LEARNING BY DOING: A COLLECTIVE MISSION

Office of Academic Research 2016

NORWICH
UNIVERSITY®

Welcome

Throughout 2016, members of the Norwich community continued their efforts to remain true to the guiding philosophy of Captain Alden Partridge by actively engaging in "learning by doing." After completing our transition to a 3-4 teaching load, our faculty have been more active than ever in building and strengthening all three legs of their professional stool—teaching, scholarship and service. Our goal is progress, not perfection, and we see it on every front.

Research by our students and faculty continues to be well supported, through the leadership and the institutional commitment of President Richard W. Schneider and our Board of Trustees, coupled with the extraordinary gifts of our alumni and friends, most notably Mr. J. Fred Weintz Jr '47. Faculty research flourished in 2016, as detailed throughout this report. The combination of support from internal and external sources now exceeds $1 million annually.

Our students' research spans all disciplines and has expanded both within and outside the curriculum. In addition to our summer undergraduate research program including internally-funded and grant-supported student researchers, we have added an apprentice program that partners students and faculty together throughout the year. Also, the value of undergraduate research as a high-impact practice has worked its way deeper into our collective consciousness, resulting in more and more courses now including original inquiry activities.

In this report, titled ***Learning by Doing: A Collective Mission***, we also spotlight and recognize recipients of awards, specifically our newest Charles A. Dana Professor Dan McQuillan, PhD and this year's recipient of the Norwich Board of Fellows Faculty Development Prize, Joe Latulippe, PhD.

Finally, to my friends and colleagues, I wish to thank you all for your support over this past decade as together we have worked to improve Norwich's academic reputation. It has been an honor to help pave the way as we invest the time, space and money to do research.

David S. Westerman
Charles A. Dana Professor of Geology
Associate Vice President for Research

Faculty Development

I am very pleased to share with you, in my capacity as Faculty Development Coordinator, some of the excellent work being supported by the Faculty Development Program at Norwich University. Funded with endowed income, the program provides support for faculty to develop their scholarship, creative work, and teaching by attending and presenting at conferences, workshops and courses, conducting research, and developing curricula in innovative ways.

Given the substantial commitment to teaching—the faculty at Norwich carry a 3-4 teaching load each year—being able to find ways to connect their teaching and scholarship ensures that faculty are staying engaged with developments in their areas, making contributions to the body of knowledge in those fields, and integrating the most up-to-date research into their courses. Our generous funding resources help to facilitate that work, enabling faculty to study traffic patterns in Ghana, to trace the footsteps of an Irish abolitionist, and to study in a comparative context nation-building in Botswana and Zimbabwe. Closer to home, faculty travelled to libraries and archives, studied manuscripts, designed and built, and conducted experiments in the labs at Norwich and elsewhere with colleagues and collaborators.

No matter where they are working, our faculty serve as models of teacher-scholars striving to enrich their fields, the university, and their students' intellectual lives.

Lea Williams, PhD
Associate Professor of English
Faculty Development Coordinator

Undergraduate Research

It is a privilege to serve as Norwich University's Undergraduate Research Program Director. The Undergraduate Research Program promotes a "students to scholars" model of intellectual and creative inquiry. Since my arrival at Norwich in 2011, the Program has grown in participants, rigor, and visibility. This year's Student Scholarship Celebration showcased over 100 undergraduate research projects bridging disciplinary, cultural, and geographical borders. In summer 2016, we funded 26 Summer Research Fellows, whose work carried undergraduates from Vermont to California, London, Greece, and Spain. Last fall, we hosted the fifth annual Students to Scholars Symposium, which highlighted 19 undergraduates across disciplines. Ten of these students have joined a new cohort of Summer Research Fellows who will pursue original projects in 2017.

This year, we partnered with Faculty Development to create the Apprentice Grant Program, a Senior Vice President of Academic Affairs Chase Scholarship Initiative that provides undergraduates with high-impact learning experiences by serving as apprentices for faculty-directed research and curriculum development. This initiative will further advance the culture of undergraduate research at Norwich by introducing students to professional life.

When I talk with students who have conducted independent research at Norwich, they tell me that their experience was transformative. These students are ambitious, creative, and innovative and their energy is contagious. I guarantee that you will be as inspired by the work they have produced as I have been.

Amy Woodbury Tease, PhD
Assistant Professor of English
Undergraduate Research Program Director

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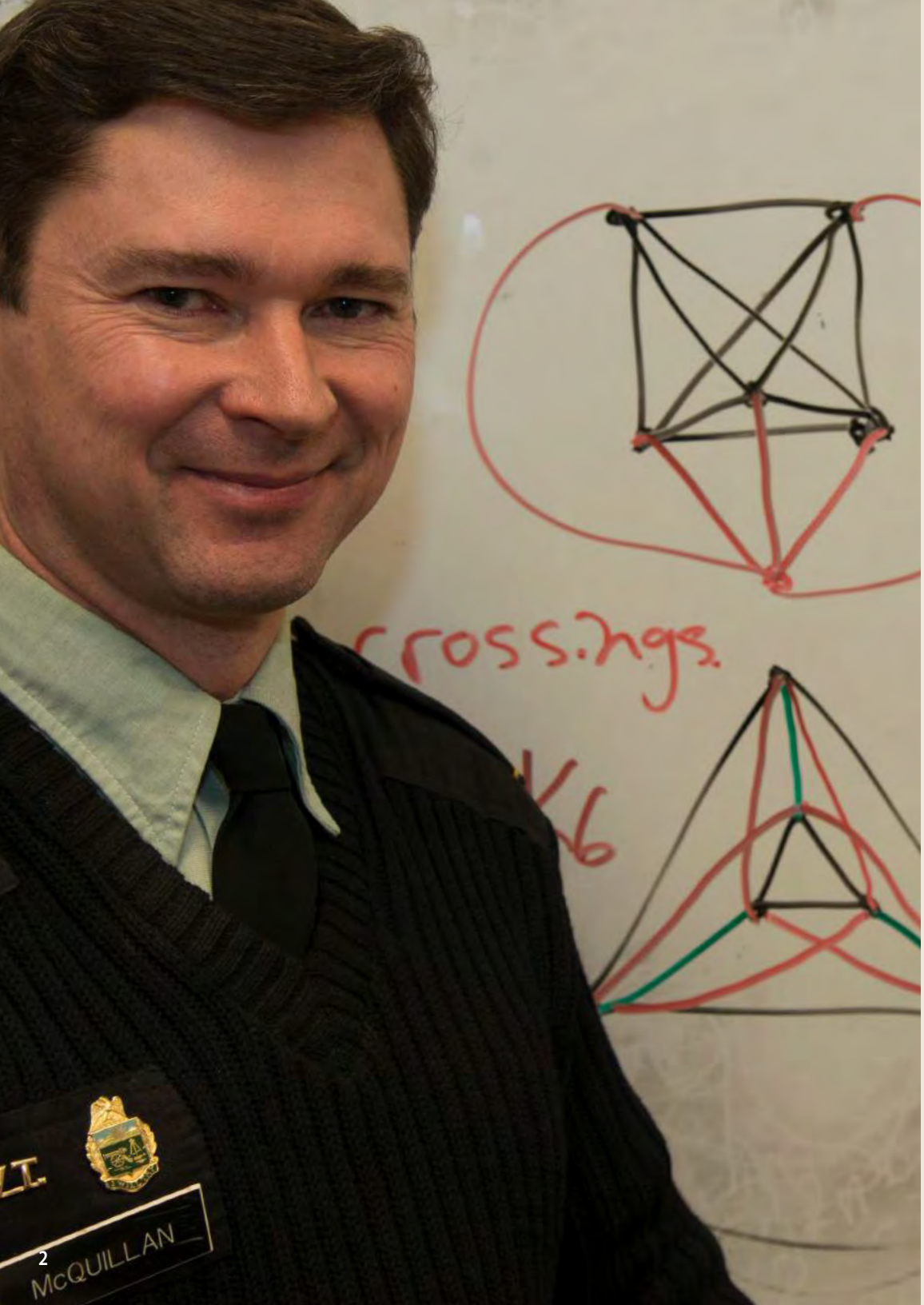


Charles A. Dana
Professor of Mathematics

IT'S MORE THAN JUST LINES AND DOTS

Dan McQuillan, PhD

"There's this misconception that some people are good at math, and some people aren't. But the truth is, it's a continuum. There are many, many skill sets required to be a really good mathematician; I just happen to have some of them."

BY JANE DUNBAR, PHOTOS BY MARK COLLIER

Dan McQuillan, PhD patiently walks a visitor through his area of expertise—topological graph theory—with a collegial tone signaling his confidence that even an abecedarian can grasp its complexities.

McQuillan's work utilizes sophisticated mathematics to calculate the crossing numbers of complete graphs embedded on a surface—but McQuillan doesn't explain it this way. Instead, he invokes common geometrical shapes to illustrate the precise area of his inquiry.

"Imagine the vertices of a square as people, and the lines between those vertices as relationships," he begins, conjuring a simplified version of a graph Facebook might use to represent its subscriber base. "Now, imagine drawing the two diagonal lines between opposite corners; this symbolizes the full complement of possible relationships among the people."

He continues, "It's my job to figure out, in any given graph, how many edge crossings there are—the point where those diagonal lines meet in this example—and whether there's a way to reduce them. Why? Because there are concrete instances where such crossings are undesirable: when you're designing an electrical circuit, for example."

Aha: his visitor understood. This pleases McQuillan.

"If you can view math as a language, and you know what the words and sentences mean, then it becomes much more fun and meaningful!" he says.

Indeed. In conversing with McQuillan in English, his knack for teaching math as a second language becomes immediately clear, and for good reason: he has been speaking mathematics fluently since 1989. That year, as an undergraduate student at Carleton University in Ottawa, Canada, he co-authored his first paper with mathematics professor R. Bruce Richter titled *On the Crossing Numbers of Certain Generalized Petersen Graphs.* This seminal event launched a career of inquiry into a topic McQuillan remains immersed in today.

A pure mathematician

McQuillan is a pure mathematician: a scholar involved in basic research for which there may be no immediate, or even future, application. As such, he feels fortunate to be at Norwich.

"A lot of the best research has no grander intent than to ask questions simply for the sake of asking them," he explains. "Yet many decision-makers don't understand this. At Norwich, I don't have to justify everything that I do. The leadership here supports the value of investigation, regardless of outcome."

One of McQuillan's current queries is, "How many edge crossings are possible for a complete graph with 15 points?"

"We literally do not know the answer," McQuillan says. "It becomes mathematically impossible to avoid edge crossings in complete graphs with as few as five points; with 15, no one can conceptualize what's going on. Even a computer can't. That's what I'm working on right now."

McQuillan can't say whether the results of this work will be useful in his lifetime. But the fact that it might—even a century from now—is precisely the reason he perseveres.

"The way most difficult problems are solved, in any field, are by using things that people didn't originally think would be part of the answer," he says. "Yet the 'publish or perish' culture of academia often pressures researchers to seek straightforward projects. I am extremely grateful to Norwich for encouraging me to take significant risks. That's when truly special work emerges."

A genuine collaborator

"Since Dan first arrived at Norwich 15 years ago, he has raised the collective level of scholarship within the mathematics department," says Dave Westerman, Charles A. Dana Professor of Geology and Vice President for Research at Norwich.

McQuillan, as humble as he is brilliant, demurs.

"There's this misconception that some people are good at math, and some aren't. But it's a continuum. There are many, many skill sets required to be a really good mathematician; I just happen to have some of them."

If McQuillan is missing a particular skill set, it's hard to identify. A prolific author, he has published several impactful papers in topological graph theory, as well as in the diverse areas of discrete mathematics, linear algebra, and calculus. His article *On the Crossing Number of K13*, also co-authored with B. Richter and S. Pan, has ranked number one on Science Direct's list of "hottest papers."

Adept at identifying his colleagues' complementary competencies—and regularly seeking their counsel on particularly difficult questions—McQuillan has co-authored several articles with Norwich faculty as well, including department chair Rob Poodiak, Darlene Olsen, and Jeremy Hansen. He also has a paper in progress with Joe Latulippe (see p. 4).

"When you see mathematics everywhere, then it's easy to engage with your colleagues in creative ways. Sometimes, those conversations lead to a publication. But it's important to note that this is not particular to me. Our entire department is very receptive to starting interesting discussions to see where they lead."

An inspiration in the classroom

A passionate teacher and mentor, McQuillan regularly brings his research into the classroom—using it to catalyze students' understanding of complex concepts, and to spark investigations of their own.

Recalling his own experience as an undergraduate, when he often didn't fully grasp the material until years later, he strives "to be aware of what sorts of things take time to sink in, and what will be helpful to students a decade from now."

By equipping students to solve problems through real-world examples, as opposed to memorizing equations just to get through the course, McQuillan hopes his approach to teaching will have a lasting impact.

This is another area in which he believes Norwich shines.

"Small class sizes offer the opportunity to experiment," he says. "When I use my work to illustrate the application of a particular topic, I know right away whether or not it 'clicks' with the students," he says. "That level of interaction doesn't exist in 500-person lecture halls."

Nor, perhaps, would the opportunity to publish as an undergraduate—something McQuillan actively encourages. To date, he has co-authored four peer-reviewed publications with Norwich students.

"I challenge students to reach beyond their comfort zones," he says. "Because truthfully, there are unsolved questions in mathematics where undergraduates know enough to contribute to their solutions," he says.

McQuillan also believes that Norwich undergraduates are fully capable of considering problems at the highest level, and signals this through his oversight of the university's participation in the annual Putnam Competition—considered one of the most prestigious mathematics tests in the world.

Looking ahead

Raised in Ottawa, McQuillan earned his master's and PhD degrees in mathematics from the University of Western Ontario. He joined the Norwich faculty in 2002 after serving as a visiting assistant professor at Lakehead University in Ontario, and a lecturer at Southern Illinois University at Carbondale.

Since his arrival, McQuillan has taught 17 different mathematics courses, often carrying a full load. He has mentored 20 students in their summer research and independent study projects.

Noting the importance of long-term research goals, he is excited to be developing the concept for a textbook on the process of mathematical problem-solving with Norwich colleague (and former student) Addie Armstrong. In the more immediate future, he anticipates (within two years) the publication of "by far the best" paper he's ever done with international collaborators B. Richter, Alan Arroyo and G. Salazar.

In recognition for his outstanding research, scholarship and teaching, President Richard M. Schneider named McQuillan as a Charles A. Dana Professor—the first in Mathematics since the award's inception in 1974—during Commencement on May 14, 2016.

"My best work has occurred since joining the Norwich University community," McQuillan says. "And I believe that—thanks to the support I receive here—even better work lies ahead."

2016–17 Board of Fellows
Faculty Development Prize

NEURONS UNDER THE INFLUENCE

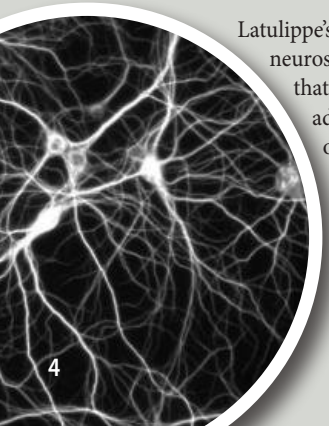
Joe Latulippe, PhD

"By shifting my focus to include Alzheimer's, I am placing myself at the forefront of current research, especially that which uses mathematics to better understand this disease."

BY JANE DUNBAR, PHOTO BY MARK COLLIER

When associate professor of mathematics Jocelyn ("Joe") Latulippe first submitted his research proposal as an application for the 2016 Board of Fellows Faculty Development Prize, he didn't anticipate that he would win. Nor did he imagine that his proposed investigations would yield potentially game-changing ramifications in the field of Alzheimer's research.

But he did. And they have.



Latulippe's specialty is mathematical neuroscience: a branch of the discipline that uses computational methods to advance researchers' understanding of the human nervous system and the mechanisms of neuron activity. In outlining his winning project, titled *Modeling the effects of synaptic plasticity on the firing patterns of neurons,* Latulippe proposed three key objectives: to develop a working mathematical model that could explain how the brain's synapses transmit signals from one neuron to the next; to more firmly establish an interdisciplinary community of neuroscientific researchers at Norwich University; and to actively engage undergraduate students in cutting-edge research.

Today, he has not only made significant progress toward those goals—he has also opened a broader investigation into how neurons communicate under the influence of specific organic diseases. The early results of this work place him, and Norwich University, at the vanguard of research into a universally devastating illness.

An unexpected tangent

For Latulippe, arriving at this point was a somewhat happy accident. Although he had earned his PhD studying mathematical neuroscience from the University of Montana-Bozeman in 2007, he had drifted away from it in the years since.

After spending four postgraduate years as associate professor of mathematics and statistics at California State Polytechnic in Pomona, he joined the Norwich faculty in 2011 as a generalist. Which is not to say he eschewed scholarship; on the contrary, he has submitted more than a dozen peer-reviewed papers on diverse topics such as differential equations, dynamical systems, perturbation methods, inquiry-based learning and writing in mathematics.

"I came to Norwich because it was a place I knew I could advance my scholarship, and grow as a teacher and a researcher," Latulippe says.

As it turned out, the Board of Fellows competition reignited his first scholarly passion in ways that have already demonstrated significant promise.

"I'll be honest; when I considered the proposal I might write, I first thought of my dissertation," he recalls. "And when I thought about *that*, I got really excited. There are so many unanswered questions in neuroscience, and so much potential in applying mathematical models to the study of neurons and how they function. I realized that I was ready to jump back in."

Mathematical modeling and organic disease

In order to understand the connection between Latulippe's work and Alzheimer's disease, it is first necessary to understand the applications of mathematical modeling in normal neuronal function.

"Biologically, the process of this reaction is extremely complex," Latulippe explains. "But from a mathematical perspective, it's simple: a signal arrives at the synapse; something happens; and then a new signal travels to the next cell."

At its base level, then, a synaptic transmission model is a quantitative tool for describing exactly what happens when neurons fire—and allows researchers to study the effects of certain stimuli, such as light patterns, on that process.

Latulippe's original intent was to improve upon existing synaptic transmission models through incorporating the idea of *plasticity*—a term that describes a synapse's ability to adapt to specific signals. More simply put, he sought to devise a tool that could help explain what variables might strengthen or weaken a synapse over time, and how.

Drawing upon hypotheses originally proffered in his dissertation (*A Non-autonomous Phenomenological Bursting Model for Neurons*), and with the assistance of a Norwich undergraduate, Latulippe succeeded in developing a "validated model"—one based on known experimental data—that enables researchers to test the behavior of neurons and synaptic transmission under the influence of specific conditions.

And this is where things got interesting: because the link between synaptic transmission and neurological diseases such as Alzheimer's is inextricable.

"Alzheimer's is the manifestation of breakdowns in memory, learning, and cognition," Latulippe explains. "In other words, Alzheimer's patients experience a progressive loss of synaptic plasticity. We know that one of the hallmarks of the disease is the development of plaques and fibrils known as amyloid-beta (Aß) peptides; what we don't know is what triggers their development in the first place."

Latulippe's newly developed model enables investigators to simulate exactly what happens to neural pathways and synaptic transmission at the very onset of Alzheimer's disease—before the imminent proliferation of plaques and fibrils.

The benefits of such an approach are clear. With the click of a mouse, mathematical models can change the conditions of an experiment by controlling for individual mechanisms, such as the effect of calcium on Aß peptides, at will. Unshackled by the limitations of time or the bureaucracy of human trials, such simulations provide reams of data in the few short minutes—or seconds—it takes to run them.

"By shifting my approach to include Alzheimer's," Latulippe

says, “I am putting myself at the forefront of current research, especially that which uses mathematics to better understand the evolution of the disease.”

At the conclusion of his project, Latulippe expects to submit two peer-reviews articles for publication: the first, based on a mathematical model that captures synaptic plasticity; the second, characterizing the firing patterns of single neurons.

Engaging the Norwich community

Along with the student who helped Latulippe develop his model, he has involved four undergraduates in his Board of Fellows project—with plans for more, thanks to continuing support from the Vermont Genetics Network.

“Although mathematical modeling comprises many advanced topics, undergraduate students with a basic understanding of differential equations can become active researchers,” he says. “In my opinion, opportunities like this—to interact across the spectrum of theory and practice—is what undergraduate research is all about.”

Noting the significance of Norwich’s recent addition of a neuroscience major, Latulippe is also working with resident neuroscientist and biology professor Megan Doczi to organize a collaborative community of faculty and students in the fields of biology, chemistry, physics and math. Although a work in progress, Latulippe’s vision for its mission is clear.

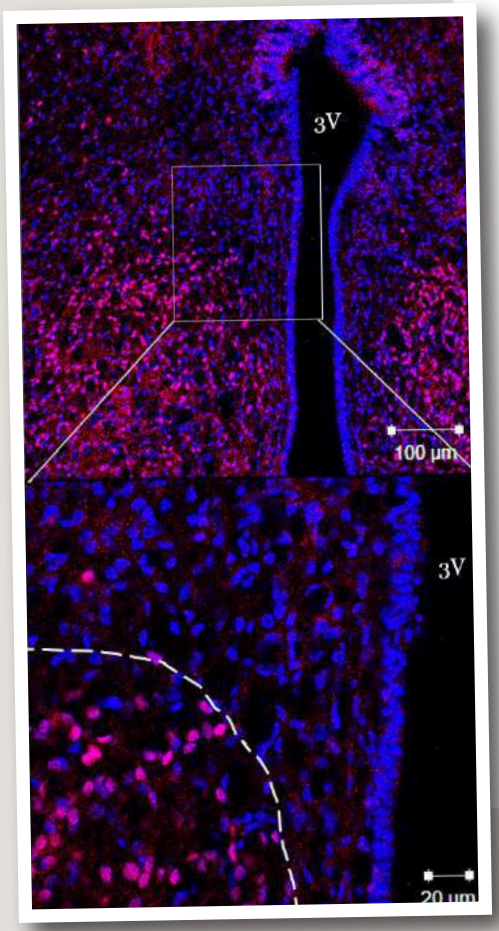
“To do this kind of research, you need broad-based expertise,” he says. “Working together through interdisciplinary interactions will put Norwich’s programs at the forefront of desirability for students, and will contribute to a vibrant scholarly environment for our faculty. The way this work is unfolding, there will be plenty of ongoing research opportunities here at Norwich for years to come.”

In addition to his current investigations in mathematical neuroscience, Latulippe teaches undergraduate courses across the mathematical spectrum, including calculus, discrete mathematics, computational theory, statistics and operations research. He serves as assistant coach of the men’s lacrosse team; holds a 2nd-degree black belt in Akido; enjoys painting and drawing (some of his work is on display at Norwich); and makes time for “fun” side projects with colleague Dan McQuillan (see p. 2). Currently, the duo is preparing a paper, *How to shovel snow all winter without lifting*, that demonstrates, through physics, a safer approach to moving the white stuff.

“I value being well-rounded, and am always seeking opportunities to grow as a person, teacher, and scholar,” he says.

Dana Research Fellowships

These fellowships, supported by endowed funds from the Charles A. Dana Foundation, are awarded to tenure-track faculty on a competitive basis to support research, creative, or scholarly projects.



Megan Doczi

Localization of the Insulin-sensitive Kv1.3 Ion Channel During Brain Development

Ion channels are membrane proteins that control neuronal activity. Kv1.3 is a specific ion channel that is sensitive to the hormone, insulin, suggesting that this channel may play a role in regulating metabolic function. The purpose of this Charles A. Dana Research Fellowship was to localize Kv1.3 ion channels in the hypothalamus, a region of the brain specialized in regulating energy homeostasis. These experiments confirmed that Kv1.3 is expressed in specific hypothalamic areas governing food intake and energy expenditure during development, suggesting a role for this channel in the early patterning of metabolic circuits. Overall, understanding the role of insulin-sensitive Kv1.3 channels in brain development may provide a target for therapeutic intervention for metabolic disorders such as diabetes and obesity.

Elizabeth Gurian

Reframing Mass Murder Within Empirical Research

With the help of the Charles A. Dana Research Fellowship, a mass murder database from 1900 to 2015 for the solo male, solo female, and partnered offenders was created. The database included an international sample of 462 cases (486 offenders) who had committed a minimum of two murders during one incident. The sample also included 21 lone actors who bridged the classification of being both, a mass murderer and terrorist. The paper resulting from this study, entitled *An Empirical Analysis of Mass Murder: Offending and Adjudication Patterns of Male, Female, and Partnered Mass Murderers* has been submitted to the Justice Quarterly journal. Prof. Gurian's future plans are to present this research at the 2017 Homicide Studies conference and/or the 2017 American Society of Criminology conference.

Table 4: Disposition of Mass Murderers

Disposition*	Male Mass (n = 376)	Female Mass (n = 44)	Partnered Mass (n = 35)	
			Male (n = 31)	Female (n = 4)
Killed before trial*	35	2		1
Suicide*	185	16	4	--
Died	7	1	2	-
Other	2	3	3	--
Life sentence	91	7	19	1
Death row**	55	9	7	1
Executed**	18	3	2	--

Yangmo Ku

The Politics of Economic Reform in Communist States: North Korea, Cuba, and Vietnam in Comparative Perspective

While staying at the Institute for Far Eastern Studies (IFES) for six weeks, Dr. Ku conducted detailed interviews with five Korean experts on the topic of North Korean politics and economy and was able to identify important sources. Based on this research, he had an opportunity to present his paper entitled, *The Politics of Economic Reform in Communist States: North Korea, Cuba, and Vietnam in Comparative Perspective* at the IFES forum. This research enabled him to deepen his understanding of the topic through comprehensive discussions with North Korean experts. Since his return to Norwich, Dr. Ku has been revising his paper based on the researched materials and interviews. After further work on Cuban and Vietnamese cases, Dr. Ku plans to submit a final draft of the paper to the *Journal of International Relations and Development.*

Tim Parker

Art and Architecture of Religious Pluralism: Historiography and Theoretical Framework

The primary goal of Dr. Parker's research fellowship was to build a historiography that would support a promising way to approach interpretive problems surrounding art and architecture insofar as they are meaningful with respect to multiple and conflicting religious identities. Since this is a largely unstudied and inherently interdisciplinary field, historiography could identify a provisional approach to "material religion as interreligious hermeneutics" and provide a basis for a theoretical framework to guide future work. During his fellowship, Dr. Parker, together with Dr. Grubiak (Villanova University, Pennsylvania), presented their paper, *Landscapes of Religious Pluralism: Understanding Difference and the Common Good* at the Architecture, Culture & Spirituality Symposium in New Harmony, Indiana in June 2016. With the information gathered from this conference, he revised his historiography and plans to continue his research on this topic in future.

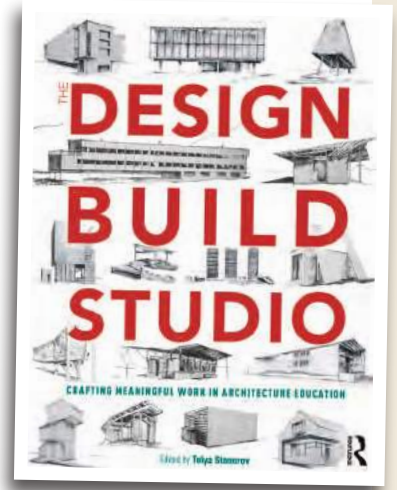
Left: Insulin receptor localization in the embryonic avian hypothalamus. (Doczi)

Right: Disposition of mass murders. (Gurian)

Tolya Stonorov

The Design-Build Studio: Crafting Meaningful Work in Architecture Education

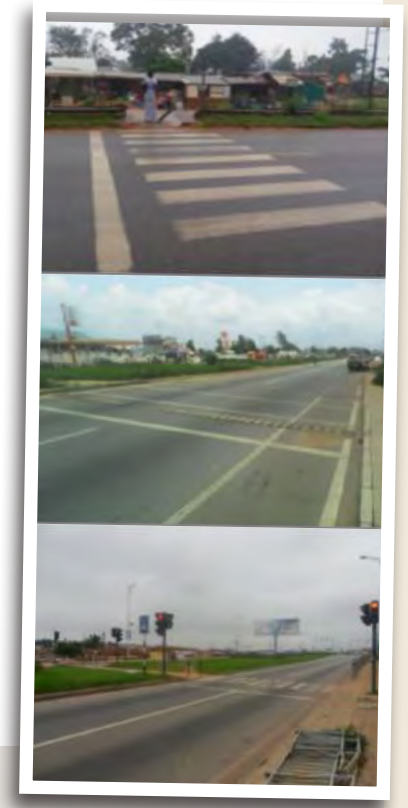
During the 2016 Dana Summer Research Fellowship, Tolya Stonorov completed the writing and editing of her book, *The Design-Build Studio, Crafting Meaningful Work in Architecture Education,* that was submitted to Routledge, a Taylor and Francis publishers. The book focuses on community driven projects that demonstrate how design-build can serve as a catalyst for change. Prof. Stonorov spent considerable time communicating with the 18 contributors and organizing the full body of work. During this time, she finalized the editing of 18 contributed chapters, finished the design-build graphic history chapter (that included 24 original drawings), completed her own case study chapter, and wrote the conclusion to the book.



Moses Tefe

A Strategy for Identifying High Pedestrian Crash Zones in Accra-Ghana

Dr. Tefe's research involved carrying out a limited study of pedestrian crashes in the city of Kumasi in Ghana to identify human, vehicle, roadway, and environmental factors that contribute to pedestrian crashes at unsignalized marked and unmarked crosswalks using four-year historic crash data. This was supplemented with an additional limited field study of thirty crash locations using identical crosswalks. Analysis of data from both these studies revealed factors that appeared to be highly associated with crash sites, and if addressed, could reduce the incidence and impact of pedestrian crashes. In December 2016, Dr. Tefe's work was presented as a poster at the peer reviewed 10th University Transportation Center's Spotlight Conference on Pedestrian and Bicycle Safety in Washington DC, organized by the Transportation Research Board. Dr. Tefe continues to analyze his data to develop a model for predicting high pedestrian crash locations and plans to eventually publish his results in a peer-reviewed journal.



Top: Tolya Stonorov book cover.

Bottom: Pedestrian crash site settings in Ghana. (Tefe)

Curriculum Development Fellowships

Curriculum Development Fellowships are awarded within the Faculty Development program to tenured and tenure-track faculty on a competitive basis for projects involving the development of courses or curricula beyond the scope of ongoing revisions.

Gina Sherriff

Language Leadership Modules for Spanish Program

In this project, Dr. Sherriff, together with other Spanish faculty at Norwich University, assigned upper-level Spanish students with "leadership modules," in which they would use various technologies, for example, voice thread, iMovie, and screen capture to create teaching materials for the lower-division beginners' courses. Elsewhere, students were also tasked with creating multimedia objects to help connect language learning to additional academic areas, such as the liberal arts, criminal justice (Norwich's most popular major), STEM, and careers in the military. A presentation addressed the rationale behind this project, as well as the preliminary steps taken during the process. The students collected the learning objects and assessed the project with the aim of reporting the outcomes for this year and plans for the future.

Darlene Olsen

A Case Study Approach to Teaching Statistics to Health Science Majors

Dr. Olsen developed a curriculum based on case studies, that was followed-up by creating computer labs to analyze the data from these case studies using R, a statistical analysis software package. The approach of using case studies is to first present a journal article that is centered on a specific scientific question related to health science, learn about the methodology used by the authors to analyze the data, and then use the statistical R software to analyze similar data (actual or simulated). This knowledge was integrated into the revamping of MA2325 course. In August 2016, preliminary work on this curriculum development was presented at the American Statistics Association Joint Statistics Meeting (JSM). A written report will be included in the JSM published proceedings under the "Statistics in Health Science" section. Dr. Olson believes that this revamping will make students more receptive to learning statistics.

Undergraduate Research Fellowships 2016

Summer Research Fellowships for undergraduate students provide support for six- or ten-week summer projects, with funding from the Chase Endowment for Academic Excellence and the Weintz Research Scholars Program. These awards are made on a competitive basis to support original research and creative or scholarly projects, mentored by faculty, beyond work leading to completion of the student's degree.

Using Petrological and Structural Evidence to Explain a Mechanism for Plutonic Emplacement Across a Major Tectonic Boundary in the Central Vermont Appalachians.

Adele Del Avellano, Department of Earth & Environmental Sciences (Geology)
(Dr. G. Christopher Koteas)

There has been an extensive amount of work done on regional tectonism in the Northern Appalachians, specifically around a major fault zone in central Vermont that separates two major mountain building events. However, not much work has been done, especially when one considers what structures within the host rock, specifically around the pluton margins, may record relative to the building of the Appalachian mountains that are associated with the Acadian Orogeny, the second major mountain building event. This work aims to use a combination of petrological and structural methods to explore the mechanisms of emplacement of plutons or intrusive igneous bodies. It is anticipated that the results from this study can be used to further understand the mechanisms behind continent-continent collisions. This is significant, not only from a scientific perspective, but also from an industrial/economic perspective, as the research area is home to many granite quarries that still remain active today.

Microgeochemical Variability Within a Ductile Shear Zone: Pressure-temperature Evolution Across a Poly-deformational Boundary

Christopher Eddy, Department of Earth & Environmental Sciences (Geology)
(Dr. G. Christopher Koteas)

Recent structural studies of the interface between Taconic and Acadian aged rocks in central Vermont have highlighted a relatively late stage of Acadian deformation that was previously unknown. Minerals associated with specific rock fabrics preserve unique chemical signatures that can be associated with specific pressure and temperature conditions. This study will focus on the mineralogical and petrological variability of geothermobarometric minerals, specifically chlorite, biotite, garnet, and alkali feldspar across narrow zones of *en echelon* shear bands. We will employ bulk rock major and trace element geochemistry and *in situ* mineral chemistry to generate mineral reaction paths that can be used to model the pressure-temperature-time-deformation path of the latest Acadian orogenesis in central Vermont. Comparison with similar studies of Appalachian units along strike will further contextualize the deformation history of how the middle crust operates during the waning stages of orogenesis.

The Effect of Circles of Support and Accountability (COSA) on Re-Entering Violent Offenders in Vermont: Perspectives of Participants and Volunteers

Zyla Fisher, School of Justice Studies & Sociology
(Dr. Emily Meyer)

Restorative justice programs are used to help reconnect an offender with both the victims and the community, leading ultimately to closure for everyone involved in the crime. These programs are gaining in popularity and can be found in almost every town in Vermont. Restorative justice programs (RJP) are frequently used for juvenile and drug offenses. The aim of this research was to determine whether these programs are a good option for more violent offenders. To accomplish this, I worked with a RJP called Circles of Support and Accountability (COSA) and interviewed community members who volunteer with this program to collect narrative data on their opinions and experiences working with the program. Finally, I accessed

publically available data to compare the recidivism rates of offenders who have completed a RJP versus those who have committed the same crime without participating in the restorative justice program. With the restorative justice program gaining in popularity throughout the country, such programs may become the future for the United States criminal justice system.

Investigating the Role of the Degree Sequence in the Existence of Graph Labelling

Artmiz Golkaramnay, Department of Mathematics
(Dr. Dan McQuillan)

From neuroscience to telecommunications, different networks can be labelled as graphs. The result of proving the existence of a Vertex Magic Total Labelling for an infinite family of graphs will have applications not yet known. MacDougall's conjecture states that every regular graph (where the degree is at least two) must have a Vertex Magic Total Labelling, with one known exception. The goal of this project was to provide considerable new evidence that the degree sequence alone does not determine whether the graph will have a Vertex Magic Total Labelling (VMTL). This was done by suggesting two families of graphs with the same degree sequence, one that will have a VMTL and one that does not. This project proves that what the graphs look like along with their degree sequence determine whether a VMTL of the graphs can be found or not.

Developing a Mobile App to Aid First Responders After a Tornado

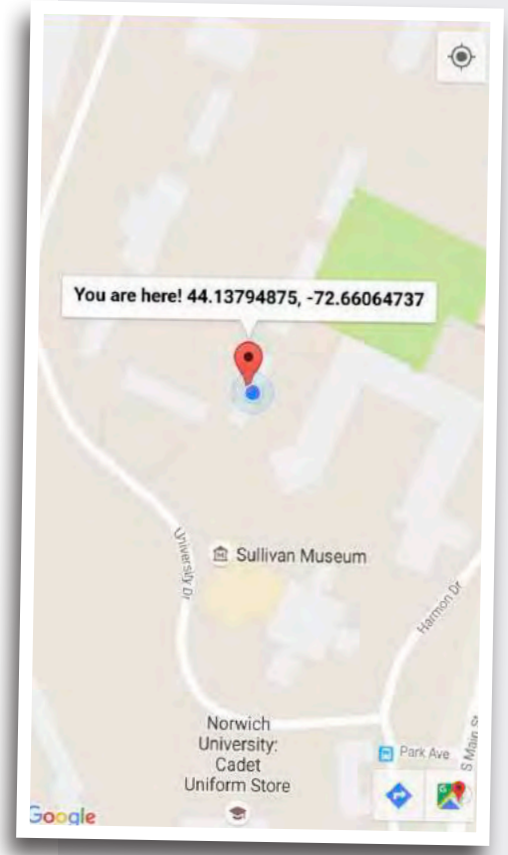
Alexis Julian, Department of Computer Sciences & Information Assurance
(Dr. Jeremy Hansen)

Current mobile phone locating standards for dispatch centers are underdeveloped, creating an easily fixable problem within disaster response done by Emergency Management professionals after a natural disaster. This research was done in order to find what features are needed by Emergency Management personnel that can be implemented through a mobile application to help assist victims of natural disasters. Much of the research for this project was done through the FEMA website using the FEMA IS courses. Focusing primarily on tornadoes within the United States, the created application works to provide Emergency Management professionals with precise locations, along with individual details in relation to each victim. Creating this application will provide evidence that integrating a mobile application into the response phase of a natural disaster is pertinent to advance the impact of search and rescue teams.

Burnout and Compassion Fatigue in Nursing Students: A Meta-Analysis

Lauren E. Kenneally, School of Nursing
(Professor Lili Martin)

While researchers are conducting numerous studies on burnout and compassion fatigue and their effects on both nurses and patient outcomes, little research has been dedicated to the same fatigue in nursing students. This is important since the students' development can directly affect the nursing workforce once they have become registered nurses. In a time where the greater population is aging and the need for nurses is increasing, it is paramount that we retain the nursing workforce we have, rather than potentially losing valuable nurses due to burnout and compassion fatigue. Several studies have shown that having a critical mass of nurses is crucial when talking about patient outcomes. High patient load for nurses indicates higher patient readmissions, higher infection rates, and higher patient mortality rates. This in turn can influence a nurse's susceptibility to burnout, which can influence susceptibility to compassion fatigue. By examining the literature, information can be gathered on what has been studied within the subset of data and make suggestions as where to go from there. This helps draw focus to the problem and will fuel researchers to pursue even further steps to contribute to the body of nursing knowledge.



Left: Bedrock mapping in central Vermont. (Eddy)

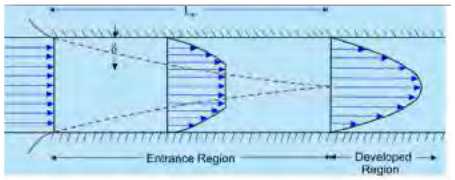
Center: Balancing in the context of restorative justice. (Fisher)

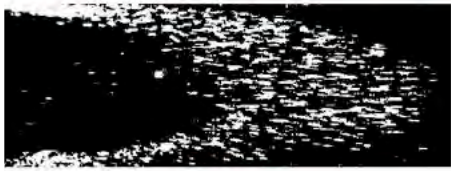
Above: Location app for use in disaster recovery. (Julian)

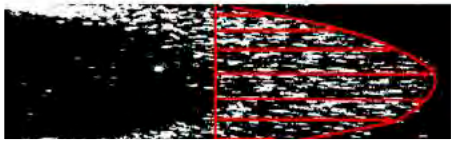
Determination of Flow Development in Whistle-Based Woodwind Instruments

Laurie King, David Crawford School of Engineering (Mechanical Engineering) - (Dr. Michael Prairie)

The timbre of whistle-based woodwind instruments depends greatly on how the air flow develops in the enclosed flue, a small rectangular duct, and across the open sound hole. This study analyzed the flow of fluids through the flue, a feature distinct from other rectangular ducts because of its uniquely small height (about 1 mm) compared to the other dimensions and its greater width and length. The Buckingham Pi Theorem was used to enlarge the flue to workable dimensions and change the fluid from air to water. Flow was analyzed using a hydrogen bubble technique that allowed visual interpretation and comparison to mathematical models to understand the velocity profile of the flow. This allowed for a better understanding of the shape of the resulting air jet, which helped in evaluating the overall properties of the instrument. The significance of predicting the velocity profile was improved prediction of the timbre of the instrument. An effective apparatus was designed to analyze fluid flow, image processing tools were used to enhance hydrogen bubble visualization, and the flow tank proved effective in changing the channel specifications and flow rate.







The Evolution of Geochemical, Petrogenetic, and Mineralogic Suites Across the Taconic-Acadian Interface in Hardwick, VT

Kirstin Lortie, Department of Earth & Environmental Sciences (Geology) - (Dr. G. Christopher Koteas)

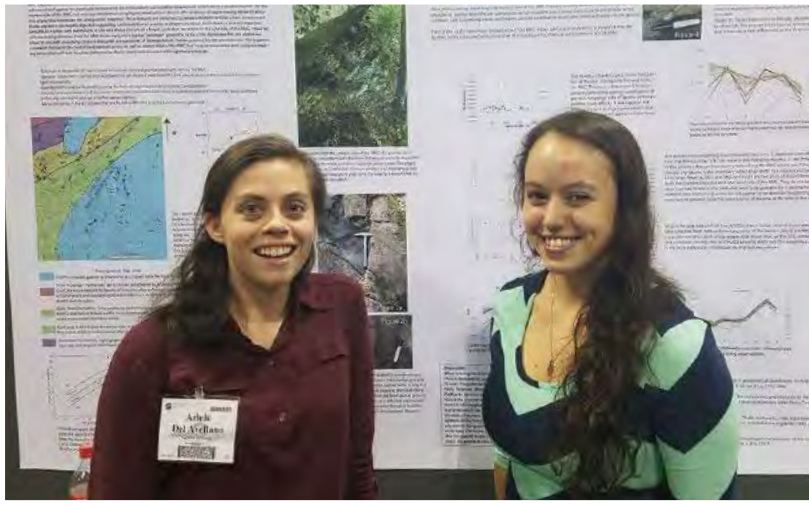
The Appalachian Mountains in central Vermont are the resulting features of past mountain building events, creating a suture zone between the Taconic and Acadian orogenies. In Hardwick, Vt., there are isolated and localized intrusions of magmatic bodies on the Taconic (western) side of the suture zone. Geochemical, petrogenetic, and mineralogic analyses will be performed on these granitic bodies to determine their chemical composition. Determining the chemical composition of the intrusion can lead to configuring the evolution of the magma body during cooling.

A well-developed analysis of suites across the Taconic-Acadian interface will lead to an understanding of the history of how these isolated intrusions were emplaced and will ultimately make a contribution to the scientific community at large.

A Mathematical Model for Synaptic Dysfunction in Alzheimer's Disease

Derek Lotito, Department of Mathematics (Mathematical Physiology, Biochemistry, Neuroscience) - (Dr. Joe Latulippe)

Alzheimer's Disease (AD) is the leading cause of dementia and can ultimately lead to death. It is believed that the onset of Alzheimer's Disease (AD) occurs due to intermittent interruption of synaptic transmission between neurons. Regulation of intracellular calcium (Ca^2+) signaling plays a critical role in neuronal signal transmission. Studies have shown that accumulation of Amyloid-β (Aβ) proteins may trigger an increase in intracellular Ca^2+ levels by disrupting the regulatory mechanisms within the neuron and has been shown to impair synaptic function and structure. The goal of this project was to develop a mathematical model for calcium signaling within neurons. More specifically, we looked to model calcium dynamics as Aβ accumulates within the neuron. The results of our model suggest that Aβ affects Calcium-Induced Calcium Release, which becomes more pronounced at higher Aβ concentrations, and that basal Ca^2+ levels can increase over time as Aβ accumulates. Analysis of mathematical models can help to identify biological mechanisms as potential pharmaceutical targets aimed at normalizing intracellular Ca^2+ levels in order to prevent synaptic loss.



Journey of the Armor

***Sean Michael McCrystal, Department of History & Political Science** - (Dr. Miri Kim)*

This work focused on ancient armor currently held in Norwich University's Sullivan Museum and History Center. The armor was originally thought to have been a Chinese armor as it was brought back by General A. Coolidge (NU'1863) from the palace in Beijing, China while Coolidge was serving with the 9th Regiment during the Boxer Rebellion. Initial investigations suggested that the armor was, in fact, 15th-century Samurai armor, based primarily on the iron that corresponded with the introduction of firearms during the same time period. In contrast to Chinese armor, which generally looked more like a dress with leather and scales, this armor was constructed more like Japanese armor with plates of iron and steel with a hinge to help in taking it on and off. It is postulated that the armor was a ceremonial gift given to the Chinese Emperor at that time to establish trade connections.

Low-cost Apparatus for Time-correlated Motion and Surface Electromographic (sEMG) Data Collection

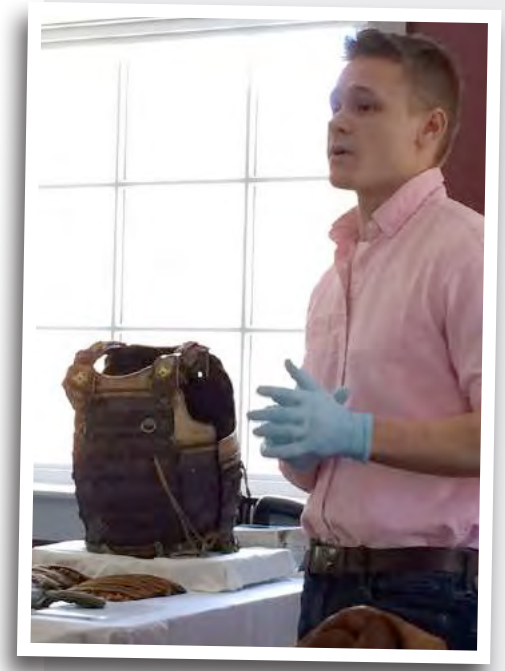
***Patrick Millington, David Crawford School of Engineering (Electrical and Computer Engineering)** - (Dr. David Feinauer)*

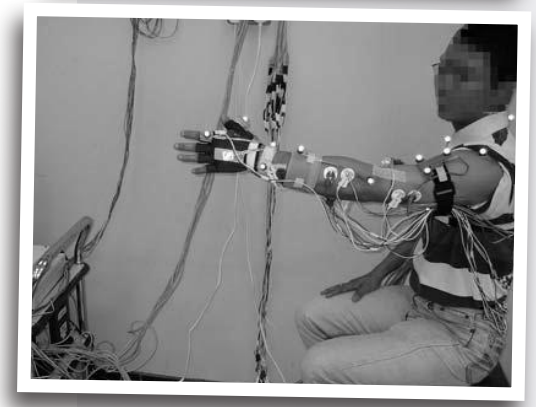
This research seeks to create a low-cost data collection apparatus called a surface electromyograph (sEMG) that collects the electrical signals given off by muscles when activated and then positions the data, based off an accelerometer. When applied, this apparatus will monitor and collect data on essential tremors (ET) in the forearm and wrist. To validate the results, the data must have the proper resolution and sampling rate such that it is a true representation of the movement of the forearm. The standards for sEMG data collection and reporting has been set out by the International Society of Electrophysiology and Kinesiology (ISEK) and will be used for the measurement of success for the apparatus in addition to the data that is deemed useful by the researcher currently in the field. The development of this apparatus will allow research on ET, with a focus on the movement of the forearm and wrist, to be conducted at a lower cost. This means that the research can be conducted with fewer barriers.

Affordable/Reusable Olympic Stadiums

Peter Misner, School of Architecture + Art
(Prof. Cara Armstrong)

Every two years an Olympic host country spends billions of dollars on infrastructure in preparation for the games. For example, new stadiums and roads are often built in order to successfully host the Games. Once the Olympics are over, many of those stadiums often sit unused. The vacant structures either waste public money through maintenance and upkeep or through initial construction and lack of use thereafter. This fellowship examined the Faliro Beach Volleyball Center, located in Athens, Greece. Also examined were structures in Barcelona and London, both of which had very successful Olympics, and post-Olympic plans. The study compared the post-Games success of a venue that had a transition plan in place before the Olympics with those that had no plan for usefulness after the games. For other host sites, the study proposes ways to reuse old venues to have a positive impact





Left: Cross section of native American flute (top), laminar fluid flow (center) and simulation of deformation (bottom). (King)

Center: Adele Del Avellano and Kirsten Lortie presenting in National GSA meeting in Denver. (Lortie)

Top Right: UR Brown Bag presentation of 15th-century Samari armor. (McCrystal)

Right Center: Surface electromyograph data acquisition. (Millington)

Bottom Right: Faliro Beach Olympic site, current (left) and proposed future (right). (Misner)

on the host city. This was done by proposing options to retrofit the Faliro Beach Volleyball Centre so that the facility is useful and supports community needs.

Verifying Dark Energy Models with Multiple Scalar Fields

Jeffrey Morgan, Department of Physics - (Dr. Rob Knapik)

Understanding the nature of dark energy has formed a central goal in the field of cosmology. This research compares the theoretical predictions of the standard cosmological model with current observational data. An open source computer simulation, called CosmoMC is used to constrain the six free parameters of the theory and assess consistency with different data sets. Future observational evidence will be available that may make the standard model inconsistent so many theories have been proposed that could explain the nature of dark energy beyond the standard model. One such theory is called Assisted Dark Energy and combines the theory of dark energy with that of inflation using the same underlying mechanism to explain the Universe's expansion at different points in the Universe's history. The CosmoMC simulation has been extended to include this extension to standard model, which increases the number of free parameters.

Measurement of Stress and Contributing Factors Between Collegiate Academic Years Among Undergraduate Students

Lauren Nehilla, Department of Psychology
(Prof. Matthew Thomas)

Academia has consistently changed over the years in terms of what material we learn and when it is learned. The expectation of intelligence continues to grow, as does the stigma associated with not attending college. Expectations such as these have led to consequences clearly visible in dropout rates, prevalence of mental illnesses such as depression and anxiety disorders, and suicide rates among college students. In order to understand a problem, we need to know when and why it starts. Which academic year presents the most challenges that could lead to increased stressors and thus potentially destructive behavior? In addition to discovering which academic year is potentially the most stressful, an investigation into the underlying factors contributing to that stress is also necessary. The purpose of this research is to develop a reliable survey that can be used to both identify the most prevalent areas of stress and measure their respective levels. Typically, stress management and orientation programs are geared towards freshmen. However, with the creation of this survey, there is the potential to identify new target groups for stress management, prevention, and intervention programs in the future.

How Does Exercise Effect Antioxidant Production?

Rhiannon Page, Department of Biology & Physical Education (Exercise Physiology)
(Dr. Elizabeth Wuorinen)

Obesity leads to the development of many diseases, resulting in a drain on the health care systems. Exercise can combat obesity, but also results in oxidative stress, which is defined as an imbalance between free radicals/reactive oxygen species (ROS) and the body's ability to counteract their harmful effects through neutralization by antioxidants. ROS/free radicals are any molecules containing one or more unpaired electrons that react with other molecules to obtain an electron to gain stability. Exercise creates ROS/free radicals as a natural by-product of increased metabolic demand; but it is also a producer of antioxidants that inhibits their action, thus preventing damage. This study seeks to explore changes in antioxidant levels occurring as a consequence of varied intensity exercise over a 20-week period in middle-aged, overweight women. The goal is to examine the quantitative changes of antioxidant production that occur in response to the exercise regimen, thus providing evidence for the positive health benefits of exercise.

Absolute Calibration of a PMT

Jake Riti, Department of Physics
(Dr. Rob Knapik)

Photomultiplier tubes (PMTs) are used to study the fundamental properties of neutrinos in many experiments throughout the world. In these experiments, generally only one incident photon is sent to the PMT during a single event. All PMTs have inherent defects such that five percent or more of the signals they detect have a significant time offset. These signals are called spurious pulses and many experiments ignore these pulses, which is limiting the quality of their data. A Monte Carlo simulation has been created that simulates spurious pulses to learn how these pulses contribute to the time and charge distributions of a PMT. The simulation was tuned with data taken with an eight-inch ETL9354KB PMT and has illuminated the origin of the large amount of under amplified pulses that are seen in the charge distribution of this model PMT. In the future, this simulation can

Below: http://buckeyepmreastland.com/chiropractic/columbus-chiropractor/tag/columbus-oh-back-pain/. (Nehilla)

Center: Thermal degradation of the different PVA/MoS2 composites. (Robert)

Right: Lutzomyia sp. sandfly vector (top, photo by Ray Wilson); S. Occidentalis size comparison (center) photo by J. Sassi). (Sassi)

be used by neutrino experiments to better model their PMTs and yield higher quality data.

A Study of Thermal Degradation Kinetics of PVA Matrix and MoS_2

Celeste Robert, David Crawford School of Engineering
(Dr. Karen Supan)

In the world of material science, a multitude of studies are being conducted to find new composite materials that will achieve distinguishable material properties. The overarching goal is to find the right combination of materials and the proper balance that will produce some useful properties. Adding a two-dimensional material like MoS_2 to a PVA matrix should help it to react better to heat, while keeping its lightweight property. The purpose of this study was to determine if this new combination of material can achieve better thermal properties than the PVA alone. If time permits, a study of the reaction process will be conducted to determine how this composite material breaks down. By knowing the activation energy and pre-exponential factor, which will be given by the degradation curves, the thermal properties of the different samples can be compared and understood. Also, the chemical reactions could be decrypted by understanding how these materials act on their own. Furthermore, by looking at the activation energy, a bridge between the new composite material and the plain matrix can be made. This material could be particularly revolutionary in the manufacturing process of certain parts of artillery used by the Army as it could make the artillery both lighter and more cost efficient.

Exploring Stellar Winds and Massive Stars

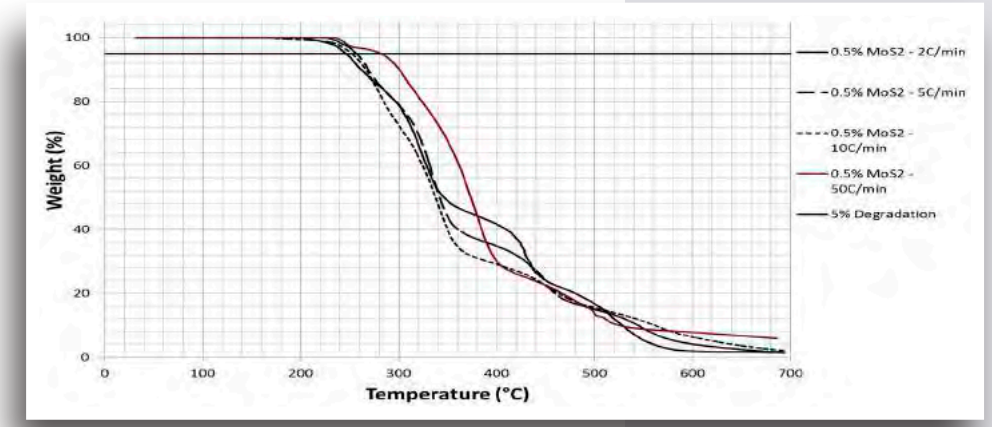
John Rotter, Department of Physics
(Dr. Tabetha Hole)

Massive stars have a large impact on the galaxy. The energy they release, and the particles that stream from their surfaces (called the stellar wind), stir up the cosmic medium that will eventually be used to create new stars. The most massive (O-type) stars have been well studied, but not much work has been done on the slightly smaller B-type stars. In this project, we will test how well our current models apply to B stars. Single B stars should emit X-rays, and in a B-star binary system, the collision of the two stellar winds should emit additional X-rays. Current theories of B stars and their winds predict that these emissions should be detectable by the Chandra X-ray Observatory; however, our observations of two such systems show far less emissions than expected. Even stranger, though these systems were chosen to be very similar in all characteristics, only one of the star systems shows any emissions at all. Clearly our understanding of B stars and their winds is incomplete. Over the course of this project, we will be exploring the characteristics of B-stars and their winds that affect X-ray emissions and find where the current theories are insufficient.

Investigating the Effect of Severe Drought on Parasite Prevalence and Diversity

Joshua Sassi, Department of Biology
(Dr. Allison Neal)

Climate change is likely to be one of the greatest challenges facing our generation. While some studies have examined the potential for changes in climate to impact the spread of insect-transmitted diseases, data is still limited and inconclusive. Northern California has been experiencing drought conditions for several years, presenting a unique opportunity to examine how the insect-transmitted parasite *Plasmodium mexicanum* reacts to climate change. To determine if drought conditions affected the prevalence of infection and the number of strains per infection in the parasite's host, the western fence lizard, blood samples were collected, and light microscopy was utilized to determine the number of infected lizards at each collection site. DNA extraction and PCR were performed to amplify genetic markers to determine the number of strains of infection in each blood sample. Infection prevalence pre- and post-drought was compared to average vegetation (lb/acre) and rainfall (mm/year), but no statistical significance was noted. Higher infection prevalence post-drought was noted, but no statistical difference in the number of strains per infection was found. While no direct correlation between infection prevalence and drought intensity was found, the increase



in prevalence following the start of the drought suggests that drought may increase infection prevalence.

An Evaluation of the Relationship Between Knowledge of Middle Eastern Culture and Justification of Violence Against Civilians in American Military Cadets

Muhammad Ali Shahidy, Department of Psychology
(Dr. Mark Stefani)

The aim of this research is to evaluate the relationship between one's knowledge of the predominantly Muslim Middle Eastern culture and acceptance of acts of violence against civilians. This study, which focuses on a population of American military cadets, and is imperative because the United States has had a long history of military involvement in the Middle East, mostly in Afghanistan and Iraq. As our literature review shows, one of the biggest challenges for the US military has been a lack of cross-cultural competency leading on occasion to accidental deaths of innocent civilians. Therefore, it is critical to understand whether or not there is a relationship between that cultural knowledge and acceptance of acts of violence against non-combatants or civilians. In order to complete this study, we will use three separate survey instruments that will measure: 1) attitudes toward people in the Middle East and Muslims in general; 2) a knowledge of the Middle Eastern culture, and 3) justification of acts of violence toward civilians. Two of the survey tools will be developed during the course of this research. The sample populations will be recruited during the Fall semester and the data will be analyzed after the data collection.

Exploring the Relationship Between Family History of Criminality and Serial Murder

Kelsey Soares, Department of Psychology (Psychology and Criminal Justice)
(Dr. Elizabeth Gurian)

For my research project, I plan to study four different serial killers to see if there is a relationship between the parents' past criminal history and the child becoming a serial killer. I do not anticipate any problems finding information on these four serial killers, as they have killed more than 30 people and furthermore, they are extremely famous. Although, this project will explore the "Nature versus Nurture" theory, I had noticed at the onset of this project that there were zero articles in the Criminal Justice database on this connection. Currently, it is not clear why a person becomes a serial killer. Most of our ideas and checklists are theories, however we believe that this project may help others get one step closer to finding a connection.

Peter Bohlin: Building with Nature

Kevin Svarczkopf, School of Architecture + Art
(Prof. Cara Armstrong)

In the modern era of architecture, many architects have not shown full awareness of the sites in which they designed. Instead, their buildings seem isolated from the surrounding environment. This results in architecture around the world appearing out of place, as if the sites are rejecting it. In remedying this problem, this study analyzed the work of architect Peter Bohlin, whose designs have started the discussion of the importance of the site in architecture. In Bohlin's designs, he incorporates modern architecture that both resonates with the site and adds beauty and serenity to it. In this research, two of his buildings were analyzed, looking at how he uses natural light, form, building organization, material, and viewpoints to create a unity between the natural space and the built space. In addition, his proposed design for the visitor's center at the Westcott House Foundation was also examined to get a glimpse of his process of design. By conducting this research, it is hoped that more discussion will occur about how architects of the future can build architecture that unites

Left: Afghan man offering tea (top, Maqbool, R., 2015); gate entry in Baquba (middle, Rhode, D., 2013); children forming opinions (bottom, Glaser, J. 2013). (Shahidy)

with the land that surrounds it, whether built or natural.

A Comparison of Pulse Oximetry and Near Infrared Spectroscopy to Detect Hypoxia in Pilots

Kevin Taylor, David Crawford School of Engineering (Mechanical Engineering)
(Dr. Brian Bradke)

In 2010, Captain Jeff Haney's F-22 Raptor's oxygen system malfunctioned, causing him to lose control of the aircraft and crash. If Captain Haney had known that his blood oxygen levels were dropping, he may have been able to take steps to save the aircraft. It could prove invaluable to have a blood oxygen sensor integrated into a pilot's headset that would monitor blood oxygen levels, non-invasively. This study aims to verify a location on the head to place the blood oxygen sensor. Three sites on the head will be examined: the forehead, the earlobe, and behind the ear. Results from these three sites will be compared to the results of a fingertip pulse oximeter, which is a medically accepted mechanism for the measurement of blood oxygen levels. If the results can be verified, it will be possible to integrate such a sensor into a pilot's headset.

Expected Revenue from Small-Scale Hemp Production in Vermont

Bethany Towne, Department of History & Political Science
(Dr. Jeremy Hansen)

For farmers in Vermont who are searching for a new way to use their land, hemp could be a promising choice. Although it is currently legal to grow hemp in Vermont, it is illegal at the federal level. The reason being that it is closely related to marijuana, as both plants are of the genus *Cannabis*. Hemp is non-psychotropic and used for agricultural and industrial installments, including food and fiber. In the 2014 Farm Bill, an exception was made that gives some room for the exploration of hemp as an agricultural commodity. Hemp can now be grown for use in research through an institution of higher learning. Some states have taken swift action on the opportunity, while others have been hesitant to do so. Industry research that could be applied to potential gains for farmers in Vermont is scarce and inconclusive. Using information from other institutions, as well as an in depth look into consumer habits in Vermont, this study plans to provide an estimate to Vermont farmers of their potential gains or losses if they choose to invest in growing hemp.

A Therapeutic Environment: Designing Architecture to Heal

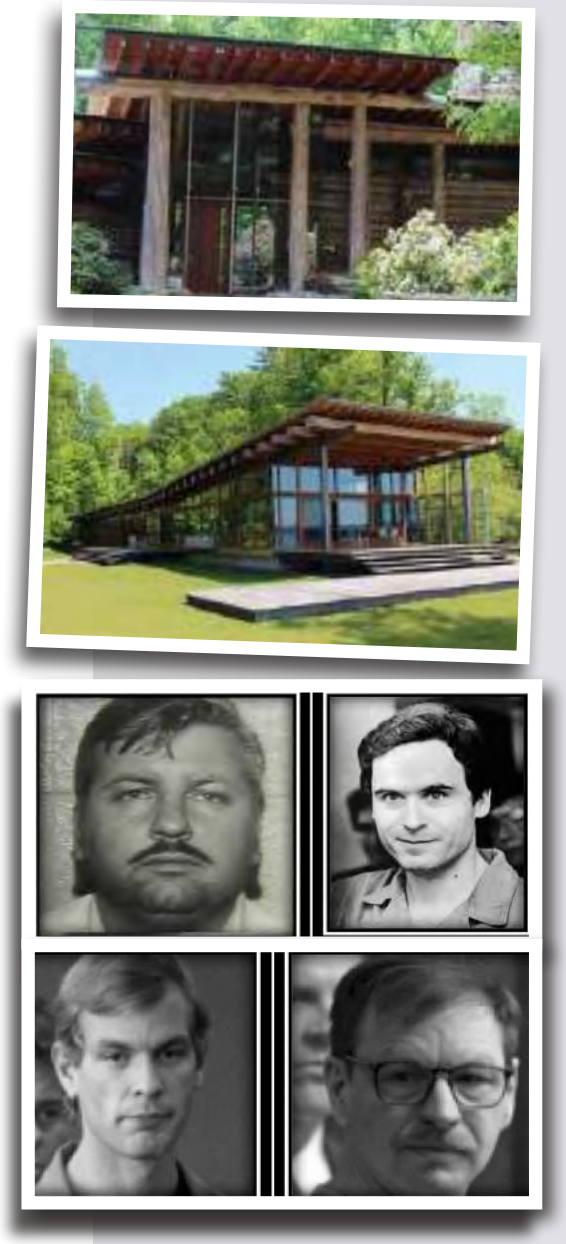
Olivia Towne, School of Architecture + Art
(Prof. Cara Armstrong)

By studying various hospitals in different conditions around the United Kingdom, I intend to research design qualities that create a healing environment and promote a positive attitude, leading to a physical progression in health. I want to discover how healing can be promoted through architecture by means of space, structure, aesthetics, and material. By looking closely at these health facilities, I will determine which of the design decisions contribute to the body, mind and/or spirit. Based on which buildings do this successfully, I will determine what is essential for healing architecture. After collecting and studying these strategies, I will apply them to older healthcare facilities, or facilities located in an underserved area, in order to demonstrate how hospitals could be improved. There is an amazing opportunity for architects to change the environment that all humans live in since, whether they physically enable a sick child to be more comfortable through air, light, or heating and cooling, or lift the spirits of a suffering family through the use of material, space, light and color will be a contribution and a milestone in helping those in need and bettering the community.

Investigating a Voice Command Device for Hypertext Fiction

Mickenzie C. Walbridge, Department of Computer Sciences & Information Assurance
(Dr. Jeremy Hansen)

Humans have always had an imagination for the "what if" stories in life. We have told stories verbally for thousands of years and now many of these stories have become audio books that allow people to hear these stories without being able to see the words. What if we could create an interactive audio book that only used your voice with the help of a smart device? This research project will investigate the feasibility of delivering hypertext fiction through a voice command smart device. I hope this research will improve the quality of life for those who are visually impaired, and can expand the ability of storytellers to enrich the imagination. Interactive hypertext fiction on voice command devices will become the new medium to connect with "readers" in the home.



Top: Bohlin's Ledge House, Catoctin Mountains (top) and Combs Point Residence, Finger Lakes (bottom). (Svarczkopf)

Bottom: Criminality and serial murder: Gacy (top left), Bundy (top right), Dahmer (lower left) and Ridgeway (lower right). (Soares)

Independent Study Leaves 2015-16

Independent Study Leaves constitute the University's sabbatical program, with awards based on scholarly proposals for projects intended to enhance the professional effectiveness of faculty through study, research, writing, travel related to professional development, and/or practical experience in the faculty member's field.

Najiba Benabess

The Effects of Increased Female Labor Force Participation in Three Diverse Economies

Women make up about half of the labor force, yet there has been little research about the nature of their work or its importance to society and the economy. Dr. Benabess' paper investigates the notion that feminization U hypothesis holds in the USA, Spain and Morocco. Dr. Benabess' interest in these countries was aroused because of apparent differences in the role of women in the countries' economic development. Spain is one of the countries with the largest social inequalities in Europe. Morocco's multiculturalism seems to be reflected in women's conditions and lifestyle. Moroccan women, backed by the policies of King Mohammed VI, appear to enjoy more rights and freedom now than a few years ago. Women are significantly more visible today in the workplace and in politics, as well as in entrepreneurial activities and the associative sector. The trends of female labor force participation in Spain and Morocco are expected to be different from those in the United States. She posits that increasing the role of women in the economy is part of the solution to the financial and economic crises, and is critical for economic resilience and growth.

Rowly Brucken

Explaining Divergent Development Trajectories: A Comparison of Nation-Building in Post-Independence Botswana and Rhodesia/Zimbabwe

For his ISL, Dr. Brucken completed the first chapter of his next book, tentatively titled, *Tangled Threads: American Human Rights Policy, 1776 to 1990*. The work builds on a Dana Fellowship that identified four themes of American human rights policy: protect American sovereignty, limit human rights to civil and political guarantees, enforce at the state level primarily, and seek to spread these rights around the globe. The chapter on the American Revolution applies these four themes to the political struggle to justify separation from Great Britain and to mobilize the population for war and sacrifice. These themes derive from Enlightenment thought as filtered through revolutionaries living across the Atlantic who were determined to create a republic, a form of government new to the era. He will use this first chapter to draft a proposal for a book contract with Northern Illinois University Press.

Patricia Ferreira

Irish Merchant Princess and Abolitionist: The Story of Isabel Jennings

Professor Ferreira completed a 10,000-word independent article, titled *Leaving Frederick Douglass's Arm: Isabel Jennings on Her Own*, and submitted it for publication consideration to Nineteenth Century Literature. Prof. Ferreira fully researched the context for the material artifacts she has acquired relating to Jennings's life. She also drafted a book proposal for a feminist biography of her subject for Cork University Press and met with the Director while in Ireland. She has nearly completed drafting a book-length manuscript which, once accepted for publication, will serve as the culmination of her work on Jennings. While very proud of her accomplishments during her ISL, Professor Ferreira is most gratified by what she has learned in the process: how the industrialism of the 19th-century was centrally linked to the social reform of the era; how women's philanthropic work in the early part of the century was an important stepping stone to their demands for equal rights, including the right to vote, in the later part of the century and the beginning of the next; how Irish women were an integral part of the anti-slavery campaign and the way Jennings distinguished herself as a leader.

Jason Jagemann

Assessing Public Opinion for the U.S. Supreme Court and its Opinions through Social Media

Professor Jagemann explored the extent to which social media was used to express public sentiment about the U.S. Supreme Court and the cases it decided between 2010-2014. Which Supreme Court decisions get the most social media attention? To what extent are micro-blogging on Twitter and internet searches via Google Trends (and the like) valid indicators of public opinion and sentiment about the U.S. Supreme Court and its decisions? After exploring the literature in the field on methodological issues using social media as sources of data and developing a number of data collection coding schemes, he devised a framework and then mined publically available opinions voiced on Twitter and through Google Trends. He now has a treasure trove of data to help package together a journal length paper, as well as seeds for a book length manuscript on social media, public opinion, and assessments of U.S. national political institutions.

Gerard LaVarnway

Comparison of Predictive Modelling Techniques for Predicting Academic Success: MARS (Multivariate Adaptive Regression Splines), Random Forest and TreeNet vs. CART (Classification and Regression Trees)

Professor LaVarnway developed materials using examples from cryptology to motivate topics in linear algebra, using the Hill Cipher as the primary example. He also included an example that implements a stream cipher and cryptanalysis of a linear feedback shift register (LFSR). This work will be submitted to the Mathematics Teacher, a publication of the National Council of Teachers of Mathematics (NCTM) and has been added to the talks he gives as part of the Expanding Horizons project that supports mathematics education in the State of Vermont. Professor LaVarnway has also developed relationships with the Air Force Research Lab's Information Directorate (RI) in Rome, NY garnering an invitation from Dr. Andrew Norga, Director of the Information Institute, for Norwich University to enter into a formal agreement and become a member of the RI Information Institute.

Robert McKay

The Rhetoric of Mill's Subjection of Women *and* The Rhetoric of Mill's On Liberty

Professor McKay wrote a paper explaining *The Rhetoric of [John Stuart] Mill's Subjection of Women*. The paper shows in detail how Mill used the resources of classical rhetoric (appeal to reason, emotion and character, effective arrangement, the "topics" of argumentation, the use of enthymeme and example, and the shaping of style through sentence structure, prose rhythm, and figures of speech and thought). Mill's result was a uniquely forceful and persuasive "address" to the general public, arguing for gender equality in the teeth of nearly universal prejudice and opposition. When revised, the paper will be submitted to the journal *Philosophy and Rhetoric*. During the summer he wrote a conference paper, T*he Apostle Paul's Areopagitical Address and its Philosophical Affiliations*, which he read at the Northern New England Philosophical Association conference at Keene State in October.

Dan McQuillen

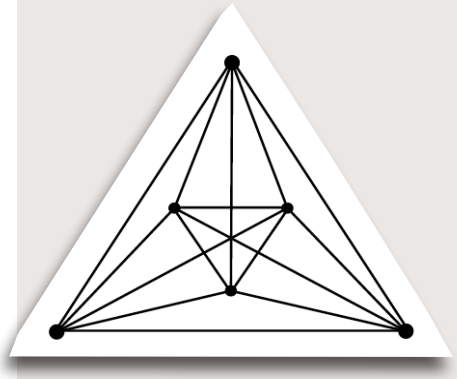
Crossing Numbers of Complete Graphs

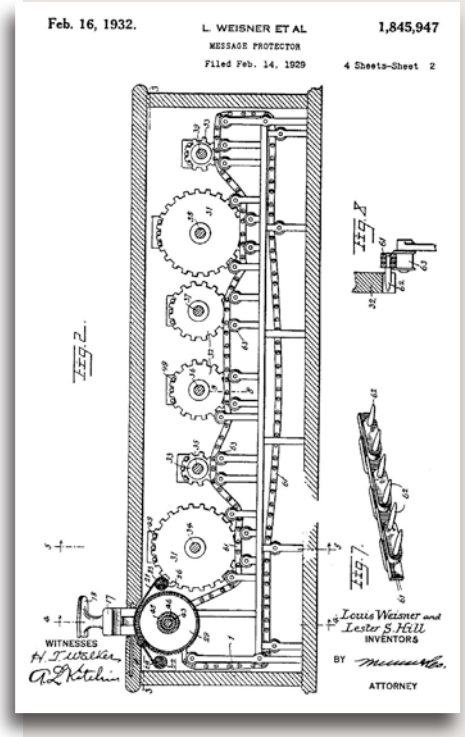
The paper, *Drawings of K_n with the same rotation scheme are the same up to triangle-flips (Gioan's Theorem)*, was submitted to The Australasian Journal of Combinatorics. Much of the groundwork for (tentatively titled) *Convex Drawings of the Complete Graph,* is a major effort that introduces a new classification system for all topological drawings of the complete graph. This new classification system builds on key observations discovered in *On the crossing number of K_n without computer assistance*. An additional paper, *Run For Third! A Defense of Aggressive Base Running* was finished during the ISL. The editor of Math Horizons requested that revisions be completed by the end of January, so that the paper could appear in April to coincide with the start of Major League Baseball season. He also presented this material to the HI 260 class. And finally, *A truly Beautiful Theorem Demonstrating the Magnificence of the Fundamental Theorem of Calculus,* was revised and published in the Journal of Humanistic Mathematics.

Adam Sevi

Particle Image Velocimetry (PIV) Analysis of Cyclical Triaxial Testing of Railroad Ballast

During his ISL, several of Professor Sevi's colleagues at the University of Vermont, as well as students from Norwich University, were completing testing on a project for the Vermont Agency of Transportation regarding pervious concrete durability. The project had been conducted over the course of three years. The group elected to make Professor Sevi the lead for regressing the data, analyzing the results, drawing conclusions and reporting on the project. As a result of this project, two publications were produced: one for the American Concrete Institutes' *ACI Materials Journal*, titled *Freeze-thaw Durability of Pervious Concrete with Salt Exposure* and the other, a report for the Vermont Agency of Transportation.





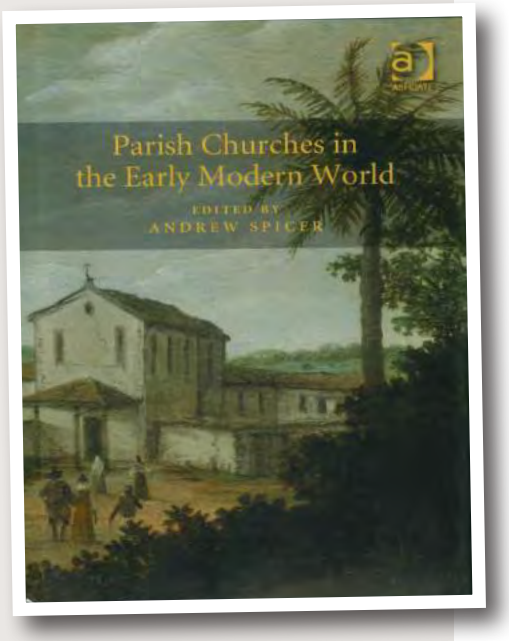
Left: Prof. Ferriera with Mary McGrath, lifetime worker in Jennings Soda Water Manufactory (top) and a chapbook of poetry donated by the Cork Ladies Anti-Slavery Society to Boston's Annual Anti-Slavery Bazaar (bottom). (Ferriera)

Above: The only drawing of the complete graph with 6 vertices that has at least 6 pairs of crossing edges. (McQuillan)

Bottom: Hill Cipher from 1932 (http://www.cs.jhu.edu/~cgarman/Cryptography.html). (LaVarnway)

Charles A. Dana I Grant Recipients

Awarded to faculty who have a superior record in scholarship, teaching, and university service.



Natalia Blank

Dr. Blank's education began with a Bachelor's in Chemistry from Nizhegorod State University, Russia before completing her PhD in Organic/Organometallic Chemistry at Dartmouth College. She joined Norwich University in the fall of 2005, and was granted tenure and promoted to the rank of Associate Professor in 2011. She has kept up a vigorous research agenda, securing $235,000 in external grants, including multi-year Vermont Genetics Network funding from 2007-2011. Dr. Blank's research has included undergraduate researchers who have presented at the National Conference on Undergraduate Research (2011, 2012) and have published in the Journal of Undergraduate Chemical Research (2013, 2016). She received the Homer Dodge Award for Excellence in Teaching in 2011. She was the founding Director of the Honors Program, has headed the College of Science and Mathematics Curriculum Committee for several years, and has served on the University Curriculum and the General Education Committees. She began serving as chair of her department in 2015, and most recently was appointed Associate Vice President for Academic Affairs (2017).

Danner Friend

After earning his PhD in Aerospace Engineering from Texas A&M University and working in private industry, Dr. Friend joined the Norwich faculty in 2003 and is currently an Associate Professor of Mechanical Engineering. He has taught broadly across the Mechanical Engineering curriculum, and has been very active as a mentor in the Norwich Undergraduate Research fellowship program, leading to his receipt of an Excellence in Mentoring Award. Dr. Friend is the lead on two grants – Vermont Space Grant and NASA EPSCoR – and advises the ASME and Tau Beta Pi student chapters. Through his research and curriculum development efforts in the area of creativity and innovation in engineering education, he has created a new course on Innovative Engineering, and is in the process of implementing creativity and innovation throughout the curriculum. His work led to a paper (in review) titled *Fostering Professional Practice Skills in a Redesigned Materials Science Course for Engineering Students.*

Emily Fisher Gray

Dr. Gray arrived at Norwich in 2007 and holds a PhD in History from the University of Pennsylvania. She has served as director of the History program since 2013 and has served on the Faculty Senate since 2011. Prof. Gray started the Athena Society chapter at Norwich, and organized and launched the Faculty Teaching Roundtables. She has also been instrumental in organizing the Norwich Passover Seder and hosting the Faculty Platoon for the Dog River Run. Dr. Gray has taught both introductory and advanced courses such as Historical Research Methods, a seminar on the Thirty Years War, and a Senior Seminar on Popular Culture in Early Modern Europe. She recently developed a freshman seminar for incoming History, Political Science, and Studies in War and Peace majors focused on the development of democracy in ancient Athens and on the 20th-century partition of India. Dr. Gray was awarded the Homer L. Dodge Award for Excellence in Teaching in 2015. She has published a number of essays on early modern Germany and religious architecture in edited collections. She is currently working on a book manuscript on Augsburg's Lutheran Holy Cross community over two hundred years of the "long Reformation," focusing on the seizure, destruction and reconstruction of their church building.

Lynne Kiernan

Prof. Kiernan earned a Doctor of Nursing Practice from Chatham University in 2016. She began teaching at Norwich in 2004 as an adjunct nursing faculty until 2012 when she became an Assistant Professor of Nursing. She has taught a wide array of courses, from beginning to advanced, and has served as course coordinator for a variety of courses and as clinical faculty. Using her 30 years of experience as a practicing nurse, combined with her knowledge of current best pedagogical practices, she provides realistic scenarios in the clinical and simulations laboratories to prepare her students for working in complex healthcare environments. She has also combined her interest in developing innovative pedagogical approaches with her scholarship to develop a remediation program for students whose skills were not sufficient for advancing in the nursing program. Prof. Kiernan has served on the School of Nursing and the College of Professional Schools Curriculum Committees, and has made substantial contributions to the School of Nursing's recent and successful accreditation report. She has served as a preceptor and mentor for a number of Master's students from Norwich University and Sacred Heart University, served as Interim Director of the School of Nursing, and been the Norwich University representative in the Vermont State Board of Nursing Education Committee.

Rob Knapik

Dr. Knapik earned a PhD in Physics from Colorado State University and served as a Postdoctoral Fellow at the University of Pennsylvania before joining the faculty at Norwich in the fall of 2011, first as a lecturer for one year, and then as an Assistant Professor of Physics. In addition to teaching a wide variety of courses, he has served on committees such as the Dean Search Committee, the College of Science and Mathematic's curriculum committee, the University Calendar Committee and the Faculty Development Committee. One focus of his research has been SNO+, a collaboration of about 100 people from 20 different universities working together on a multipurpose neutrino detector located two kilometers underground in a nickel mine near Sudbury, Ontario. He coordinates the work of a small group of six people as the "Data Cleaning" analysis task group leader. Additionally, he is responsible for making measurements in the lab at Norwich that will help optimize the light yield for a future upgrade to SNO+ that will increase the sensitivity by almost a full order of magnitude. Since 2011, he has published several articles in the journals *Advances in High Energy Physics* and *Nuclear Instruments and Methods in Physics Research* with some of his collaborators, and was awarded a Curriculum Development Fellowship for his project, "Integrating Faculty Mentored Research in the Physics Major Curriculum at Norwich."

Yangmo Ku

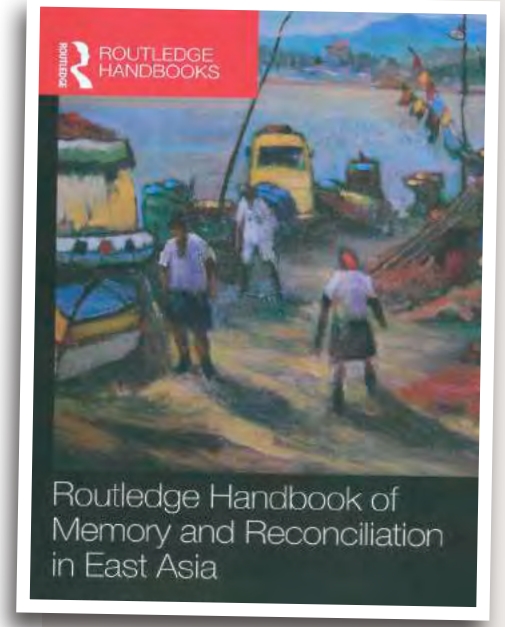
Dr. Ku earned a PhD in political science from George Washington and worked as an Assistant Professor in the School of International Service at American University for two years before joining Norwich in 2012 as an Assistant Professor of Political Science. Since 2012 he has published a number of articles in journals such as East Asian Studies and Pacific Focus, as well as a book chapter on the comfort women controversy. He has a book under contract with Routledge regarding politics in North and South Korea, and is working on another manuscript about the politics of memory and reconciliation in East Asia and Europe. In addition to national and international conference presentations, Dr. Ku has been invited to give talks at Seoul National University and the Korean Institute for National Unification. He has also served as a commentator on various Korean and Japanese radio and television programs. At Norwich, he has served as the Director of the International Studies Program, developed a new Asian Studies minor, served as the faculty advisor for Model UN, and attended the annual Harvard National Model UN conference with Norwich delegates. Dr. Ku has also served as a facilitator to establish an Army ROTC exchange between Norwich University and Korea University in Seoul.

Emily Meyer

Following early degrees in family studies and family & child ecology, Dr. Meyer earned her PhD in Media & Information Studies from Michigan State University. She started her teaching career as a graduate assistant at Michigan State before becoming an adjunct faculty at the University of New Haven in Connecticut. She joined Norwich in 2014 and is currently an Assistant Professor of Criminal Justice. She continues to work tirelessly as an advocate for victims of abuse through her role as faculty advisor for Community Against Sexual Assault (CASA), Executive Counselor for the Victimology Section of the Academy of Criminal Justice, College of Liberal Arts' representative on the Sexual Harassment/Assault and Response & Prevention (SHARP) Committee, and Board Member of Circle of Washington County (the intimate partner violence program of Washington County, Vermont). In addition to her teaching responsibilities, Dr. Meyer is currently researching violence against women with a focus on intimate partner violence, for which she has received an internal research grant.

Judith Stallings-Ward

Dr. Stallings-Ward earned Bachelor's degrees in Journalism and in Spanish, and Master's degrees in Spanish and in Spanish Literature, before earning her doctorate from Yale's Department of Spanish and Portuguese. Before joining the faculty of Norwich University in 1993, she worked as a Peace Corps volunteer in Colombia, as a translator in China, and as an instructor at Dartmouth College and Yale University. Currently, she is the Spanish Program Director, as well as the College of Library Arts Colloquia Coordinator. Since her arrival, Professor Stallings-Ward has taught an array of Spanish courses from an introductory to advanced level, including Spanish language courses and various courses focused on Latin American and Spanish culture, film, and literature. She also maintains an active scholarly agenda, publishing articles in the *Bulletin of Spanish Studies, International Journal on the Image*, and *Comparative Literature Studies*, as well as essays on Diego and Cervantes in several edited collections. She has presented her work at many national and international conferences and her current project is a manuscript about Diego's Fable of X, Y, Z.



Research Explores how to Help Wounded Warriors Recover in Mind and Body

BY SEAN MARKEY, PHOTOS BY MARK COLLIER

It's a Friday lunch hour, and seven Army veterans filter into a second floor gym at a Vermont National Guard armory on the Norwich campus. Many of the men and women have served tours in Iraq and Afghanistan, and all have been wounded or injured while on duty.

Athletic trainer Carrie Beth Pine, a 36-year-old Army veteran and mother of two, writes the day's workout in black magic marker on a mirrored wall. As her smartphone pumps out a 30-year pop playlist on portable speakers, the wounded warriors chat and ease into Pine's workout.

As the hour progresses, Pine—a Norwich triple major—offers encouragement over kettle ball squats and inverted rows. "Is that an extra [rep]? Are you doing something extra?" she says, keeping a sharp eye on her charges.

A middle-age Army vet, whose name is withheld for privacy, pulls up during a Hungarian lunge, remarking that his knee is sore. After 20 years of active duty, including tours in Iraq and Afghanistan, he is 50 days from retirement. "How about we do front raises instead?" Pine says, suggesting he switch to a weight-lifting arm exercise. "That way you're not aggravating the [heck] out of your knee."

If not for the Army t-shirts and tight haircuts, the workout could resemble any lunch-time corporate wellness program. But there's some serious science behind the sweat.

The wounded vets are participating in a study called the Collegiate Warrior Athlete Initiative. The protocol is designed to learn whether a "buddy system" that partners college athletes with wounded warriors can effectively engage veterans to improve their physical and mental health and help them reintegrate into civilian life.

Today's group, the third and final cohort of the year-long study at Norwich, is one month into their 12-week program. The volunteer subjects have signed up for 150 minutes of exercise per week, Fitbit activity tracking, and weekly TED-talk-style lectures to spark their minds. Topics range from nutrition and meditation to plate tectonics and love poetry.

NU researchers are also recording benchmark physical and mental health indicators at the one, six, and twelve-week mark. These include BMI (body mass index); a self-report RAND sleep survey; and the 21-question Beck Depression Inventory to assess mood.

Norwich School of Nursing Director Paulette Thabault, DNP, APRN-BC, FAANP, is leading the study with help from nursing faculty colleagues Llynne Kiernan, PhD, RN-BC, and Lorraine Pitcher, PhD, RN. Their work is part of a broader study developed for Boston College by retired Army Col. Susan Sheehy, PhD, RN, and led by principal investigator Ann Burgess.

"We have a lot of military, who come back from deployments… with a variety of injuries," Thabault says, speaking in her basement office in the NU Bartoletto science complex. "Historically, there have been some challenges around reintegrating them into society."

For many veterans, those challenges extend beyond physical injuries. Thabault says many experience post-traumatic stress, sleep disorders, anxiety, and difficulty reestablishing their relationships.

The Wounded Warrior Project, a national nonprofit founded in 2003 to help injured servicemen and women, estimates that more than 54,000 U.S. service members have been severely wounded in conflicts since 9/11.

An additional 300,000 service members have suffered traumatic brain injuries during that period, while 400,000 experience some form of post-traumatic stress disorder.

The nonprofit awarded a $250,000 research grant to support the Collegiate Warrior Athlete Initiative study, which Boston College investigators invited Norwich to join.

A large and growing body of research continues to highlight the link between exercise and improved physical and mental health. Part of the work of the wounded warrior study at Norwich and Boston College explores needs matching.

"We have warriors all over the country," Thabault explains. "We have universities and colleges all over the country" with workout facilities and potential volunteer pool of student athletes.

"If this could be a national model, it would be just a great opportunity for us to really address our warriors." That is the vision of the study's principal investigator Ann Burgess.

Kiernan, an assistant professor at the Norwich School of Nursing, says she and her study colleagues are looking to foster engagement. "We're trying to get the warriors engaged in a weekly workout routine. With that, we're hoping that improves their mood and maybe other aspects of their life."

Early signs suggest the program has already helped many participants. Thabault says warriors set personal goals at the beginning of the program, and many have achieved them. "That's been really important," Thabault says.

One warrior in the Boston College program, for example, had trouble with his back. "His individual goal was to be able to lift up his small child," Thabault says, adding that by the end of the twelve-week program, he could.

While Norwich researchers have enlisted two to three NU students as volunteers for each study cohort, there haven't been enough for a true 1:1 "buddy system." So they modified the protocol to create a group circuit workout model. The change appears successful, with vets working out as often as five times a week.

Back in the Vermont National Guard armory gym, the wounded warriors gather to share a few thoughts at the end of their Friday workout. "It's easier with the group motivation," says one female Army captain. "Otherwise, I'd be like [stuff] it."

"I have less aches and pains than when I started," says the male vet with the sore knee. He adds that some lecture topics didn't sync with him, meditation in particular. But a middle-aged Army colleague disagrees. He says he's already applied some of the meditation tools discussed to improve his sleep.

The warriors also talk about the general wear and tear that active duty in a war zone imposes on a human body. Performing as many as two to three daily missions "outside the wire" of their base, soldiers carry 120 pounds of body armor and rucksack gear.

Then there are the countless hours spent slamming over war-torn, third world roads in military vehicles with rough suspension.

"Without looking at the specific data results, we have noted that our warrior athletes are able to recover from some of the wear and tear of the battlefield," says retired Air National Guard Lt. Col. Kim Swasey, who was forced to end a 26-year-military career after breaking her neck.

Swasey participated in the first cohort of the Collegiate Athlete Warrior Initiative at Norwich last summer and has since stayed on as a workout buddy and research assistant. Swasey says the program helped her recovery. "[It] put [me] back on a path toward physical and mental fitness," she says.

Norwich and Boston College researchers gave a podium presentation on their research and findings at the April 2017 Eastern Nursing Research Society Conference in Philadelphia.

New Faculty Biographies

ADDIE ARMSTRONG
Assistant Professor of Mathematics

Area of Specialty:
Graph Theory, particularly graph colorings, graph labeling, and graph Ramsey theory

Dissertation Title:
Degree-Limited Defective Three Colorings of Planar Graphs Containing No 4-Cycles or 5-Cycles

Degrees:
Ph.D. Mathematics, May 2016, University of Rhode Island
M.S. Mathematics, May 2012, University of Rhode Island
B.S. Mathematics, Summa Cum Laude, May 2010, Norwich University

"Paying it forward! My ultimate goal for my career at Norwich is to pay forward all the excellent mentoring, challenging coursework, and fascinating research I experienced as a student here. I'm particularly excited about developing my research program to include undergraduates and about maintaining the strength of our math program to facilitate student challenge and growth."

DAVID FEINAUER
Assistant Professor of Electrical Engineering

Area of Specialty:
The integration of design process, and innovation and entrepreneurship (I&E) principles into engineering education; the role of design principles in extending the opportunities for engineering education to more inclusive groups at the post-secondary and P-12 levels.
Applications of control and systems theory; embedded systems applications

Dissertation Title:
Control Characteristics of an All-Digital Proportional-Integral-Derivative (PID) Compensator

Degrees:
Ph.D., Electrical Engineering, 2011, University of Kentucky
BS, Electrical Engineering; Minors: Mathematics, Computer Science, Summa Cum Laude, 2003, University of Kentucky

"I aspire to incorporate design and innovation principles into my craft as a teacher. I look forward to effecting change in our curriculum and to studying the effect of that change on student attitudes towards learning. I enjoy connecting students to contexts that help them find relevance and build resiliency."

BRIAN GLENNEY
Assistant Professor of Philosophy

Area of Specialty:
Early Modern, Philosophy of Psychology

Dissertation Title:
Molyneux's Question Answered

Degrees:
Ph.D. Philosophy, 2007, University of Southern California
M.Litt. Philosophy, 2000, University of St. Andrews/Stirling, Scotland
B.A. Philosophy, 1999, University of Washington

"I'm putting into practice my view that philosophy is more than a set of texts and scripted arguments, being a set of best practices for a meaningful and innovative life, a disposition to act and inquire with the open honesty and creative impulse of its past practitioners, who represent some of the best of humanity."

STEPHANIE MAASS
Assistant Professor of Criminal Justice

Area of Specialty:
Corrections

Dissertation Title:
Individual, Organizational, and Training Design Influences on Supervision Staff's Knowledge and Use of Evidence-Based Practices

Degrees:
Ph.D. Candidate in Criminology, Law & Society, Expected Spring, 2017, George Mason University
M.A. in Justice, Law, and Crime Policy, 2010, George Mason University
B.A. in Administration of Justice, Minor in Sociology, 2007, George Mason University

"I truly believe that individuals produce their greatest work when they are in an environment that is supportive, engaging, and stimulating. Norwich offers exactly this environment through competitive research funding awards, celebrations of faculty and student scholarship, faculty who are open to collaboration, and a general sense of productivity and achievement. I'm thrilled to hit the ground running and contribute to Norwich excellence!"

External Grant Funding During Academic Year 2015-16 (July 1, 2015 -June 30, 2016): $3,082,456

VERMONT GENETICS NETWORK
Coordinator, Bioinformatics Specialist, Stastistician, Grants Manager, Outreach, Administration, Proteomics and Microarray Project:
Amount: $512,860

PI: Cara Armstrong
Project: Creating Affordable Sustainable Architecture CASA802 Initiative
Grantor: TD Charitable Foundation
Amount: $40,000

PI: Matt Bovee
Project: The CyberCorps: Scholarship for Service program
Grantor: National Science Foundation
Amount: $1,424,958

PI: Matt Bovee
Project: GenCyber@NU Camp
Grantor: National Security Agency
Amount: $72,145

PI: David Clubb
Project: Study Abroad Ireland
Grantor: Institute of International Education
Amount: $7,500

PI: Steven Fitzhugh
Project: SmartGrid
Grantor: Vermont Transco
Amount: $32,761

PI: Danner Friend
Project: National Space Center – Student Mentored Research
Grantor: NASA
Amount: $50,000

PI: Jim Graves
Project: Norwich Internship Support
Grantor: Vermont Department of Labor
Amount: $12,000

PI: Jan Hansen
Project: Nurse Faculty Loan Program
Grantor: US Health Resources and Service Administration
Amount: $383,715

PI: Tabetha Hole
Project: Occulation Measurements of the Embedded Wind Shock Distribution in the Nearest Eclipsing O-star Binary
Grantor: Smithsonian Astrophysical Observatory
Amount: $5,699

PI: Tabetha Hole
Project: A Study of Colliding Winds in Short Period B Star Binaries
Grantor: Smithsonian Astrophysical Observatory
Amount: $11,157

PI: Sean Prentiss
Project: Poem Campus
Grantor: Vermont Humanities Council
Amount: $1,000

PI: Michael Puddicombe
Project: Interdisciplinary Environmental Entrepreneurship
Grantor: VentureWell
Amount: $26,500

PI: Jason Ridler
Project: Dreamers in Daylight: The Use of Unconventional Scholars in Strategy and Warfare, from T.R. Lawrence to Sarah Chayes
Grantor: Anonymous
Amount: $60,000

PI: Stewart Robertson
Project: Project Global Officer
Grantor: Department of Defense and Institute of International Education
Amount: $142,561

PI: Edwin Schmeckpeper
Project: Contextual Research - Empirical: A Direct Method for Teaching and Measuring Engineering Professional Skills
Grantor: National Science Foundation
Amount: $41,270

PI: Edwin Schmeckpeper
Project: Construction of the Wheel Pad Prototype
Grantor: WheelPad, LLC
Amount: $40,000

PI: George Springston
Project: Geologic and Slope Stability Mapping
Grantor: Vermont Department of Environmental Conservation
Amount: $65,818

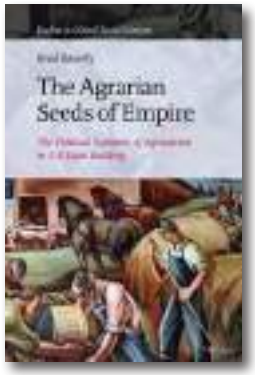
PI: Mark Stefani
Project: Assessing GABAergic Involvement in Schizophrenia-like Cognitive Deficits in Rats
Grantor: National Institutes of Health
Amount: $101,532

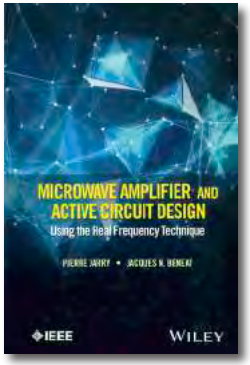
PI: Paulette Thabault
Project: College Warrior Athletic Initiative from Wounded Warrior Project to Boston College
Grantor: Boston College, MA
Amount: $12,288

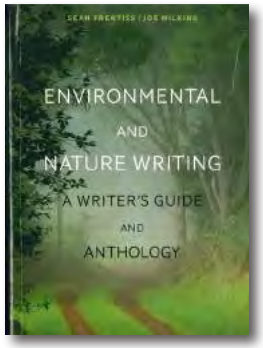
PI: Moses Tefe
Project: Collaborative Research: Training Next Generation Faculty and Students to Address Infrastructure Crisis
Grantor: National Science Foundation
Amount: $29,992

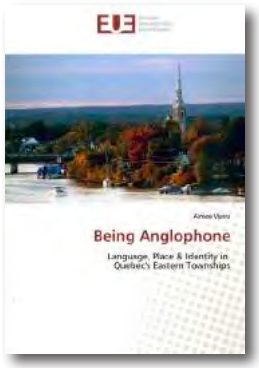
PI: David Westerman
Project: Incorporating Service Learning into the Curriculum
Grantor: Davis Foundation Vermont Campus Compact
Amount: $3,700

PI: Liz Wuorinen
Project: Exercise Intensity Effects on Protein Carbonylation and Antioxidant Status
Grantor: Vermont Genetics Network (National Institutes of Health)
Amount: $5,000









Faculty Publications

Books

Bauerly, B., 2016, *The Agrarian Seeds of Empire: The Political Economy of Agriculture in US State Building.* Brill.

Jarry, P. and **Beneat, J.,** 2016, *Microwave Amplifier and Active Circuit Design Using the Real Frequency Technique.* IEEE Wiley.

Prentiss, S. and Wilkins, J., 2016, *Environmental and Nature Writing: A Craft Guide and Anthology.* Bloomsbury Press.

Vieira, A., 2016, *Being Anglophone: Language, Place & Identity in Quebec's Eastern Townships.* Editions Universitaires Europeennes.

Book Chapters

Gray, E. F., 2016, "The Body of the Faithful: Joseph Furttenbach's 1649 Lutheran Church Plans" in Andrew Spicer, ed. *Parish Churches in the Early Modern World.* Farnham, Surrey: Ashgate Publishing, 103-118

Ku, Y., 2015, "Comfort Women Controversy and Its Implications for Japan-ROK Reconciliation." In Mikyoung Kim, ed., *Routledge Handbook of Memory and Reconciliation in East Asia.* Routledge.

Creative Works

Beckwith, J., 2015, *The Death of Rosie Callaghan.* Maribo Productions, Off Center for the Performing Arts, Burlington, VT 05669.

Beckwith, J., 2016, *Shot in Baghdad.* Chandler Music Hall, Issues Play Reading Series, Randolph, Vermont.

Beckwith, J., 2016, *Speaking of Dead Mice.* Boston Theater Marathon XVIII, Boston Playwrights Theater, Huntington Theatre Company, Boston, Massachusetts.

Beckwith, J., 2016, *The Late Rosie Callaghan* (Revised.). Cape Cod Community College Theater Arts Program, Play with Your Food Reading Series.

Beckwith, J., 2016, *The Offering.* International Conference on the Fantastic in the Arts, Orlando, Florida.

Cox, F.B., 2016, *They Got Louie.* See the Elephant, 2. http://www.metaphysicalcircus.com/category/free-short-fiction/

Prentiss, S., 2015, *Fragile World,* Artemis, XXII, 30.

Prentiss, S., 2015, *All the Varieties of Hunger,* Baltimore Review, 314-316.

Prentiss, S., 2016, *Destinations on a Map.* Artemis, XXIII, 47.

Prentiss, S., 2016, *There Is No Other World,* Pilgrimage, 39 (3), 108.

Prentiss, S., 2016, *Bones in Juarez. Winter Birth,* The Meadow, 55-56.

Prentiss, S., 2016, *1. Prologue 2. Interview with Sean Prentiss 3. Beard (Poem) 4. Heartwood (Poem) 5. A Morning Blessing (Poem).* Mud Season Review 2, 162-181.

Journal articles

Andringa, S., E. Arushanova, S. Asahi, Knapik, R. et al., 2016, *Current status and future prospects of the SNO+ Experiment.* Advances in High Energy Physics, DOI:10.1155/2016/6194250

Balcom, I.N., H. Driscoll, J. Vincent and M. Leduc, 2016, *Metagenomic analysis of an ecological wastewater treatment plant's microbial communities and their potential to metabolize pharmaceuticals.* F1000Research, 5, 1881.

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