

SURE AWARDS SUMMER '09

Forty-five Stonehill College students will work with twenty-four faculty members on a variety of research projects over the coming summer of 2009. The scholars and their faculty mentors are the fourteenth 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.

Dana Gilfeather '11, Nicole Klemonsky '11, and Brittany Montano '11 will work with **Karen L. Anderson**, Associate Professor of Education and **Susan Mooney**, Associate Professor of Biology, on a project titled *Children as Urban Ecologists: A Model for Inquiry- Preschool through Preservice*. Since the schools of Reggio Emilia, Italy were hailed as the best in the world by Time magazine (1991), their innovative approach to early childhood education has not only received world-wide attention, it has also served as the theoretical basis for an LC co-taught by Mooney and Anderson. Capitalizing on work started as students in this LC, Gilfeather and Klemonsky, both Early Childhood Education and American Studies double majors, and Montano, an Elementary Education and American Studies double major, will investigate how elements of the RE approach can be modified to better apply to US schools. Through the creation of an outdoor classroom at Trinity Catholic Academy in Brockton, their goal is to better understand 3 key principles of the RE Approach: children's use of symbolic languages, documentation as assessment, and project-based learning. The ultimate goals of this project are a conference presentation and a manuscript draft for submission to a science education journal that outlines the approach utilized by both the schools of Reggio Emilia and the LC *Children as Urban Ecologists*.

Jacqueline De Cormier '11 and Kristina Swartz '11 will work with **Elizabeth Belanger**, Assistant Professor of History on a project titled, *Women City Builders in Progressive Era Chicago and St. Louis*. They will be examining the neighborhood planning practices of Chicago women in the years between 1870-1914. Jacqueline, a History major, will use historic newspapers, diaries, letters, and organizational records to trace the efforts of Italian American women to improve their neighborhoods by providing social services and creating community spaces for newly arrived immigrants. Kristina, also a History major, will use historical newspapers, research collected from government archives and historical maps to research the development and outcome of specific court cases in which women reformers protested against the planning actions of city governments and individuals. Both students will present their research at the next year's New England Historical Association Annual Meeting.

Caitlin Dunn '11 will work with **Kenneth Branco**, Professor of Sociology on a project titled, *Spirituality, Religiousness, and Social Behavior among Nursing Home Residents*. This research builds on Professor Branco's previous work on the relationship between spirituality, religiosity, and social functioning among nursing home residents. Their research will involve observations and interviewing within local nursing homes, the West Acres Home in Brockton, and the Blue Hills Alzheimer's Care Center in Stoughton. Dunn, an American Studies major will assist in literature review research and writing, assist in development of measures of religiousness and social behavior, write detailed descriptions of resident behavior, and conduct interviews. The outcomes of this research will result in both conference and publication.

Alessia Di Censo '11 will work with **George Branigan**, Associate Professor in the Department 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. Alessia, a History major, will assist Professor Branigan in examining the records of Dexter Asylum (Poor House) and the records of RIHS to search for individuals who bounced back and forth between the two institutions. They will build and extend the data base which chronicles the lives of each of the 2,725 inmates. They will also examine Civil War pension records at the National Archives. From all of these records, they will analyze family dynamics: socio-economic status, occupational history, marital stability, growth of families and circumstances of death. They will continue to gather the 1865 and 1875 Rhode Island state census records for the identified sample and target marriages and death from the vital records. Alessia will contribute to Branigan's manuscript and will participate in the next generation of publications and conference presentations.

Erin Horan '11 will work with **Scott Cohen**, Assistant Professor of English, on a project entitled, *Out of Bounds: Literature and Territory*. Horan, an English major, and Cohen will pursue a thoroughly interdisciplinary approach to better understand how the construction of boundaries, borders, and frontiers shapes works of fiction.

Their investigation will involve a survey of the key texts from the field of boundary making, archival research into specific instances of boundary making, and close textual analysis of novels grappling with the rendering of boundaries. They anticipate this project will result in an article-length scholarly publication, a collaborative presentation of their findings, and a presentation at the Undergraduate English Conference.

Margaret Sheehan '10 will work with **Maria Curtin**, Professor of Chemistry on, *Formamidine Sulfinic Acid as an Alternative to Ascorbate in the Production of Chlorine Dioxide*. Sheehan, a Chemistry major, will focus on the reaction of formamidine sulfinic acid with sodium chlorite. She will study the FSA chlorite reaction under the neutral to slightly basic conditions required for the sterilizer. During the SURE program of summer of 2008, Sarah Keeling and Candinho Gomes explored FSA as a possible alternative to ascorbate and found that when mixing chlorite with FSA, Chlorite was produced even under basic conditions. This work will contribute to Sheehan's senior thesis.

Ben Irzyk '10 will work with **Maria Curtin**, Professor of Chemistry on, *Chlorine Dioxide produced by the reaction of sodium chlorite with sodium ascorbates: the search for an intermediate*. This project will involve the study of the mechanism by which chlorine dioxide is produced by the ascorbate-chlorite and ascorbate-chlorite-sulfite reactions. The reaction of ascorbate with chlorite is not well understood and has only been mentioned in reference with the production of chlorine dioxide. Irzyk, a Chemistry major will explore different reaction conditions and the effect of those on the production of chlorine dioxide. This research will contribute to Irzyk's senior thesis.

Matt Doucette '11, Angela Farinella '10, and Megan Shave '11 will work with **Roger M. Denome**, Associate Professor and Chair of Biology, on *Genetic Differentiation in the Local Red-backed Salamander Populations*. They will use the techniques of molecular genetics to elucidate the biological mechanisms that determine the distribution of genetic variation in redback salamander populations in southeastern Massachusetts. Doucette, Farinella, and Shave, all Biology majors will isolate DNA from the redbacks tissue samples collected from three stone wall locations. They will examine genetics variation at microsatellite loci, which are tools of choice for studying population heterogeneity. The results will be submitted for publication in a peer-reviewed journal and presented at the Eastern New England Biological conference in April 2010.

Tom Lally '11 will work with **Sarah Gracombe**, Assistant Professor of English, on a project titled, *"Bland" Englishness: Investigation Identity in the Writing of W. Somerset Maugham*. Lally, an English major, and Gracombe will examine the work of English writer W. Somerset Maugham. They will focus on its engagement with debates about the Jewishness and Englishness, categories that inevitably intersect with and challenge understanding of race, nationality, and creativity in the early 1900s. They will examine all of Maugham's work including his lesser-known travel writings and short stories, as well as the scholarship his work has generated; and the theories of nationality that illuminate it. This project will serve as the basis for a scholarly article written by Professor Gracombe and a long research paper by Tom that will be presented at Stonehill's Undergraduate Literature Conference (Spring 2010). Tom will also submit his paper to national conferences such as the Undergraduate Literature & Creative Writing Conference.

Kelsey Hill '10 will work with **Marilena F. Hall**, Associate Professor of Chemistry on *Characterization of the Zinc Binding Reactivity of Phage-displayed Peptide*. Enzymes are the proteins that catalyze all the important reactions in biological systems. Understanding how an enzyme operates can provide useful information about how to best catalyze a given reaction and can be applied to the development of medicinal compounds as well as industrial catalysts. A good way to simulate a protein on a smaller scale is using a short chain of amino acids, called a peptide. Hill, a Biochemistry major, will examine sequences that have been identified as a putative zinc-binder such as QHLRHHH, and therefore is worthy of further characterization.

Christina Martone '11, and Evan Tallmadge '10 will work with **Marilena F. Hall**, Associate Professor of Chemistry on *Creation of novel fast propagating M13 bacteriophages using a gene II Shine-Dalgarno library*. M13 is one of the most intensely studied bacteriophages and is often used as a model for gene expression. They suspect that a mutation leads to the enhanced expression of one of the M13 genes, producing more of a particular protein. The location of the mutation, which is Shine-Dalgarno sequence of gene II, is consistent with an increase in protein expression based on the role that the SD sequence is known to play in initiating gene expression.

Future direction for this research aim to confirm this hypothesis and then apply the connection between SD mutation, protein expression, and phage propagation to the general study of gene expression in M13 bacteriophage.

Meghan Galiardi '11 and **Daniel Perry '11** will work with **Hsin-hao Su**, Assistant Professor of Mathematics, on *The Edge-balance Index Set of the Halin Graph of a Caterpillar Graph*. They plan to determine all the possible edge balance indexes of the Halin graph of a caterpillar graph with a spine length of 3. A caterpillar graph has a spine and many feet and a Halin graph connects all the ending vertices forming a cycle. Because they do not restrict the number of feet, there is an infinite number of these graphs. This problem has never been solved before. Meghan, a Mathematics and Computer Science double major, and Dan, Mathematics major will first study a number of recent journal articles that discuss graph labeling problems. Meghan and Dan will search for possible techniques to attack the problem and come up with an original solution. Assuming they solve the problem, they will write a paper and present it at a conference.

Kimberly Canty '11 and **Courtney Earle '11** will work with **Magdalena James-Pederson** on, *Cloning and sequence comparison of various genomic regions from different isolates of Armillaria*. This project represents a continuation of the research performed last year on the honey mushroom *Armillaria gallica*. Canty, a Biochemistry and Spanish double major and Earle, a Neuroscience major will clone genomic fragments from *Armillaria*'s IGS-1 region. Through genomic sequence analysis, they hope to provide insight into some of the cell sorting and genome changes that take place during the life cycle of *Armillaria gallica*.

Kerri Caulfied '10 will work with **Pamela Kelley**, Instructor of Sociology, on *Lessons Learned from the Brockton Shannon Community Safety Initiative*. They will conduct an evaluation of the Shannon Community Safety Initiative Gang Grant for the Brockton Police Department. The Shannon Gang Grant is funded through the Executive Office of Public Safety and involves suppression, intervention, and prevention activities. This project will examine all of the different strategies that have been employed between July 2006 and June 2009 to evaluate which were most effective and achieved stated goals and which were ineffective and failed to accomplish what was expected. Caulfied, a Criminology major, and Kelley will work to create an evaluation plan, collect necessary data, conduct an analysis of the information gathered, and create a "Lessons Learned" report that can be shared with the Brockton Police Department, the Executive Office of Public Safety, and other existing or proposed Shannon Grant communities in the Commonwealth.

Amanda Kellett '10 and **Sarah Chiodi '11** will work with **Bonnie Klentz**, Professor in the Psychology Department. Kellett, a Psychology major, will work on a project titled, *Should Attorneys be Concerned about a CSI Effect*. Chiodi, a double major in Psychology and Mathematics will work on a project titled, *Predicting Juror and Jury Verdicts Using Logistic Regression*. Both Kellett and Chiodi will work with Klentz to examine whether watching forensic science TV dramas influences how jurors discuss evidence when deliberating. They will analyze data from individual jurors and juries collected during the pre CSI years ('97-'98) with data collected since CSI has been on the air. This will be the first empirical examination of the CSI effect that includes jury deliberations. Both students will submit their findings to be presented at the 2010 meeting of the American Psychology-Law Society.

Meredith Eno '11, Brittany Fox '11, Mitchell Keylor '11, Nicole Leonard '11, and Nicholas Pace '11 will work with **Louis J. Liotta**, Professor of Chemistry, on *Expanding the Scope of a Polyhydroxylated Pyrrolidine Synthesis to Include More Isomers of the Polyhydroxylated Pyrrolidine as well as the Synthesis of Polyhydroxylated Pyrrolizidine and Indolizidines*. Carbohydrates are the most widely distributed naturally occurring organic compounds on earth. Over the last several years, SURE scholars in collaboration with Dr. Liotta have developed a means of efficiently converting commercially available sugars into vinyl pyrrolidines. Biochemistry majors Keylor and Pace, Chemistry majors Eno and Fox, and Leonard, a Biology major will further develop the synthesis to allow for the synthesis of polyhydroxylated pyrrolidines and pyrrolizidines. Results of the research will be presented at the national meeting of the American Chemical Society as well other chemistry conferences. The project will also include the preliminary preparation of a manuscript that will be submitted for publication once sufficient results have been obtained.

Caitlin O'Connell '11 and **Michael Daly '11** will work with **Gregory D. Maniero**, Assistant Professor of Biology on a project titled *Early gene expression of the innate immune response of Xenopus laevis following exposure to the fungal pathogen Batrachochytrium dendrobatidis (BD)*. 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. This project will study the response of an animal that is resistant to BD infection to find out what genes are expressed during an acute exposure.

The long-term goal is to perform similar experiments on a susceptible species to determine if evasion of innate immunity plays an important role in amphibian die-offs. O'Connell and Daly, both Biology majors will present their work in the Eastern New England Biological Conference in April 2010. And their work will be used in a manuscript that Professor Maniero will write and submit to a leading comparative immunology journal.

Matthew Rigby '10, Kaitlyn Scalisi '10, and Devon Poeta '10 will work with **John G. McCoy**, Associate Professor of Psychology on three separate research projects pertaining to sleep. Each study will be carried out at the Brockton VAMC, located less than two miles from Stonehill. Rigby a Biology major, will focus his laboratory research on the elucidation of the role of certain brain regions in the regulation of sleep and wake, in a project titled *Neuroanatomy of the sleep/wake cycle*. Scalisi, a Neuroscience major, will conduct experiments designed to better understand the sleep disruption that is one of the symptoms of Alzheimer's Disease. The project is titled *Sleep Disruption, Alzheimer Disease, and Memory*. Finally, Poeta also a Neuroscience major will develop a model to study the deficits in attention that characterize humans diagnosed with sleep apnea. The project is titled *Cognitive Effects of Experimental Sleep Fragmentation*.

Meghan Sullivan '10 will work with **Angela Paradise**, Assistant Professor of Communication, on a project titled, College Students' Use of Facebook in Relation to Personality Traits and the Third Person Effect. The project will survey college students' on their use of the popular social networking site, Facebook, as well as their perceptions of Facebook's influence on themselves and others. The survey will also measure students' level of introversion-extroversion, a well-known personality trait, in relation to their Facebook use and self-disclosure habits. Meghan, a Psychology major, will conduct literature reviews, assist in survey creation and administration, code and enter data, participate in data analysis, and assist in the writing and editing of their manuscripts for future publication.

Jason Lynch '11 will work with **George Piggford C.S.C.**, Assistant Professor of English, on *Flannery O'Connor and Psychoanalytic Theory*. This work will build on a SURE grant from the summer of 2007 as well as research conducted during the summer of 2008. Piggford and Lynch will trace the interplay between psychoanalytic theory and the literary output of Flannery O'Connor. They will begin by undertaking a thorough examination of psychoanalytic theory and then proceed to primary and secondary sources. Lynch, an English major, will produce a lengthy essay on the topic that demonstrates the usefulness of psychoanalytic theory for interpreting Flannery O'Connor. Collaboratively they will write a short paper that will be presented at a professional conference during the 2008-2009 academic years.

Tracy Catalan '10 will work with **Eugene Quinn**, Assistant Professor of Mathematics on a project titled Analysis of Data from a Longitudinal Study 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 develop new and better treatments. Catalan, Mathematics major, will analyze the data collected from this study. She will participate in all aspects of the statistical analysis, including database programming, running statistical analysis programs, and writing up results.

Brittany Kaminski '11 will work with **Ann Marie Rocheleau**, Instructor in the Department of Sociology and Criminology on Prison Infractions. This study will be an exploratory examination of the prison disciplinary reports given to inmates who have been classified as a security threat and as disruptive in the Rhode Island Department of Correction (RIDOC) during the past three years. Kaminski, a Sociology and Philosophy double major, and the faculty researcher will collect and code the disciplinary reports as a part of a larger study, enter the data into a database, and then analyze the data using SPSS. It is anticipated that the result will be a scholarly article submitted to a peer-reviewed journal in the field as well as a presentation on the findings to the RIDOC, at the SURE conference and also a regional sociological conference.

Michael Goretti '11 and Kristin Jackson '10 will work with **Cheryl S. Schnitzer**, Assistant Professor of Chemistry. Goretti, a Chemistry major will work on, *Purifying and Analyzing Biodiesel*. Jackson, also Chemistry major will work on, *Purifying Biodiesel using a Bubble Column*. Both projects involve helping home brewers of biodiesel, an alternative, renewable fuel derived from raw vegetable oil of crops such as canola, corn, or soybeans. They will develop a website that explains how to synthesize biodiesel, how to build a bubble column using supplies from Home Depot, how to use a bubble column most effectively, and how to eliminate contaminants for safe biodiesel use in vehicles. A paper will be submitted to the journal of Environmental Science and Technology and a poster presentation the Student Chemistry Research Conference in Boston, MA.

Meghan Galiardi '11 and **Daniel Perry '11** will work with **Hsin-hao Su**, Assistant Professor of Mathematics, on *The Edge-balance Index Set of the Halin Graph of a Caterpillar Graph*. They plan to determine all the possible edge balance indexes of the Halin graph of a caterpillar graph with a spine length of 3. A caterpillar graph has a spine and many feet and a Halin graph connects all the ending vertices forming a cycle. Because they do not restrict the number of feet, there is an infinite number of these graphs. This problem has never been solved before. Meghan, a Mathematics and Computer Science double major, and Dan, Mathematics major will first study a number of recent journal articles that discuss graph labeling problems. Meghan and Dan will search for possible techniques to attack the problem and come up with an original solution. Assuming they solve the problem, they will write a paper to publish in a peer-reviewed journal and present it at a conference.

Allison Colthart '10, **Brad Constant '11**, **Lily Nicole Dubois '10**, and **Michael Mercadante '10** will work with **Leon Tilley**, Associate Professor of Chemistry on, "*Toward the Synthesis of Tetrahedrane: Synthesis and Solvolysis of 3-Trimethylgermyl- and 3-Trimethylsilyl cyclobutyl Systems.*" The ultimate goal of the highly symmetrical hydrocarbon tetrahedrane, 1. Synthesis of 1 has proven to be elusive, presumably as a result of the high degree of ring strain required of its carbon bonds by geometry. However, the tetra-tert-butyl derivative of 1 is a remarkably stable crystalline solid. More recently, tetrakis(trimethylsilyl) tetrahedrane has also been prepared and found to exhibit high thermal stability. From a purely research oriented view, synthesis of the potentially less stable tetrahedrane would prove to be an accomplishment. From an applied view, this compound could be used as a high-energy fuel either for direct combustion, or perhaps as a potential feedstock for fuel cells. This research will be presented at an Office of Naval Research conference. The long-term outcome of this project will be publication in a peer-reviewed chemistry journal.

Kathleen Stephan '10 will work with **Peter Ubertaccio**, Associate Professor of Political Science and Director of the Martin Institute on a project titled *The History, Politics, and Culture of the Igbo People*. Ubertaccio and Stephan, an International Studies Major, traveled to the poverty stricken Aku village in the Nsukka region of Nigeria with the African Youth Education and Community Development Foundation (AYECDF) in mid-August 2008. There they met with government officials, school children, and local citizens and conducted seminars on issues of development, health, and the pervasive problem of political corruption in the region and nation. This SURE project will begin to write the history of the Igbo people who live in Nsukka and will analyze the nexus of longstanding political corruption and cultural attributes that appear to work against sustainable development in the region. Ubertaccio and Stephan will examine the video journals and field notes they developed while in Africa as well as primary source material given to them by the people of Aku. They will also put together a literature review of the area's politics, culture, and history as well as interview Nigerian expats in the United States and those involved in development efforts in Nigeria. Ubertaccio and Stephan hope to present their findings at a regional political science conference in the 2009-2010 academic year and will work with local scholars of Nigerian history and politics to co-host a symposium on Nigeria in the spring of 2010.