections on Hopkins Biophysics. Here we are focusing on Leanna Owen and Gabe Salzman, who graduated in the now-legendary class of 2012. Both of them are putting their biophysics training to great use, are on path to make us proud to have them in the "Jenkins family".

Leanna Owen. Upon graduation from Hopkins, Leanna moved across the country to begin Ph.D. research in Biophysics at Stanford University. At the end of her first year, Leanna joined the research team of Alex Dunn, a member of the Department of Chemical Engineering.

The perfect graduate student: in addition to her super biophysics smarts, Leanna wins a big ol' bag of goodies in a raffle for lab supplies!

Leanna's research focuses on mechanobiology. In her first few years of research, she has investigated the mechanical properties at the cellular level, connecting from the actin network to extracellular matrix. She is now transitioning from the cellular scale down to the molecular scale, using optical trapping techniques. Leanna greatly enjoys research that bridges from the molecular to the cellular scale, and to application of state-of-the art instrumentation such as lattice light-sheet microscopy and optical tweezers to span these scales.

Earlier this month, Leanna and I talked on the phone, caught up, and I had the opportunity to ask her the questions that all biophysicists (young and old) are dying to ask. This is what she said:

1. How did you decide to major in Biophysics? Did you identify the major before you came to Hopkins, or did you come into the light during your freshman year? I came to Hopkins with an interest in the biological sciences in general, and some research experience in behavioral neuroscience. One problem that interested me early on was the role of conformational changes in cell surface receptors. Also, I enjoyed taking freshman physics. When I found Topics in Biophysics research, I realized that Biophysics combined all of my varied interests in a single discipline.

2. What were your favorite aspects of the biophysics major? I liked how classes build on one another, where concepts and methods learned in introductory classes are put to use in a more advanced class. An example for me was the concepts in Biophysical Chemistry, which we used in Advanced Virology Seminar. I also liked the small size of the department and its classes.

3. What advice can you give current majors? I would recommend students to take core courses early, so that they can be used as building blocks for advanced study in the major.

4. How did biophysics prepare you for your thesis research in the Dunn lab? My undergraduate training in Biophysics gave me the ability to talk across disciplines, from physics to chemistry to biology, and especially, engineering. Biophysics provides a nice frame for the questions I am interested in, and gave me the skill-set and the confidence to solve hard problems.

5. What are your long-term career goals? My next step is a postdoc. Beyond that, I am interested in a faculty position with a significant teaching component, perhaps at a small institution. Alternatively, I could see myself in a staff scientist, as long as I get to work with students in a research context.

6. What do you miss about Hopkins and Baltimore? The food and restaurants. Two of my favorites are the Paper Moon Diner and Karma's.

7. What do you enjoy most about your new home in the bay area? I love the outdoors here. The mountains are beautiful, the hiking and the backpacking are great, and the beaches are not far away.

Gabe Salzman. Upon graduation, Gabe went to the heartland to get a combined Ph.D./M.D. (sure, we can say it that way) in the MSTP at the University of Chicago. After a year of medical school, Gabe selected dual mentors (Shohei Koide and Demet Araç) and began his Ph.D. research. Gabe studies the structures and functions of an

unusual class of cell surface proteins called adhesion G protein-coupled receptors. These proteins combine large extracellular interaction domains often found extracellular adhesion proteins with conventional GPCRs. To obtain high-resolution structures of these extracellular domains, Gabe has used monobody technology to screen for high affinity binding partners from large phage libraries. Primary and secondary selection has given Gabe nanomolar binders, along with a high-resolution crystal structure (see Salzman et al., *Neuron 91*, 1292 [2016]). This summer, Gabe will complete his Ph.D. dissertation and return to medical school to complete his MD degree.

Poster boy: Gabe temporarily takes off his ravens purple to pose for the UC Biophysics homepage.

Last week, I queried the "man of salt", and this is what he said:

1. How did you choose Biophysics as your major? When I came to Hopkins I was interested in premedicine, but I knew nothing about research. I attended a number of departmental info sessions, including Biophysics. Hearing from and speaking to Karen Fleming and Sarah Woodson did it for me!

2. What were your favorite aspects of the Biophysics major? The class-size was really nice. Biophysics class sizes are manageable, but they are not too small. At this size, there are plenty of resources to take advantage of, and it is hard to get lost.

3. What advice can you give to current majors? Take advantage of the courses offered at Hopkins. The courses I took gave me a solid foundation in a broad range of topics, including those that seemed very far from my main interests. For example, I took a course in astronomy with Adam Riess, and a course in glycobiology by Yuan Chuan ("Ed") Lee. Though I had no way of knowing it at the time, the extracellular domains of the adhesion receptor I study are highly glycosylated, and the knowledge I obtained in my glycobiology course was a big help in my Ph.D. research.

4. How did biophysics prepare you for your current studies at Chicago? I cannot say enough positive things about my biophysics preparation. In addition to the rigorous academic courses in a variety of fields, my experiences in the lab taught me how to carry out my own project. I also learned the social aspects of navigating an academic department (admittedly a very friendly one). In short, the biophysics major gave me skills that I use every day.

5. What are your long-term goals? A lot of things sound good right now. One thing I am sure of is that in ten years, I will be doing research. I love research. The thing that sounds *best* is being a physician-scientist. To care for and treat patients with a highly specialized disease, while doing research on that disease in the lab sounds very exciting. That said, I don't yet know what it is like to be a physician. I am about to find out.

6. What do you miss about Hopkins and Baltimore? That's easy. The Ravens. Of course, also Jenkins hall, and all the nice people in the department.

7. What do you enjoy most about your new city of Chicago? I like the hugeness of Chicago. Growing up in NYC, I have always been a fan of big cities. I like the diversity of my neighborhood (Hyde Park), Chicago architecture, and easy access to downtown. In Chicago, the quality of life is high, and the cost of living is low.

Keep in touch!!! Please give us your current contact information, and drop us a line telling us what you are up to. You may appear in a future article of the newsletter! Send info to

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