

UNION

COLLEGE



ANNUAL REPORT OF EXTERNAL FUNDING

JULY 2016 | JUNE 2017

COLLEGE RELATIONS
OFFICE OF CORPORATE, GOVERNMENT
& FOUNDATION RELATIONS

Proposals and Awards: A Year in Review

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Proposals and Awards: A Year in Review

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NEW AWARDS

Chinese and Japanese Language Teaching Fellows

THE ALLEX FOUNDATION

PROJECT PERSONNEL:

Project Directors **Dr. Megan Ferry**, **Dr. Junko Ueno**, and **Dr. Zhen Zhang** (Modern Languages & Literatures)

ABSTRACT:

The ALLEX Foundation enables colleges and universities to begin or maintain a high quality Chinese or Japanese language program by providing them with professionally trained, native Chinese or Japanese instructors. Union College's Department of Modern Languages and Literatures will host the Chinese and Japanese language fellows, both having recently completed ALLEX's intensive summer training program emphasizing the teaching of Chinese and Japanese specifically to native-English speakers. This is a perspective rarely studied by language teachers trained in Asia, where most language students are from nearby Asian countries and have very different language backgrounds from students in the American university classroom. The fellows serve as a crucial participant in Union's Chinese and Japanese language programs, offering additional language practice for students, as well as sustaining the core values of the American Council on the Teaching of Foreign Languages (ACTFL) Standards by seamlessly linking the classroom with the community, especially the Chinese-speaking and Japanese-speaking communities on campus. The fellows will increase students' access to Chinese and Japanese cultural habits, products, and beliefs, as well as assist Union students in making connections across the various academic disciplines.

Conservation of Théodore Olivier's 1850's String Geometric Models

GREATER HUDSON HERITAGE NETWORK

PROJECT PERSONNEL:

Curator of Art Collections and Exhibitions **Julie Lohnes** (Mandeville Gallery)

ABSTRACT:

This GHHN Conservation Treatment grant, made possible with public funds from the New York State Council on the Arts, supports the conservation of a selection of Théodore Olivier's 1850's string geometric models housed in Union's Permanent Collection. The work will be done by conservator Christine Puza. Union's Permanent Collection holds the largest single group of Théodore Olivier's string models used for demonstrating the relationships and intersections of geometric shapes in space. The models were made in Paris in the 1830s for French mathematician Théodore Olivier (1793-1853), who devised them to represent the intersections of 3D objects in his teaching of descriptive geometry. They are the first models of this type that are adjustable. Several of the Olivier models from the collection will be displayed in the 2018 exhibition, *Probability and Uncertainty*, at the Mandeville Gallery.

Davis United World College Scholar

THE SHELBY M.C. DAVIS CHARITABLE FUND

PROJECT PERSONNEL:

Associate Dean/Director of International Admissions **Nicole Buenzli** and Senior Associate Dean **Susan Hanks** (Admissions)

ABSTRACT:

Union welcomes its newest Davis United World College (UWC) Scholar to campus for the 2017-18 academic year. The UWC Scholars are exceptional young people who have graduated from a UWC school and then matriculated at select U.S. colleges or universities. The UWC experience—which brings students from around the world to live and learn together in one of 16 locations on five continents—has challenged them academically and personally, expanded their horizons exponentially, and shown them how to build understanding from diversity. The UWC Scholars program objective is to advance international understanding through education. The program is built on two assumptions: 1) that promising future leaders from a broad range of cultures should be afforded greater educational opportunities and serve to accelerate global networking and 2) that these educational opportunities take place at leading U.S. colleges and universities, including Union College, in the belief that these American schools will become more effective learning communities for all students by becoming more internationally diverse and globally engaged.



Théodore Olivier, Surface of a Half Cylinder with Oblique Ends (black and white), ca. 1830-1845, fruitwood, brass, thread, lead weights, Union College Permanent Collection, 1868.12 UCPC.

NEW AWARDS

Continued

Development of Aerogel-based Window Systems

NEW YORK STATE ENERGY AND RESEARCH DEVELOPMENT AUTHORITY

PROJECT PERSONNEL:

Principal Investigators **Dr. Ann Anderson** (Mechanical Engineering and Sunthru, LLC), **Dr. Mary Carroll** (Chemistry and Sunthru, LLC); Co-PI **Dr. Bradford Bruno** (Mechanical Engineering)

ABSTRACT:

Sunthru, LLC is developing high performance, aerogel-based windows for use in commercial and residential buildings. The use of highly insulating window products has the potential to significantly reduce the energy costs associated with heating, cooling, and indoor lighting. Aerogels are light-weight, highly insulating, highly translucent materials that are made using sol-gel methods. Union's faculty researchers have successfully manufactured aerogel monoliths with excellent insulating properties and excellent visible light transmission. Sunthru, LLC will work with Union researchers to develop methods to scale up the size of the aerogel monolith using a larger hot press at Automated Dynamics to make realistic aerogel window prototypes. The overall goal of this work is to measure pressure and temperature conditions during rapid supercritical extraction (RSCE) processing which will allow Sunthru to scale up to manufacture larger aerogel monoliths.

Diffusion in Iron-Nickel Alloys and Sulfides: Constraints on Segregation and Crystallization of Early Planetary Cores

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Heather Watson** (Physics & Astronomy)

ABSTRACT:

The segregation of a planet into a mantle and core is one of the most important and fundamental global processes, and can contribute to planet-wide attributes such as developing and sustaining a magnetic field which is a criterion for habitability. Iron meteorites are considered to be remnant cores of early proto-planets. Our picture of the earliest days of the Solar System depends crucially on accurate and precise dating of these objects that have survived since the beginning. This project aims to place important constraints on the information received from measuring radiometric ages of meteorites. In particular, researchers aim to constrain both the temperature and time at which the radiometric age signatures were emplaced by conducting experiments on meteoritic materials at the high temperatures and pressures characteristic of early planet formation. The experimental results will be used in conjunction with measured ages of meteorites to constrain models of the thermal histories of iron meteorite parent bodies.



High school girls participate in the EDGE program.

Educating Girls for Engineering

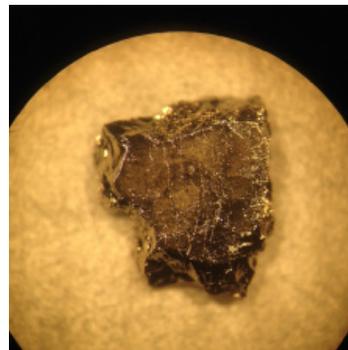
GENERAL ELECTRIC
GLOBALFOUNDRIES
THE FOUNDATION FOR ENGINEERING EDUCATION

PROJECT PERSONNEL:

Project Director **Dr. Cherrice Traver** (Electrical, Computer & Biomedical Engineering)

ABSTRACT:

EDGE is a pre-college educational enrichment program designed to give participants academic learning experiences not available in the standard high school curriculum, as well as encourage humanistic approaches to group activities. The program's theme of "Toys and Tools for Disabled Children" focuses on developing technologies to enhance the learning activities and communication skills of children with special needs. Through intensive course modules and team projects, the program aims to instill in participants a compassionate, civic-minded approach to addressing societal issues. The EDGE program balances classroom lectures, educational modules, and laboratory experiences with field trips, team projects, and formal presentations. Participants will develop the theoretical and technical knowledge to not only build tools and toys for the disabled, but also to make educated, informed decisions about their career paths.



Microscope view of a sample of FeS, a common material found in iron meteorites. This sample will be used for high temperature experiments of mobility of Lead (Pb), which is a product of radioactive decay of Uranium and used to measure the ages of iron meteorites. Image courtesy of Dr. Heather Watson.

NEW AWARDS

Continued

Engineering Ambassadors Network

GENERAL ELECTRIC

PROJECT PERSONNEL:

Project Director **Dr. Shane Cotter** (Electrical, Computer & Biomedical Engineering)

ABSTRACT:

Union College students involved in the Engineering Ambassadors Network (EAN) participate in outreach events designed to engage middle and high school students. EAN is a collaboration of engineering students from across universities who are dedicated to changing the conversation and perceptions middle and high school students have about engineering. The EAN originated at Penn State University, and a grant from the National Science Foundation supports international workshops designed to enable students to enhance EAN programs at each institution. EAN serves the need for strong future leaders in engineering and supports a diverse future generation of engineers.

Enhancing Undergraduate Research Experiences through Extragalactic Radio Astronomy

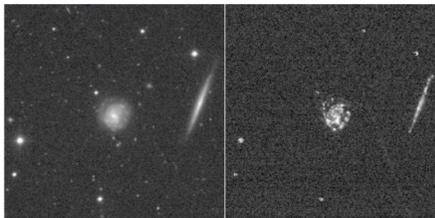
THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

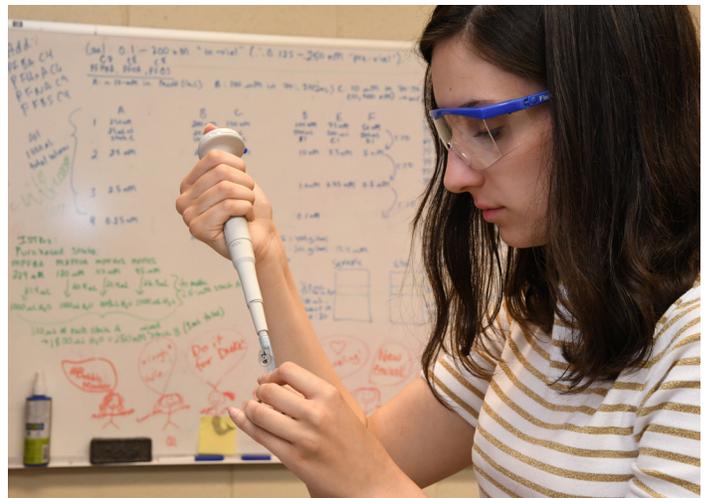
Principal Investigator **Dr. Rebecca Koopmann** (Physics & Astronomy)

ABSTRACT:

The highly successful Undergraduate ALFALFA Team (UAT) has provided research-based educational opportunities for 253 students closely collaborating with 25 Astronomy faculty from a diverse range of institutions across the country to carry out several related scientific programs that involve a radio survey of hydrogen in and around nearby galaxies. Undergraduates are involved in all aspects of the scientific program, including planning and carrying out the observations. They will attend an annual workshop at Green Bank Observatory, Arecibo Observatory, or Kitt Peak National Observatory. This program serves as a prime example of the value of scientific collaboration, particularly for faculty and students at isolated schools, and of the importance of research as a component of undergraduate education. This exposure to front-line astronomical research enhances the educational infrastructure and the quality of Science, Technology, Engineering, and Math (STEM) at a large number of schools. The program has an even wider impact through the curriculum and outreach materials they produce and share, and through broadening the participation of groups underrepresented in STEM.



Galaxy images captured at the Kitt Peak National Observatory, WIYN 0.9m telescope. Images courtesy of Dr. Rebecca Koopmann.



Anna Mahony '20 prepares contaminated soil extracts for the analysis of perfluorochemical by liquid chromatography-tandem mass spectrometry (LC-MS/MS). Photograph by Michael Farrell.

Groundwater Contamination in the Northeast: Improving STEM Education by Demonstrating How Science Matters

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Laura MacManus-Spencer** (Chemistry)

ABSTRACT:

In 2014, the chemical Perfluorooctanoic Acid (C8 or PFOA) was discovered in the public drinking water in the Village of Hoosick Falls, NY. As concern over this discovery grew, other communities began testing their water for PFOA. As of October 2016, PFOA has been discovered in unsafe concentrations in the groundwater of Eagle Bridge and Petersburg, NY, Merrimack, NH, and in Bennington, North Bennington, and Pownal, VT. In response, select science courses at Bennington College and Union College will be redesigned in conversation with this unfolding contamination event. In these courses, undergraduate students will be trained in chemistry, geology, and environmental studies and equipped to apply that training in the production of independent data on a disaster in real-time. The project will craft new curriculum and teaching modules aimed at incorporating local environmental problems into science curriculum, as well as new methods for assessing the educational impact of doing so. The educational data produced by this project promises to inform and improve existing science curriculum at Bennington and Union, as well as offer insights about what works in STEM education on a liberal arts campus more generally. This project will also produce key data on changing levels of PFOA in groundwater and regional soils that will provide a much-needed independent characterization of the contamination plume. This project, then, will showcase the civic value of an education in science for diverse undergraduate students and the local community.

NEW AWARDS

Continued

Hazards in the Caribbean: The history of magma chambers, eruptions, landslides, streams, and fumeroles in Dominica

KECK GEOLOGY CONSORTIUM
THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Holli Frey** (Geology)

ABSTRACT:

The Caribbean has been the site of significant historic volcanism, from the ongoing eruptions in Montserrat to the devastating eruptions of Mt. Pelee, Martinique (~32,000 fatalities), and Soufriere, St. Vincent in 1902 (~1,500 fatalities). However, the island with the most volcanic hazard risk is Dominica, which experienced the largest explosive eruption in the Caribbean in the last 200 kyr, features nine potentially active volcanic centers that are Pleistocene or younger in age, and had phreatic eruptions in the Valley of Desolation in 1880 and 1997. The rugged landscape of Dominica has also been shaped by its tropical climate and landslides, caused by storms like Tropical Storm Erika in 2015. Today, Dominica is known as the Nature Island of the Caribbean. There are numerous eco-tourism sites and the Waitukubuli National Trail, an island-wide 185 km hiking trail, was recently completed. The tourism sites feature active geothermal areas, with fumeroles and steam vents, as well as older lava flows and explosive deposits of pumice and ash. Recent shallow seismic swarms in northern and southern Dominica may be indicative of volcanic unrest. The goals of this project are to understand how different processes have shaped the Dominican landscape and history in the past and how they may manifest in the future. Researchers hope to elucidate the complicated explosive history of the island through geochronology and petrologic studies. They will build upon prior work by characterizing meteoric and hydrothermal waters, as well as volcanic gasses, from fumeroles to contribute to baseline monitoring of volcanic activity for use in detecting volcanic unrest. The researchers will also study how the landscape has affected the settlement of people and the history of landslides.



Balinese musician and master drummer I Made Lasamawan joins the Skidmore Gamelan Banyu Wali Ensemble. Image courtesy of Dr. Shalahudin Kafrawi of Hobart and William Smith Colleges.

Idyll and Abyss: The Late Works of Schubert

THE NATIONAL ENDOWMENT FOR THE ARTS

PROJECT PERSONNEL:

Artistic Director **Derek Delaney** (Union College Concert Series)

ABSTRACT:

Idyll and Abyss: The Late Works of Schubert is an intensive study of some of Franz Schubert's solo and chamber music masterworks composed toward the end of the great composer's life, and a recent work by Jorg Widmann reflecting a contemporary view on this music. The works will be performed by leading international artists and talented emerging musicians on the cusp of major careers from the Curtis Institute. The project will include community outreach activities, free concerts, extensive program notes, and lectures on the subject.



Pianist Mitsuko Uchida appeared in recital at three places in the U.S.: University of Michigan, Carnegie Hall, and Union College as part of the NEA-supported Schubert series. Image courtesy of Derek Delaney.

Indonesian Arts, Religion, and Cultural Sustainability in Upstate New York

(CO-) SPONSORED BY THE NEW YORK SIX LIBERAL ARTS CONSORTIUM, FROM AN AWARD BY THE ANDREW W. MELLON FOUNDATION

PROJECT PERSONNEL:

Program Directors **Dr. Jennifer Matsue** (Music) and **Dr. Bunkong Tuon** (English)

ABSTRACT:

This collaborative, multi-institution project supports the NY6 consortium's mission to share expertise and resources while enhancing options for students, faculty, and staff. The September 2016 symposium was led by faculty members from Skidmore College, Hobart and William Smith Colleges, and Union College to share Indonesian arts and religion, bringing together scholars from NY6 institutions and community members interested in furthering work on cultural sustainability. The symposium included a fashion show, a Gamelan performance, and Indonesian food. This collaborative event was part of the exhibition *Sixfold Symmetry: Pattern in Art and Science* at the Tang Museum. The project succeeded in connecting faculty and students across three institutions and bringing them together with members of the local Indonesian community.

NEW AWARDS

Continued

Memory Lane: A Neuro-Exergame to Mitigate Cognitive Decline Later in Life (iPACES™)

1st PLAYABLE PRODUCTIONS
THE NATIONAL INSTITUTES OF HEALTH

PROJECT PERSONNEL:

Principal Investigator **Dr. Cay Anderson-Hanley** (Psychology)

ABSTRACT:

1st Playable Productions (Troy, NY) and Union College are collaborating to develop a commercializable product combining physical exercise and cognitive activities through interactive gaming on a stationary bicycle to help prevent cognitive decline and dementia in older adults. The Interactive Physical and Cognitive Exercise System (iPACES™) developed by Union College's Healthy Aging and Neuropsychology Lab is the first system to combine physical and cognitive interventions, and has already proven to have a greater cognitive benefit to older adults than either of these two interventions alone. While behavioral interventions are unlikely to completely prevent or halt dementia, there is the potential for synergistic physical and cognitive exercise specifically to reduce the risk of onset dementia or slow progression. Creating an affordable and easily distributed product will enable wide access to this intervention, while also furthering understanding of what combinations have biggest impact. Considering multiple causes of dementia, no known cure, and minimal benefit from medication, behavioral interventions to improve brain health are a critical component for extending quality of life for patients, families, and their support systems.

Minerva Fellows Program

HERMAN GOLDMAN FOUNDATION

ABSTRACT:

The Minerva Fellows Program advances Union's mission by exposing recent Union graduates to the human side of poverty and by teaching them to harness their entrepreneurial skills and talents for lasting, positive impact. While many students care deeply about those who are less fortunate, they know little about the opportunities that exist to help. This program provides that opportunity to make a difference. While some Minerva Fellows may become social entrepreneurs who devote their careers to finding innovative ways to eradicate poverty or improve conditions in the developing world, most will return to a conventional career path. Regardless of the path they choose, their experience as a Minerva Fellow changes each of them forever – they become global citizens. And by sharing their experiences with students on campus, their impact is multiplied. Fellowship recipients take a social entrepreneurship course in the spring during their final term at Union, which teaches them to be inquisitive, creative, questioning, skeptical and ambitious, and it opens their minds to the possibilities that exist to better manage social initiatives. Returning Minerva Fellows also join the Social Entrepreneurship course as instructors.

Phenotypic and Genomic Patterns of Divergence across a Young *Drosophila* Species Complex

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Roman Yukilevich** (Biology)

ABSTRACT:

The process of speciation (the splitting of one species into two) is the fundamental source of biodiversity and yet is still not well understood. This study will advance understanding of the genetic, behavioral, and morphological changes that allowed new species to fully differentiate from one another. The research focuses on fruit flies, which have long served as a model organism for studies of genetics. By studying closely related species of fruit flies, it is possible to tease apart which genetic changes led to the original separation versus which changes happened afterwards. The project will identify what genetic differences are associated with differences in mating behavior and morphology that restrict or even prevent interbreeding between newly diverged species. The research will involve undergraduate students by training them in DNA sequencing and genetic analysis. The findings will be used to train high school teachers and develop science educational workshops.



A Drosophila (fruit fly)

Projects for Peace

THE SHELBY C. DAVIS CHARITABLE FUND

ABSTRACT:

Projects for Peace is an initiative for all undergraduate students currently enrolled at one of the participating Davis United World College Scholars Program partner schools to design grassroots projects—anywhere in the world—which promote peace and address the root causes of conflict among parties. Baahh-Nazoshnnii Brown-Almaweri '17 developed the project Thriving as a Nation which sought to connect Native American youth to their roots and to share their stories. To enable them to do so, Brown developed a curriculum to provide a platform for Native American youth at Oakland's American Indian Child Resource Center. The children shared stories that identified injustices within the community, raised awareness on access to healthy lifestyles, and pushed indigenous peoples' collective narrative from a history of surviving to a future of thriving by passing on knowledge.

NEW AWARDS

Continued

Race, Rights, and Disaster Relief: Hurricane Camille, Mississippi, and the Transformation of American Disaster Policy

THE NATIONAL ENDOWMENT FOR THE HUMANITIES

PROJECT PERSONNEL:

Fellow **Dr. Andrew Morris** (History)

ABSTRACT:

This prestigious NEH fellowship supports Dr. Morris' book project focused on Hurricane Camille, which devastated the Mississippi Gulf Coast in 1969, brought the inequities of disaster relief in the U.S. into sharp focus, and ushered in an era where the federal government assumed primary responsibility for individuals impacted by major disasters across the country. The shortcomings of traditional arrangements were legion after Camille. Racial discrimination in disaster relief after Camille brought disaster relief into the national spotlight, but the impulse to turn to the federal government transcended race and political ideology. The racial and financial failures of existing institutions following Camille pushed federal policy toward establishing a national entitlement for Americans for relief from natural calamities.



The aftermath of Hurricane Camille, Gulfport, Mississippi, August 18, 1969. NOAA Photo Library: <https://www.flickr.com/photos/51647007@N08/5033930778/>

Russian Language Teaching Assistant

THE INSTITUTE OF INTERNATIONAL EDUCATION

PROJECT PERSONNEL:

Program Director **Dr. Kristin Bidoshi** (Modern Languages & Literatures)

ABSTRACT:

The Fulbright Foreign Language Teaching Assistant (FLTA) Program helps bolster Union's rapidly growing Russian program by offering an increased international presence and diversity in language programming. The teaching fellow assists in first and second year language courses, leads practice or drill sessions, offers guided conversational activity, and serves as a tutor. The fellow actively participates in Language Table and Russian Language Club meetings while engaging in campus life, offering Union students further informal practice in ever-day conversation.

Science and Technology Entry Program Scholars Bowl

AT&T ASPIRE PROGRAM

PROJECT PERSONNEL:

Director **Angela Tatem** (The Kenney Community Center)

ABSTRACT:

The STEP Scholars Bowl is a science competition that engages historically underrepresented and economically disadvantaged 9-12 grade students from NY's Capital District. The event included educational enrichment activities: keynote speaker, workshop, luncheon, and college tour.



Ed Bergstraesser, director of external affairs for AT&T, presents Angela Tatem with a check to support the STEP Scholars Bowl.

Special Collections Survey

DOCUMENTARY HERITAGE AND PRESERVATION SERVICES FOR NEW YORK

PROJECT PERSONNEL:

Head of Special Collections and Archives **India Spartz** (Schaffer Library)

ABSTRACT:

Preservation surveys focus on preventive care and mitigating deterioration and damage by analyzing the physical environment of archives and library materials. The grant program is part of the Documentary Heritage Preservation Services New York (DHPSNY), which is supported by the New York State Archives, New York State Library, the Conservation Center for Art & Historic Artifacts, and the New York State Education Department. The one-day survey required completion of a detailed pre-survey questionnaire about the special collections and archives formats, facilities, funding, personnel and preservation challenges. Conservator Gillian Marcus visited campus, using the pre-survey questionnaire to target Union's needs and determine next steps for addressing preservation issues, and also met with facilities and campus safety personnel to discuss and assess fire and safety issues at the Hattie Street warehouse. The result is an in-depth and comprehensive preservation survey that will guide the Special Collections & Archives department into the future.

NEW AWARDS

Continued

Special Metrics in Kaehler and Sasaki Geometry

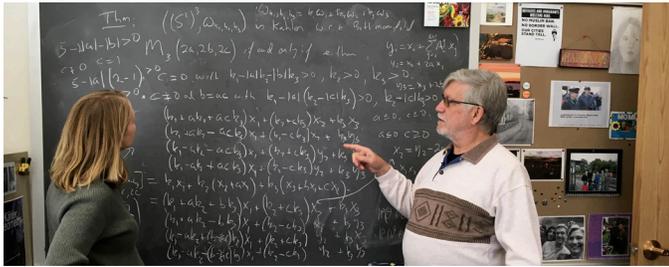
SIMONS FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Christina Tønnesen-Friedman** (Mathematics)

ABSTRACT:

The Simons Foundation Collaboration Grants for Mathematicians support the “mathematical marketplace” by substantially increasing collaborative contacts between mathematicians. Through the grant, Dr. Tonnesen-Friedman will continue her efforts started with her first Simons Foundation Collaboration grant. She will strengthen her collaboration with Dr. Charles Boyer from the University of New Mexico (a fellow Simons Foundation grantee), attend conferences and meetings in Kaehler geometry, Sasaki geometry, or related topics, invite potential collaborators to Union College, travel to visit potential collaborators, and sponsor participants at the Union College Mathematics Conferences throughout the grant period.



Professor Tønnesen-Friedman and collaborator Professor Charles Boyer. Image courtesy of Dr. Christina Tønnesen-Friedman.

The Integrated Science & Engineering Complex

WALTER R.G. BAKER CHARITABLE FOUNDATION

ABSTRACT:

This grant supports the renovation and expansion of Union College’s Science and Engineering (S&E) Center to construct the new 142,000 sq. ft. Integrated S&E Complex. The Complex will house Union’s nine existing departments of science and engineering: biological sciences; chemistry; computer science; geology; electrical, computer, and biomedical engineering; mathematics; mechanical engineering; physics and astronomy; and psychology. The Complex will also be home to a number of interdisciplinary studies programs that cross the boundaries of many of these departments, including nanotechnology and neuroscience. Built in 1970, the existing S&E Center has educated generations of students, but its labs are small and outdated with compartmentalized spaces that hark back to a time when undergraduate research was the exception, not the norm. Currently, S&E consists of five interconnected towers. Three of these towers will be redesigned, and the remaining two will be replaced with a magnificent newly constructed building, now underway, largely devoted to sophisticated research laboratories. This new building will adjoin the redesigned towers to create collaborative learning spaces that foster converging multi-disciplinary approaches to teaching and learning.

The Stylus and the Scalpel: A Theory and Practice of Metaphors in Seneca’s Prose

LOEB CLASSICAL LIBRARY FOUNDATION

PROJECT PERSONNEL:

Fellow **Dr. Tommaso Gazzarri** (Classics)

ABSTRACT:

Dr. Gazzarri’s fellowship award will support his book project, which provides a functional description of Seneca’s dialectical relation between metaphorical language and philosophy: namely, it shows how Stoic philosophy finds a new means of expression in Seneca’s highly elaborated rhetorical discourse, and how this relates to the social and cultural demands of Neronian culture. This project expounds Seneca’s text based on the assumption that metaphors are purposely utilized to work “collectively” rather than by category or type and that, therefore, the analysis of what metaphors do when Seneca chooses to combine them in clusters, demonstrates the existence of a “metanarrative of rhetoric”. This approach is fundamentally innovative and has the advantage of gauging the functioning of Senecan style (or at least a crucial part thereof) as a whole, rather than focusing on single features of its rhetorical functioning. The book addresses the relation between Stoic materialism and bodily imagery to show how philosophical preaching materially contributes to the healing of human soul because it shapes the individual’s cognitive faculty in a way that is physical and not simply figurative. The stylus and the scalpel blend in their functions.

The Watson Fellowship

THOMAS J. WATSON FELLOWSHIP FOUNDATION

ABSTRACT:

The purpose of the Watson Fellowship award is to give college graduates of unusual promise the freedom to engage in a year of independent study and travel abroad following their graduation. Graduating seniors selected as fellows are awarded \$30,000 to travel the world for 12-14 months pursuing a project based on a personal passion. The 2017 recipient of the prestigious fellowship was Riley Konsella. This marked the fifth straight year that Union has had a student named as a Watson Fellow. The Computer Engineering major and Astronomy minor is pursuing his project, “Stuck in Traffic: Steering Offbeat Transportation Solutions through Human Pushback” in Denmark, Norway, Rwanda, Singapore, Vietnam and Brazil. His Watson Fellowship is being spent investigating the fascinating ways in which governments solve traffic and transportation problems, and how citizens react to these changes through advocacy or resistance.



Watson Fellow Riley Konsella '17

NEW AWARDS

Continued



Undergraduate Summer Research Fellow

GLOBALFOUNDRIES

PROJECT PERSONNEL:

Program Director **Dr. Rebecca Cortez** (Mechanical Engineering)

ABSTRACT:

Undergraduate research is an integral part of Union's curriculum and is key to cultivating and retaining student interest in STEM fields. Intensive coursework combined with rigorous undergraduate research experiences help facilitate the application of concepts learned in the classroom to the investigation of contemporary research problems addressing global needs. Union's success in undergraduate research is due to the commitment of dedicated faculty, robust infrastructure and facilities, and state of the art instrumentation available for hands-on student use. Through a competitive selection process, the GLOBALFOUNDRIES Undergraduate Summer Research Fellow will conduct original research for eight weeks during the summer with a faculty member. At the end of the summer term, the Fellow will present the research findings to an audience of industry experts at GLOBALFOUNDRIES. Undergraduate research provides opportunities for students to develop a critical understanding of their field through learning the current state of knowledge, gain experience and confidence in knowing when and how to ask the right questions to solve difficult problems, and students often have the satisfying experience of coauthoring publications and delivering papers at conferences. Union students have participated in the National Conference on Undergraduate Research (NCUR) every year since its inception in 1987. Over the years, Union has sent more than 700 students to NCUR, among the largest delegation of undergraduates to this conference.

[TOP] Students, faculty, staff, and families gather each year for the annual Steinmetz Symposium. [RIGHT] The Brentano Quartet, Yale's quartet-in-residence, are yearly fixtures on Memorial Chapel's stage. Image courtesy of Derek Delaney.

Union College Concert Series

NEW YORK STATE COUNCIL ON THE ARTS

PROJECT PERSONNEL:

Artistic Director **Derek Delaney** (Union College Concert Series)

ABSTRACT:

The Union College Concert Series (UCCS) was founded in 1956 by faculty member Edgar Curtis to bring regional and renowned recitalist and chamber ensembles to Schenectady. In 1969, music enthusiast and local pathologist Dr. Daniel Berkenblit joined the committee as its artistic chair and assumed leadership in 1979. Under Dr. Berkenblit's guidance, UCCS expanded and developed into one of the most respected classic music series in the Northeast. In 2012, upon Dr. Berkenblit's retirement, Derek Delaney assumed leadership and in 2014 came on full-time to strengthen community ties to the series. Since then, concert attendance has increased and the series now presents 14-17 concerts each season and has added free concerts for the community, outreach programming at assisted living facilities, free pre-concert lectures, and masterclasses. Many talented musicians are featured each year, including legendary pianist Mitsuko Uchida, series favorite pianist Jonathan Bliss, with eminent British tenor Mark Padmore, and three extremely-talented young artists in collaboration with the Curtis Institute of Music in Philadelphia, pianists Eric Lu and Mikaek Eliassen and tenor Evan LeRoy Johnson.



NEW AWARDS

Continued

Union College Permanent Collections Stewardship Assessment

AMERICAN ALLIANCE OF MUSEUMS
INSTITUTE OF MUSEUM AND LIBRARY SERVICES

PROJECT PERSONNEL:

Curator of Art Collections and Exhibitions **Julie Lohnes** (Mandeville Gallery)

ABSTRACT:

The Museum Assessment Program (MAP) helps small and mid-sized museums of all types through a confidential, consultative process of self-study and a site visit from an expert peer reviewer over one year. MAP helps museums strengthen operations, plan for the future, and meet standards. MAP assessed the Mandeville Gallery collection at Union with the objectives of planning for future stewardship, storage, and building research space for the collection; planning future budgetary, space, and staffing resources; and highlighting issues of safety for the collection that could be addressed immediately with the ultimate goal of creating a research space and a small museum.

Union College Space Grant

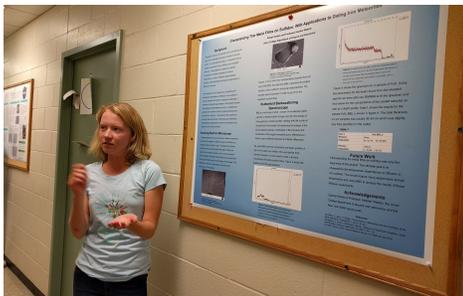
NASA – NEW YORK SPACE GRANT

PROJECT PERSONNEL:

Principal Investigator **Dr. Rebecca Koopmann** (Physics & Astronomy)

ABSTRACT:

The New York Space Grant program supports summer research projects, student travel to conferences, and a student outreach team. The research objectives for students who participate in the summer research program are threefold: 1. to participate in a STEM research project during the summer; 2. to engage in the summer seminar program; and 3. to present their findings at a local, regional or national conference. Outreach activities include partnering with Union's Kenney Community Center and the local secondary schools to host the Union College Physical Constants Workshop for high school physics teachers and students. Teachers and students from regional high schools work in teams with Union Physics and Astronomy faculty and advanced undergraduates to perform experiments, gaining experience with modern instrumentation and laboratory techniques such as high-resolution video analysis, scattering experiments with a particle accelerator and scanning electron microscopy.



Allegra Dawes '19 presents research conducted with Professor Watson as part of the Union College Space Grant. Image courtesy of Dr. Rebecca Koopmann.

Using Big Data to Predict Academic Achievement

CONSORTIUM ON HIGH ACHIEVEMENT AND SUCCESS

PROJECT PERSONNEL:

Principal Investigators **Dr. Tomas Dvorak** (Economics) and **Dr. Mark Wunderlich** (Dean of Studies)

ABSTRACT:

This project uses big data to predict academic achievement, with “big data” meaning the vast array of data sources that colleges and universities have for their students. This includes information on courses students take, their grades, the dorm rooms students live in, the clubs they participate in, etc. Big data also includes data from web-based course content management systems, with hundreds of clicks per student per course. The main aims of this project are to: 1. understand student course selection in explaining academic achievement and 2. use big data to develop an early warning system for students at risk of failing. The results will be useful in advising to inform advisors about the role of social networks in course selection and patterns of academic achievement.

W. Howard Wright Scholars

THE WRIGHT FAMILY FOUNDATION

ABSTRACT:

The W. Howard Wright Scholarship supports four outstanding, full-time undergraduate students majoring in Mechanical Engineering.

Waves of Futurity, Monstrous Attachments: American Literary Representation of Affect, Place, and Otherness

THE EBERLY FAMILY SPECIAL COLLECTIONS LIBRARY AT PENN STATE'S UNIVERSITY PARK CAMPUS

PROJECT PERSONNEL:

Project Director **Dr. Jillmarie Murphy** (English)

ABSTRACT:

Waves of Futurity, Monstrous Attachments: American Literary Representations of Affect, Place and Otherness, 1797-1901 argues that in the literature under consideration the characters' attachment needs illustrate the important role human-to-human and human-to-place bonding occupies in crafting a national identity. American conceptions of security and freedom underpin the book's discussion as Dr. Murphy investigates how writers in the early American republic constructed modernity by restructuring representations of interpersonal and place attachments, which are subsequently re-imagined, reconfigured, and sometimes even rejected by writers in the long nineteenth century.

ACTIVE GRANTS

A Physicochemical Exploration of the Diffusion of Small Molecules in Glassy and Highly-Viscous Materials

THE AMERICAN CHEMICAL SOCIETY – PETROLEUM RESEARCH FUND

PROJECT PERSONNEL:

Principal Investigator **Dr. Andrew Huisman** (Chemistry)

ABSTRACT:

Diffusion is a process fundamental to molecular motion that is of interest when molecules reach an interface (e.g., methanol in a fuel cell) or penetrate a viscous or vitreous material (e.g., aging of polymers by ozone). This study explores the molecular diffusivity of a small tracer molecule in highly viscous systems. In addition to water, the diffusive behavior of small organics such as methanol and ethanol (used in chemical synthesis and many industrial processes) in viscous and glassy media are being explored. The project involves several Mechanical Engineering and Chemistry students in the design and fabrication of the temperature and humidity-controlled sample cell for the Raman microscope, construction and improvement of Union's electrodynamic balance (EDB), the performance of proposed experiments, and acquisition and analysis of data taken on the EDB.

Acquisition of a High-Resolution Micro-Computed Tomography System for Multidisciplinary STEM Research and Undergraduate Training

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Scott Kirkton** (Biology); Co-PIs **Dr. Jennifer Currey** (Electrical, Computer & Biomedical Engineering), **Dr. Leo Fleishman** (Biology), **Dr. Robert Olberg** (Biology), and **Dr. John Rieffel** (Computer Science); Senior Personnel **Dr. David Hodgson** (Mechanical Engineering), **Dr. Steven Rice** (Biology), and **Dr. Nicole Theodosiou** (Biology)

ABSTRACT:

Union College biology, computer science, and engineering faculty have developed collaborative and integrative research across diverse STEM fields to understand how structural properties at one level of organization affect organismal function at another. The μ CT will enable researchers to nondestructively visualize complex internal anatomy and provide insight into how organismal structures: 1) impact developmental physiology, 2) respond to external mechanical stimuli during bone fracture healing, 3) lead to speciation through visual communication, 4) inform development of biomimetic soft robots, 5) support the evolution of morphogenesis, and 6) explain water balance in plants critical to the global carbon cycle. This project will enhance multidisciplinary and interdisciplinary STEM research at Union College that will increase student interest in pursuing graduate STEM study and improve the scientific and technical research infrastructure of our country.

Acquisition of a Multi-Material 3D Printer to Enable Novel Multi-disciplinary Research and Research Training

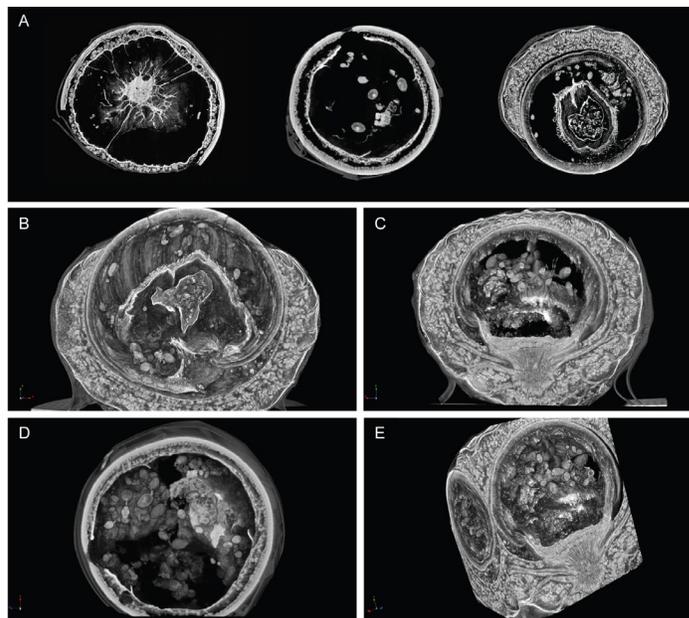
THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. John Rieffel** (Computer Science); co-PIs **Dr. Ann Anderson** (Mechanical Engineering) and **Dr. Steven Rice** (Biology); Senior Personnel **Dr. Takashi Buma** (Electrical, Computer & Biomedical Engineering), **Dr. Michael Hagerman** (Chemistry), and **Dr. Robert Olberg** (Biology)

ABSTRACT:

By harnessing a huge demand for prototyping technologies, researchers will launch a new era of innovative research, with applications ranging from the neuromechanics of dragonfly capture to the manufacture of novel aerogel coated surfaces to the design of completely soft robots. This 3D printer is the centerpiece of Union's Collaborative Design Studio (UCDS), and serves as the foundation of an inherently cross-disciplinary and highly collaborative research program. Providing a common space in which community members can design solutions and solve problems together helps foster and spark spontaneous interdisciplinary collaborations. Students using the space are emboldened as craftspersons and enabled as entrepreneurs. Not only does this acquisition help set the standard for the integration of rapid prototyping techniques into undergraduate research and teaching, it provides tools, methods, and environments around which tomorrow's designers will coalesce and thrive.



Visualizing acorn ant colonies with x-ray microtomography. In the first panel (A), three virtual cross-sections through acorns are shown, with lighter shades of grey associated with higher density plant and animal tissues. Three dimensional renderings of regions of interest within the scanned acorns are displayed in panels B-E illustrating the density of ants and the complexity of the cavity space within these nests. Image courtesy of Dr. Scott Kirkton.

ACTIVE GRANTS

Continued

Acquisition of an Inverted Optical Microscope to Enable Interdisciplinary Research that Unites Five Departments within the Union College Nanoscience Program

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Samuel Amanuel** (Physics & Astronomy); co-PIs **Dr. Palmyra Catravas** (Electrical, Computer & Biomedical Engineering), **Dr. Brian Cohen** (Biology), **Dr. Rebecca Cortez** (Mechanical Engineering), and **Dr. Michael Hagerman** (Chemistry); Senior Personnel **Dr. Joanne Kehlbeck** (Chemistry), **Dr. Seyfollah Maleki** (Physics & Astronomy)

ABSTRACT:

This award supported the acquisition of an inverted optical microscope, which was integrated with an existing atomic force microscope (AFM) to offer simultaneous collection of fluorescence and morphological data under controlled environmental conditions (temperature and humidity). The integrated optical/AFM system supports Union's long-standing commitment to incorporate undergraduate research experience as an integral part of the curriculum and develop innovative, multidisciplinary research and teaching opportunities through active learning that includes hands-on experience in instrumentation. Enhanced student expertise with key materials characterization techniques promote professional development, graduate studies, and careers in science and technology. The instrument is an integral part of ongoing outreach programs that use frontiers of science and technology to engage the general public through applications including arts, food science, and the Physical Constants workshop designed for high school students and teachers.

Alpine Conference on Algebraic and Applied Topology

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Brenda Johnson** (Mathematics)

ABSTRACT:

The Alpine Conference on Algebraic and Applied Topology took place in August 2016 in Saas-Almagell, Switzerland. The conference brought together experts in both the theoretical aspects of algebraic topology and the growing range of scientific applications of topology. The plenary speakers informed participants about recent advances in their fields, and provided insight into possible directions for future work. Participants had the opportunity to discuss their work, receive feedback, continue existing and form new collaborations, and learn more about potentially useful tools and techniques outside their areas of expertise. This award ensured that the US algebraic topology community is well-represented at this important conference, and, in particular, that early-career topologists from the US had the opportunity to participate.



Union's SUCCESS Scholars attend a summer dinner with their two faculty mentors, Professors Cortez and Kirkton. Image courtesy of Dr. Rebecca Cortez.

ANTE – A Four-Tier Framework to Boost Visual Literacy for High Dimensional Data

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Kristina Striegnitz** (Computer Science)

ABSTRACT:

With the massive availability of data, the need to understand and be comfortable with data has gained increasing importance. There is now a great demand for individuals that have the skills to extract meaning from data. While academic programs in data science are being created, going back to school to formally study this topic is not possible for a large segment of the population. Not everyone needs to become a formal data scientist to be competitive in this increasingly data-centric society and workplace, but it is of great benefit to become more data literate. Visualizations, such as bar charts, line plots, maps, etc. are helpful in explaining data. However, today's data sets often combine many different kinds of information and are, therefore, too complex to be represented with these basic visualizations. The goal of this project is to develop a visualization system that can represent data in such a way that a user can make sense of complex data without extensive training. This will involve advances in visualization techniques as well as novel approaches to presenting visualizations in an engaging way. The ANTE (Appeal, Narrate, Transform, Engage) system developed in this project has the potential to help increase the ability of citizens to become more knowledgeable participants in an increasingly data-centric society. The project provides research training for graduate students at SUNY Stony Brook and undergraduate students at Union College. The visualization tools and games will make an excellent environment for teaching both data and visual literacy, at all education levels.

ACTIVE GRANTS

Continued

Brazil Program Development Experience

(CO-) SPONSORED BY THE NEW YORK SIX LIBERAL ARTS CONSORTIUM, FROM AN AWARD BY THE ANDREW W. MELLON FOUNDATION

PROJECT PERSONNEL:

Directors **Lara Atkins** (International Programs) and **Dr. William García** (Modern Languages & Literatures)

ABSTRACT:

This project supports the New York Six consortium's mission to share expertise and resources while enhancing options for students, faculty, and staff. The December 2015 trip to Sao Paulo was designed to support the Hobart and William Smith Colleges/Union College Partnership for Global Education (PGE) study abroad program by engaging faculty and international programs staff from the consortium with Fundação Armando Alvares Penteado (FAAP) University in Sao Paulo – the Brazil program site. The Brazil program has consistently been named as one of the top three study abroad opportunities of interest for undergraduates at each of the New York Six schools. The development trip enabled faculty and staff to learn more about the program, gain a better understanding of the Brazilian culture, and develop valuable contacts and connections with FAAP to facilitate the educational experiences and enrichment activities of future programs.

Care and Support in Aging Communities

(CO-) SPONSORED BY THE NEW YORK SIX LIBERAL ARTS CONSORTIUM, FROM AN AWARD BY THE ANDREW W. MELLON FOUNDATION

PROJECT PERSONNEL:

Principal Organizer **Dr. Carol Weisse** (Psychology); Research Mentors **Dr. Cay Anderson-Hanley** (Psychology) and **Dr. David Cotter** (Sociology)

ABSTRACT:

This project focuses on access to end-of-life housing, support, and palliative and hospice care. As more individuals live into older ages, the ways in which modern society either integrates aged individuals and addresses their particular experiences and needs, or fails to, represents an important human rights issue. If, as an aging society, we do not consider the many issues and inequities that exist around integration, quality of life, and care for the aging, our social institutions and norms will be increasingly mismatched to a growing proportion of the population. The members of this project team hope to investigate the challenges presented by an aging society in order to enrich their teaching and research, with a broader goal to understand the factors that make communities more 'livable' and contribute to integrated aging. Planned activities for this project will investigate end-of-life care more specifically and aging more broadly will include site visits to hospice programs (domestic and international), expert speakers and discussion; and service learning student projects. The goals of these activities are two-fold, to make connections that will promote future teaching and research, and to learn more about the challenges faced by individuals aging today and those who support them.

Catalytic Aerogel Materials

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Ann Anderson** (Mechanical Engineering); co-PIs **Dr. Bradford Bruno** (Mechanical Engineering) and **Dr. Mary Carroll** (Chemistry)

ABSTRACT:

Existing catalytic converter systems use rare precious metals to catalyze exhaust gas. Decreasing the use of these metals has the potential to transform automotive pollution clean-up methods. This has important economic implications for the nation because a typical automobile catalytic converter contains about \$100 of precious metals, adding about 700 million dollars per year to the total cost of cars sold in the U.S. Moreover, it has major environmental and geopolitical implications; mining of precious metals is environmentally damaging, and many of the best sources are outside of the U.S. Aerogels are lightweight, nano-porous materials with lots of surface area and good thermal properties. Catalytic aerogel materials have the potential to replace the precious metals while being both cost-effective and environmentally friendlier than current automotive catalysts. This project involves an interdisciplinary team of faculty and students in Mechanical Engineering and Chemistry who are undertaking fundamental studies of catalytic aerogel materials and demonstrating the utility of these materials as catalysts to alleviate automotive pollution.



Professor Ann Anderson and mechanical engineering students Joana Santos '20 and Kamin Sylvia '18 examine a mold in the aerogel lab. Image courtesy of Dr. Ann Anderson.

ACTIVE GRANTS

Continued



Professor Donald Rodbell with former students Nick Weidhaas '15 and Grace Delgado '14 on a drilling rig on Lake Junin. Image courtesy of Union College's Office of Communications.

Chinese Language Teaching Fellow

THE ALLEX FOUNDATION

PROJECT PERSONNEL:

Project Directors **Dr. Megan Ferry** and **Dr. Zhen Zhang** (Modern Languages and Literatures)

ABSTRACT:

The ALLEX Teaching Fellow Program provides a means for an institution to augment and enrich its language course offerings in Chinese, Japanese or Korean. The ALLEX Teaching Fellow will serve as a crucial participant in Union's Chinese foreign language program, offering additional language practice for students, as well as seamlessly linking the classroom with the community, especially the Chinese-speaking community on campus. The Fellow will increase students' access to Chinese cultural habits, products, and beliefs, as well as assist students in making connections across the various academic disciplines (e.g., environmental sustainability for Environmental Science students and China's global relations with Latin America or Africa for Economics or Political Science students).

Cognitive Benefits of Interactive Mental and Physical Exercise for MCI

THE NATIONAL INSTITUTES OF HEALTH

PROJECT PERSONNEL:

Principal Investigator **Dr. Cay Anderson-Hanley** (Psychology); Senior Personnel **Dr. Kristina Striegnitz** (Computer Science)

ABSTRACT:

The primary goal of this research project is to replicate and extend the recently concluded randomized clinical trial (RCT) investigating interactive physical and mental exercise, "Cybercycling for Cognitive Health" (Anderson-Hanley et al., 2012a). This project extends the research to persons with mild cognitive impairment (MCI), to examine the generalizability of the above finding to those already experiencing cognitive decline, with the hypothesis that cybercycling can slow decline more than either physical or mental exercise alone.

Deep Drilling of Lake Junin, Peru: Continuous Tropical Records of Glaciation, Climate Change and Magnetic Field Variations Spanning the Late Quaternary

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Donald Rodbell** (Geology); Senior Personnel **Dr. David Gillikin** (Geology)

ABSTRACT:

Our ability to understand the full complexity of climate change and forecast future regional trends requires that we extend the available instrumental records into the geologic past. Proxy paleoclimate records from the tropics are particularly important because this region is the "heat engine" of Earth. Lake Junin is exceptional in the length of record that it contains, but also in the climate signals that it records. This research developed these and other proxy climate records for the full length of recovered core to generate one of the longest continuous records of climate and environmental change from the inner tropics. The public outreach component of this project aimed to engage Lake Junin residents, teachers, environmentalists, and the government in citizen sciences activities.

Educating Girls for Engineering

GENERAL ELECTRIC
GLOBALFOUNDRIES
THE AMERICAN SOCIETY OF CIVIL ENGINEERS
THE NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS

PROJECT PERSONNEL:

Program Director **Dr. Cherrice Traver** (Electrical, Computer & Biomedical Engineering)

ABSTRACT:

The EDGE program is an intensive, two-week summer residential program with the mission to inspire high school girls' interest in engineering. The program combines real-life college learning and living experiences with activities intended to spark interest in participants to study science, health and engineering in college and undertake a career in one of those disciplines. The program's unifying theme of "Toys and Tools for Disabled Children" illustrates the humanitarian aspects of engineering and focuses on developing technologies to enhance the learning activities and communication skills of children with special needs. The theme also immerses participants in all aspects of engineering, from theory and academic learning to field trips and activities where real-life examples of engineering are studied. During the program, EDGE participants will have the occasion to meet with several local practicing women engineers.

ACTIVE GRANTS

Continued

Elucidating the Interactive Effects of Sensory Response and the Signal Function on the Evolution of Signal Diversity

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Leo Fleishman** (Biology)

ABSTRACT:

A fundamental challenge of modern Zoology is to understand why, in some cases, large numbers of similar-appearing animal species have formed, and continue to coexist, in relatively limited geographical areas. This study examines the role of communication in facilitating species boundaries in communities of Anolis lizards, focusing on lizard communities on the islands of Jamaica, Hispaniola and Puerto Rico. This project includes a strong outreach component involving high school, undergraduate and graduate students with a special effort to include groups underrepresented in sciences. By explaining the role of effective communication in the maintenance of reproductive boundaries between species, the project will provide information that is critical for conservation efforts aimed at preserving biological diversity through habitat preservation and reconstruction.

Encounters with Circus and its Others

SOCIAL SCIENCES HUMANITIES RESEARCH COUNCIL OF CANADA

PROJECT PERSONNEL:

Principal Organizer **Dr. Charles Batson** (Modern Languages & Literatures)

ABSTRACT:

From Pink and Britney Spears' stage shows to American Horror Story to Cirque du Soleil's status as the world's most successful live performing arts company, circus in the early 21st century has undeniably gone mainstream. This positive news for circus companies, artists, and audiences with a taste for thrilling entertainment raises questions about circus' historic status as a site for celebration and exploitation of differences, from stagings of exceptional performing bodies to the display of "freakery." This project addresses these questions, focusing on what and whom have been targeted as different, as Other, in contemporary circus practice. We include questions of gender, sexuality, embodiment, ability/disability, ethnicity, class, and species. Encounters with Circus and Its Others proposes extended and multi-faceted engagement with these concerns via exchanges between scholars, circus artists and workers, and the public. The three-part series of "Encounters" will be held in connection with the July 2016 iteration of Montréal Complètement Cirque (MCC) festival, whose collaboration, along with Cirque du Soleil and the National Circus School, will bring these conversations to a broad public.

Engineering Ambassadors Network

GENERAL ELECTRIC

PROJECT PERSONNEL:

Faculty Advisor **Dr. Shane Cotter** (Electrical, Computer & Biomedical Engineering)

ABSTRACT:

This grant from General Electric supports outreach events to middle and high school students as part of the Engineering Ambassadors Network (EAN). Originally funded by the National Science Foundation, EAN is a collaboration of engineering students across universities "dedicated to changing the conversation middle and high school students are having about engineering. The EAN serves the need for strong future leaders in engineering and supports recruitment of a diverse future generation of engineers." Union's EAN students attended an intensive workshop to learn the fundamentals of building outreach presentations using messages from the National Academy of Engineering's Changing the Conversation to develop an oral presentation. The program expanded to include a social/professional event, and coordinated efforts by partnering with Rensselaer Polytechnic Institute's EAN. Additionally, the program involved Union's SUCCESS scholars, a cohort of academically talented students majoring in STEM disciplines.

Feigenbaum Center for Visual Arts

THE J. M. McDONALD FOUNDATION

ABSTRACT:

The new Center is programmatically designed with new spaces in which students are encouraged to explore their creative talents and pursue their artistic dreams. Highlights of the renovation include a three-story addition featuring a sculpture and design studio for metalworking alongside an outdoor sculpture space, an expanded public gallery, a traditional darkroom, a drawing/2D design studio, a 3D design studio, media lab, and a suite of working artists' studio spaces. By fully integrating the arts into Union's curriculum, the Feigenbaum Center for Visual Arts inspires faculty and has sparked pedagogical renewal and curricular transformation that will attract and engage students not only interested in the arts, but those studying science and engineering who seek a broad and deep education.



Image from the show "Bromance" from the Barely Methodical Company. Image courtesy of Dr. Charles Batson.

ACTIVE GRANTS

Continued

Global Learning Faculty Study Tours

THE ANDREW W. MELLON FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dean Strom Thacker** (Academic Affairs) and Director of General Education **Dr. John Cramsie** (History)

ABSTRACT:

The Project for Global Learning helped to enhance the curriculum through cross-disciplinary, global experiences for faculty. The PGL supported 25 faculty members in two 10-day intensive international experiences. The first cohort of faculty traveled to China, while the next year's cohort traveled to Berlin. The faculty engaged in preparatory discussions and readings, visited international locations linked to academic content, and shared ideas and intellectual connections. Upon their return, participants attended a campus retreat to integrate the experience into Union's curriculum. Using two foundational courses in the Common Curriculum, First-Year Preceptorial (with its emphasis on critical reading or writing) and the Sophomore Research Seminar (with its focus on research practices), faculty worked to develop new courses or redevelop existing ones around content inspired by the trip.



Faculty members on the study tour abroad in China look over the expansive landscape. Image courtesy of Jim de Sève.

IgniteCS

TIDES FOUNDATION

PROJECT PERSONNEL:

Faculty Advisor **Dr. Nick Webb** (Computer Science)

ABSTRACT:

Union's Association for Computing Machinery's Council on Women in Computing (ACM-W) received a Google IgniteCS grant, to support an after-school program for middle school students, offered through the Kenney Community Center.

Is Larger Smarter? Investigating the Effects of Group Size on Collective Intelligence

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Christopher Chabris** (Psychology)

ABSTRACT:

From Wikipedia to Linux to scientific and business work-groups all over the world, both online and off-line groups are becoming a pervasive part of modern life. It is becoming increasingly important, therefore, to understand how to improve the performance of these groups. This work will use a new measure of generalized group effectiveness – called “collective intelligence” – to help do this. While there have been decades of research on factors that affect the performance of groups, almost all these studies have each focused on a single task. This work uses the perspective of collective intelligence to investigate, not just the ability of a group to perform a single task, but the group's general ability to perform a wide range of tasks. Since many real-world groups must cope with a wide range of problems, just such a perspective may be needed to systematically predict their performance. By making an online test of collective intelligence available to other researchers, the project will help advance scientific practice in this area. More generally, by providing a firmer scientific foundation for measuring and improving the performance of groups, the project may help our society address many of its most important problems more effectively.

Minerva Fellows Program

THE HERMAN GOLDMAN FOUNDATION

ABSTRACT:

Union's mission is to educate students to be engaged, innovative and ethical contributors to an increasingly diverse, global and technologically complex society. The Minerva Fellows Program shapes that vision by exposing young Union graduates to the human side of poverty and by teaching them to harness their entrepreneurial skills and talents for lasting, positive impact. While many students care deeply about those who are less fortunate, they know little about the opportunities that exist to help. This program provides that opportunity to make a difference. While some Minerva Fellows may become social entrepreneurs who devote their careers to finding innovative ways to eradicate poverty or improve conditions in the developing world, most will return to a conventional career path. Regardless of the path they choose, their experience as a Minerva Fellow changes each of them forever – they become global citizens. And by sharing their experiences with students on campus, their impact is multiplied.

ACTIVE GRANTS

Continued

Optical Components to Construct a Surface Plasmon Resonance Apparatus and Self-Standing Microscope

THE JONATHAN F. REICHERT FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Seyfollah Maleki** (Physics & Astronomy)

ABSTRACT:

The Advanced Laboratory Physics Association (ALPhA) has created a highly successful faculty development program called the “ALPhA Immersions.” Union’s ALPhA Immersion Equipment grant is notably part of the Foundation’s inaugural program to support the ALPhA Immersions with funds to help schools purchase the apparatus used by faculty members who have participated in the immersion. The Surface Plasmon Resonance Apparatus and a self-standing microscope will enable students to conduct new experiments on nano-plasmonics and Surface Enhanced Raman Spectroscopy (SERS), as part of the required advanced physics lab (Physics 300, Methods of Modern Physics). This new experimentation overlaps with the PI’s research activities with Raman Spectroscopy applications in the study of cultural heritage research. It also overlaps with Union’s study of physics of nano structures, providing an opportunity for physics, chemistry and engineering students to minor in nanotechnology.

Our Shared Humanities

THE ANDREW W. MELLON FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dean Jennifer Fredricks** (Academic Affairs); Project Director **Dr. Stephen Romero** (Psychology & Interdisciplinary Studies); Steering Committee **Dr. Deidre Hill Butler** (Sociology), **Dr. Andrew Burkett** (English), **Dr. William Finlay** (Theater), **Frances Maloy** (Schaffer Library), **Dr. Fernando Orellano** (Visual Arts), **Dr. John Rieffel** (Computer Science), **Denise Snyder** (Learning Technologies & Environments), and **Dr. Yasmine Van Wilt** (Academic Affairs)

ABSTRACT:

Union’s Our Shared Humanities initiative promotes the integration of the arts and humanities across academic disciplines through faculty development and a series of distinctive hands-on experiences. The grant provides a broad range of opportunities to explore interdisciplinary collaborations, such as workshops and mini-grants to support curricular renewal through Discovery, Design, and Zones of Inquiry projects. The Our Shared Humanities initiative also expands Union’s Faculty Development Institutes (FDI), promotes Union’s Maker Community, and bolsters library holdings to enrich our collections of materials that integrate the arts/humanities across the disciplines.

Postdoctoral Teaching Fellow in Japanese Literature and Film

ASIANETWORK – LUCE FOUNDATION

PROJECT PERSONNEL:

Project Directors **Dr. Megan Ferry** and **Dr. Junko Ueno** (Modern Languages & Literatures)

ABSTRACT:

This grant supported a postdoctoral teaching fellow, a position that had a tremendous impact on Union’s Asian Studies Program and the Japanese program in the Modern Languages and Literature department. The teaching fellow will taught Japanese literature and Japanese film courses during the 2016-2017 academic year. These classes not only provided an excellent opportunity for the Japanese language students to deepen their cultural knowledge and to complement and enhance their language course experiences, but also provided an opportunity for non-Japanese language students to learn about the Japanese culture. The fellow helped to reinforce the bridge between Union’s Asian Studies Program and the local community through a partnership with the Albany Japanese Language School to extend student learning outside the classroom and foster lifelong language and cultural learning. In addition to teaching, the fellow created a community-based culture learning module, facilitated an extra-curricular film series, and participated in the weekly lunchtime “Japanese Table” in the college dining hall.



Professors Jennifer Mitchell (English) and Laini Nemett (Visual Arts) collaborated to create an Our Shared Humanities Maker-related program featuring invited fiber artist Gabrielle Mitchell. The weaving workshop engaged Union faculty, students, and staff in a demonstration, discussion, and hands-on introduction to weaving. Image courtesy of Dr. Jennifer Mitchell and Laini Nemett.

ACTIVE GRANTS

Continued

Reconstructing the Biogeochemistry in Tropical Aquatic Ecosystems Using Elemental and Stable Isotope Tracers in Freshwater Bivalve Shells

THE FLEMISH SCIENCE FOUNDATION, BELGIUM

PROJECT PERSONNEL:

Principal Investigator **Dr. David Gillikin** (Geology)

ABSTRACT:

Aquatic ecosystems are vulnerable to changes in land use, climate, and nutrient inputs, as the material they transport is directly influenced by a range of catchment characteristics. This is particularly true for tropical systems which are under increasing stress and are sensitive early indicators of catchment modifications. Long-term datasets on aquatic biogeochemistry are virtually non-existent. An elegant method to circumvent this absence is to use well-dated biological archive to reconstruct environmental conditions. Freshwater bivalves have demonstrated the potential to store such information in their shell: the geochemical composition along the growth axis provides a history of aquatic biogeochemical and environmental conditions during the lifetime of the bivalve. The researchers have initiated detailed monitoring of a wide range of parameters on several African rivers at unprecedented temporal resolution. The research will provide excellent case studies of how freshwater bivalves record known (and unknown) changes in climate and/or land-use in understudied tropical catchments.

Renewable and Compostable Fungus Based Plastics - Establishing the Structure/Property/Processing Relationships to Facilitate Commercialization

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Ronald Bucinell** (Mechanical Engineering)

ABSTRACT:

Renewable and biodegradable materials are a key element to a sustainable planet. Researchers from Rensselaer Polytechnic Institute, Union College, and Ecovative Design, LLC, will expand the range of applications where highly renewable, compostable, and inexpensive materials can replace petroleum-derived products. Ecovative Design has created new compostable mycelium-based (fungus) bioplastic/biocomposite materials that have the potential to be used in markets such as transportation and recreation that currently use petroleum-based plastics, but first the structure/property/processing relationships need to be understood. This grant supports fundamental research to provide needed knowledge on how to optimize and tailor the properties of these new materials.



Professor David Gillikin hunts freshwater clams in northern Botswana as a herd of elephants come for a drink. Dr. Gillikin uses the clam shells to reconstruct past rainfall across the African continent. Image courtesy of Dr. David Gillikin.

Russian Language Teaching Assistant

THE INSTITUTE FOR INTERNATIONAL EDUCATION

PROJECT PERSONNEL:

Program Director **Dr. Kristin Bidoshi** (Modern Languages & Literatures)

ABSTRACT:

The Fulbright Foreign Language Teaching Assistant (FLTA) program provides welcome and exciting resources for Union's Russian language program. The FLTA assists in teaching first and second year language courses, leads practice or drill sessions, offers guided conversational activity, and provides tutoring as appropriate. The FLTA actively participates in Language Table and Language Club meetings while engaging in campus life, offering our students further informal practice in every-day conversational language. The FLTA bring an increased international presence and diversity in language programming to Union.

Science & Technology Entry Program

THE NEW YORK STATE EDUCATION DEPARTMENT

PROJECT PERSONNEL:

Director **Angela Tatem** (The Kenney Community Center)

ABSTRACT:

Since 1994, Union College has been awarded the STEP grant by the NY State Education Department to establish collaborative relationships with public schools in the City of Schenectady. The program aims to engage and excite historically underrepresented and economically disadvantaged students to consider studies and careers in mathematics, science, technology, health related fields and the licensed professions. Public school students partner with Union faculty and students to receive high-quality instruction, including academic tutoring, college-level courses for enrichment, and opportunities to work with college students and faculty on research projects.

ACTIVE GRANTS

Continued

SUCCESS: Stimulating Undergraduates: Creating Contributors in Engineering & Science for Society

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Joanne Kehlbeck** (Chemistry); co-PIs **Dr. Samuel Amanuel** (Physics & Astronomy), **Dr. Palmyra Catravas** (Electrical, Computer & Biomedical Engineering), **Dr. Rebecca Cortez** (Mechanical Engineering), and **Dr. Scott Kirkton** (Biology); Senior Personnel **Dr. George Bizer** (Psychology)

ABSTRACT:

The SUCCESS Scholars program further broadens Union's inclusive recruiting strategy by building relationships with small, rural under-resourced public high schools in order to attract and retain talented students to STEM fields. SUCCESS scholars are selected from all science and engineering disciplines, with four-year scholarship support for two cohorts of ten students. The project is helping participants achieve success by meeting the educational and financial needs unique to their situations and backgrounds. The SUCCESS Scholars program is designed to produce talented, energetic STEM professionals from diverse backgrounds. The approach will be transferable to educational institutions across the country. SUCCESS scholars trained as leaders and capable of propagating transformative mentoring skills will positively impact this nation's workforce.

Supporting Scholars in Science and Engineering

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Bradford Bruno** (Mechanical Engineering); Co-PIs **Dr. Joanne Kehlbeck** (Chemistry), **Dr. J. Douglass Klein** (Economics), and **Dr. Cherrice Traver** (Electrical, Computer, & Biomedical Engineering); Senior Personnel **Dr. Suzanne Benack** (Psychology)

ABSTRACT:

The integration of engineering and the liberal arts offers unique opportunities for students. This project aimed to: 1) improve recruitment and retention of academically-talented students in STEM fields; 2) increase the number of women in engineering, physics, and computer science, and underrepresented groups in all disciplines; 3) provide students with opportunities to enhance their education through summer research, internships, study abroad, and leadership training; 4) enable these students to make connections between their major and other disciplines through pursuit of a dual major, minor or interdisciplinary major. The impact of these efforts resulted in increased numbers of students with the education and skills necessary to enter the workforce or professional and graduate programs in emerging multidisciplinary fields. The proven results of the activities implemented through this project provided important preliminary data for the SUCCESS Scholars grant.

The Arthur O. Eve Higher Education Opportunity Program

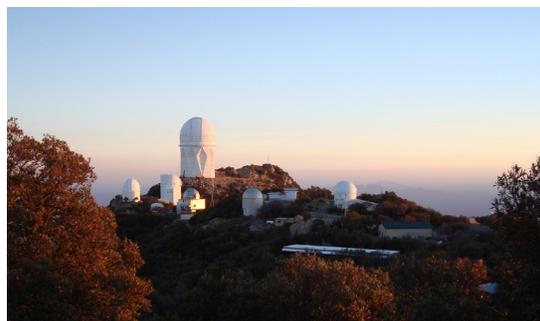
THE NEW YORK STATE EDUCATION DEPARTMENT

PROJECT PERSONNEL:

Director **Philip Poczik** (Academic Opportunity Program/Higher Education Opportunity Program)

ABSTRACT:

Union College has participated in The Arthur O. Eve Higher Education Opportunity Program (HEOP) since its inception 45 years ago. The program provides a broad range of services to New York State residents who, because of academic and economic circumstances, would otherwise be unable to attend a postsecondary educational institution. Union continues to pursue its goal of providing a viable option for higher education for the economically and educationally disadvantaged population of New York. Through the HEOP, we will continue to provide the resources required to achieve this goal by providing academic support and mentoring, while also encouraging students to pursue studies leading to careers and professions in underrepresented areas.



The Kitt Peak National Observatory at sunset. Image courtesy of Dr. Rebecca Koopmann.

The Undergraduate ALFALFA Team

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. Rebecca Koopmann** (Physics & Astronomy)

ABSTRACT:

The Undergraduate ALFALFA Team (UAT), a consortium of 19 undergraduate-focused institutions from across the United States, is conducting a multi-faceted program of student training, faculty development, and public outreach that is integrated into the Arecibo Legacy Fast ALFA (where ALFA refers to the Arecibo L-band Feed Array detector) collaboration. UAT students and faculty participate through several program components, including workshops and observing sessions, group work, and undergraduate research experiences. The collaborative nature of the program, supported by appropriate computer infrastructure and communication media, enables students and faculty to participate effectively in data analysis and remote observing. The program builds connections between staff at Arecibo Observatory and faculty and students at the participating U.S. institutions. The project develops publicly available materials that enhance the undergraduate astronomy curriculum for both science and non-science majors.

ACTIVE GRANTS

Continued

Undergraduate Summer Research Fellow

GLOBALFOUNDRIES

PROJECT PERSONNEL:

Undergraduate Research Director **Dr. Rebecca Cortez** (Mechanical Engineering)

ABSTRACT:

Undergraduate research is an integral part of Union's curriculum and is key to cultivating and retaining student interest in STEM fields. Through a competitive selection process, the GLOBALFOUNDRIES Undergraduate Summer Research Fellow will conduct original research for eight weeks during the summer with a faculty member. Undergraduate research provides opportunities for students to develop a critical understanding of their field through learning the current state of knowledge, gain experience and confidence in knowing when and how to ask the right questions to solve difficult problems, and students often have the satisfying experience of coauthoring publications and delivering papers at conferences. Union students have participated in the National Conference on Undergraduate Research (NCUR) every year since its inception in 1987. Over the years, Union has sent more than 700 students to NCUR, among the largest delegation of undergraduates to this conference. Our students present their work at annual meetings of professional societies including The American Chemical Society, ASME International Mechanical Engineering Congress & Exposition, American Physical Society, and the Materials Research Society.

Understanding the Provenance and Thermal Evolution of the Chugach Prince William Terrane in Southern Alaska

THE NATIONAL SCIENCE FOUNDATION

PROJECT PERSONNEL:

Principal Investigator **Dr. John Garver** (Geology)

ABSTRACT:

The Chugach-Prince William terrane is an extensive accretionary complex that formed along the western margin of North America during subduction (under-thrusting) of oceanic lithosphere in the Cretaceous to Eocene. Researchers use geochronology, stratigraphy, petrology, structural geology, and geophysics to unravel the source region of this accretionary complex and subsequent thermal history. This research directly addresses several key problems in North American tectonics related to terrane formation, translation, accretion, and basin formation, and is helping advance geochronologic methods used for tracking the origin and thermal evolution of sedimentary rocks. This project has a strong educational component aimed at increasing the number of students in the geoscience pipeline and ultimately the workforce, and our effort is partly focused on recruiting students under-represented in the Geosciences.

[RIGHT] 2016 basecamp in Nunatak Ford, close to Yakutat, Alaska. Image courtesy of Cameron Davidson, Professor of Geology at Carleton College.

Union College Space Grant

NASA – NEW YORK SPACE GRANT

PROJECT PERSONNEL:

Principal Investigator **Dr. Rebecca Koopmann** (Physics & Astronomy)

ABSTRACT:

Union College has been a member of the NASA – New York Space Grant since 2007. In the past five years, 29 summer research projects, student travel to conferences and a student outreach team were sponsored through funding. The research objectives for students who participate in the summer research program are threefold: 1. to participate in a STEM research project; 2. to engage in the summer seminar program at Union College; and 3. to present their findings at a local, regional or national conference. Space Grant funds are primarily dedicated to student research support, allowing the maximum number of participants each summer. On-campus presentations and summer seminars provide a natural forum for these projects, as well as help students gain exposure to the variety of other science and engineering projects on campus. Space Grant awardees will participate in Union's active summer student seminar program, which features talks or posters by each student researcher. They will also present their findings at campus research seminars and will be strongly encouraged to present their results at regional or national meetings. Related outreach activities will include partnering with Union College's Kenney Community Center, to reach out to the local secondary schools to host the Union College Physical Constants Workshop for high school physics teachers and students. Teachers and students from regional high schools work in teams with Union College Physics and Astronomy faculty and advanced undergraduates to perform experiments, gaining experience with modern instrumentation and laboratory techniques such as high-resolution video analysis, scattering experiments with a particle accelerator and scanning electron microscopy.



SUBMITTED PROPOSALS

A Collaboration that Enables New Approaches to Computationally-Intensive Research at Liberal Arts Institutions

THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Ellen Yu** (Chief Information Officer)

Acquisition of a 1.7MV Pelletron Tandem Accelerator for Interdisciplinary Research and Undergraduate Education and Research Training

THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Dr. Michael Vineyard** (Physics & Astronomy); Co-PIs **Dr. Samuel Amanuel** (Physics & Astronomy), **Dr. Scott LaBrake** (Physics & Astronomy), **Dr. Donald Rodbell** (Geology), and **Dr. Heather Watson** (Physics & Astronomy); Senior Personnel **Dr. Michael Hagerman** (Chemistry), **Dr. Andrew Huisman** (Chemistry), **Dr. Joanne Kehlbeck** (Chemistry), **Dr. Seyfollah Maleki** (Physics & Astronomy), and **John Twilley** (Stony Brook University)

Acquisition of a LA ICP-MS for Expansion of a Broad Range of Analytical Activities and Research Training in the Earth Sciences

THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Dr. Holli Frey** (Geology); Co-PIs **Dr. John Garver** (Geology), **Dr. David Gillikin** (Geology), **Dr. Kurt Hollocher** (Geology), and **Dr. Donald Rodbell** (Geology); Senior Personnel **Dr. Laura MacManus-Spencer** (Chemistry), **Dr. Matthew Manon** (Geology), and **Dr. Heather Watson** (Physics & Astronomy)

Advancing Adirondack Studies at Union College

THE ANDREW W. MELLON FOUNDATION

Principal Investigator **Strom Thacker** (Stephen J. and Diane K. Ciesinski Dean of Faculty and Vice President for Academic Affairs); Faculty Director **Dr. J. Douglass Klein** (Economics); Special Collections & Archives Director **India Spartz** (Schaffer Library)

Advancing Cognitive Neuroscience Research and Research Training at Union College Through the Development of an EEG/ERP Core

THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Dr. Stephen Romero** (Psychology and Director of Interdisciplinary Programs); Senior Personnel **Dr. Christopher Chabris** (Psychology), **Dr. Alyssa Morey** (Psychology/University at Albany) **Dr. D. Catherine Walker** (Psychology), and **Dr. Erika Wells** (Boston University)

Assessment of Microplastic Pollution in the Mohawk Watershed and the Potential for Delivery to the Hudson Estuary

HUDSON RIVER FOUNDATION

Principal Investigator **Dr. Jacqueline Smith** (Geology)

Bridging the Gap from Northern Iberia to Northwest Africa to Reconstruct Atmospheric Dynamics and Hydroclimate for the last 2,500 Years

THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Dr. David Gillikin** (Geology)

Can Cascade Reinforcement Initiate and Complete Speciation? Theoretical and Empirical Investigations in Killfish

THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Dr. Roman Yukilevich** (Biology)

Chinese Language Teaching Assistant

THE INSTITUTE OF INTERNATIONAL EDUCATION

Program Directors **Dr. Megan Ferry** and **Dr. Zhen Zhang** (Modern Languages & Literatures)

Deadline: Crime Journalism and the Will to Security in Caracas

AMERICAN COUNCIL OF LEARNED SOCIETIES

Project Director **Dr. Robert Samet** (Anthropology)

Fellowship for Symposium in Athens

ONASSIS FOUNDATION

Project Director **Dr. Tommaso Gazzarri** (Classics)

Living Between Camps: A Comparative Inquiry on Argentina's Politics of Memory

THE NATIONAL ENDOWMENT FOR THE HUMANITIES

Project Director **Dr. Guillermina Seri** (Political Science)

SUBMITTED PROPOSALS

Continued

Mathematical Methods for Effective Cancer Detection and Characterization

SIMONS FOUNDATION

Principal Investigator **Dr. Jue Wang** (Mathematics)

Novel Indicators of Water Quality and Health Impacts from Oil and Gas Development in the Appalachian Basin

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Principal Investigator **Dr. David Gillikin** (Geology)

Optimization of the Design and Manufacturing of Fly Rods: Performance Evaluation

EMPIRE STATE DEVELOPMENT'S DIVISION OF SCIENCE TECHNOLOGY AND INNOVATION (NYSTAR) – JEFF LAWRENCE MANUFACTURING INNOVATION FUND
POWERED BY FUZEHUB

Program Director **Dr. Ronald Bucinell** (Mechanical Engineering)

Performance Evaluation of Residential Circuit Breakers

FM GLOBAL

Project Director **Dr. James Hedrick** (Electrical, Computer & Biomedical Engineering)

Por la Patria Grande: Persistence of State Abuses under the “Pink Tide” (1999-)

AMERICAN COUNCIL OF LEARNED SOCIETIES – THE NATIONAL ENDOWMENT FOR THE HUMANITIES

WOODROW WILSON INTERNATIONAL CENTER FOR SCHOLARS

Project Director **Dr. Guillermina Seri** (Political Science)

Preventing or Ameliorating Alzheimer’s and Related Dementias: An Interactive Physical and Cognitive Exercise System (iPACES©) for Mild Cognitive Impairment (MCI)/Neurocognitive Disorder (mNCD)

NATIONAL INSTITUTES OF HEALTH

Principal Investigator **Dr. Cay Anderson-Hanley** (Psychology); Senior Personnel **Dr. Brian Cohen** (Biology) and **Dr. Kristina Striegnitz** (Computer Science)

Russian Verbs of Motion in Extended Immersive Reality

THE NATIONAL ENDOWMENT FOR THE HUMANITIES

Project Director **Dr. Kristin Bidoshi** (Modern Languages & Literatures)

Sample Tributaries of the Mohawk River for Microplastics

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Principal Investigator **Dr. Jacqueline Smith** (Geology)

SUCCESS-LEADERS: Leading Educational and Academic Directions to Enhance Retention in STEM

THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Dr. Joanne Kehlbeck** (Chemistry); Co-PI **Dr. David Cotter** (Sociology); Senior Personnel **Dr. Samuel Amanuel** (Physics & Astronomy), **Dr. Ronald Bucinell** (Mechanical Engineering), **Dr. Palmyra Catravas** (Electrical, Computer and Biomedical Engineering), Undergraduate Research Director **Dr. Rebecca Cortez** (Mechanical Engineering), **Dr. Holli Frey** (Geology), **Dr. Michael Hagerman** (Chemistry), **Dr. Laura MacManus-Spencer** (Chemistry), and **Matthew Malatesta** (Vice President for Admissions, Financial Aid and Enrollment)

The 2018 Beckman Scholars Program

THE ARNOLD AND MABEL BECKMAN FOUNDATION

Project Director **Dean Wendy Sternberg** (Academic Affairs); Faculty Mentors **Dr. Leo Fleishman**, **Dr. Scott Kirkton** and **Dr. Roman Yukilevich** (Biology) **Dr. Mary Carroll**, **Dr. Kristin Fox**, **Dr. Michael Hagerman**, **Dr. Andrew Huisman**, **Dr. Joanne Kehlbeck**, and **Dr. Laura MacManus-Spencer** (Chemistry); **Dr. Cay Anderson-Hanley** (Psychology); Undergraduate Research Director **Dr. Rebecca Cortez** (Mechanical Engineering)

The Antarctic Scallop as a Key to Paleoenvironments and Sea Ice Conditions: Understanding the Modern to Predict the Past

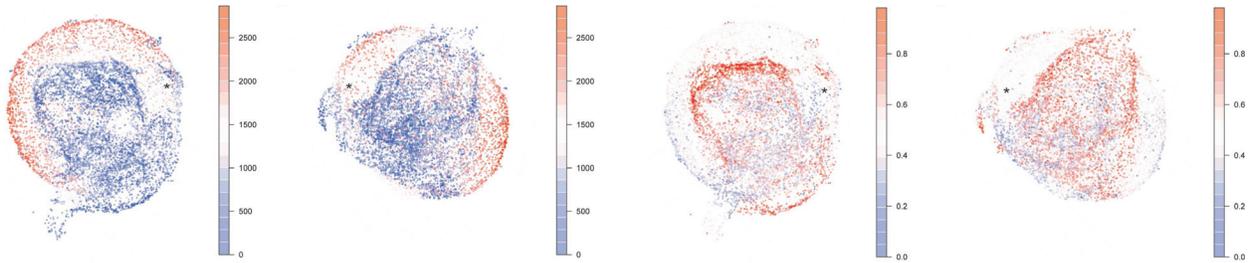
THE NATIONAL SCIENCE FOUNDATION

Principal Investigator **Dr. David Gillikin** (Geology)

Waves of Futurity, Monstrous Attachments

THE NATIONAL ENDOWMENT FOR THE HUMANITIES

Project Director **Dr. Jillmarie Murphy** (English)



PROPOSALS AND AWARDS

A Year in Review

41 NEW AWARDS

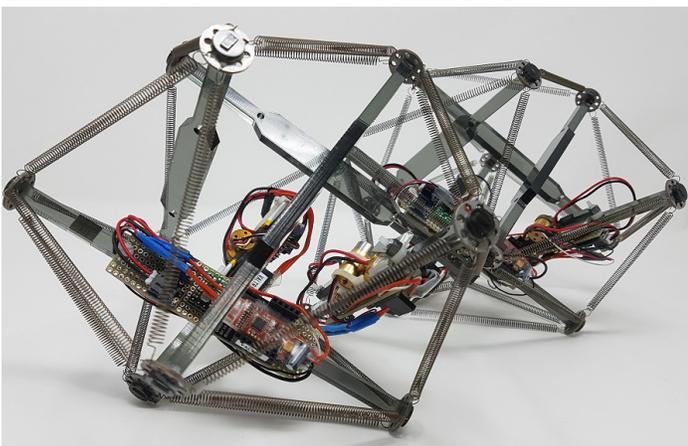
Involving 31 Union College Faculty & Staff
From 23 Academic Departments and Programs
Totaling \$2,851,161

48 PROPOSALS SUBMITTED

Involving 52 Union College Faculty & Staff
From 22 Academic Departments and Programs
Totaling \$5,844,969

70 ACTIVE AWARDS

Involving 75 Union College Faculty & Staff
From 29 Academic Departments and Programs
Totaling \$9,469,426



[TOP] Surface based 3D visibility graph analysis (sbVGA) of acorn ant nest-101. Image courtesy of Dr. Scott Kirkton. [LEFT] A tensegrity robot built by students of the Evolutionary Robotics Lab. This modular, low-cost robot system can be used to explore fundamental questions about the design, modeling and control of soft robots. Image courtesy of Dr. John Rieffel. [RIGHT] Prof. MacManus-Spencer and her research students are studying the contamination of soil samples taken from Bennington, VT, by perfluorochemicals. The soil samples are extracted and then prepped for analysis by liquid chromatography-tandem mass spectrometry (LC-MS/MS). Photograph by Michael Farrel.

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