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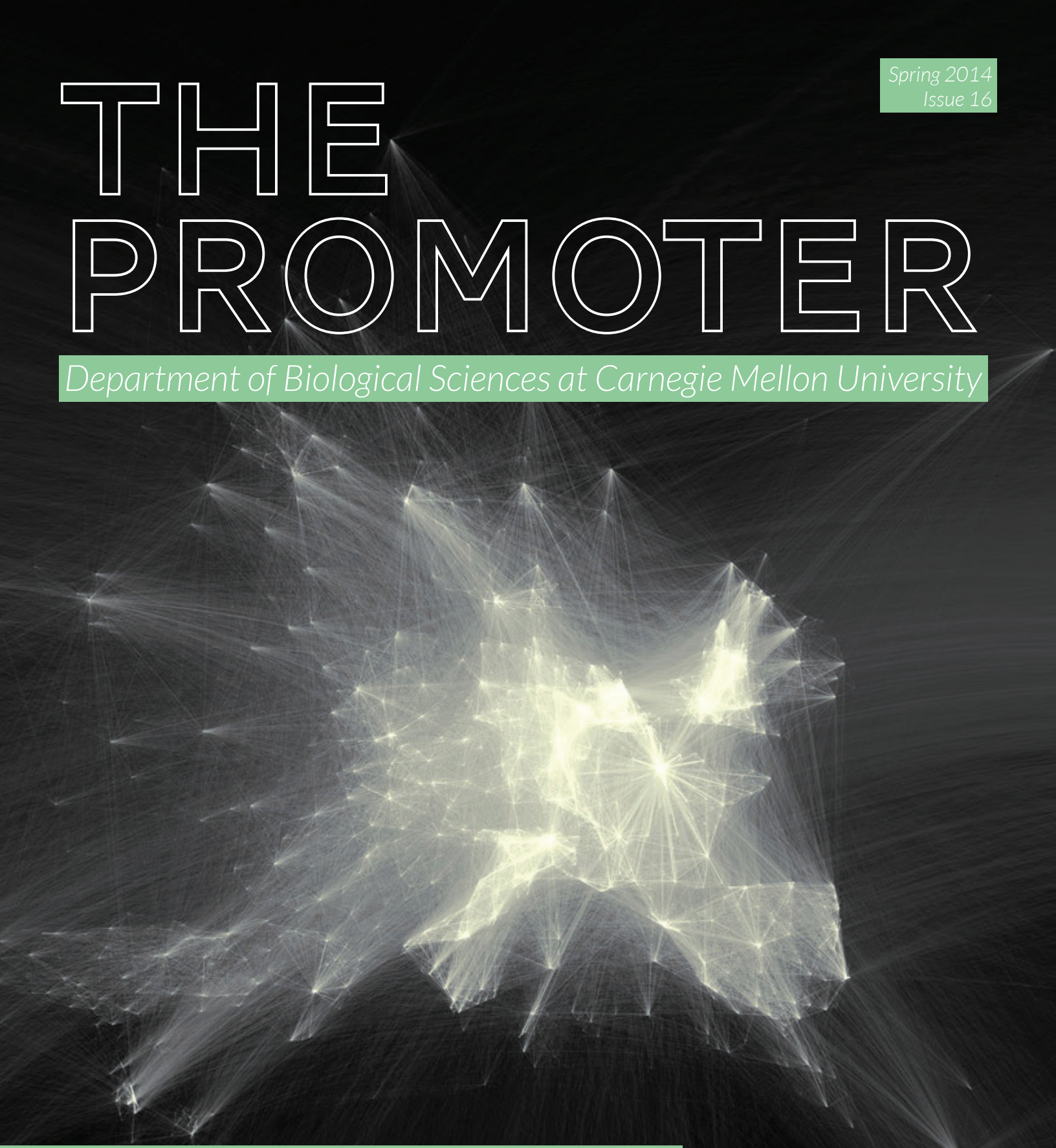
THE PROMOTER

Department of Biological Sciences at Carnegie Mellon University



The Science Social Network

Collaborations Shaping Our Science Community | *Page 6*

CONTENT

On the cover: Section of an infographic map showing the scientific collaborations between cities (and their researchers) all over the world. Data compiled from Scopus (using books, trade journals, and peer-reviewed journals). Credit: Olivier H. Beauchesne

On this page: *Lab Goes to High School* Salini Konikkat instructs high school students; *The Science Social Network* Students in the MSCB Program look over data before class; *Departmental Highlights* Rachel Vistein, Jigar Desai and Greg Smith; *Students Overseas* Betty Mbom (center) with a group of her students

LETTER FROM THE DEPARTMENT HEAD

Nathan Urban, Ph.D.
Dr. Frederick A. Schwertz Distinguished Professor of Life Sciences
Head, Department of Biological Sciences

Collaboration - literally "together work" – is a key to all of the missions of the biological sciences department. Collaborations bring together a team of people with different perspectives, different expertise and different resources to solve problems that, in many cases, no one of them could solve independently. Many of the most difficult and interesting challenges can only really be solved through collaborative effort. Therefore learning how to work effectively as part of such a team is a critical skill in many environments.

Collaboration in Research

Many aspects of research across science, especially in biology, are increasingly dependent on effective collaborative efforts. Many reasons underlie this trend, from the increasingly complex nature of the technologies and methodologies associated with biological experiments to the desire to answer questions that span from single molecules to whole biological systems. For research to have impact it is critical to combine an understanding of fundamental processes with an ability to connect with practical problems from medicine, technology or other fields. But another reason is simple, collaborative science is fun! It provides an opportunity to learn from colleagues and students in a way that goes well beyond the classroom experience and it gives us a chance to re-experience the neophyte's enthusiasm about just how cool science really is.

Creating an environment that encourages collaboration takes work. For many people, including many scientists, continuing to do what has worked is a conservative, highly rational approach. However, doing so may mean missing the big discovery or not taking the big step. We have been fortunate that our faculty have had the vision and enthusiasm to engage in many collaborative projects (some of which are described in this issue of *The Promoter*) that continue to transform the department. We have also been fortunate to have found a variety of mechanisms to support these nascent projects while they are still in their early, risky and visionary phases.

Collaboration in Education

As part of CMU's Mellon College of Sciences (MCS), the Department of Biological Sciences is engaged in a major collaborative effort across MCS to modernize many features of the educational experience of our students. The backdrop of this effort is that the core curriculum required for all MCS students has changed little in the past few decades. This stability is in the face of the fact that the scientific enterprise itself, as well as all of the fields covered by MCS majors, have been changing rapidly. Our current students also have different backgrounds and different goals than did MCS students twenty years ago. Finally, the face of university education is in flux. The development of online learning approaches (at CMU and across the world) creates the need to consider how we can best use students' campus experiences to educate and prepare them to meet their goals. For these reasons, over the last two years, MCS faculty have devoted hours and hours of effort to the development of a new core curriculum that seeks to accomplish several important goals. We hope in the end to have a curriculum that maintains rigor, improves flexibility, recognizes the importance of education that occurs outside the classroom and helps prepare students for their future life and career.

A key to the development of these efforts has been the collaboration between departments and among faculty in different areas. Understanding what biology a physics major should learn (and vice versa) requires ongoing discussions between physicists and biologists. Many such discussions have been occurring among MCS faculty as we develop these curricular changes. All of this has been done in the context of recognizing that encouraging students to be engaged in activities outside the classroom (and even outside the lab!) is critical to students' long term success, as well as their happiness during their time at CMU. I have learned a lot from my colleagues in these discussions. Different disciplines have different perspectives on what their students need, and I am confident that this collaboration will improve the education and life of MCS students for years to come.

Collaboration with Alumni

I also see a key to the success of our department in the ongoing collaborations with alumni. As I have said at recent departmental diploma ceremonies, we as a department are linked – forever – to our students. Through their actions, our alumni influence the department in many ways, even if they don't realize it. Every time a biology student gets a new job, makes a new discovery or starts a new company the ripples of that event influence the department and our place in the world.

Sometimes the effect is very direct – a gift such as the one from alumnus Glen de Vries (B.S. '94) that created a Presidential Graduate Fellowship or when alumnus DJ Kleinbaum's (B.S. '05) company hires a biology graduate from our department. Sometimes the links are more subtle – like when alumnus Dietrich Stephan (B.S. '91) is hired as Chair of Human Genetics at Pitt's School of Public Health or when alumna Robin Wright (Ph.D. '86) wins the Elizabeth W. Jones Award for Excellence in Education given by the Genetics Society of America. Other recent links include computational biology alumna Judy Savitskaya (B.S. '12) winning a prestigious Hertz Graduate Fellowship while in graduate school at Berkeley and alumnus Naveen Chandramohan (M.S. '11), a bioinformatician, co-leading one of the winning teams at the Breast Cancer Startup challenge. All of these events contribute to the success of our department. In my mind, all are part of a collaboration between the department and our students. A collaboration that has as its fundamental goal making the Department of Biological Sciences at CMU better every day.

Nathan Urban, Department Head

Lab Goes to High School

The Sciences Teaching Club uses outreach labs to inspire high school students

Growing up in a one traffic light town with a graduating high school class of fifty-five students, I had limited biology laboratory experience in my courses. As a result, I didn't know what the day-to-day life of a lab biologist was like, and I had no idea what it was like to pursue a career in science. It wasn't until my undergraduate career, when I had my first cell biology lab and interacted with my biology professors, that I decided to pursue a career in science.

Many high schools, like my own, can't afford the equipment and lab supplies needed to perform molecular and cellular biology labs, and this motivated members of the Sciences Teaching Club to design our own molecular biology outreach lab that we could take to local high schools. On March 11 and 13, 2014, we took our first outreach lab to Ringgold High School in Monongahela, PA. On the first day, students isolated their own DNA and performed PCR to amplify two genes of interest that were known to have regions of variation among the human population. On the second day of the outreach lab, students visualized their results using agarose gel electrophoresis. The purpose of the lab was to teach students about genetic variation among the human population and how DNA variations are inherited. Ming Zhang and Andy Kehr each gave pre-lab lectures, explaining the background behind the lab and how the techniques work. Lori Schalles, biology teacher at Ringgold High School, was excited to have CMU Ph.D. students bring the outreach lab to her classroom because her students learned about and practiced new techniques and it gave them the opportunity to ask graduate students what it is like to pursue a career in science.

Before we created our off-site outreach lab, the Sciences Teaching Club had been involved in Carrie Doonan's biology high school outreach events at Carnegie Mellon. Participating in these outreach labs played a role in inspiring us to create a lab that we could take to local high schools. Doonan explained that she enjoys having Ph.D. students participate in her outreach events because it gives the high school students the opportunity to talk to scientists. She also believes that it is extremely beneficial for Ph.D. students to participate in outreach labs because they gain valuable teaching experience.

Ming Zhang leading a pre-lab lecture

Students using the PCR machine during a lab

WRITTEN BY SHANNA BOWERSOX

Karen Kormuth working with students from Ringgold High School in Monongahela, PA

Graduate Students Involved in the Outreach Lab

Top Row (left to right): Dan Shiwarski, Rachel Vistein, Andy Kehr, Zach Weinberg, Ming Zhang
Bottom Row (left to right): Katie Lagree, Dylan McCreary, Amanda Soohoo, Karen Kormuth, Salini Konikkat, Shanna Bowersox

The Science Social Network

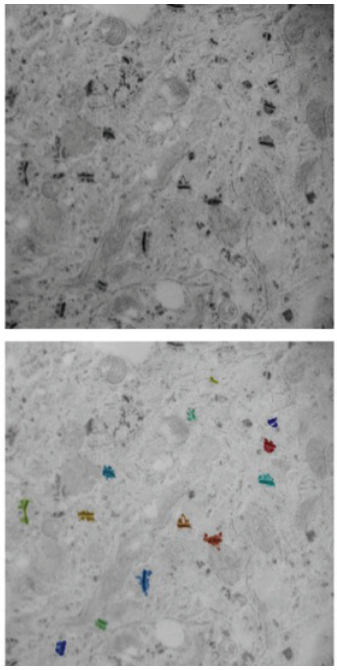
Collaborations Shaping Our Science Community

WRITTEN BY MATTHEW SALYERS

Collaboration has always been intrinsic to the research process, and with the technological advancements of the past decade, it is now easier than ever to communicate and share ideas. The seemingly instant exchange of data through email and cloud storage, along with the ease of high-quality video conferencing, makes it simple to work with other members of the science community not only in other buildings, but also in other countries.

The nature of interdisciplinary collaboration has also opened the doors to increased funding opportunities and made available a larger pool of renowned faculty, which has increased the interest of first-class students. The Biological Sciences Department is proud to house a myriad of ongoing research collaborations, from departmental partnerships between labs to experimentation joining multiple fields of study and institutions. Along with these collaborations, the affiliated training programs bring in students looking to pursue research in a range of biological areas.

A look at detected synapses using Barth's and Bar-Joseph's high-throughput framework



RESEARCH COLLABORATIONS

High-throughput Synapse Detection

In 2011, Alison Barth, associate professor of biological sciences, found herself sitting next to sociologist Duncan Watts during Google's Social Networking Week, facing a roomful of young professionals taking photos and tweeting. The subject of the discussion was how networks are built and how they function. From this talk, Barth saw a relationship between recent discoveries in her neuroscience lab and the engineered networks that connect our cellphones, our cyberspace, and even our travel destinations. This relationship suggests that the brain may be able to help us understand other complex networks.

"If you build an airline network, you wouldn't connect every city in America and then slowly get rid of the flights that nobody used," Barth said. "You'd first connect the most densely populated routes and then add more as you need them." But this pruning-based network, with every city first connected, is exactly how the synapses in our brain function, the antithesis of an engineered system of connectivity that you would find in a network.

Returning to Pittsburgh, Barth contacted Ziv Bar-Joseph, associate professor at CMU's School of Computer Science, and began what would turn into a three-year long collaboration between the faculty and Bar-Joseph's postdoc, Saket Navlakha, to study how principles of neural networks could lead to a better design of engineered networks.

Navlakha revived a 50-year-old technique to stain and label the synapses, which make them easier to see, and was then able to train an algorithm to count them. Using such machine-learning methods to count the synapses in the neocortex and theoretical computer science to simulate the rates at which these connections were being pruned, their process became extremely effective at quantifying rates of change. Their paper on this method of detecting synapses was published in *Bioinformatics* in July of 2013.

"Now with this high-throughput framework, instead of looking at a few hundred images, we can look at a few thousand," Barth said. "And instead of looking at one or two developmental time points, we can look at fifteen."

With their simulations running on the calculated pruning rates found in the brain, they found that pruning-based networks can enhance fault tolerance by more than twenty fold compared to growth-based networks when looking at cost, efficiency, and network robustness. Barth, Bar-Joseph, and Navlakha feel that these pruning-based networks found in biology could have a large impact in the world of computer science and in thinking about how networks are structured.

Regenerative Biology

Veronica Hinman, associate professor of biological sciences, saw an opportunity to further research an area few have explored in her field. As the recipient of a grant from the Charles E. Kaufman Foundation, Hinman and Jonathan Minden, professor of biological sciences, along with Bruce Armitage and Danith Ly, faculty members of the Chemistry Department at CMU, have begun working with sea star larva as a model for regenerative biology.

The initial research began in the summer of 2012, through the Summer Research Institute, a program for rising CMU sophomores supported by the Howard Hughes Medical Institute. Hinman then brought together Minden, Armitage, and Ly for the grant proposal, and with this funding they were able to hire a postdoc to continue the research.

"Developmental biologists can learn a lot about the types of mechanisms operating in the human body by looking at other species," Hinman said. "And taking a look at these simple invertebrate models can tell us a lot about ourselves and how we work. The area of regenerative biology is so new that almost anything we find is going to be exciting and interesting."

Hinman's work in genomics will benefit from Minden's methods of proteome analysis, as they believe protein level changes are an important part in understanding regeneration. The key to understanding the development of the embryos of sea stars and the changes at a molecular level in early regeneration is to perturb normal gene expression. Injections of various modified nucleic acids into the egg or early embryo would be the standard method, but in this project sea stars need to develop normally and then be perturbed later.

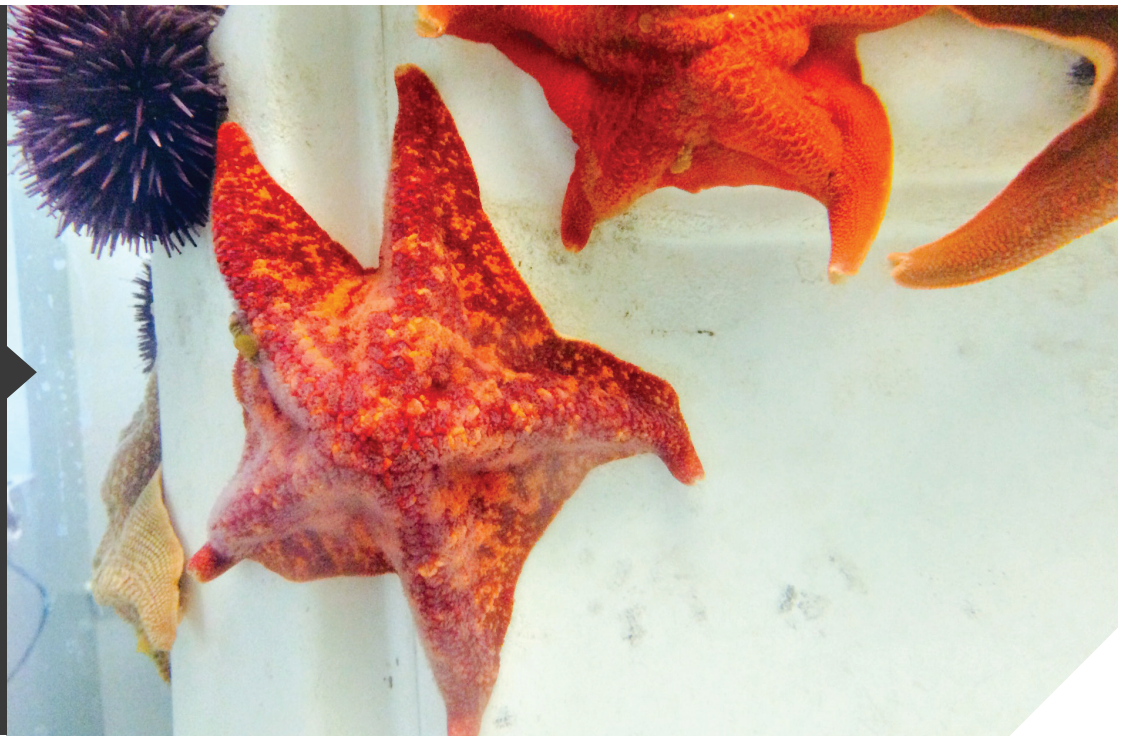
Luckily, Armitage and Ly are working on ways to chemically modify nucleotides so that the alteration of the endogenous gene products could be time-controlled and these alterations could then be introduced by uptake seawater baths. These technical tools of chemistry help scientists look at the larger biological questions that are present when it comes to regeneration.

RNA Structures

As part of their ongoing studies in ribosome assembly, Dr. Woolford's lab has used CRAC, a new method that uses high-throughput sequencing to identify RNA-protein interactions. Typically, RNAs are cross-linked to proteins and sequenced. However, this approach can result in a great deal of background noise, making identification of true binding sites problematic. To separate the signal and noise, the Woolford lab approached Joel McManus, assistant professor of biological sciences. Careful treatment of the data revealed the RNA recognition site of a ribosome assembly factor, and a publication in the fall of last year.

"The attitude of this department is that a postdoc in one lab will know that a faculty member from another lab has the ability to solve a certain

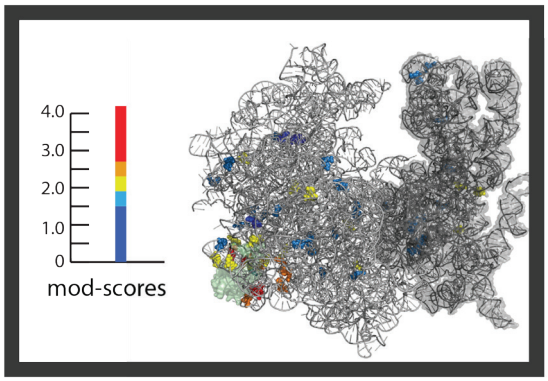
"[T]aking a look at these simple invertebrate models can tell us a lot about ourselves and how we work."
- Veronica Hinman



A close-up view of several grown sea stars and sea urchins from the Hinman Laboratory

Footprinting the binding site of an RNA binding protein. Views of the xray-crystal structure model of the yeast 80S ribosome generated with pymol (PDB: 3U5F, 3U5G, 3U5H, 3U5I). The large (left) and small (right) subunits are shown in different shades of grey. Ribosomal protein L26 is shown in a transparent surface rendering. Nucleotides with increased modification by DMS in the absence of L26 protein in vivo are shown in colors representing their mod-scores.

Courtesy of the Woolford and McManus Labs



problem and is willing and happy to help," said John Woolford, professor of biological sciences and co-director of CNAST. "It's one of the many positive examples of the culture of collaboration here."

At about the same time, the two labs began pursuing a new approach to study the structures of large RNAs.

"RNA is like a teenager," said Woolford as to a way to think about its formulation. "It has too many wrong choices." In their new approach, the labs use high-throughput sequencing to map regions of unstructured RNA. This allows them to look at RNA much more rapidly.

The wet-bench work of probing ribosomes from the Woolford lab became the proof of principle for McManus' new method of investigating RNA structure, leading to another publication this spring. The success of this method also helped McManus receive a Kaufman grant to study the structures of long RNAs from human cells, and opened up possibilities to address larger questions in RNA biology for the two labs.

JOINT TRAINING PROGRAMS

Molecular Biophysics and Structural Biology Program

Officially launched in 2007, the Molecular Biophysics and Structural Biology Graduate Program (MBSB) brings together faculty members from CMU and the University of Pittsburgh (Pitt) to give students who are interested in biophysics theoretical and practical training in the field. It is an independent degree-granting program, directed by Gordon Rule, professor of biological sciences at CMU, and James Conway, professor of structural biology at Pitt.

The need for a community of local biophysics labs and the available resources at CMU and Pitt led to the idea for a collective MBSB program, which now boasts opportunities for students to work with more than 50 faculty members from both universities.

In the program's core courses, Pitt and CMU faculty collaboratively teach students how to use tools that have their roots in physics to solve biological programs. Work in structural biology has the students create three-dimensional structures of biological entities to infer how the entities are functioning.

"What this program has done," said Rule, "is that it has fueled a larger sense of collaboration by students in the field by bringing additional students into both campuses that are really interested in biophysics." Special funding such as the NIH training grant gives opportunities to several students per year.

Center for the Neural Basis of Cognition

Celebrating its 20th anniversary this fall, the Center for the Neural Basis of Cognition (CNBC) trains students from more than twenty departments at CMU and Pitt. The program offers courses in cellular, systems, cognitive, and computational neuroscience, and students can receive a specialization certificate in conjunction with a Ph.D. from their home program.

The program was created to provide coursework for students who are interested in doing work in neuroscience but may not be coming from a neurobiology lab, such as students in computer science or psychology. It is also beneficial for students wanting to expand their training in the field.

"The courses provide a richer educational environment for students who are interested in this area, especially those whose Ph.D. programs may not be necessarily focused on this area," said Nathan Urban, CNBC faculty member and Head of the Department of Biological Sciences at CMU.

In addition to course requirements, members of the program have the ability to present their work at Brain Bag, a weekly meeting for CNBC members, and attend annual retreats to connect students and faculty together. With 120 students from both campuses and training

grants available in multiple areas of research, CNBC aims at enriching members of the science community interested in the cognitive functions in the brain.

"One of the overall emphases of the program is getting students to become better trained and more comfortable applying quantitative approaches to data analysis and simulation," Urban said. "That's something that I think has been beneficial to quite a number of students."

M.S. in Computational Biology

The M.S. in Computational Biology Program (MSCB) started in the Department of Biological Sciences nearly fifteen years ago, offering degrees in this rapidly growing niche area of biology. Students use computational tools to solve biological problems. As enrollment has increased throughout the years, the program has also become a joint venture with the Lane Center for Computational Biology at the School of Computer Science, starting in the fall of 2012.

With the M.S. degree coming from the Mellon College of Science, students now have the opportunity to take courses and partake in research both in the Department of Biological Sciences and at the Lane Center. This gives students more opportunities for specialized research, as graduates from the program are largely going into bioinformatics jobs within the industry. The ability to take courses in biology, computer science, machine learning and statistics leads to a broader understanding of the quantitative tools needed for these positions.

"The program advises each student in a customized fashion, such that they are enrolled in the appropriate courses that will put them in a position to get the best internships and ultimately, the best jobs," said Shoba Subramanian, Assistant Director for the M.S. in Computational Biology Program and assistant teaching professor of biological sciences. As the program stays current with the demands of the industry, a new curriculum is currently being developed to offer more options to interested students.

MSCB students looking over data before class

COLLECTIVE MEETINGS

Local Traffic Meeting

This annual meeting on membrane trafficking brings together principal investigators, postdoctoral fellows, graduate students, and technicians from the broad scientific community in Pittsburgh and neighboring cities. Manoj Puthenveedu and Adam Linstedt, faculty members from biological sciences, serve on the organizing committee for the meetings, with Tina Lee serving as committee chair. Each year, attendants have included members of the University of Pittsburgh School of Medicine, Pitt, CMU, Penn State University, Case Western Reserve University, and The Ohio State College of Medicine. In addition, distinguished scientists from around the United States are invited to share their research.

Additional Meetings

A local yeast meeting occurs each month as members of the 14 labs in the greater Pittsburgh area that study yeast as their model organism gather together to share their latest results. At each meeting, persons from two different groups present their research and solicit advice about how to design, execute, and interpret their experiments.

The monthly developmental biology meeting brings together researchers from many departments from nearby universities – CMU, University of Pittsburgh School of Medicine, Magee-Womens Research Institute, Rangos Research Center at the Children's Hospital, and Pitt. The goal of the meeting is to build an interconnected community to strengthen research and training in the area and to increase cross-disciplinary interactions.

The Annual International Conference on Research in Computational Molecular Biology (RECOMB), one of the oldest and most prestigious international meetings in computational biology, took place this spring in Pittsburgh. In its 18th year, the conference is aimed at bridging the computational, mathematical, statistical, and biological sciences with a focus primarily on the development and application of computational methods for understanding molecular biology. Russell Schwartz, professor of biological sciences, serves as conference co-chair.

DEPARTMENTAL HIGHLIGHTS

Shanna Bowersox
(Ph.D. '16) was selected to present a talk at the 13th Annual Pittsburgh Symposium on Intracellular Membrane Traffic and at the Great Lakes GPCR Conference.

Marcel Bruchez
(Faculty) was awarded the ELRIG Best New Technology Award for Sharp Edge Labs. He was also an Institutional Nominee for the Blavatnik Awards for Young Scientists and a Beckman Young Investigator Finalist. He received several grants from the NIH, DHTI and the Curci Foundation for his work.

Shawn Burton
(Ph.D. '17) was awarded a Ruth L. Kirschstein National Research Service Award (NRSA) from the National Institute on Deafness and Other Communication Disorders.

Carrie Doonan
(Faculty) received the Carnegie Mellon Role Model Award from the Pan Hellenic and Interfraternity Councils in October 2013.

Dannie Durand
(Faculty) received the ABI Innovation grant from the National Science Foundation.

Charles Ettensohn
(Faculty) partnered with Stanford University's Virtual Urchin web project to provide free, interactive educational resources directed at high school and college students.

Michael Gamalinda
(Ph.D. '14) was presented with the Guy C. Berry Graduate Research Award. He also received a GSA/Provost GuSH Research Grant.

Aryn Gittis
(Faculty) received the NARSAD Young Investigator Award.

Veronica Hinman
(Faculty) received a Charles E. Kaufman Foundation Research Grant.

Chien Ho
(Faculty) was elected as a Fellow of the American Association for the Advancement of Science (AAAS) and of the International Society for Magnetic Resonance in Medicine (ISMRM). He was awarded a Gold Medal by ISMRM in recognition of his pioneering contributions to the development of cell tracking by MRI *in vivo*.

Ezgi Kunttas-Tatli
(Ph.D. '14) received the Ralph and Mildred Buchsbaum Prize for Excellence in Photomicrography, SICB Broadening Participation Travel Award, and the Society for Developmental Biology Travel Award. She also received the Max M. Burger Endowed Scholarship, Horace W. Stunkard Scholarship, and Society for Developmental Biology Scholarship for MBL Embryology.

Tina Lee
(Faculty) received a grant from the Spastic Paraplegia Foundation for her work in developing a high throughput screen to identify small molecule facilitators of SPG3A Function. She also served as a review editor for *Frontiers in Cell and Developmental Biology*.

Adam Linstedt
(Faculty) was awarded a grant from DHTI and also served as editor of *Biology of the Cell* and associate editor of *Molecular Biology of the Cell*.

Joel McManus
(Faculty) received a Charles E. Kaufman Foundation Research Grant.

Jonathan Minden
(Faculty) received a Charles E. Kaufman Foundation Research Grant.

Aaron Mitchell
(Faculty) was awarded a grant from NIH/NIDCR for his work in Candida gene expression during oropharyngeal infection. He also received a grant from Highmark Healthcare DHTI for his contributions in the development of anti-biofilm surface coatings based on long-wavelength photosensitizers (in conjunction with faculty members **Fred Lanni** and **N. Luisa Hiller**).

Robert Murphy
(Faculty) was appointed as an Associate Editor for *Bioinformatics* and as a member of the editorial board for *Scientific Data*.

Manojkumar Puthenveedu
(Faculty) received a grant from the American Heart Association and a grant from NIDA/NIH. He also served as a review editor for *Frontiers in Cell and Developmental Biology*.

Suchitra Ramachandran
(Ph.D. '14) won the People's Choice Award and placed 2nd across all disciplines in Carnegie Mellon's 2014 Three Minute Thesis Competition for the presentation of her thesis, "Visual Statistical Learning in Monkey Inferotemporal Cortex".

Madhumitha Ramesh
(Ph.D. '16) was a finalist in Carnegie Mellon's 2014 Three Minute Thesis Competition. In addition, she was awarded the GSA travel award for her group's visit to the Rustbelt RNA meeting in October 2013.

Gordon Rule
(Faculty) is now the Associate Dean for Research at CMU-Qatar.

Russell Schwartz
(Faculty) received the award for Best Paper in Translational Bioinformatics at Intelligent Systems for Molecular Biology 2013.

Dan Shiwarski
(Ph.D. '17) won a best poster award at the Great Lakes GPCR Conference.

Ardon Shorr
(Ph.D. '17) was a finalist in Carnegie Mellon's 2014 Three Minute Thesis Competition.

Nathan Urban
(Faculty) recieved a grant from the Simons Foundation Autism Research Initiative to study the neuronal basis of unreliable sensory evoked responses in a model of autism.

Rachel Vistein
(Ph.D. '14) was selected to present a talk at the 13th Annual Pittsburgh Symposium on Intracellular Membrane Traffic.

Alan Waggoner
(Faculty) received a grant from the NIH for his work in targeted fluorescent indicators.

DEPARTMENTAL AWARDS

GRADUATE STUDENT SERVICE AWARD

This award is given to a Biological Sciences graduate student for their service within and outside the department.

The following student was awarded the Graduate Student Service Award for 2013–2014:

Shanna Bowersox

GRADUATE STUDENT TEACHING AWARD

This award is given to a Biological Sciences graduate student for their service to the department with regards to teaching.

The following student was awarded the Graduate Student Teaching Award for 2013–2014:

Alys Jarvela

SEMON H. STUPAKOFF FELLOWSHIP

The Semon H. Stupakoff Fellowship is awarded to a graduate student every year for the impact and quality of their recent publication. This fellowship began in 2012 and was named after alumnus Semon Stupakoff.

The following student was awarded the Semon H. Stupakoff Fellowship for 2014:

Jigar Desai

ELIZABETH W. JONES AWARD
for Excellence in Undergraduate Research in Experimental or Computational Biology

To honor her commitment to undergraduate research, the Elizabeth W. Jones Award was created in 2009. This award is given to honor the research efforts of a talented and dedicated undergraduate over their years at Carnegie Mellon.

The following student was awarded the Elizabeth W. Jones Award for 2012–2013:

Xuexia Jiang

DR. MARGARET CARVER TRAVEL AWARD

Each year, a group of biological sciences doctoral students are granted travel awards by the department. These scholarships are used by the students for professional reasons, such as attending conferences or furthering their research at an external location.

The travel awards are made possible through generous contributions from Margaret Carver, M.D. (MM '43), who passed away November 25, 2013. She was 92. After attending Margaret Morrison Carnegie School for Women, Carver attended medical school and opened an OB-GYN practice in Uniontown, PA. She was also instrumental in responding to other health care gaps within the small community. She was largely responsible for setting up the area's first mental health clinic and first family planning clinic. At Uniontown Hospital, she became chief of Obstetrics and Gynecology, a position she held for thirty years. She remained a part-time practitioner until she withdrew from practice in 1997.

The following students were recipients of the Dr. Margaret Carver Travel Award for 2013–2014:

Shanna Bowersox
Santosh Chandrasekaran
Alys Jarvela
Adam Foote
Michael Gamalinda
Andrew Kehr
Beril Kumcuoglu
Stacie Oliver
Madhumitha Ramesh
Tanvi Shashikant
Dan Shiwarski
Amanda Soohoo
Zhongling Sun
Ritika Tewari
Idil Ulengin
Phu Van
Minyan Zheng

GLEN de VRIES FELLOWSHIP

The de Vries Fellowship is awarded to a graduate student every year for the impact and quality of their recent publication. This fellowship began in 2012 and was made possible through the generosity of Glen de Vries, alumnus and founder of Medidata Solutions.

The following students were recipients of the de Vries Fellowship for 2014:

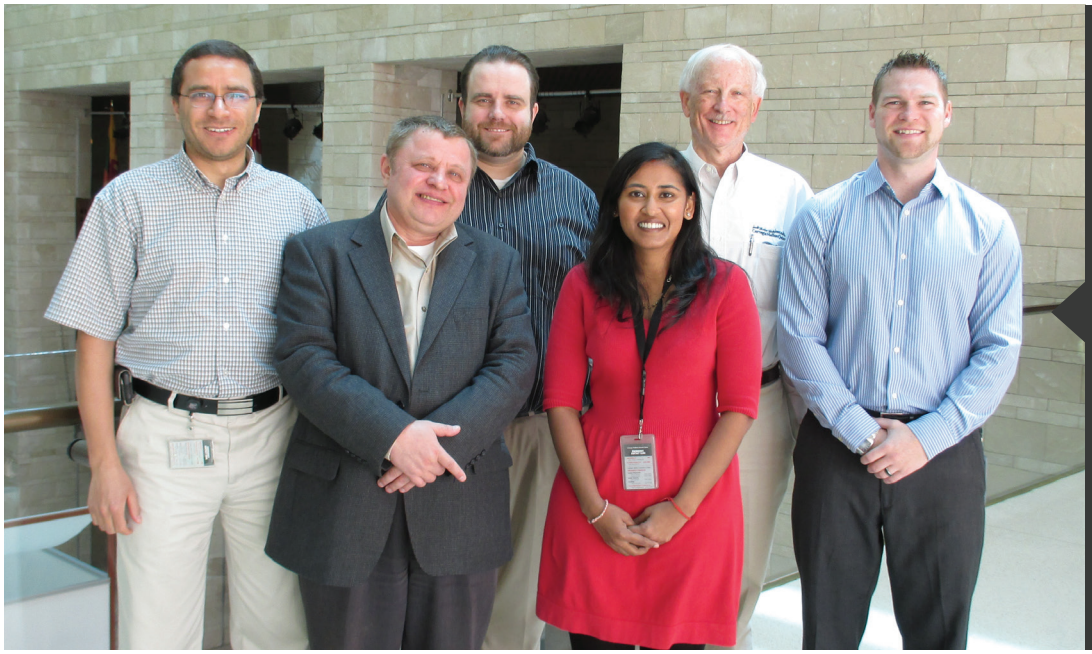
Greg Smith

Rachel Vistein

A Lot Can Happen in Two Years

A Look at CMU-Qatar's Biological Sciences Program

WRITTEN BY KENNETH HOVIS AND SHOBA SUBRAMANIAN



Faculty teaching in Qatar (left to right): Mohamed Bouaouina, Valentin Ilyin, Jonathan Finkel, Annette Vincent, Terrance Murphy, and Kenneth Hovis

Carnegie Mellon University in Qatar (CMU-Q) celebrated its 10th anniversary on March 18, 2014. A major milestone on this 10-year journey was the addition of the Biological Sciences and Computational Biology undergraduate degree programs to other highly regarded programs already existing at CMU-Q in Business Administration, Computer Science, and Information Systems. The Biological Sciences program in Qatar has experienced rapid growth in the last few years, paralleling the tremendous growth of the country itself, which invited our department to be a part of CMU-Q in 2011. Since then, the program has expanded from only 6 students and 2 full-time science faculty in 2011, to more than 30 students – 12 of whom are Qatari – and more than 10 full-time faculty and staff. The department also celebrated its first cohort of graduating students in May 2013. In less than 3 years, the B.S. in Biological Sciences has become one of the most popular degrees and most competitive programs to get into in all of Education City. Located in Doha, Qatar, Education City hosts an array of top-ranked universities offering a multitude of degree programs including Weill Cornell Medical College (WCMC-Q), who is a collaborator with CMU-Q in the Biological Sciences program.

In addition to the strong academic training and hands-on research opportunities, which are top highlights of the Biological Sciences undergrad program on both campuses, active outreach within the local primary and secondary schools has also been a priority in Qatar. Inspired by the Pittsburgh campus' long history of successful outreach programs pioneered by Carrie Doonan and the late Beth Jones, Kenneth Hovis created the Biotechnology Explorer Program (BEP) on the Qatar campus in the fall of 2011. Adapted to the needs of the region, Hovis modified versions of several successful outreach themes used on the main campus to create 7 outreach events with over 350 students in attendance from nearly 20 high schools across the region.

CMU-Q has also partnered with other universities in Doha to expand their outreach efforts to high school life science educators and their students. In 2012, CMU-Q, in collaboration with WCMC-Q, formed the Life Science Educator's Network (LiScEN), which hosts 4 days of outreach specifically geared towards high school educators and aimed at incorporating more inquiry-driven learning into secondary school classrooms. In a partnership with Qatar University, a five-day STEM Camp that offers outreach programs in the areas of biology, information and communications technology (ICT), math, and physics/engineering is planned for the spring of 2014. These outreach programs are designed not only to strengthen and nurture the pipeline of talented students in the areas of science, but to also partner with high schools and their educators to strengthen the overall science education in the Qatar region.

Biological Sciences Faculty Teaching at CMU-Qatar

Gordon Rule, Ph.D.	Professor of Biological Sciences; Associate Dean for Research at CMU-Q	Teaching: Biochemistry; Immunology; Genes, Drugs, and Disease Research: Structural Biology and Biophysics
Kenneth Hovis, Ph.D.	Assistant Teaching Professor; Academic Advisor for CMU-Q Biological Sciences	Teaching: Honors Modern Biology; Cell Biology; Systems Neuroscience; Physiology; Colloquium Research: Neurobiology of Olfaction
Terrance Murphy, Ph.D.	Teaching Professor of Chemistry	Teaching: Chemistry I & II; Laboratory I: Introduction to Chemical Analysis Research: Air Quality and Environmental Chemistry
Jonathan Finkel, Ph.D.	Assistant Teaching Professor	Teaching: Modern Biology; Genetics; Molecular Biology Research: Fungal Pathogenesis
Annette Vincent, Ph.D.	Assistant Teaching Professor	Teaching: Experimental Techniques in Molecular Biology; Experimental Biochemistry
Valentin Ilyin, Ph.D.	Associate Teaching Professor	Teaching: Computational Biology; Phage Genomics Research: Computational Genomics and Structural Biology
Mohamed Bouaouina, Ph.D.	Assistant Teaching Professor	Teaching: Cell Biology; Basic Science to Modern Medicine Research: Cell Adhesion

The program is supported by Shoba Subramanian, Ph.D., faculty member in Pittsburgh, who serves as a liaison for Qatar-related undertakings in the Department of Biological Sciences and organized the first Teaching Goals Symposium for Biological Sciences at CMU in 2013 to better connect course instructors in Doha and Pittsburgh.

Carnegie Mellon University Qatar

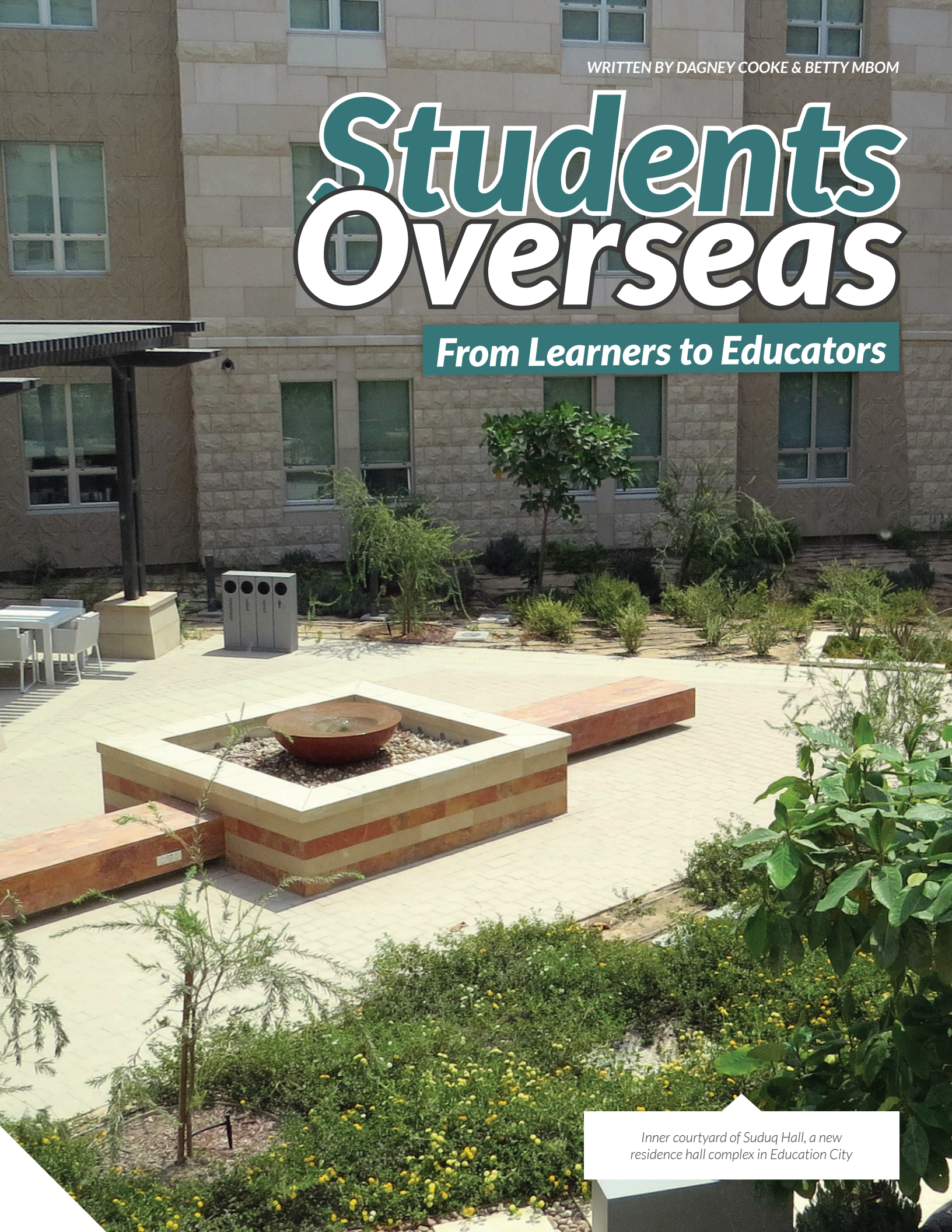
Shoba Subramanian, Qatar liaison and Director of Special Programs in Pittsburgh, and Gordon Rule, Associate Dean for Research at CMU-Q.

CMU-Q's campus building in Education City

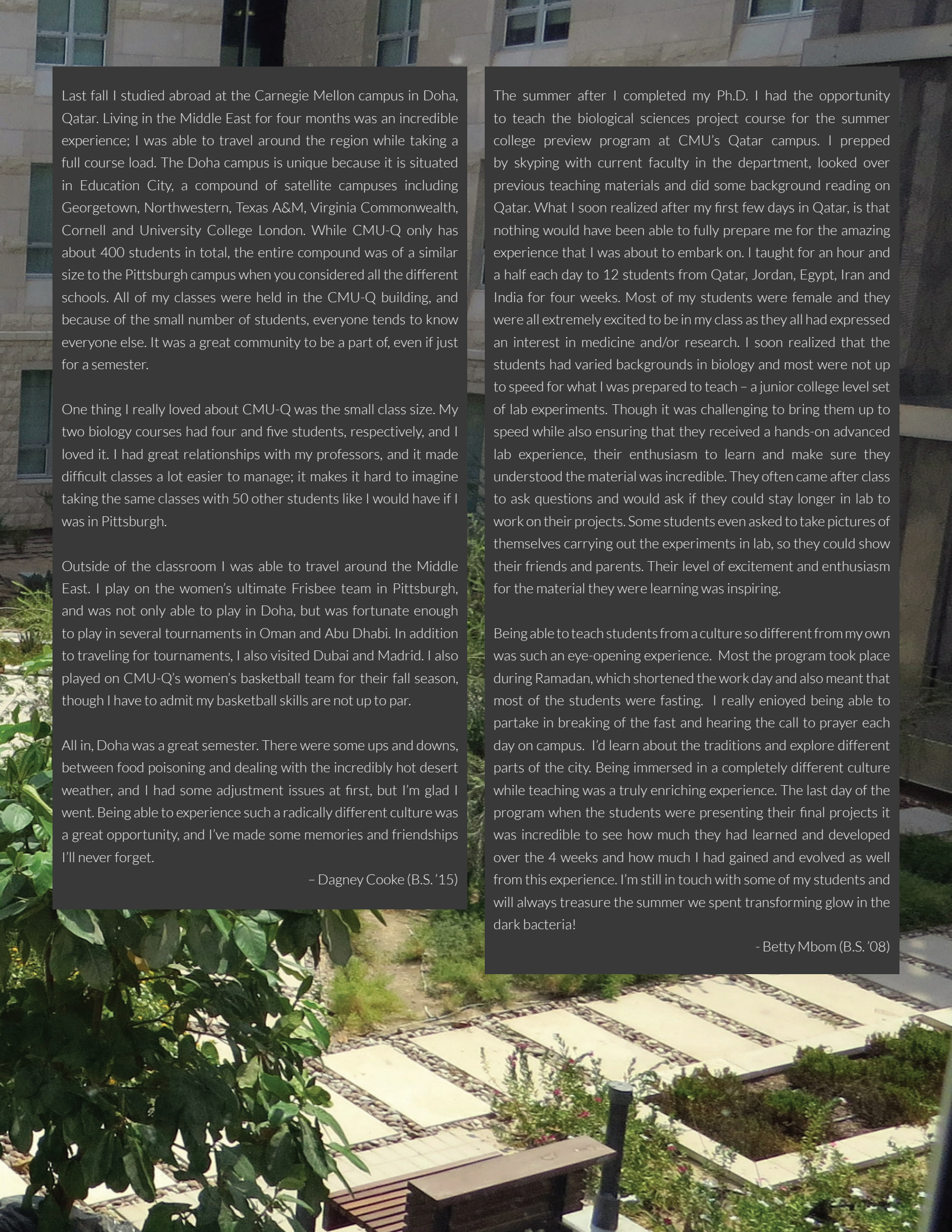
WRITTEN BY DAGNEY COOKE & BETTY MBOM

Students Overseas

From Learners to Educators



Inner courtyard of Suduq Hall, a new residence hall complex in Education City



Last fall I studied abroad at the Carnegie Mellon campus in Doha, Qatar. Living in the Middle East for four months was an incredible experience; I was able to travel around the region while taking a full course load. The Doha campus is unique because it is situated in Education City, a compound of satellite campuses including Georgetown, Northwestern, Texas A&M, Virginia Commonwealth, Cornell and University College London. While CMU-Q only has about 400 students in total, the entire compound was of a similar size to the Pittsburgh campus when you considered all the different schools. All of my classes were held in the CMU-Q building, and because of the small number of students, everyone tends to know everyone else. It was a great community to be a part of, even if just for a semester.

One thing I really loved about CMU-Q was the small class size. My two biology courses had four and five students, respectively, and I loved it. I had great relationships with my professors, and it made difficult classes a lot easier to manage; it makes it hard to imagine taking the same classes with 50 other students like I would have if I was in Pittsburgh.

Outside of the classroom I was able to travel around the Middle East. I play on the women's ultimate Frisbee team in Pittsburgh, and was not only able to play in Doha, but was fortunate enough to play in several tournaments in Oman and Abu Dhabi. In addition to traveling for tournaments, I also visited Dubai and Madrid. I also played on CMU-Q's women's basketball team for their fall season, though I have to admit my basketball skills are not up to par.

All in, Doha was a great semester. There were some ups and downs, between food poisoning and dealing with the incredibly hot desert weather, and I had some adjustment issues at first, but I'm glad I went. Being able to experience such a radically different culture was a great opportunity, and I've made some memories and friendships I'll never forget.

– Dagney Cooke (B.S. '15)

The summer after I completed my Ph.D. I had the opportunity to teach the biological sciences project course for the summer college preview program at CMU's Qatar campus. I prepped by skyping with current faculty in the department, looked over previous teaching materials and did some background reading on Qatar. What I soon realized after my first few days in Qatar, is that nothing would have been able to fully prepare me for the amazing experience that I was about to embark on. I taught for an hour and a half each day to 12 students from Qatar, Jordan, Egypt, Iran and India for four weeks. Most of my students were female and they were all extremely excited to be in my class as they all had expressed an interest in medicine and/or research. I soon realized that the students had varied backgrounds in biology and most were not up to speed for what I was prepared to teach – a junior college level set of lab experiments. Though it was challenging to bring them up to speed while also ensuring that they received a hands-on advanced lab experience, their enthusiasm to learn and make sure they understood the material was incredible. They often came after class to ask questions and would ask if they could stay longer in lab to work on their projects. Some students even asked to take pictures of themselves carrying out the experiments in lab, so they could show their friends and parents. Their level of excitement and enthusiasm for the material they were learning was inspiring.

Being able to teach students from a culture so different from my own was such an eye-opening experience. Most the program took place during Ramadan, which shortened the work day and also meant that most of the students were fasting. I really enioyed being able to partake in breaking of the fast and hearing the call to prayer each day on campus. I'd learn about the traditions and explore different parts of the city. Being immersed in a completely different culture while teaching was a truly enriching experience. The last day of the program when the students were presenting their final projects it was incredible to see how much they had learned and developed over the 4 weeks and how much I had gained and evolved as well from this experience. I'm still in touch with some of my students and will always treasure the summer we spent transforming glow in the dark bacteria!

- Betty Mbom (B.S. '08)

Got *(own)* Lab?

Talking With Three Biological Sciences Ph.D. Alumni

FOREWORD AND INTERVIEWS BY SHOBA SUBRAMANIAN

Many life sciences students start off on their Ph.D. journeys with the aspiration to have their own laboratory and be able to train future scientists. Landing such a position requires a proven track record of publications, funding success, and leadership skills not only during the Ph.D. years, but also during an almost mandatory postdoctoral training period, which typically ranges from three to seven years. Universities and departments, after a very thorough search through hundreds of applicants, hire the most promising candidate(s) to expand their research programs. Thus, the job market for tenure-track positions is cut-throat and the situation is getting worse with recent cuts in federal and state funds for research. Despite these odds, our own graduate student alumni have started their own labs by getting tickets to board the tenure-track train. These are the success stories of three such alumni.

1

ROGER CLEM (Ph.D. '07)

STARTED LAB '12

Assistant Professor, Departments of Neuroscience and Psychiatry, Icahn School of Medicine at Mount Sinai Hospital

Postdoctoral Fellowship, Johns Hopkins University School of Medicine
Advisor: Richard Huganir, Ph.D.

Ph.D., Biological Sciences, Carnegie Mellon University & The Center for the Neural Basis of Cognition
Advisor: Alison Barth, Ph.D.

Research Assistant, Sensory Neurobiology, West Virginia University

B.S., Biology & Philosophy, West Virginia University

Select Recent Awards/Honors/Funding

NARSAD Young Investigator Award

Finalist, Eppendorf and Science Prize for Neurobiology

Daniel Nathans Research Award, Johns Hopkins University

National Research Service Award (NRSA), NIMH, NIH

How would you describe your lab research?

Emotional experiences leave an enduring record in the brain by way of structural and molecular remodeling of cells and synapses. While these modifications help organisms respond appropriately to threats and rewards, they also contribute to maladaptive states like addiction and post-traumatic stress disorder. Many key characteristics of emotional memory mirror those of synaptic plasticity in reduced neuronal preparations. For example, both involve changes in neurotransmission that can persist for long periods provided they undergo molecular stabilization. We now recognize, however, that this basic model fails to capture the complexity of processes that contribute to emotional memory storage or that update or inhibit memory as behavioral conditions change.

We utilize molecular and electrophysiological approaches, including optogenetic stimulation, to identify how associative fear conditioning modifies neural pathways and individual neurons in limbic and cortical brain regions in mice. Once fear responses are established, other experiments will

address the mechanisms that contribute to their long-term maintenance, as well as their reinforcement or attenuation by molecular and behavioral interventions. Ultimately, these types of experiments will lead to new rationales for treatment of emotional disorders that are informed by circuit biology of emotional behavior.

Could you talk about your overall career path that ultimately guided you to your current position?

My path began as an undergraduate biology student at West Virginia University, a land-grant institution in my home state. There I became involved in microbiology research in Herbert Thompson's lab in my freshman year, and later completed a thesis on molecular characterization of a heat-shock promoter from the Q-fever agent *Coxiella burnetti*. As many graduate applicants do, I spent two years as a research assistant in sensory neurobiology labs at WVU before applying to graduate school. While I had a strong inclination towards neuroscience upon entering Carnegie Mellon, it was not long before I was certain that I wanted to be a neurophysiologist. My obsession with neurons really blossomed after my lab rotation with Alison Barth, and has continued to grow ever since. After joining Alison's lab, I became part of a close-knit group of freshman graduate students and junior principal investigators (PIs) in the Great Hall of Brain Science. There I first learned how to record from neurons, and had the good fortune to be one of the first people to work with Alison's fosGFP transgenic mouse, one of the most exciting new tools in neural plasticity. I became very focused early into my thesis, and was able to make a few exciting discoveries that landed in great journals. This, more than anything, gave me confidence to continue my training in addition to providing great options for a postdoctoral position. I ultimately chose to conduct my postdoctoral research in the lab of Rick Huganir, an early pioneer in molecular mechanisms of synaptic plasticity. There I had the fortune to work with numerous mouse mutants of synaptic proteins, many of which had not yet been applied to behavioral paradigms. With Rick's support, I was able to establish emotional learning paradigms to investigate synaptic correlates of memory processes in the amygdala. After several years in Rick's lab, I obtained a tenure-track position in the Department of Neuroscience at the Icahn School of Medicine at Mount Sinai. Here I am Assistant Professor in the Neuroscience and Psychiatry departments and a member of the Friedman Brain Institute.

Did you stay in the same field of research as your Ph.D. or did you switch fields post graduation?

Unlike many of my colleagues, I continued in the same area of research after graduation. As a graduate student I studied sensory-driven synaptic plasticity in the barrel cortex, and as a postdoc I used similar approaches to study synaptic mechanisms of emotional memory.

Did you always know that you wanted to have your own lab?

I think that similar to most students, my pursuit began with a desire to be involved in science, and to make new discoveries. The academic track emerged later as the surest way to sustain that involvement and intellectual growth, and an arena in which I could bring my own vision of a research lab to life.

Did your CMU training influence your decision to start a lab? If not, what in the past/future led you to your current position?

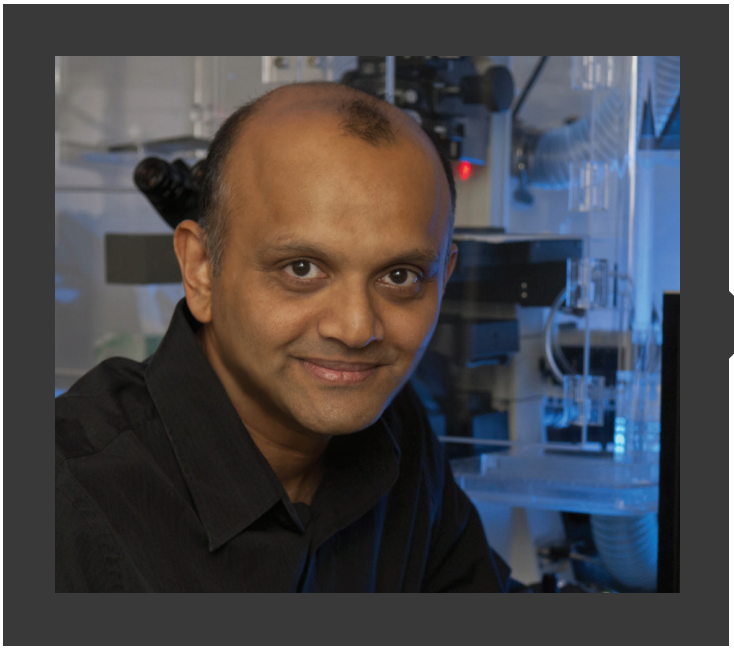
My graduate training at CMU undoubtedly brought having my own lab into the realm of possibility. I think that being principal investigator of a lab is probably the best imaginable outcome for most students, but these positions are extremely limited. Thus, a graduate program needs to go the extra mile to give their students a fighting chance. This was particularly crucial to me as a first-generation college graduate who felt constantly in uncharted territory.

How do you use the skills that you obtained during your CMU training in your current position?

One obvious example of an important skill that I obtained at CMU is electrophysiology, which was hugely marketable in obtaining a postdoctoral position. In terms of non-scientific skills, I think that being a student in a biological sciences department prepared me well for relating my research to a broader audience. This comes in handy in many scenarios – for example, it helped me win runner-up in an essay contest for the Eppendorf and Science Prize, and is useful when tailoring my grant applications to non-expert reviewers. In terms of alternative careers, I think that these kinds of skills can also go a long way.

Any words of wisdom for our students who aspire to be tenure track PIs?

My best advice would be to prepare to be something else while aspiring to be a tenure track PI, because the reality is that while research institutions in the United States provide great opportunities to achieve this kind of success, they are generating too many faculty candidates and there is not a lot of impetus to change that formula. Even when you achieve your own lab, you may fall victim to fierce competition for limited research funding. I would advise current trainees to prepare themselves for these unfortunate realities.



2

MANOJ PUTHENVEEDU
(Ph.D. '04)

STARTED LAB '09

Assistant Professor, Department of Biological Sciences, Carnegie Mellon University

Postdoctoral Fellowship, University of California, San Francisco
Advisor: Mark von Zastrow, M.D., Ph.D.

Ph.D., Biological Sciences, Carnegie Mellon University
Advisor: Adam Linstedt, Ph.D.

Research Fellow, National Center for Biological Sciences, India

M.B.,B.S., Calicut Medical College, India

Select Recent Awards/Honors/Funding

Eberly Career Development Chair

Beginning Grant-in-aid (BGIA), American Heart Association

Exploratory/Developmental Research Grant Award (R21), NIDA, NIH

Pathway to Independence Award (K99/R00), NIDA, NIH

How would you describe your lab research?

My lab works on understanding why drugs are addictive. Most currently abused drugs, such as heroin and morphine, activate targets known as opioid "receptors" in the brain. Strikingly, these same receptors are also constantly activated in the brain by endorphins - normal signaling molecules - without many adverse effects. The central question in addiction, therefore, is why we rapidly get addicted to drugs, but far less so to endorphins. Considering that a tenth of the U.S. population is addicted to illicit drugs, this is a question of profound socioeconomic impact. Research in my lab focuses on the molecular mechanisms that underlie this difference between drugs and endorphins.

Decades of previous research have made it clear that we need new methodologies to address this question. We have pioneered the use of innovative fluorescence imaging assays to directly visualize, in real time, how opioid receptors respond - specifically, how the location of receptors change - in response to drugs in living neurons. We are currently using these assays to understand the mechanisms by which the responses of brain cells to drugs and endorphins differ, with the goal of generating molecular models that can drive new strategies to combat addiction.

Could you talk about your overall career path that ultimately guided you to your current position?

I entered medical school straight out of high school. This was a natural path, as my father was a doctor, and medical school was "the" option that every student tried for in India. During my medical training, however, I found myself becoming deeply interested in the molecular basis of any disease that I came across - an interest that rapidly expanded to understanding how cells worked in a normal organism. Unfortunately, back then, there were no opportunities for a medical student to be involved in basic research. So, after completing my medical degree (MBBS) and house surgeoncy, instead of clinical practice, I started a two-month summer internship at the National Center for Biological Sciences (NCBS), a leading research institute in India. At the end of this period, I was awarded a competitive Junior Research Fellowship to continue working at NCBS for a year. This was my first exposure to hands-on research in Biology. I absolutely fell in love with research and decided to do a Ph.D.

After initially joining the University of Utah, I transferred to CMU, which I had visited in between and really liked. At CMU, I studied the molecular mechanisms of Golgi biogenesis with Adam Linstedt as part of my doctoral work. After that, I moved to the lab of Mark von Zastrow at UCSF, where I initiated my current studies on the membrane trafficking of G-Protein Coupled Receptors (GPCRs). I was fortunate in that I was able to publish high-impact papers during both my doctoral and postdoctoral work, and I believe these were crucial in securing me a tenure-track position. Additionally, with Mark's support, I was able to obtain the NIH K99/R00 "Pathway to Independence" grant, a highly competitive grant awarded to postdoctoral fellows aspiring to start their own research labs. A relatively new initiative by the NIH at that time, this grant funds one's postdoctoral work and also provides 3 years funding of one's own lab. This early funding support made getting resources for my lab and hiring graduate students quite a bit easier.

Did you stay in the same field of research as your Ph.D. or did you switch fields post graduation?
During my Ph.D., I worked on understanding the fundamentals of membrane trafficking. For my postdoc, I extended this to a clinically important class of molecules, GPCRs, to understand the trafficking mechanisms that localize these proteins to their locations of function in cells.

Did you always know that you wanted to have your own lab?
After I got my taste of science, yes.

Did your CMU training influence your decision to start a lab? If not, what in the past/future led you to your current position?
The scientific culture at CMU, the way the PIs were excited about science, reinforced my decision to be a PI.

How do you use the skills that you obtained during your CMU training in your current position?
Outside the technical skills in biochemistry and imaging, two factors stand out. First, was the emphasis on rigor. There was this sense that whatever came out of the department was careful and iron-clad. The second was the feeling of education and collaboration as opposed to unhealthy competition. It was very easy to walk into the office of any faculty member, and they would be willing to spend time answering your questions. Often these conversations turned out into ideas that would have been very difficult to generate on my own. I try to maintain these factors in my current lab.

Any words of wisdom for our students who aspire to be tenure track PIs?
Believe in yourself and enjoy the ride. One of the hardest aspects of the job, for me, is dealing with failures and rejections at every level, from getting the job to continuing in it. Letting these rejections roll off your shoulders is a critical quality to develop. I don't think I will ever get used to this, but I try to counterbalance it by appreciating and celebrating all the successes - discoveries in lab, student recognitions, publications, grants, awards, etc. What has worked for me, is putting the science first and assuming that the rest of it would come along. Also, there are several options available now for a biology graduate, so be sure this is what you want to do. If you approach a tenure-track position as a day job, it is one of the worst jobs you can think of. But if you are in it because you enjoy science, this is absolutely the best job anyone can have.

ALUMNI UPDATES

Stuti Agrawal (M.S. '13) is currently a Bioinformatician at the University of Chicago School of Medicine.

Ka-Young An (M.S. '05) welcomed a daughter, Kyu-Ri, in the summer of 2013. She is currently a researcher with Macrogen in Seoul, Korea.

Ayse Aydemir (Ph.D. '05) completed her postdoc at Columbia University Medical Center, and then took on a teaching faculty position at Bard High School Early College, one of the schools of Bard College. She teaches introductory biology and labs in the first year college program.

Gargi Bajpayee (B.S. '07) successfully graduated medical school in 2012 and is now a 2nd year Internal Medicine Resident at Mount Sinai Beth Israel Hospital in NYC. Next year will be his last year of his residency training and will then apply for a cardiology fellowship in hopes of becoming a cardiologist.

Helen Buse (B.S. '01) (formerly Helen Lau) received her Ph.D. in Microbiology and Immunology in 2007 from the University of Michigan in Ann Arbor. For her postdoctoral training, she conducted drinking water pathogen research from 2007-2011 at the US Environmental Protection Agency. She married her husband in 2009 and has two daughters, a 3 year old, Sophie, and a 1 year old, Arya. She is currently a microbiologist with the U.S. EPA in Cincinnati, OH.

Hak Chang (Ph.D. '01) is currently the Senior Patent Counsel of Intellectual Property at Synageva BioPharma Corp.

Sunguk Choi (M.S. '13) is a Senior Associate and Machine Learning Scientist at BNY Mellon.

Josh Earl (M.S. '09) is a Research Instructor at Drexel University College of Medicine.

Jeffrey A. Freed (B.S. '79) is a pathologist with CellNetix Pathology and Laboratories, working at Grays Harbor Community Hospital in Aberdeen, WA. He has published and patented three methods pertaining to measurement of ploidy in tissue sections. He is also an accomplished amateur violinist and composer who is active in local chamber groups and in the Grays Harbor Symphony.

Anmol Grover (Ph.D. '13) is a Postdoctoral Associate at Weill Cornell Medical College.

3

MANGALA SRINIVAS (Ph.D. '07)

STARTED LAB '13

Assistant Professor, Radboud University Njimegen Medical Center (RUNMC), The Netherlands

Postdoctoral Researcher, Radboud University Njimegen Medical Center (RUNMC), The Netherlands
Advisor: Jolanda de Vries, Ph.D.

Ph.D., Biological Sciences, Carnegie Mellon University
Advisor: Eric Ahrens, Ph.D.

B.Sc. (Hons), National University of Singapore

Select Recent Awards/Honors/Funding

European Research Council (ERC) Starting Grant

Innovational Research Incentives Scheme VENI Grant, Netherlands Organisation for Scientific Research (NWO)

How would you describe your lab research?

We're working on the development and application of new tools for *in vivo* imaging. My biggest current project focuses on nanoparticles that are built like Lego blocks, in that they can be customized through simple addition or removal of components, for applications such as imaging using various modalities (e.g. ultrasound, MRI, SPECT, fluorescence, photoacoustics), *in vivo* targeting, and drug delivery.

Could you talk about your overall career path that ultimately guided you to your current position?

I did my undergraduate degree in Singapore, at the National University. After that I went to CMU for my Ph.D., and have been in the Netherlands ever since. I'm working in the Department of Tumor Immunology, which I initially joined as a postdoc. I have received two major grants, the first being a VENI grant from the Netherlands Organisation for Scientific Research, which is a personal grant for 3 years given to postdocs within 3 years of their defense (250,000 euro). Last year, I received a Starting Grant from the European Research Council, which is the biggest and most prestigious grant for people early in their career in the EU (up to 1.5 million euro). That led to a tenure-track position for me in the department and to starting my own group.

Did you stay in the same field of research as your Ph.D. or did you switch fields post graduation?

I did my Ph.D. on the development of 19F MRI for cell tracking. I'm now working with many imaging techniques, including MRI. So it's still generally the same field, just much, much broader.

Did you always know that you wanted to have your own lab?

Not at all! My work is very applied, and because of this, industry always seemed like a viable alternative. But I really like the scientific freedom and flexibility I have now. Also, there always seems to be something else to work on, so it's hard to leave.

Did your CMU training influence your decision to start a lab? If not, what in the past/future led you to your current position?

I really enjoyed my time at CMU. I especially liked that it was so easy to do interdisciplinary work there and I benefited from those collaborations. I want to maintain an interdisciplinary environment in my future research, and starting my own group enables me to do this because now I can hire a chemist and a physicist to be part of my lab. Moreover, many of the professors that I saw at CMU just simply seemed to be having a good time. Seeing people genuinely happy with their work is always great advertising.

How do you use the skills that you obtained during your CMU training in your current position?

I learned so much during my Ph.D., most of which is hard to quantify. Scientific skills and techniques aside, I think one of the biggest pluses for me

was learning to handle multidisciplinary research. My advisor, Eric Ahrens, was a physicist, and my committee originally consisted of two chemists and an immunologist (CMU's Alan Waggoner and Bill Brown, and Penny Morel from the University of Pittsburgh). They all approached my work from vastly different angles, and asked very different questions. I think those experiences made me fluent in "translating" ideas or research between fields, which, I think, is an essential skill.

Any words of wisdom for our students who aspire to be tenure track PIs?
Watch *The Last Lecture*. It's important to never listen when people tell you it can't be done if you believe otherwise. I remember when I applied for the VENI grant, the university assigned me to a random "mentor" (from outside my department). He took one look at my CV and told me not to bother applying. Now he's embarrassed every time we meet in the elevator! There are always people like that, who will tell you that you are not good enough, usually in more subtle ways, and I think this is especially true for women. Politely ignore such people.

Also, do not feel that you must sacrifice your personal life to succeed in science. I think I'm particularly lucky here, in that the Netherlands is very family-friendly in general, and my department is specifically so. Ever since I had my first child, I've been working part-time, so I have most Fridays off. I also try to work from home at least once a week. This really helps keep me sane, and gives me enough energy to be more creative in my work. I really enjoy spending Fridays home with the kids (most of the time, anyway). Don't feel guilty about being a mom who's there, or at the same time, for being a mom who needs to work some evenings because of deadlines, or needs to travel for conferences. I think these are both issues a lot of women struggle with. This applies to people without kids too, of course – try to keep the evenings and weekends free from work, at least, most of the time.

ALUMNI UPDATES

Mark Ko (M.S. '10) continues to work at Bloomberg as a senior software developer.

Bob Last (Ph.D. '86) was a visiting scientist at the Weizmann Institute for Science in Rehovot, Israel for ten months in 2013. He is currently the Barnett Rosenberg Professor of Plant Biochemistry and Molecular Biology at Michigan State University.

Jeanne Morin-Leisk (Ph.D. '11) is a Postdoctoral Fellow in the lab of Jenny Hinshaw at the National Institutes of Health. She is working on using cryo-electron microscopy and cryo-electron tomography to elucidate the structure of the minimal machinery required for mitochondrial outer membrane fusion.

Rajesh Naik (Ph.D. '98) is the Bio Research Team Leader in the Soft Matter Materials Branch (AFRL/RXAS) at the Air Force Research Laboratory in Wright-Patterson AFB, OH.

Audra Pompeani (B.S. '03) graduated from the University of Pennsylvania School of Veterinary Medicine and married Dante Ricci in May 2013. Together, they moved to San Francisco, where sh e currently works as a veterinarian at the Pet Emergency and Specialty Center of Marin.

Brian Sage (Ph.D. '04) is a Professor of Biology at Valencia College.

John R. Simon (Ph.D. '88) is pleased to see his daughter, Emily, become a Ph.D. student in CMU's biological sciences program.

Shree Sriram (M.S. '09) is a Senior Computational Biologist with Genomics R&D at Dow Agrosciences LLC.

Amit Srivastava (Ph.D. '99) is a Program Officer in the Global Health Program in Pneumonia at the Bill and Melinda Gates Foundation. Amit manages the Foundation's investments in making the existing pneumonia vaccine cheaper both by working with low-cost vaccine manufacturers in the developing world and helping develop innovative manufacturing technologies. In addition, Amit helps the Foundation invest in industry and academic researchers working on novel pneumococcal vaccines.

Nitesh Turaga (M.S. '13) works at Data Analyst at Johns Hopkins University School of Medicine.

Surya Viswanathan (Ph.D. '03) is a Senior Global Marketing Manager at BD Diagnostics.

Peter J. Ward (B.S. '96) is currently an Assistant Professor at West Virginia School of Osteopathic Medicine. He and his wife, Sarah Koressel, celebrated the birth of twin sons, Dashiell and Archer, in August 2013.

The Comings & Goings

Jason D'Antonio

Director, Health Professions Program
Lecturer, Biological Sciences

interviewed by Tara Primiero

As I look back at my career, I equate my professional and collegiate experiences as being on a conveyor belt. What I mean to say is that college was a definite; there was no question that was going to be my next step and no consideration of a gap year to experience the world. And so I propelled myself onto the premed track, perhaps in an effort to follow in my father's footsteps, but undoubtedly to secure "success" and financial stability. And perhaps, this career choice pleased those around me too well that no one, including my parents, pushed me to understand and question if this was indeed the right path for me.

My turning point, or more accurately, rude awakening, came with Organic Chemistry at the Univeristy of Colorado Boulder, and instantly, I knew that I needed another path. I graduated majoring in both Philosophy and Biology before setting out on a series of unsatisfying career paths, including working as a paralegal and financial planner. Learning and growing from each experience, I completed the Cellular and Molecular Pathology Ph.D.

Jim Williams

Professor, Biological Sciences

written by Maggie Braun

Jim Williams is a well-respected scientist and teacher who shared his passion for virology with his peers and students for almost 40 years. Jim began his career at the University of Glasgow, Scotland in 1967. During this time at Glasgow, he took a sabbatical to work as a visiting scientist at Cold Spring Harbor Laboratory in New York and the University of Uppsala in Sweden. He moved up the tenure ranks at the University of Glasgow before coming to CMU as a full professor in 1976. His new lab was set up on the 6th floor of Mellon Institute and quickly grew to house several graduate students and staff, including Jim's wife, Merlyn. Jim's dedication to his research was contagious and he and his lab members worked many late nights (i.e. early mornings!) to progress their work.

Jim's research focused on using adenovirus as a genetic tool to study tumor progression in mammalian model systems. Adenovirus was one of the first leading model systems to study eukaryotic transcription and mRNA splicing, connecting his work to much broader fields of study. Jim is one of the world's best adenoviral

Cindy Davis

Business Manager, Biological Sciences

written by Maggie Braun

Cindy Davis has participated in numerous aspects in the field of biology – from coursework to manuscript preparation to grants administration. She earned a bachelor's degree in Anatomy and Cell Biology with a minor in History at the University of Alabama before coming to CMU in August of 1980 as the Secretary for Chien Ho, then Department Head of Biological Sciences. She worked with Ho (who went on to become Director of the NMR Center) for 13 years before transitioning to Business Manager for the Department of Biological Sciences in 1993, a position that she held for the next 21 years.

In that time, Cindy worked with several department heads and facilitated a smooth financial road for the department. Some of these roles included: support for faculty with grant applications and grant fund management, creation and management of departmental budgets, administration of all departmental human resources-related responsibilities and support of graduate students in securing funding. She also served as a confidant and friend to many faculty, staff

Program at the University of Pittsburgh. Soon after, I became an adjunct professor at Stevenson University teaching a Human Physiology course for nursing majors and confirmed that I found my true calling as an educator. Finally on the right path, my career erupted – I began teaching for American University and in just three years developed and taught eight different courses.

In my current role as CMU's Health Professions Program Director, my mission is to keep students off of the conveyor belt by creating an action plan that is uniquely suited to them. I think what is most unique about this university, in comparison to the others that I have experienced, is the advising culture. The staff is really focused helping students succeed, connect, and grow by asking those big questions that were never asked of me and facilitating experiences that redefine and/or confirm their professional pursuits.

Looking ahead, my plans are to continually improve the Health Professions Program as well as getting my feet back in the classroom. For me, success is getting students excited to learn and helping them to start looking at the bigger issues and solutions for public health.

geneticists; his mutant viruses are still requested to this day. While his research lab closed in 2003, Jim continued to collaborate and co-author publications until as recently as 2009. Jim was very involved in the research in his lab – from maintaining the mouse colony to training his enthusiastic and dedicated graduate students one-on-one. Many of his former graduate students went on to become successful scientists and some have their own research labs at prestigious universities across the country.

Jim was a dedicated and respected teacher in the classroom as well. From his arrival on campus until the spring of 2013, Jim taught an undergraduate virology course that was well rated by students. He also taught a first-year mini-course on viruses from 2002-2011, which he continuously updated yearly based on popular press regarding the topic. One example of the subjects covered includes "Preparing for a Potential Influenza Pandemic," a version in which students reviewed current literature on that subject and prepared presentations on H1N1 subtype of influenza and related issues on virulence, drug development, vaccinations, and surveillance of the spread of the flu strain. Jim also co-taught the department's Microbiology course from 2011-2013.

Jim officially retired on May 31, 2013. He plans to spend his retirement continuing to travel and spending time with his family, which includes several great-grandchildren.

and students in the department. Over the years, Cindy was recognized both on and off campus for her significant contributions to the University and greater Pittsburgh professional community. In 2003, she received the MCS Merit Award for Outstanding Service to the College based on her consistently exceptional job performance, positive attitude, and strong commitment to teamwork. She also served as Secretary for the Allegheny Chapter of the Society of Research Administrators for more than 6 years. Cindy served on 10 different CMU committees, including Staff Council, the University Disciplinary Committee, and the CMU Mentoring Program.

Cindy has always had a generous and warming personality; she is consistently giving to anyone in need. Cindy was vital in the annual coordination of the departmental Holiday Party for many years, ensuring that the children of faculty, staff, and students were able to get a special gift during a visit from Santa and his elf at the party. She led numerous efforts to raise donations and funds for the Salvation Army which helped to keep countless children in the Pittsburgh area warm and allowed so many less fortunate families to provide holiday gifts to their children.

Cindy officially retired on March 3rd, 2014. She plans to enjoy her retirement traveling, spending time with her family, and cheering on the Pittsburgh Steelers.

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CONNECTING OUR PAST WITH OUR FUTURE

Alumni – Does your lab have current opportunities for postdocs? Is your company looking for qualified students for internships or recent graduates for open positions?

Connect with the Department of Biological Sciences and we can announce these opportunities to our current students.

Email bio-jobs@andrew.cmu.edu

"Teamwork is the ability to work together toward a common vision. The ability to direct individual accomplishments toward organizational objectives. It is the fuel that allows common people to attain uncommon results." – Andrew Carnegie

IMAGE & PHOTO CREDITS

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