



**ARCS® FOUNDATION, INC.
Pittsburgh Chapter**

**Scholar Information
2016-2017**

Third Year Scholars



Staci Amburgey (sma279@psu.edu)
The Ryan Award in Honor of Jeanne B. Berdilk

Penn State University
Department of Ecosystem Science and Management

Personal: I enjoy home-brewing my own beer and practicing nature photography.

Research: Ecology of species ranges and modeling population dynamics

- I work on modeling species occurrence for a wide variety of taxa (amphibians, reptiles, birds and mammals).
- I am interested in understanding the role of abiotic and biotic pressures in shaping species ranges and the scale (local to regional) at which different pressures operate.
- These pressures may include climate, urbanization, and community interactions, and these pressures can vary across space and time and interact in complex ways.
- By better understanding the current elements impacting species occurrence, we can better predict shifts in species distributions and target management efforts in the future.



Stephanie Biedka (sbiedka@andrew.cmu.edu)
The Roche/ARCS Foundation Scholar Award in the Life Sciences

Carnegie Mellon University
Mellon College of Science
Department of Biological Sciences

Personal: I enjoy cooking and baking, and have become the resident baker for special events in my lab.

Research: The study of ribosomes, the macromolecular complexes responsible for production of proteins in all organisms.

- My specific focus is on determining how a large group of proteins, including several enzymes, function together to control a specific remodeling event.



Michael Craig

(mcraig10@gmail.com / mtcraig@andrew.cmu.edu)
The Lockheed Martin Award

Carnegie Mellon University
Carnegie Institute of Technology
Department of Engineering and Public Policy

Personal: My hobby is reading science fiction and fantasy.

Research: Environmental Impact of the Electricity Grid

- Reducing the environmental impacts of electricity generation
- Analyzing the costs and benefits of environmental regulations
- Quantifying the effect of grid-scale electricity storage on greenhouse gas emissions

Awards/recognition since becoming an ARCS Scholar: Bertucci Fellowship, CMU (2017); Science and Engineering Ambassador, National Academy of Sciences and Engineering (2015-present); Doctoral Fellow, Steinbrenner Institute (2015-2016); Dean's Fellowship, CMU (2015-2016); 1st Place, Three Minute Thesis Competition, Energy Week, CMU (2016); 2nd Place, Three Minute Thesis Competition, CMU (2015).



Hannah Gommerstadt (hgommers@cs.cmu.edu)

The Auclair –Unkovic Award

Carnegie Mellon University
School of Computer Science
Department of Computer Science

Personal: I love to run in Frick and Schenley Parks and am excited to run the Great Race.

Research: Programming Languages & Security

- I work on providing provable security guarantees for software
- I mathematically model systems and then prove theorems about how they are secure under various conditions
- I don't hack into things!

Awards/recognition since becoming an ARCS Scholar: Microsoft Graduate Women's Scholarship.



Shelby Hemker (shelby.hemker@gmail.com)
The Berdik-Pappas Award

University of Pittsburgh
School of Medicine
Molecular Genetics and Developmental Biology

Personal: I enjoy fishing at the family summer cabin, visiting state parks and small towns, and doing home improvement projects.

Research: Hypoxia in Kidney development and Its Effects on Gene Expression

- We know that low oxygen levels (hypoxia), such as from a defective placenta, affect kidney development.
- I am investigating how the regulatory molecule *miR-210*, which is encoded by your DNA, is regulated by hypoxia.
- Mice with *miR-210* deleted from their DNA have changes in kidney development, especially when we induce hypoxia during pregnancy.

Awards/Recognition since becoming an ARCS Scholar: I n November 2015 I was accepted into the Kidney Stars program at the 2015 American Society of Nephrology Meeting, which included a travel award. In July 2016 I was awarded as a predoctoral scholar by the Renal and Epithelial Biology Training Program to partially fund my stipend. I was awarded the Best Poster Presentation by a Third Year PhD Student in October 2016 at the Biomedical Graduate Student Association Symposium.



William Herlands (herlands@cmu.edu)
The Hans and Leslie Fleischner Award (V)

Carnegie Mellon University
School of Computer Science
Machine Learning and Public Policy

Personal: I raise quail!

Research: Intelligent urban analytics

- Develop predictive systems for urban crime and requests for government service
- Model complex systems such as spatiotemporal disease patterns in the United States
- Design novel machine learning and deep learning algorithms

Awards/Recognition since becoming an ARCS Scholar: NSF (National Science Foundation) Graduate Research Fellowship.



Daniel Long (daniellong92@gmail.com)
The Roche/ARCS Foundation Scholar Award in the Life
Science

University of Pittsburgh
Department of Bioengineering

Personal: I like to spend my time cooking, brewing beer, and fishing.

Research: Cellular and Organ Engineering

- Many animals have the ability to regrow body parts such as starfish, salamanders, and zebrafish, but this ability is lost in humans and other mammals.
- My research uses the acellular components of these species to develop potential treatments for heart disease.
- We have shown that this approach is a drastic improvement over traditional acellular therapies for heart disease.

Awards/Recognition since becoming an ARCS Scholar: NSF Graduate Research Fellowship honorable mention 2015 & 2016, Biomechanics in Regenerative Medicine Training grant fellow 2015-2017, Pitt Innovation Challenge (PInCh) winner 2015.



Erynn Maynard (eem212@psu.edu)
The Breedlove-Martin-Stover Award

Penn State University
Intercollege Graduate Degree Program in Ecology

Personal: My husband and I share a passion for growing, wild-harvesting, preparing and preserving foods.

Research: Earth Science

- Several shrubs from eastern Asia are gaining prevalence in eastern deciduous forests of the U.S. Examples: honeysuckles, privet, burning bush, barberry.
- I'm trying to understand the changes that occur with increasing invasive shrub abundance, especially since they leaf out earlier and maintain their leaves later than many native species.
- This longer period of leaf out for invasive shrubs creates more shade at the forest floor which has the potential to impact many aspects of the ecosystem. Examples: nutrient cycling, the success of native herbaceous species, canopy tree regeneration, and forest pollinators.

Awards/Recognition since becoming an ARCS Scholar: Shaver's Creek Environmental Center Graduate Assistantship (2015-2016), Center for Landscape Dynamics Grant Recipient (2015), Huck Graduate Research Innovation Award (2016); Ecology Department Spring Seminar Series Coordinator (2016)



Ameya Nanivadekar (acnana@gmail.com)
The Roche/ARCS foundation Scholar Award in the Life Sciences

University of Pittsburgh
Department of Bioengineering

Research: Neural Engineering

- As part of the HAPTIX program funded by DARPA my research focuses on developing novel neural interfaces with the peripheral nervous system to restore sensorimotor function lost to amputation and injury
- Specifically, my work involves studying the conscious percepts of touch and proprioception that can be elicited through microstimulation of the dorsal root ganglion for potential use in a closed loop upper extremity prosthetic device.



Jenna Reeger (jer302@psu.edu)
Pittsburgh Chapter Award

Penn State University
Plant Biology Program

Personal: President of Graduate Women in Science State College Chapter at Penn State, plants and gardening, biking, tennis, oboe player.

Research: Rice root genetics and physiology

- I study rice roots so that we can make rice plants more drought tolerant.
- First, I am looking for genes that control certain root traits in rice plants.
- I am also studying which particular root traits make rice plants more drought tolerant.

Awards/recognition since becoming an ARCS Scholar: Borlaug Summer Institute on Food Security Fellow, Asia Rice Foundation USA Scholar



Jacquelyn Russell (jor76@pitt.edu)
Pittsburgh Chapter Award

University of Pittsburgh
School of Medicine
Department of Pathology

Personal: I enjoy cooking, reading, and running in races such as the Pittsburgh Half Marathon.

Research: Cancer Biology

- Liver disease is currently the 12th leading cause of death in the United States in large part due to the 30 million Americans with chronic liver disease who are at high risk of developing often-fatal conditions such as cirrhosis and liver cancer.
- The only treatment for such patients is a liver transplant, but the scarcity of donor organs prevent this from being an option for many patients, so there is a great need to develop new treatments for patients with chronic liver disease.
- My work focuses on the role of liver stem cells in liver regeneration, with the goal of identifying new mechanisms of liver regeneration in order to develop new treatments for patients with liver disease.

Awards/Recognition since becoming an ARCS Scholar: I have received an American Society for Investigative Pathology (ASIP) Trainee Travel Award to attend the Pathobiology for Investigators, Students, and Academicians (PISA) 2015 conference in Baltimore, MD. I have also received an ASIP Trainee Travel award to attend the Experimental Biology (EB) 2016 conference in San Diego and recently received another travel award to attend the 2017 EB Conference in Chicago. I have also received a travel award in order to present my research at the Federation of American Societies for Experimental Biology (FASEB) 2016 Summer Research Conference in West Palm Beach.



Amy Shannon (amys hann@andrew.cmu.edu)
The Jared L. and Maureen B. Cohon Award for Leadership in
the Formation of ARCS Foundation - Pittsburgh Chapter

Carnegie Mellon University
School of Computer Science
Human-Computer Interaction Institute

Personal: I participate in the School of Computer Science Grad Student Musical each year as an actor and costume coordinator. I also play Ultimate Frisbee.

Research: Education Technology

- Imagine you are a student giving an in-class presentation. It's likely that 1) your peers are paying attention to their laptops instead of you, 2) there isn't time in class for peers to ask many questions, and 3) you won't get a lot of feedback on your presentation.
- PeerPresents is a peer feedback system I designed that allows students to give real-time comments during an in-class presentation. This gives students something productive to do during the presentation and allows presenters to get more, immediate feedback on their work.

Awards/recognition since becoming an ARCS Scholar: I was accepted to the PIER (Program for Interdisciplinary Education Research) fellowship program, and I received an Honorable Mention for the NSF (National Science Foundation) Graduate Research Fellowship Program in 2015.



Nathan Vogler (voglernate@gmail.com)
The Burke-Harter Award

University of Pittsburgh
Center for Neuroscience

Personal: As an undergrad, I double majored in Neuroscience and History & Philosophy of Science. I also enjoy playing the piano and guitar.

Research: Neural plasticity in the auditory system

- Recent research has identified zinc (Zn²⁺) as a neurotransmitter in the brain.
- My research studies the role of zinc in neural plasticity and pathology in the auditory system.

Awards/recognition since becoming an ARCS Scholar: University of Pittsburgh Predoctoral Training Grant in Neuroscience; NIH Ruth L. Kirschstein NRSA Individual Predoctoral Fellowship (F31, NIDCD).

Second Year Scholars



Dean Alderucci (alderucci@cmu.edu)
Jeanne Berdik Founder Award

Carnegie Mellon University
Department of Engineering & Public Policy

Personal: I love creating new technology in various fields and have been awarded several patents.

Research: Strategy Entrepreneurship technological Change

- My research area involves new machine learning and natural language processing technologies to cure problems in the patent system.
- A combination of new software tools and policy changes would allow dramatic increases in the accuracy and efficiency of many processes that drive the patent system.

Awards/recognition since becoming an ARCS Scholar: I've been inducted as a Fellow in the National Academy of Inventors.



Timothy Bartholomew (tbarthol@andrew.cmu.edu)
The Heppner-Testoni-Young Award

Carnegie Mellon University
Civil and Environmental Engineering

Personal: I am an avid sports player. I played 3 sports in high school and varsity football in college. Now in graduate school, I spend my free-time playing basketball.

Research: Environmental Engineering Sustainability and Science

- My goal is to improve water and wastewater management.
- I develop computer models to minimize the financial and environmental costs of water management networks for shale gas production (also known as fracking).
- I also assess the potential of novel water treatment technologies.

Awards/recognition since becoming an ARCS Scholar James Sprague Presidential Fellowship, 2015; NSF Graduate Research Fellowship Program Honorable Mention, 2016.



Ethan Bassin (ejb77@pitt.edu)
The Chapter-Ragni-Ryan Award

University of Pittsburgh
School of Medicine
Department of Immunology

Personal: Ice Hockey, Skiing

Research: Immune cell mimicking microparticles for transplant tolerance

- Regulatory T cells (Tregs) suppress the activity of other immune cells to prevent excessive inflammation
- Treg cell-therapy faces concerns with cell stability and regulatory hurdles
- My research is focused on developing Treg mimicking microparticles with the goal of preventing rejection of transplanted tissue

Awards/Recognition since becoming an ARCS Scholar: Interdisciplinary Training in Transplantation Biology T32 Training Grant, 1st Prize poster presentation 2016 University of Pittsburgh Immunology Scientific Retreat -1st and 2nd year graduate student category.



Katerina Clemens (kac216@pitt.edu)
The Fine Foundation Award

University of Pittsburgh
Center for Neuroscience

Personal: I've been dancing the Argentine tango for six years.

Research: The use vision to gather information about the world around us.

- I study how visual information is encoded in the brain and how processes like visual attention allow us to flexibly pick out the most crucial information for our behavior at any moment.

Awards/Recognition since becoming an ARCS Scholar: I received the NSF graduate fellowship in 2016.



Stephanie Crilly (scrilly@andrew.cmu.edu)
Pittsburgh Chapter Award

Carnegie Mellon University
Department of Biological Sciences

Personal: In addition to science I am also very passionate about art. I used to serve as a museum tour guide in my hometown of Philadelphia and am hoping to find a similar opportunity in Pittsburgh!

Research: Cell Biology

- I study G-protein-coupled receptor (GPCR) trafficking. GPCRs are the target of many therapeutic drugs.
- By studying the factors which influence receptor location in the cell we hope to identify new and better drug targets, especially for opiates in the treatment of chronic pain.

Awards/recognition since becoming an ARCS Scholar: NSF GRFP recipient.



Michelle Heusser (heusser.michelle@gmail.com)
The Freed-Jones-Meadowcroft Award

University of Pittsburgh
Department of Bioengineering

Personal: I play the French horn and enjoy swing dancing.

Research: Mechanisms of population coding in the oculomotor system.

- I am developing decoding algorithms to predict where the eyes are looking (eventually to be implemented in an “oculomotor brain-computer interface”)
- The developed algorithms will allow us to address questions about neural basis of various perceptual phenomena.

Awards/Recognition since becoming an ARCS Scholar: Department of Bioengineering Bevier Award, Behavioral Brain (B2) Research Training Program, GAANN TRED SysMed Fellowship.



Alexis Nolfi (alexis.nolfi@gmail.com)
Pittsburgh Chapter Award

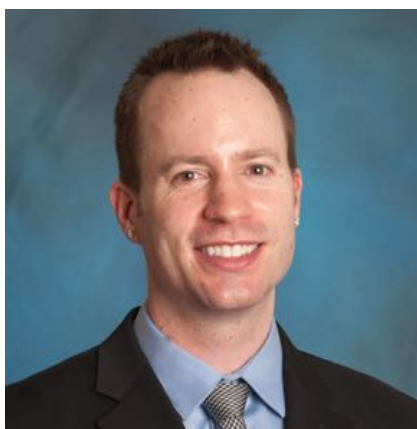
University of Pittsburgh
Department of Bioengineering

Personal: I LOVE gardening! I also love volunteering and outreach, and this year I am helping to plan outreach and educational programs for students in the Hill District of Pittsburgh.

Research: Women's health research, specifically the disease endometriosis and the conditions of pelvic organ prolapse and stress urinary incontinence.

- I study the pathogenesis of the gynecologic disease endometriosis.
- I am trying to develop a model using cells and hydrogels to study the early progression of the disease.
- I am especially interested in the role of the macrophage, an important cell of the immune system, in the development of the disease. I also am concurrently researching ways to modify the adverse events associated with the foreign body reaction when polypropylene mesh is implanted into the body for alleviation of pelvic organ prolapse and stress urinary incontinence.

Awards/Recognition since becoming an ARCS Scholar: Bevier Award from the School of Engineering; This is also my second year as an NSF (National Science Foundation) Graduate Research Fellowship Program fellow (received at same time as ARCS); Cover art for the August 2016 edition of the American Journal of Obstetrics and Gynecology chosen from images in my published first-author journal article.



Ryan Wagner (rrwagner@andrew.cmu.edu)
Pittsburgh Chapter Award

Carnegie Mellon University
Institute for Software Research

Personal: I'm a former "ethical hacker," mainly of financial and US government systems. To relax, I enjoy weight lifting and mindfulness meditation.

Research: Graceful degradation of software systems in response to attack.

- I'm using formal methods to model and evaluate how systems can self-adapt to withstand attacks. Using these software models, one can estimate the impact of a security attack to a cyber system, determine structural weak points in a system, and guide self-adaptation of the system to preserve critical functionality while increasing resilience.



Zoe Wright (zwright@andrew.cmu.edu)
The PPG Industries Award

Carnegie Mellon University
Mellon College of Science
Department of Chemistry

Research: design and synthesis of new materials for tissue regeneration

- Create "biomimetic" materials that aim to recapitulate the chemistry of healthy tissues.
- Use principles of chemistry to anchor and/or deliver drugs to specific parts of the body, to make "cell-instructive" materials that guide wound healing.
- Use chemistry to tune mechanical, electronic, and biological properties of materials. Materials include therapeutic medical adhesives that eliminate the need for sutures; copolymers that conduct electricity and adhere to cells, for treating heart and nerve injuries.

First Year Scholars



Christopher Lee Hughes (clh180@pitt.edu)
The Beukema-Wainwright-Wood Award

University of Pittsburgh
Department of Bioengineering

Personal: I play music, primarily guitar.

Research: Electrical Stimulation Techniques

- Our lab works with a human patient with microelectrode arrays implanted in motor and somatosensory cortex.
- We provide stimulation to somatosensory cortex to provide "touch" via a robotic arm (which is controlled via motor cortex).
- I am working specifically to improve our stimulation paradigms so that he has better sensory feedback that is more biomimetic.

Awards/Recognition since becoming an ARCS Scholar: Bioengineering Dept. Bevier Award.



Alyssa Lawler (alawler@andrew.cmu.edu)
Pittsburgh Chapter Award

Carnegie Mellon University
Department of Biological Sciences

Personal: I enjoy dancing ballet, playing the ukulele, and practicing yoga.

Research: Developmental biology

- Using sea urchins and sea stars as model organisms, I seek to understand how novel traits arise during evolution.
- To assess a gene's function, I manipulate the expression of the gene during development and quantify its effect on the expression of other genes.
- By comparing networks of gene activity in the sea urchin and sea star, I can formulate models for how gene networks evolve to produce new body structures and functions.

Awards/Recognition since becoming an ARCS Scholar: National Science Foundation Graduate Research Fellowship Program Award.



Tyler Meder (tjm153@pitt.edu)
Pittsburgh Chapter Award

University of Pittsburgh
Department of Bioengineering

Personal: While not a traditional, I taught myself guitar and bass during high school and undergraduate college and have played in venues including the House of Blues in Cleveland.

Research: Bioengineering/Regenerative Medicine

- My research focuses on manufacturing and optimizing rapidly degradable, synthetic vascular grafts. These acellular vascular grafts must have suitable mechanical properties, good blood compatibility, and resorb at a rate allowing replacement by living tissue.
- Currently manufactured via electrospinning, a process that creates a microfibrinous and porous network, I intend to develop a novel method of electrospinning that can be scaled up to an industrial setting and that does not use harmful chemicals and solvents that are used in current methods.

Awards/Recognition since becoming an ARCS Scholar: Bioengineering Department Bevier Award.



Thu Nguyen (thun1@andrew.cmu.edu)
Pittsburgh Chapter Award

Carnegie Mellon University
Mechanical Engineering

Personal: I love going to the theater to watch musicals and plays.

Research: Robotics and Controls

- I'm interested in understanding why many post-stroke individuals walk asymmetrically.
- I want to adapt exoskeletons that have previously been used to augment human walking to accelerate post-stroke rehabilitation.

Awards/Recognition since becoming an ARCS Scholar: NSF GRFP (received 1 month before ARCS), CMU Presidential Fellowship (received 1.5 months before ARCS).



Ziv Scully (zscully@cs.cmu.edu)
The Roy and Susie Dorrance Award

Carnegie Mellon University
Computer Science Department

Personal: I love music and learning to play new instruments—most recently tenor sax.

Research: Queueing theory

- *Queueing theory* is the study of all sorts of systems that involve queues, lines, or waiting—for example, how to manage line lengths at a grocery store.
- I work on *scheduling*, which reduces the time customers wait by cleverly deciding the order in which to serve them—for example, by having a fast lane for customers with only a few items in their shopping cart.
- Traditional scheduling assumes that each customer has one shopping cart; my research tackles the trickier case where customers might have many carts.

Awards/Recognition since becoming an ARCS Scholar: Recipient of National Science Foundation Graduate Research Fellowship.



Michelle Scribner (MRS186@pitt.edu)
The Fromm-Payne- Stockman Award

University of Pittsburgh
Interdisciplinary Biomedical Graduate Program

Personal: My interests include hiking, swimming, and science outreach.

Research: Genetic Disorders and Reproductive Sciences

- I am in the first year of my program, which consists of three laboratory rotations.
- My current project is to investigate the evolution of antibiotic resistance in bacteria.



Alex White (ALW196@pitt.edu)
Pittsburgh Chapter Award

University of Pittsburgh
Molecular Pharmacology

Personal: I enjoy working out and I was previously a personal trainer.

Research: TBD

- I am currently rotating in a lab that studies the parathyroid hormone receptor.
- My project involves the elucidation of mechanisms by which receptor activation is modulated.



Katherine Ye (kqy@cs.cmu.edu)
Pittsburgh Chapter Award

Carnegie Mellon University
Computer Science Department

Personal: Got pencil, paper, and 10 minutes? I'll draw you!

Research: TBD

- Current tools for creating mathematical diagrams are far too manual and low-level. Thus, I am building a system to automatically create diagrams from mathematical notation.
- My work combines techniques from programming languages with techniques from computer graphics.
- I am generally interested in powerful representations in the form of languages, interfaces, and visualizations.

Awards/Recognition since becoming an ARCS Scholar: Computing Research Association (CRA) Outstanding Undergraduate Researcher Award, Google Anita Borg Scholarship - Honorable mention, NSF Graduate Research Fellowship.



Diana Zhang (dianaz1@andrew.cmu.edu)
The Alicia M. Avery and Virgil D. Gligor Award

Carnegie Mellon University
Electrical and Computer Engineering

Personal: I enjoy cooking and playing music.

Research: Wireless Networks

- Broadly, I seek to innovate more ways to utilize radio signals for new applications and to improve existing communication technologies.
- I am currently working to use WiFi signals to locate and identify the materials of objects. These can "see" around corners and through walls, so we're interested in using them in autonomous vehicles and to find survivors in disaster sites.