



ARCS-PITTSBURGH NEWSLETTER

www.arcsfoundation.org/pittsburgh

Winter 2015

Advancing Science in America®

ARCS Foundation advances science and technology in the United States by providing financial awards to academically outstanding U.S. citizens studying to complete degrees in science, engineering and medical research. The Pittsburgh Chapter has the additional focus of increasing the number of doctoral scholars pursuing advanced scientific study and research in the Western Pennsylvania region.

The Pittsburgh Chapter

Chartered in 2003, the Pittsburgh Chapter is one of the newest of 17 nationwide ARCS chapters. In a short time, the Chapter has already pledged more than a million dollars to its three partner universities, Carnegie Mellon University, the University of Pittsburgh, and Penn State University.



Pittsburgh Roche/ARCS Scholars Announced

The Roche Foundation, one of the oldest charitable foundations in the United States, and ARCS National have formed a partnership which will substantially add to the number of ARCS scholars across the United States. Through this partnership, Roche has agreed to provide a total of \$663,000 in funding to support 40 ARCS scholars over the next three years. As with all of our scholars, the Roche/ARCS scholars have been selected from approved programs or departments at ARCS partner universities. All of the students are first year PhD candidates in fields related to the Life Sciences.

In Pittsburgh, there are three Roche/ARCS scholars: Stephanie Biedka, Daniel Long and Ameya Nanivadekar.

Daniel and Ameya are both in the Bioengineering Department in the Swanson School of Engineering at Pitt, while Stephanie is in the Department of Biological Sciences at Carnegie Mellon. Stephanie's undergraduate research interest was Molecular Biology and Biotechnology. Currently, she is exploring several branches of biology during her first year rotations. Her first rotation was in a developmental biology lab where she studied molecular mechanisms of cellular reprogramming in sea urchin embryos. Daniel is researching a system that will regenerate damaged tissue in a manner that is far better than currently possible. This system has widespread applications in cardiac regeneration, healing of chronic wounds,

and bone regeneration. Ameya will work on the development of neural interfaces to restore sensory function to people whose abilities to perform daily activities have been damaged because of injury or disease. His research will provide potential benefits to many people, including those with spinal cord injuries, limb loss, or diabetes.

Stephanie, Daniel and Ameya are all outstanding students, and we congratulate them as recipients of Roche/ARCS awards. As their studies proceed, they will surely help to further the Roche Foundation's and ARCS's shared interest in advancing science in America. A big thank you to the Roche Foundation for its support of ARCS scholars.

Upcoming Events for ARCS Pittsburgh

SCHOLAR SHOWCASE

*March 24 6:30 PM
The Twentieth Century Club
4201 Bigelow Boulevard
Open to spouses and significant others.*

Meet and greet ARCS scholars and talk to them about their research. Many will be presenting posters on their research. This is one of our most popular events as members frequently leave with a sense of awe at the important work that is being accomplished here.

AN EVENING WITH THE CHANCELLOR

*April 1, 2015
5:30-7:30 PM
University Club in Oakland Ballroom A.
Open to spouses and significant others.*

ARCS Pittsburgh will host "An Evening with the Chancellor" in which members will have the opportunity to meet the new Pitt chancellor, Patrick Gallagher.

Letter from the President

Every weekday morning, I wake my sleepy dog and venture outside with her. Most mornings we meet up with several other dog walkers and their dogs. I'm not sure who gets more enjoyment out of those walks, the people or the dogs. For the people, it is a chance to be outside, to get some exercise, and most importantly to talk about issues, concerns and joys that we all have. My conversations frequently revolve around ARCS matters. When ARCS has had a successful event, my dog walking friends hear about it. If a meeting has not gone as well as it should, they know, and they advise.

More often than not the dog walkers hear about how much I thoroughly enjoy working with other ARCS Pittsburgh members, or what amazing work in the sciences our partner universities are doing, or how simply wonderful our students are. I figure that every ARCS chapter has three important constituencies without whom it simply could not exist: its members and donors, its universities, and its students. In Pittsburgh we are so fortunate with all three of our constituencies.

We have approximately 140 members and a handful of other donors, each of whom gives valuable time or treasure (or both!) to ARCS. Together we have already donated \$1,100,000 to our partner universities. In addition we have committed an additional \$272,500 to fund the remaining awards for our current students, so that our total commitments to date amount to \$1,372,500. A big thank you goes to our members, other individual donors, and the foundations and corporations that show their commitment to science by funding our students.

My dog walking friends always hear when we have had a program given by one of our universities. I love telling of lectures from the various departments such as Plant Science, Ecology, and Acoustics at Penn State, Computer Science and Engineering at CMU, or Bioengineering and Medical Research at Pitt. I believe that western Pennsylvania is very fortunate to be home to three such top universities.

Finally, our third constituency, the students. We so enjoy meeting the new first year scholars each fall with their superb undergraduate records and the excitement of choosing their research fields. We love seeing their progress through the first three years of graduate school, but before we know it, they are presenting posters at the Scholar Showcase in the spring of their third year, they get to keep their ARCS medallions, and it's time for us to bid them a fond farewell as they become scholar alums. It's hard to see them leave, because we've grown so fond of them. However, we are excited by the research they are already doing, and we look forward to the careers their PhD's will bring. We can be sure that they will make their mark on the world.

Thank you so much for the part you play as a member of one of ARCS Pittsburgh's constituencies!



Missy Unkovic
President
ARCS Foundation Pittsburgh Chapter

ARCS Pittsburgh Honors Jared and Maureen Cohon

On September 2, Carnegie Mellon's Posner Center overflowed with ARCS Foundation Pittsburgh Chapter members, ARCS scholars, and well wishers as the group gathered to honor Jared and Maureen Cohon for their leadership in helping to create the Pittsburgh Chapter and for their continued support of the organization since its inception.



The Cohons and ARCS Scholars enjoy the evening

The evening began with a cocktail networking party in the lobby of the Posner Center and moved on to fill Mellon Auditorium where Robbee Kosak, Vice President of University Advancement at Carnegie Mellon, welcomed guests and introduced CMU Interim Provost Dr. Nathan Urban.

Mr. Urban spoke eloquently about the nationally important work ARCS Foundation does in supporting emerging scientists. He introduced ARCS President and CMU alumna, Missy Unkovic who thanked the many donors for supporting ARCS Foundation's

mission and its scholars. CMU President Emeritus Jared Cohon and his wife Maureen were then recognized with a named award in their honor.

Following a hearty round of applause, Missy introduced two of ARCS's third year scholars, Tom Jackson (CMU) and Courtney Andersen (University of Pittsburgh), who spoke about how ARCS has assisted in their scholarly pursuits. They then asked the remaining scholars to stand, introduce themselves, and give a brief synopsis of their

focus of study. The consensus among the enthusiastic group was that ARCS helped not only in their scholarly pursuits but also in many value added ways including tickets to events.

The evening concluded back in the Posner Center Lobby with congratulatory networking over coffee and dessert.

A list of the first year 2014 Pittsburgh ARCS scholars can be found in this newsletter and on the website.

Welcome Our New Member

Welcome our new ARCS member

CAROL GOLDBERG

Our members are the heart and soul
of our organization.

We welcome Carol,
a resident of the Park Mansions,
and look forward to her becoming a part of the ARCS team.

ARCS Foundation Pittsburgh Donors 2014

CORPORATION and FOUNDATION FULL SCHOLAR AWARDS

BNY Mellon Charitable Foundation
Fine Foundation
Lockheed Martin
PPG Industries
The Roche Foundation

INDIVIDUAL FULL SCHOLAR AWARDS

Roy and Susie Dorrance
Hans and Leslie Fleischer
John and Catherine Ryan in honor of
Jeanne Berdik
Chapter Award in honor of Jeanne Berdik
Chapter Award in honor of Jerry and
Maureen Cohon

DONORS OF HALF AWARDS

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DONORS OF THIRD AWARDS

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Erika Kirwin
Janice Leckey
Jennifer and James Martin
Susan Martin
Barbara Palmer
Margaret Ragni, MD and
Frederick Porkolab, MD
Thea and Dick Stover
Kathleen and Louis Testoni
Elizabeth Wainwright
Janet Wood
Maureen Young

ARCS Foundation greatly appreciates the generosity of
these donors toward our scholars.

From Rural Iowa to High-Tech Pittsburgh

Born in rural Iowa, in a town of 5,000 people in the southwest, Peter Lund now finds himself a CMU doctoral student and third year ARCS scholar working in neuroscience.

“In general,” Peter says, “my work involves brain-computer interfaces. For example, in a quadriplegic person, brain control may be intact but the spinal cord has been severed, so the neural pathways telling limbs how to move have been interrupted. Our goal is to redirect information from the brain into a robotic arm or leg, enabling the quadriplegic person to regain movement.”

Peter entered the neurosciences from “general compassion,” he says, not from the experience of knowing a quadriplegic person. “Understanding the brain is a fascinating problem to work on,” he explains. “Pittsburgh is also a fantastic place for neuroscience research.”

Two research arms power Peter’s work. First, he works with monkeys and computer cursors in the University of Pittsburgh’s monkey lab, under Professor Aaron Batista. It turns out that computer cursors are easy for monkeys to learn how to use. But from the many choices available to them, the monkeys usually choose one or two ways to make the cursor move straight up.

So why do they consistently use such a narrow range of possibilities?

Often, Peter and his team are trying to answer these questions after the fact. Monkey time is limited. So the second part of Peter’s work involves experiments already completed by others. Some researchers think the monkey’s neurons have minimized their

activity because activity is energetically expensive: the monkey wants to be as efficient as possible. But Peter and other CMU-Pitt researchers don’t think so.

Why then do monkeys ignore numerous other ways to move the cursor?



Peter Lund is pictured in his lab and climbing a rock wall.

“Right now,” Peter says, “most of my time is spent running analyses of this data on the computer. It’s not trivial to make sense of it all. I make predictive data sets and compare them to real data.” Such basic research into the brain’s motor control system has ramifications beyond what researchers can now even imagine.

“If I get a PhD and stay in academia,” says Peter, “it will be to continue neuroscience like this. If I go into industry, it will be for this kind of data analysis – what they call machine learning.”

“When I was studying math as an undergraduate at Pitt,” he continues, “I did not envision that I would be where I am now. Now, I’m not exactly sure where I’ll be in the future, either.”

One thing Peter knows for sure: he is grateful for ARCS support. “It’s tough to live as a graduate student, since you don’t get much money from other sources. It’s enabled me to develop some stress-relievers, like rock climbing and photography.”

He also can visit his girlfriend, a lab technician in South Carolina, not always easy on a limited income. And he can photograph Pittsburgh -- from the flowers in Phipps Conservatory to scenes in various local neighborhoods and parks.

“I like Pittsburgh,” he says.

by Ann Fromm

Brooke Sullivan: Dedicated Scientist and Bride

"I bought some analysis software with my ARCS money," said Brooke Sullivan, third-year ARCS scholar at Pitt. "We have it in the lab, and now I also have it on my home computer."

The lab for Brooke is Dr. Bob Hendrick's immunology laboratory. There, they study the immune system, specifically what the immune system does to keep the herpes virus latent. Otherwise, years later, the herpes virus can re-awaken to cause cold sores, or even blinding lesions on the eye.



Brooke Sullivan is pictured above on her wedding day. And, on the right, she spends many hours in the lab.

"Fifty to 80 percent of people have herpes simplex by the time they're adults," said Brook. "But most of us don't get cold sores, thanks to our immune system." In the lab, Brooke's team studies how the immune system keeps the virus latent and hiding in our neurons. When the virus does appear as a lesion, it's been triggered by stress, the menstrual cycle or trauma, which re-starts its replication cycle.

"How can we boost the immune system and understand exactly why the virus remains latent?" Brooke asks. "We start by studying the cells."

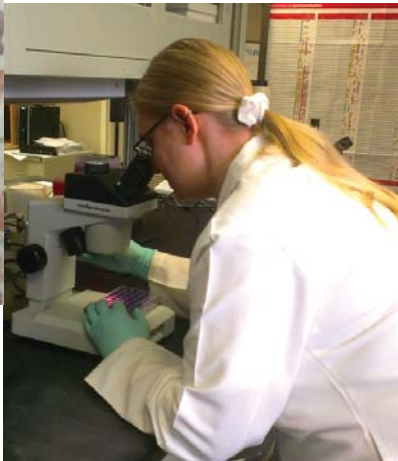
Researchers think CD4 cells fight viral infections, especially a cold. But CD4 cells regulate CD8 cells and secrete certain chemical signals that change what cells do.

"If we really understood what these CD4 cells do," Brooke says, "we could manipulate them to help people's immune system stop a recurrent herpes action."

To mimic human illness in the lab, they infect anesthetized

mice with the herpes lesions that cause blindness. They wait 30 days for the virus to go latent. Then Brooke harvests the neurons with tweezers and, under a microscope, examines the cells hiding inside.

When she's not working, Brooke enjoys "board game nights" with other graduate students, or makes a big pot of chili and watches Sunday afternoon football games with her new husband. Brooke married Kyle Thomas last August in Nebraska, so her name will soon change to his. They live in the Friendship section of Pittsburgh. "I love to cook and bake," she adds. "I'm known for my make-from-scratch lasagna."



Back home in Omaha, Nebraska, Brooke used home-canned tomatoes and neighbor-grown beef for her lasagna. Brooke notes that Omaha is only one degree of latitude different from Pittsburgh. "The weather's a little worse, though," she laughs. "For months, it's above 90 and just as humid. We don't have as much color as Pittsburgh, because it's open land. But you get a lot out of the sky. You see storms

coming."

Brooke and Kyle, a broadcaster for both radio and TV, are happy in Pittsburgh. "We've especially enjoyed the symphony tickets Beth Wainwright gave us," Brooke said, and Pirates games in the summer.

The ARCS grant has also enabled them to stash away a little money each year to pay undergraduate student loans.

Someday, Brooke hopes to teach science at the undergraduate level. As an undergraduate herself at the University of Nebraska, Brooke won an award to do NIH-funded science. "I was inspired by my teachers those years. I'd like to pass that on to other students who are interested in science but don't even know it. I didn't know how much I would love science."

by Ann Fromm

Do You Recognize Our First Year Scholars?

UNIVERSITY OF PITTSBURGH



SHELBY HEMKER
The Berdik-Pappas Award
School of Medicine
Research Interest: Genetics of inherited diseases



DANIEL LONG
The Roche/ARCS Foundation Scholar in the Life Sciences
Department of Bioengineering
Research Interest: Cellular and organ engineering



AMEYA NANIVADEKAR
The Roche/ARCS Foundation Scholar Award in the Life Sciences
Department of Bioengineering
Research Interest: Neural interfaces to restore sensory function



JACQUELYN RUSSELL
Pittsburgh Chapter Award
Interdisciplinary Biomedical Graduate Program
Research Interest: Cancer biology



NATHAN VOGLER
The Burke-Harter Award
Neurobiology/Neuroscience Graduate Program
Research Interest: Sensory systems and neurodegenerative diseases

PENN STATE UNIVERSITY



STACIE AMBURGEY
The Ryan Award in Honor of Jeanne B. Berdik
Ecology Intercollege Graduate Degree Program
Research Interest: Geology/earth science



ERYNN MAYNARD
The Breedlove-Martin-Stover Award
Department of Ecology
Research Interest: Earth science



JENNA REEGER
Pittsburgh Chapter Award
College of Agricultural Sciences
Research Interest: Plant biology

CARNEGIE MELLON UNIVERSITY



STEPHANIE BIEDKA
The Roche/ARCS Foundation Scholar in the Life Sciences
Department of Biological Sciences
Research Interest: Biological sciences



MICHAEL CRAIG
The Lockheed Martin Award
Department of Engineering and Public Policy
Research Interest: Environmental impact of the electricity grid



LISA D'COSTA
The PPG Industries Award
Department of Chemical Engineering
Research Interest: Bioengineering



HANNAH GOMMERSTADT
The Auclair/Unkovic Award
Department of Computer Science
Research Interest: Programming languages and information security



WILLIAM HERLANDS
The Hans and Leslie Fleischner Award (V)
School of Computer Science
Research Interest: Machine learning and public policy



AMY SHANNON
The Jared L. and Maureen B. Cohon Award for Leadership
Human-Computer Interaction Institute
Research Interest: Human-computer interaction

Donate Tickets to our Scholars

How many times have your series tickets to a sports or cultural event been wasted, because you were unable to use them? Our system makes it easy and simple to bring tremendous happiness to others by giving those tickets to one of our scholars. Send an email to ARCS Pittsburgh member Kathy Dee at kathydee28@aol.com with the following information.

1. The event.
2. Date, time, and place.
3. How many tickets are available.
4. Your name and contact information.

Kathy then notifies the scholars and they claim the tickets on a first come, first served basis. Normally, the student makes arrangements to obtain the tickets, but Kathy also helps with that process as well, e.g., if you must suddenly go out of town.

We hear time and time again that scholars really enjoy attending these events, and it gives them a true sense of community.

A Fresh Look at Wastewater

In October, thirty enthusiastic ARCS women toured the ALCOSAN facility in an event organized by Jennifer Martin.

Engineer and guide John Findley explained that, until 1959 when ALCOSAN began cleaning wastewater, all Pittsburgh sewage went directly into our rivers. Today, ALCOSAN covers 300 square miles and serves approximately 900,000 people.

“Due to the topography of Allegheny County, if the marble rolls one way,” said Findley, “the wastewater stream comes to us. If it rolls the other way, it goes into a municipal or other wastewater cleaning facility.”

As we walked through the plant, Findley noted that ALCOSAN maintains 90 miles of pipeline along the rivers and processes up to 250 million gallons of wastewater a day. Below, Debbie Scully and Linda Ban gaze over the river where the processed wastewater spills back into the Ohio River – at that spot, approximately 120,000 gallons a minute.



First Row, Photo 1 - Carol Heppner and Fredrica Cryan; Photo 2 - Debbie Scully and Linda Ban view the Allegheny River from the ALCOSAN plant;
Second Row: Photo 3 - Doris Calian, Marilyn Bruschi; Photo 4 - Thea Stover.
Third Row: Photo 5 - ARCS women under the McKees Rocks Bridge.

Pittsburgh Chapter Board of Directors Fiscal Year Ended June 30, 2014

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Special thanks to Kellie Anderson, Lori Spisak, and the University of Pittsburgh for the printing and mailing of this newsletter.