

Summer 2011 SURE Awards (Announcement from Spring 2011)

Forty-eight Stonehill College students will work with twenty-six faculty members on a variety of research projects over the coming summer of 2011. The scholars and their faculty mentors are the sixteenth group to work under the Stonehill Undergraduate Research Experience (SURE) program, whose purpose is to provide students with an opportunity to perform significant, publishable research under the guidance of an experienced faculty researcher. The research experience will help to provide students with a competitive advantage in graduate and professional school applications and in post-college employment opportunities, as well as to provide assistance to faculty in research activities.

Nora Feeney '13 and Nicole Rota '14 will work with **Bronwyn Heather Bleakley**, Assistant Professor of Biology, on *Does Genetic Diversity Influence Rates of Learning in Guppies?* Both wild and inbred guppies, *Poecilia reticulata*, learn from their shoalmates and cooperate in displaying antipredator behavior. Feeney and Rota, both Biology majors, will use inbred strains of guppies to control the genes (carried in individuals) present in different social groups to describe the influences of genetic diversity and social environment on learning new tasks. They will be responsible for the husbandry of guppies and record keeping associated with maintaining inbred lines, recording behavioral observations, record keeping and data organization associated with large behavioral data sets, and statistical analysis of quantitative genetic data. It is expected that both Rota and Feeney will apply for student fellowships to present their results at one of three national meetings: Animal Behavior Society, Society for the Study of Evolution, or the Society for Integrative and Comparative Biology.

Joseph R. Gale '13, Liam Ross-Fitzgibbons '13, and Timothy Walsh '12 will work with **George Branigan**, Associate Professor of Education on *The Providence Reform School Project*. This project is a continuation of an ongoing investigation into the records of the Providence Reform School, 1850-1880. Gale a History major, Ross-Fitzgibbons a History and Spanish double major, and Walsh a History major and Political Science minor, will assist Professor Branigan in examining and transcribing letters from the office of the Mayor and other documents at the Providence City Archives. All documents will be transcribed, photographed and entered into a comprehensive electronic data base. They will continue their activities at the Judicial Archives to search for additional divorce records, extend the search of arrest records beyond Providence County, and continue to build the vital records profiles (census, births, deaths and marriages) of all inmates. The team will extend its archival searches to the National Archives in Washington, D. C. to copy and transcribe the contents of all Civil War Pension applications filed by inmates who served in the military during the Civil War.

Sean Dwyer '14 will work with **Maria Curtin**, Professor of Chemistry on a project titled *Chlorine Dioxide Produced by the Reaction of Sodium Chlorite with Sodium Ascorbate: The Search for an Intermediate*. The research project involves the study of the mechanism by which chlorine dioxide is produced by the reaction ascorbate with chlorite. Dwyer, a Chemistry and Chemical Engineering major in the Stonehill-Notre Dame Dual Degree program, will use the UV-Vis Spectrophotometer to monitor the production of chlorine dioxide under different conditions. His goal is to isolate and identify a previously observed intermediate in this reaction. He will also learn techniques such as iodimetric and potentiometric titrations to determine the concentration of ClO_2 independently from the spectrophotometric studies and NMR and Mass Spectrometry for the identification of the intermediate.

Emily Nicotera '12 will work with **Maria Curtin**, Professor of Chemistry on a project titled *Investigation of Aluminum Chlorohydrate by Atmospheric Ionization Mass Spectrometry*. Nicotera, Chemistry major and Mathematics minor, will work on developing a method to study aluminum species using Mass Spectrometry. This project entails determining the maximum conditions under which aqueous aluminum species can be ionized with the least amount of fragmentation and the most efficiency using Electron Spray ionization. Initially she will synthesize a typical Aluminum chlorohydrate (ACH) salt using published methods and then she will analyze a library of samples. She will study different ACH salts under various conditions such as temperature, concentration and pH and determine the reproducibility of the spectra and the information they yield. Nicotera's work will be combined with that of the previous SURE studies and will be submitted for publication in the Journal of Inorganic Chemistry. Additionally a Poster will be presented at the 2012 Spring National ACS (American Chemical Society) meeting in San Diego.

James Tracy Denholm '13 will work with **Corey Dolgon**, Director of the Office of Community-Based Learning and Professor of Sociology, on *The Role of Grassroots Organizing in Building a Sustainable Economy for Brockton, MA*. This research will look at Brockton as a “gateway city” and suggest that top-down, “pro-growth” strategies for economic development have not worked for most of these communities despite concerted efforts and major investments. Denholm, an International Studies and Political Science double major and History minor, will review current literature on the ways in which grass roots community organizing can drive development strategies and provide alternative visions and planning. The project will look specifically at Brockton organizing groups (the Brockton Interfaith Community, Community Connections, the Coalition for Social Justice) and their potential for impacting local economic development. Organizers and leaders will be interviewed to discuss the development needs and possibilities that come from their own constituencies. The results of this research will help to frame the upcoming *Urban Innovations* conference sponsored by the City Council and *Brockton Enterprise* to be held this fall.

Kaylee Johnson '12 and **Derek Krevat '13** will work with **William Ewell**, Assistant Professor of Political Science, on a project titled *Presidential Influence on Congressional Appropriations*. Johnson, an International Studies and French double major with a Political Science minor and Krevat, a Political Science major will examine presidential influence in the Congressional appropriations process with the central argument being that presidents possess positive power to strategically influence budget negotiations. The study argues that presidential veto authority in addition to other formal and informal powers provide the president with positive influence in the appropriations process. While Prof. Ewell has been working on domestic spending component of the research, Johnson will assume the defense spending component and Krevat the supplemental spending component. The primary research tasks include data collection and input, literature review, data analysis, and writing a draft of the paper.

Abby Schommer '13 will work with **Brian Glibkowski**, Assistant Professor of Business Administration, on *Personal Selling and Closing Approaches*. The research project will examine the important role of relationship marketing to personal selling closing. The central hypothesis is that the relationship marketing demands a new approach to closing that is integrative (win-win), less focused on specific closing tactics and more focused on antecedent aspects of the relationship that create enabling conditions for sold products and services. It will also examine what personal selling approaches are most effective within the context of high-quality (and low-quality) relationships. Schommer, a Communication major and Business minor, will conduct a literature review, modeling, assessment, analysis and results, and manuscript development. She will also work closely with Qvidian, including direct interaction with senior executives. The desired outcome is a conference paper and presentation in the area of study.

Francis O'Brien '13, will work with **John Golden**, Associate Professor and Chair of Foreign Languages, on *The Brothers Karamazov as Test Case for a Theory of Literary Translation*. The project will compare two English translations of Dostoevsky's *The Brothers Karamazov* and explain how, and, more importantly, why, they differ. The hypothesis is that differences between translations derive from differences in interpretation of a text, because translators are readers before they are writers. O'Brien, an English major and Journalism minor, will examine the two most important translations of the text: the canonical one by Constance Garnett, revised by Ralph Matlaw, important because it appears as a Norton Critical Edition' and the one by Richard Pevear and Larissa Volokhonsky, important because the translators currently reign as *the* translators of classic Russian fiction into English. Dissemination of results is planned in either a conference paper or an article in a journal devoted to literary translation.

Kelly Albino '12 will work with **Stacy Grooters**, Director of the Center for Teaching and Learning and Assistant Professor of English, on *When the Campus is the Community: Shifting the Idea of “Service” in Service Learning*. Community-Based Learning (CBL) seeks to increase students' academic and civic engagement by providing them meaningful opportunities to apply what they learn to projects completed in partnership with community organizations. A foundational value of CBL holds that such projects must be “mutually beneficial” to both campus and community; however, in practice, community needs are often overshadowed by the demands of the classroom. The project seeks to investigate whether CBL projects that disrupt assumptions about who serves and who is being served in campus-community partnerships can set the stage for more mutually beneficial relationships. Albino, an English and Gender & Sexuality Studies double major and Secondary Education minor, will compile a literature review by surveying existing research on community-based learning and feminist pedagogy; develop an interview protocol; and follow through with conducting, transcribing, and coding interviews for analysis. A proposal to the New England Women's Studies Association conference in April 2012 is planned.

Nathaniel Bowditch '13, Patrick Kelleher '13, Eliseo Miranda '13, and David Thomas '12 will be working with **Mevan Gunawardena**, Assistant Professor of Physics, on a project titled *Detection of Weak Atomic Transitions with Entangled Photons*. The project aims to understand and control quantum coherences and entangled states in atomic, molecular or optical systems and investigate potential applications in spectroscopy and imaging. Bowditch, a Computer Science major, Kelleher, Chemistry major with a Physics minor, Miranda, a Physics major, and Thomas also a Physics major, will use a nonlinear crystal to create entangled photon via parametric down conversion. The entanglement of these photons will be investigated using photon counting techniques. The eventual goal of this work is to demonstrate imaging at a resolution beyond the classical limit.

Min Seong Kim '13, and Stephanie Milne '12 will work with **Marilena F. Hall**, Associate Professor of Chemistry on two separate projects. Kim, a biology major and chemistry minor, and Milne, a biochemistry major will be working on *Investigation of the Effect of Gene II Shine-Dalgarno Mutations on Protein Expression and Phage Propagation in M13 Bacteriophage* to continue the efforts of past SURE projects. Both students will develop a better assay to quantify levels of pII production by M13 phage, work on creating designed mutants, and construct a library of mutants to select additional fast-propagating ones. M13 is one of the most intensely studied bacteriophages and is often used as a model for gene expression.

Alicia Carreiro '13, Patrick Hill '12, and Jessica Zebrowski '13 will work with **Magdalena James-Pederson**, Assistant Professor and Chair of Biology on three related projects. The honey mushroom, *Armillaria gallica*, is a saprophytic fungi that can degrade wood and cause white rot on the infested wood. One of the byproducts that is made during the wood degradation process is methanol. Recent studies seem to indicate that there is a second organism, *Methylobacteria*, living in close association with *A. gallica* and this microorganism is probably benefiting from the methanol produced by the fungal enzymes. The goal of the research projects this summer is to study different aspects of this symbiotic relationship between *Armillaria* and *Methylobacteria*. Carreiro, a Biochemistry major will work on a project titled *Analysis of 16S rRNA Gene Sequences from Methylobacteria Infecting Cultures of Armillaria gallica*. Hill, a Biology major will work on, *Cloning of the Putative Phytase Gene from Armillaria gallica*. Zebrowski, also a Biology major will work on, *Analysis of the Relationship Between the Honey Mushroom and Methylobacteria*.

John Driscoll '12 will work with **John Lanci**, Professor of Religious Studies, on *Pedagogies of Collaboration*. This research project will continue work about active or engaged pedagogy at the college and university level. A number of forms of teaching will be examined, particularly service or community-based learning, undergraduate research, intensive use of Teaching Assistants (TA's), and problem based learning. Driscoll, a History major, will be the lead author on an article about how undergraduates can be more wisely utilized as co-teachers in the humanities and how to structure training sessions for the job. Driscoll and Lanci will also work on a second article that explore the thesis: Despite warnings that a gulf is developing between tech-savvy 21st century students and mid- to late-career faculty, active learning strategies – particularly problem based learning- provide a possible bridge between Millennials and Baby-Boomers that can result in particularly effective education.

Eve Granatosky '12, Kelly McCarthy '13, Nicole Sjoblom '13, and Samantha Sweeney '13 will work with **Louis J. Liotta**, Professor and Chair of Chemistry, on three related projects. Over the last several years, SURE scholars in collaboration with Dr. Liotta have developed a means of efficiently converting commercially available sugars into polyhydroxylated pyrrolidines, and pyrrolizidines. Granatosky, a Biochemistry major will work on, *The Syn- Steroselective Dihydroxylation of Pyrrolizidine Double Bonds*. She will repeat the synthesis of the vinyl pyrrolidine starting from D-glucose that was originally developed by a 2004 SURE scholar. Her research will then concentrate on the selective conversion of this vinyl pyrrolidine into a tetrahydroxylated pyrrolidine. McCarthy, a Biochemistry major will be working on, *Synthesis of Polyhydroxyted Pyrrolidine from a D-Altrose Derivative*. She will be continuing research started by previous students, collecting a full set of characterization data on every compound for which it had not been done and improving the yields of those steps that gave low yields. Sjoblom, a Biochemistry major will be working on *Synthesis of Di(hydroxymethyl)pyrrolidine Diol from D-glucose*. She will continue the work of a previous SURE scholar in trying to expand the utility of the synthetic methodology developed by Dr. Liotta and his student collaborators into a whole new class of polyhydroxylated pyrrolidines. Sweeney, also a Biochemistry major will be working on *Polyhydroxylated Indolizidine Synthesis from D-Glucose*. She will continue the research she started last summer as an NSF-STEP scholar to adapt the pyrrolizidine synthesis methodology to make compounds that are one carbon large called indolizidines. Results of the research will be presented at the national meeting of the American Chemical Society and eventually published in the Journal of Organic Chemistry.

Patrick Cabral '13, Erica Carbone '13, and Michele Flannery '13 will work with **Gregory D. Maniero**, Assistant Professor of Biology. Cabral, a Biology major, will work on *Complement Activity in the Serum of Leopard Frogs, Rana pipiens: Investigating the Innate Immune Response in Amphibians*. Carbone, a Biology major, will work on *Early Gene Expression of the Innate Immune Response of Rana pipiens Following Exposure to the Fungal Pathogen Batrachochytrium dendrobatidis*. Flannery, a Biology major, will work on *Early Gene Expression in the Innate Immune Response of Xenopus laevis*. An understanding of amphibian immune response to pathogens, and the ability to detect such responses, are extremely valuable tools for understanding and possibly preventing future losses of amphibian populations. BD has been implicated in many amphibian die-offs and is considered by some researchers to be the prime agent in global amphibian decline. Previous work has looked at the innate immune response in amphibians that are relatively resistant to BD. This project will study the response of an organism that is susceptible to BD infection to find out what genes are expressed during an acute exposure. The long-term goal is to determine if evasion of innate immunity plays an important role in amphibian die-offs. Their work will be used in a manuscript that Prof. Maniero will write and submit to a leading comparative immunology journal.

Domenique Ciavattone '13 will work with **Anne Mattina**, Associate Professor of Communication, on the research project titled *Striking Women: Massachusetts Mill Workers & Rhetorical Agency, 1912*. The 1912 Bread and Roses strike of Lawrence, Massachusetts woolen workers is a pivotal event in American labor history. Though the strike and its aftermath have been the subject of much scholarship, little attention has been paid to the effect these events had on the state's workforce. In the wake of the Lawrence strike, labor unrest spread throughout the Commonwealth. There remains a significant amount that we can learn from these events, particularly in terms of rhetorical agency, or the ability to effect change through persuasion. Ciavattone, a Communication major will familiarize herself with the literature of the strike and rhetorical agency, conduct archival research, and organize and summarize findings in a literature review. An analysis of data will look for evidence of rhetorical agency and effectiveness.

Elizabeth Belanger '13, Maura Ferrarini '12, Emily Palmisano '13, and Ashley Proctor '13 will work with **John G. McCoy**, Director of the Neuroscience program, on three separate research projects carried out at the Brockton Veterans Administration Medical Center. Clinical studies in humans show that sleeping 2 to 3 hours less than normal leads to impairment in cardiovascular, immune, endocrine and cognitive functions. However, little experimental research has been done to understand these effects. Ashley Proctor will work on *Caffeine, Sleep Restriction, and Sleep Homeostasis*. Here, electrophysiological (EEG) recordings are used to evaluate how caffeine interacts with sleep restriction to modify sleep state and sleep quality. Liz Belanger will work on *Caffeine, Sleep Restriction, and Memory*. Since it binds to adenosine receptors, caffeine can be used to assess the role of adenosine in mediating the connection between sleep restriction and memory deficits. Maura Ferrarini will work on *The Neural Arousal System*, a project focused on the neuroanatomical circuits involved in switching between sleep and wakefulness. Emily Palmisano will evaluate motivational variables thought to mediate the connection between sleep loss and changes in food consumption. Her project is entitled *Sleep Deprivation and Motivation for Food Reward*. All four students are majoring in Neuroscience.

Nicholas Kolenda '12 will work with **Lee McGinnis**, Assistant Professor of Business Administration on *Testing the Knowledge-Transfer Circumplex among Golfers*. This project will draw on the results of interviews conducted with twenty-five highly credentialed golf professionals. The professionals were highly capable at using a diverse set of communication skills and modes that can be illustrated through the Knowledge-Transfer Circumplex (KT-Plex). Now that an understanding of how the top teaching professionals in the country teach and which communication modes they prefer when transferring knowledge, this project will extend the study by focusing on how golfers prefer to learn. Kolenda, a Marketing major, will be performing interviews of active and avid golfers to accurately assess the model variables in addition to testing its corresponding nomological network. Data entry and analysis will also be performed.

Rachel Sederberg '13 will work with **Sean Mulholland**, Associate Professor of Economics on *Catholic Schools, Competition, and Public School Quality*. Catholic school attendance is associated with higher college graduation rates and wages for observationally similar students. Less clearly understood are the competitive effects of private schooling and Catholic schools in particular, on *public* school quality. Sederberg, an Economics major and Mathematics minor, will collect data on public school student performance at the school and district level for all fifty states from each state's Department of Education. She will then estimate and interpret the relationship between public school performance and the exogenous changes in Catholic school operation and funding. A presentation at either the 2012 Eastern Economic Association Meetings, the 2012 Midwest Economic Association Meetings, or the 2012 Association of Private Enterprise Education Meetings is planned.

Corey Adams '12 will work with **Eugene Quinn**, Assistant Professor of Mathematics, on a project titled *Associations in the Longitudinal Course of Body Dysmorphic Disorder*. This project involves preparation and analysis of data that has been collected by Katharine Phillips, M.D., Professor of Psychiatry at the Warren Alpert School of Medicine at Brown University, during an ongoing study of Body Dysmorphic Disorder (BDD) at Butler Hospital in Providence. The purpose of the study is to help people with BDD by increasing knowledge about BDD and developing new and better treatments. Adams, a Mathematics major, will analyze the data collected from this study. He will participate in all aspects of the statistical analysis, including database programming, running statistical analysis programs, and writing up results.

Michael Hershberg '13 and **Mallory Sullivan '13** will work with **Robert R. Rodgers**, Assistant Professor of Political Science, on a project titled *Open Space Preservation in Colorado: The Great Outdoors for Whom?* The project stems from Professor Rodgers's previous research into the politics of New Jersey's Green Acres Program, the state's longstanding program to preserve land as open space. The purpose of this research is to examine whether the politics of exclusion afflict Colorado's open space preservation programs. Hershberg, a Political Science major, will research the enactment of the Great Outdoors Colorado Trust Fund. Sullivan, a Political Science and Public Administration double major, will research the adoption and use of local taxes to fund open space preservation. They intend to present their paper at a scholarly conference during the upcoming academic year and submit it for publication in either a law review or political science journal. They may also decide to communicate their findings directly to policymakers.

Terry Rose '13 will work with **Hsin-hao Su**, Assistant Professor Mathematics, on projects titled *The Edge-balance Index Set of the Halin Graph of a Caterpillar*. These are continuing projects from Professor Su's previous SURE projects. While investigating several different combination L-product graphs, previous students successfully solved a number of them and generated enough results to publish papers on the findings. Professor Su's projects this year are untouched problems from last year. Rose, Mathematics major, will be trying to determine the possible edge balance indexes of the L-Product graph of a centipede graph with a cycle graph and will also be trying to determine all the possible edge balance indexes of the Halin graph of a caterpillar graph with a spine length of 3. A joint paper submitted to the 43rd *Southeastern International Conference on Combinatorics, Graph Theory and Computing* at Florida Atlantic University in March 2012 in anticipated.

Kayla Delle Chiaie '13 and **Stephanie Murray '13** will work with **Leon Tilley**, Associate Professor of Chemistry, on a project titled *Investigation of Electron-withdrawing Substituents in the Synthesis of Cyclopropanes, Bicyclobutanes, and Tetrahedranes*. Delle Chiaie and Murray both Chemistry majors, will be refining a syntheses for several cyclopropanes and bicyclobutanes and developing a syntheses of potentially less stable tetrahedranes and trifluoromethyltetrahedranes. Syntheses of these would prove to be a novel accomplishment. From an applied view, the methodology being developed could be useful for pharmaceuticals containing the trifluoromethylcyclopropyl moiety. Another possibility for some of these compounds is that they could be used as high-energy fuels either for direct combustion or perhaps as a potential feedstock for fuel cells.

Hannah Rosen '12 will work with **Erica Tucker**, Assistant Professor of Anthropology, on a project titled *La Famille Étrangère: Cultural Constructions of Frenchness and the Home Stay Experience*. The research project is an anthropological study on the home stay experience conducted with host families and students studying abroad in Grenoble, France. An ethnography will be written which examines how the host family adapts their lifestyle and routine behaviors, and orients themselves around an extended foreign presence in the home: both foreign in the sense that the student is not a member of the family, and also foreign in that the student is literally from a foreign country. Rosen, an English and French double major, is already collecting data via participant observation and interviews as she is studying abroad in Grenoble, France this semester. During the summer, the research process will continue in a few ways; review of anthropological texts as well on French culture, transcription of recorded interviews, coding and analysis. Ultimately, data collected will result in an ethnographic paper for submission to a conference or academic journal.

Kristyn Kelley '12 and **Joseph Masciangioli '13** will work with **Peter Ubertaccio**, Director of the Martin Institute and Associate Professor and Chair of Political Science on *Network Marketing, Social Media, and the American Party System*. Kelley, a Criminology and Political Science double major, and Masciangioli, a Political Science major, will be analyzing the effects of social media on local party organizations and campaigns. Though social media and network marketing are modern innovations, the literature on both is vast, a product of their success. A few national campaigns have had well documented success with social media platforms, most notably the Howard Dean campaign in 2004 and the campaign of Barack Obama in 2008. But the impact of these tools on local parties remains relatively unknown. The specific goal of this project is to analyze the effects of social media and network marketing on local party organizations and campaigns. A presentation at a national or international conference on political marketing is planned.

Kimberly Luciano '13 will work with **Chris Wetzel**, Assistant Professor of Sociology, on a project titled *Social Worth and Common Wealth: Race Class, Gender and the Politics of Gaming Legalization*. Their research will situate contemporary debates about tribes and casinos in a larger context by diachronically assessing how race, class, and gender have impacted debates over legalizing different forms of gaming in Massachusetts. Specifically, this project will draw on qualitative data sources to analyze variable public constructions of the proprietors of gaming operations, the patrons of gaming facilities, and the process of allocating gaming proceeds during debates over pari-mutuel wagering in 1930s, the state lottery in the 1970s, and casinos (particularly tribal casinos) in the 2000s. Luciano, a sociology and Public Administration double major, will use the completed research to present a paper at a regional sociology conference during the 2011-2012 academic year. She will also collaborate with Prof. Wetzel to prepare an article that will be submitted to a journal.

Briana Burke '13 will be working **Eunmi Yang**, Assistant Professor of Education, on a project titled *Research in Science Education: Studies on the Nature of Science & Inquiry*. The project is broken into two parts. The first part focuses on entry and analysis of collected data about the pre-service teachers understanding of the Nature of Science. A survey instrument was developed and piloted as a result of a previous SURE project and this summer, the instrument will be finalized. A final set of questions will be selected based on in-depth analysis of wordings of each item, factor analysis of the combined data set, and qualitative analysis of preservice teachers' answers on the Nature of Science question. The second part of the project will examine the impacts of teachers' implementation of a student-oriented inquiry approach on changes in students' standardized test scores over a 3-year period. A draft of a manuscript for an article in a science education journal and a conference presentation proposal are anticipated outcomes of this summer's work.

SURE Scholars will begin the program on May 31, 2011 for an eight or ten week period. They will engage in weekly meetings to discuss the progress of their projects and other topics of general interest, and will be paid a stipend for their full-time service. All SURE Scholars will present summaries of their summer's work at an all-campus poster session in the early fall.

Students and faculty members who wish to pursue a SURE research project for the summer of 2012 may contact the Office of Academic Development, Duffy 119, ext. 1069, for further information. The deadline for applications for the summer of 2012 will be in early December 2011.