

Advancing Science in America®

The 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

The Pittsburgh Chapter, chartered in 2003 is one of the newest of the 17 chapters. In a very short time, the Chapter has already made a sizable financial commitment to its first two partner universities, Carnegie Mellon University and the University of Pittsburgh. A third partnership with Penn State University is now underway with funding that began in the fall of 2010.

Additional information on the ARCS Foundation: www.arcsfoundation.org/national or www.arcsfoundation.org/pittsburgh

Please address questions to: ARCS Foundation, Inc. Pittsburgh Chapter P.O. Box 9117 Pittsburgh, PA 15224 or email Pittsburgh@arcsfoundation.org

ARCS Members See Restored Stream and Wetlands

A lively group of ARCS members and guests assembled in Frick Park to learn about one of the largest, most successful urban stream and wetland restorations in the United States. During an hour-long walking tour along Nine Mile Run, on a brilliantly clear April afternoon, our guide demonstrated why storm water control projects are necessary and how much worse our storm water systems used to be.

For example, before the Army Corps of Engineers project ended in 2006, only about 8 fish could be found along the entire Nine Mile Run stream. Currently, six to eight thousand fish swim in these waters. The City of Pittsburgh Department of Public Works and the Pittsburgh Parks Conservancy stewarded the restoration.

An ALCOSAN project to prevent

storm water overflows and tragic accidents, like the one that took the lives of a mother and two daughters on Washington Boulevard in Highland Park, is currently underway.

Executive Director of The Nine Mile Run Watershed Association, a 501(c) 3 non-profit like ARCS, gave an overview of the association's current goals and achievements.



ARCS members assemble in Frick Park.

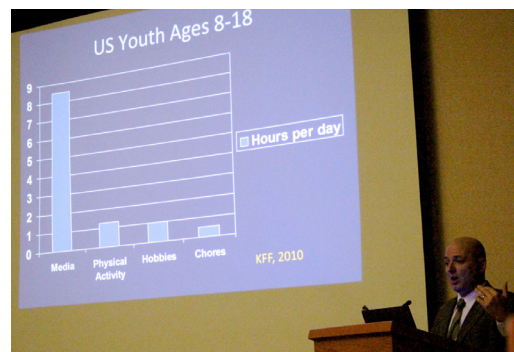
February Program: Media and Health

This past February 12, fourteen ARCS members and six guests gathered at the University Club in Oakland to hear Pitt's Dr. Brian Primack discuss the impact of media on human health.

After enjoying refreshments, listeners soaked up fascinating information about how media affects our daily lives. Still-developing young people are especially impacted. Dr. Primack peppered his talk with slides to illustrate his points.

Many thanks to ARCS Program Committee Chair, Lourdes Castellanos, to Marisa Bell-Metereau, Corporate & Foundation Relations Manager, UPMC Medical and Health Sciences Foundation, with the support of Kellie S. Anderson, Executive

Director, Central Development, Medical and Health Sciences Foundation, University of Pittsburgh and UPMC, and to Dr. Primack himself, who boasts both an MD and a PhD and is an extraordinarily good speaker.



Dr. Primack illustrates how media affects us (Photo by Maren Cooke)



Letter from the President

Every time I attend an ARCS program, I am pleased and amazed by the excellent questions that our members ask. Again and again, I hear from our presenters: "What a wonderful group! It's such fun to speak to such an engaged group."

This year was no exception. We held five educational programs, beginning last fall with a trip to Range Resources to tour a producing well and an active rig in the Marcellus Shale formation. This trip was repeated in the spring, because so many members wanted to attend it.

In November, our very own ARCS scholar, Peter Chapman at CMU, gave a talk on computer security. He answered many questions, helping us to learn how to keep our systems secure.

On a cold evening in February, in competition with a major basketball game at the Petersen Events Center, Dr. Brian Primack entertained us with a wonderful talk about the media and its effect on health.

Spring finally came and with it a talk at the Mt. Lebanon Library on the science of Marcellus drilling as well as information on carbon sequestering given by two scientists at the National Energy Technology Lab. We are so fortunate to have this lab located just outside of Pittsburgh.

Finally, on a beautiful day in April, we walked along Nine Mile Run to see a major urban water restoration project.

So thanks to all of you who came to our programs and asked such great questions. I hope you enjoyed the programs as much as I did.

We also owe a big thank you this summer to our third year students for the excellent presentations they gave at the Scholar Showcase. It is time now to bid them a fond farewell as they join the ranks of ARCS Alums. We very much hope that they will stay in touch with us, because we know that they have important work ahead of them. It's these students who will invent future medical devices which will help to save lives; who will find new ways of growing food and so help prevent hunger; who will develop new sources of energy to help the world in so many ways; or who will teach future students to become the scientists of tomorrow.

—Missy Unkovic

Farewell To Our Third Year Scholars

We wish them continued success as they complete their studies,
and we look forward to staying in touch with them.

CARNEGIE MELLON UNIVERSITY

Scholar Alumni:



David Bamman

Pittsburgh Chapter Award
Computer Science/Language
Technologies Institute
Research: Language technologies
for classical Latin and Greek for
digital libraries.



Shawn Burton

The Fleischner Award
Department of Biological Sciences
Research: Neuroscience



Samantha Finkelstein

The Fleischner Award
Human Computer Interaction
Institute, School of Computer
Science
Research: Virtual reality and
psychology



Rachel Jackson

The Berdik-Elliott Award
Mechanical Engineering-Swanson
School of Engineering
Research: Controls with
applications to biomedical
engineering and robotics

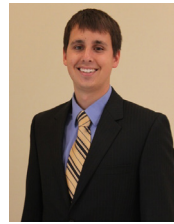


Amy Dale

Pittsburgh Chapter Award
Engineering and Public Policy,
College of Engineering
Research: Water quality and public
health and risk-based regulatory
policy

UNIVERSITY OF PITTSBURGH

Scholar Alumni



Denver Faulk

Stockman-Paul Award
Bioengineering-Swanson School of
Engineering
Research: Tissue Engineering



Adam Large

Pittsburgh Chapter Award
Center for Neuroscience, University
of Pittsburgh School of Medicine
Research: Computational and
cognitive neuroscience



Robert Matthew Miller

The Burke-Harter Award
Bioengineering – Swanson School
of Engineering
Research: Bone biomechanics



Austin Nuschke

Pittsburgh Chapter Award
Interdisciplinary Biomedical
Graduate Program, University of
Pittsburgh School of Medicine
Research: Stem cell therapies for
wound healing

PENN STATE UNIVERSITY

Scholar Alumnus



Christopher Thawley

Pittsburgh Chapter Award
Ecology intercollege Graduate
Degree Program, Huck Institutes of
the Life Sciences
Research: Biological Invasions

Charting the War: Fire Ants versus Fence Lizards

"My research focuses on invasive species," said Christopher [Chris] Thawley, 3rd year ARCS scholar at Penn State. "And what happens to native species as a result of the invaders?"

Researchers like Chris can't design experiments to import an unknown foreign species into the U.S. to see what happens; instead, they study what is already happening because new species have arrived, perhaps by boat or plane, from another country. To that end, Chris is writing his doctoral thesis on fire ants, a stinging ant that works with its colony to sting, paralyze and kill its prey. These ants had already arrived in Mobile, Alabama in the 1930s from warm, wet areas in South America, which researchers know from research before the invasion. Chris wondered how existing species adapted to the invading fire ants? By studying one particular species native to Alabama, the fence lizard or *Sceloporus undulatus*, Chris and his team could watch evolution occur.

Invasive fire ants are medium-sized, red, up to a centimeter long. They have well-organized jobs: some stay in the nest and guard larvae, others help build or guard the mound. Just three or four ants can paralyze a young fence lizard. As few as 12 attacking ants can kill an eight-inch long adult fence lizard. The fence lizards even have scales, ordinarily a good defense against predators. But fire ants pry under the scales and send venomous stingers from their abdomen into the lizard's vulnerable skin beneath the scales.

Chris spent sometimes four to four and a half months in the summers doing extensive fieldwork, observing how the lizards changed or evolved to defend themselves against fire ants. He most frequently went to a site in southern Alabama run by Auburn University, partly funded by his ARCS award. "I'm hugely grateful for my ARCS award," he interjects. "It's also helped me travel to conferences. As a graduate student, you can get a little funding; but conferences are expensive. There was one in San Francisco recently where even

the lodging would have been out of reach without the ARCS help."



Chris Thawley doing field work in Alabama

During his fieldwork in Alabama, Chris and his team, under their advisor Dr. Tracy Langkilde, learned that fence lizards change their behavior in order to adapt to the fire ants. Ordinarily, the lizards froze when threatened by a predator. Fire ants, which spray a pheromone that summons other fire ants, could easily overwhelm the lizard. But now, the lizard twitches and runs away. They've adapted to have longer hind limbs. They flee more frequently than they did before.

"That's the big story for my advisor," said Chris, "learning how the lizards evolved. We've since been able to demonstrate different aspects of red ant behavior."

As the rate of invasive species in our country continues to grow, Chris's research grows in urgency. Are we evolving in response to invasive species? In response to climate change? Because of humans, habitat destruction is happening more quickly now. Can native species adapt quickly enough to be able to survive? Are adaptations like the lizards' heritable? Are they related to stress?

"A lot has to happen for the invader in a different climate," Chris notes. "It has a new ecology, new predators, new diseases. A lot happens for the native species, too. We have more questions than answers with the lizards. It's a wonderful chance to study evolutionary adaptation as it continues."

Chris hails from outside Philadelphia, where his parents still live; he is closer to home now than he was in Davidson, North Carolina, where he did his undergraduate work, or at the University of Alabama when he earned his Master's Degree. He has one younger brother, who "took the straight path," Chris says. "He became a teacher in New York in a public high school. I took the long and winding path."

Ultimately, after he has finished his PhD work at Penn State and potentially done post doctoral work, Chris hopes to join the faculty of a small liberal arts school. There, he can combine teaching with his own research.

"I love to discover new things," he said. "And students need to know facts. But the fun part is asking questions – using your brain to figure out a way to test and learn those facts. Science can be engaging and fun if everyone learns it like that."

Meanwhile, Chris engages in field work during field season, does school work at Penn State about 50 hours a week, experiments with cooking, and plays ultimate Frisbee when the weather cooperates. "I'd like to travel but that's difficult right now," he said, smiling. "I did get to Austria once with my family."



Fire ant stalks fence lizard

We thank Christopher for his hard work and wish him well in the future. To read more about his work, check out <http://thelizardlog.wordpress.com>, subtitled "The Langkilde Lab in Action."

—Ann Fromm

Annual Meeting Highlights ARCS Light Award, Conservative Chapter Finances



*Karen Auclair and others
enjoy meeting offerings.*

On a sunny afternoon last May, Kathy Testoni opened her lovely home near Chatham University for one of our most popular events of the year, the annual meeting of the Pittsburgh chapter of ARCS.

In an informal talk after drinks and pastries, President Missy Unkovic mentioned the conservative way in which our chapter finances are handled, and that

we promise a new scholar award only when we have existing funds to support that scholar the three full years. Happily, Missy was able to announce that this coming year, we are even able to fund an additional scholar.

In another highlight of the meeting, Missy announced that Carol Stockman has won this year's annual ARCS Light Award, an honor bestowed on an ARCS member who has provided outstanding service to our organization.

A member of ARCS Pittsburgh since 2007, Carol will finish her sixth year on the board this year. Chapter

president for two years, she has also served as ARCS Communications co-chair and Fund Development chair.

Currently, she and her husband, Paul, are financially supporting their third ARCS scholar. She has also served on the National ARCS Board as chair of Evaluation. Boasting a PhD in economics from the University of Pittsburgh, Carol is an adjunct faculty member at California University of Pennsylvania.

Congratulations, Carol, and special thanks to Kathy Testoni and chapter president, Missy Unkovic.



*Missy Unkovic (left) with Carol Stockman,
ARCS Light Award honoree*

Donate Tickets to our Scholars!

If you can't use your tickets to any sports or cultural event, please email Kathy Dee at KathyDee28@aol.com, or telephone her at 412-243-5333.

Include your telephone number and the event name and date.

Kathy will then contact the scholars via email to ask if he/she can use your tickets.

The first scholar to reply will then contact you directly to arrange a way in which to get the tickets.

Scholars love it! Thank you.

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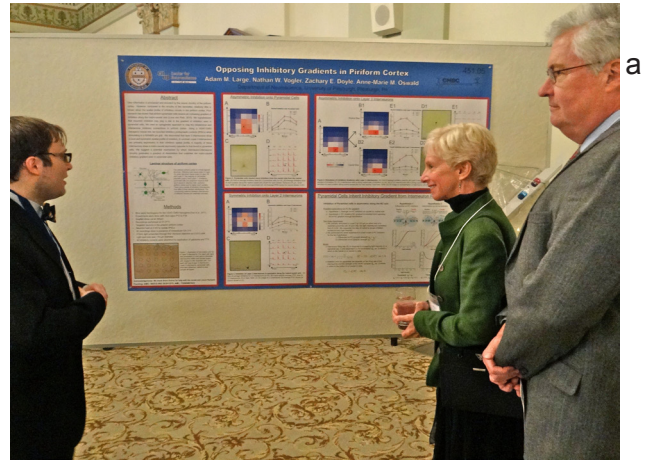
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*A special thanks to
Krista Campbell and
Carnegie Mellon for printing
this newsletter.*

Scholars Inform, Keynote Speaker Dazzles

In the much-anticipated fourth annual Scholar Showcase at the 20th Century Club last March, third-year ARCS scholars presented posters of PhD work done during their recent three years at CMU, Penn State, or Pitt. After reception, ARCS members and their guests circulated among the posters, viewing them and questioning the scholars. Scholars answered those questions courteously and in informative language even lay people could understand.



Scholar Adam Large answers a question from co-chair Sarah Jones and her husband Craig about his neuroscience research.



Professor Sparrow demonstrates an amazing way to produce sound.

Dr. Victor Sparrow, professor in the Penn State Graduate Program in Acoustics since 1990, demonstrated with a flash of light a scientific principle behind noise conduction. Professor Sparrow has also served as an executive committee member and vice-president of the Acoustical Society of America, and worked with the International Civil Aviation Organization's Committee on Aviation Environmental Protection's Noise Working Group and Supersonic Task Group.

Many thanks to chair Kate Freed and co-chair Sarah Jones for organizing such a multi-faceted event.

Café Scientifique: Pittsburgh's (and ARCS') Best-Kept Secret

Originally founded in England as a salon, Café Scientifique in Pittsburgh is now held on the first Monday of each month at the Carnegie Science Center in order for ordinary people to gather and learn about cutting-edge advances in the sciences. Formerly held at the Penn Brewery, evenings at the Science Center usually begin now at 7 p.m. with a talk by an invited guest, followed by a break, and then a question-and-answer session.

ARCS member Carol Heppner and incoming ARCS program chair Jennifer Martin have kept ARCS members informed, and members have informally gathered for dinner at the Science Center before the programs.

Examples of speakers include:

- Rebecca Skloot, author of the best-seller about Henrietta Lacks, whose genes were used in research
- Dr. Mary Dawson, paleontologist with groundbreaking research in the Arctic Circle
- CMU's Dr. Alison Barth, "The Persistence of Memory: How Experience Changes the Brain"

For more information or to RSVP for one of the Cafes, call 412-237-3400, or go to <http://www.carnegiesciencecenter.org>

Curious ARCS Members Question Fracking Lecturers

"Why doesn't Pennsylvania impose 'best practices' on drilling companies?" asked an audience member after a fascinating ARCS-sponsored lecture about fracking this past March 20 at the Mt. Lebanon Library.

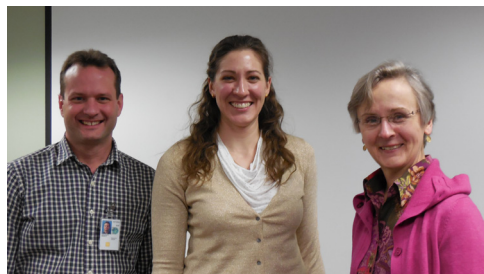
The answer: because imposed mandates could be out of date within two years, and the shale gas industry itself tries to study and improve its own best practices.

This back and forth between lecturer and audience is typical of informative ARCS-organized lectures and talks. Two prominent scientists, Drs. Strazisar and Hakala, fielded these and other questions after their talk, organized by

outgoing ARCS program chair Lourdes Castellanos.

Dr. Brian Strazisar, who has a PhD in physical chemistry from Cornell, has recently been researching carbon capture, utilization and storage. Dr. Ale Hakala's team tries to predict potential changes to water quality due to fossil energy development.

This past year, Lourdes also organized two tours of a Range Resources natural gas drilling site for ARCS members in order to accommodate curious ARCS women and their guests.



*Drs. Brian Strazisar and Ale Hakala,
with ARCS member Michalina Pendzich*

Drs. Strazisar and Hakala expressed appreciation for the questions, stemming from the tours and other reports abundant in the media today.

ARCS Foundation Pittsburgh Donors

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

With Thanks to Pitt's Chancellor Nordenberg, Welcome to Patrick Gallagher

For many years, we appreciated the 17th University of Pittsburgh Chancellor, Mark Nordenberg, an effective and affable man who supported ARCS work and generously appeared at our events to present interesting news of the University of Pittsburgh and scholars there.



After serving at Pitt for more than two decades, Chancellor Nordenberg will step down on August 1 of this year.

Patrick D. Gallagher, elected unanimously by University of Pittsburgh trustees as the 18th chancellor, promises to be equally cordial. According to the *Post Gazette*, his colleagues describe him as an excellent manager and strong collaborator. A University of Pittsburgh alum, Mr. Gallagher is acting Deputy



Secretary at the Department of Commerce and has also been director of the National Institute of Standards and Technology since 2009. A scientist himself, he spent more than twenty years at that institute before serving as its director.

We welcome Dr. Gallagher and look forward to working with him as congenially and effectively as we did with Chancellor Nordenberg.

Save the Dates!

"All members are invited to the **National ARCS Meeting** in Salt Lake City, September 17 – 20," said President Missy Unkovic at the recent annual chapter meeting. "It's a chance for great science and wonderful camaraderie."

For more information, go to arcsfoundation.org and check "Members" in black letters on the home page. You do not have to log in.

Also Upcoming:

Al Fresco luncheons in June, July, August: dates TBD
Donor Appreciation Event at CMU in September: date TBD

Stay Tuned for Email Alerts!