

HWS SUMMER RESEARCH OPPORTUNITIES 2012

Biology

Ecological Controls of Water Clarity at the Southern End of Cayuga Lake

Faculty Contact: Professor Meghan Brown (mbrown@hws.edu)

Project Description: In this project, the student will work on Cayuga Lake to investigate the role of zooplankton grazing on water clarity. The project involves a significant amount of lab work processing samples and assisting with experiments. Some field work is also involved.

Student Qualifications: Strong background in biological science, limnology, and/or field biology. Preferred experience with plankton sampling and identification. Student will live in Ithaca.

Dates: 10 weeks starting in early May

Development of a Cell-Culture Assay to Test Anti-Cancer Compounds

Faculty Contact: Professor Sigrid Carle (carle@hws.edu)

Project Description: Members of the Biology and Chemistry Departments will be introducing a joint laboratory experiment into Cell Biology (Biol 232) and Organic Chemistry II (Chem 241). Organic Chemistry II students will synthesize potential anti-cancer drugs called HDACi and these compounds will be tested by Cell Biology students. This summer the biological assay using cells and a known HDACi will be developed for use in Cell Biology this coming Fall semester. A student will use mammalian tissue culture, different concentrations of a known HDACi, and an ELISA plate reader to develop the biological assay. The student will also help with writing and revising the lab manual for use in the Cell Biology course.

Student Qualifications: Prefer at least JR status but will consider SO status. Course requirements: Prefer students who have taken Cell Biology, but will consider those who have taken Genetics, Molecular Biology, or Immunology.

Dates: May 21 – July 13

Do Bacteria Need to Attach to Host Plants to Cause Disease?

Faculty Contact: Professor Sigrid Carle (carle@hws.edu)

Project Description: *Agrobacterium vitis* is a bacterium that causes the debilitating disease in grape plants known as crown gall disease. This tumor-like growth reduces the productivity of mature vines and kills young vines. The disease has major economic consequences for vineyards worldwide, including the Finger Lakes region of New York. The *A. vitis* strain F2/5 prevents crown gall formation by another bacterium when both co-infect grape vines. This phenomenon is known as biocontrol. We hypothesize that biocontrol requires attachment of *A. vitis* to grape plants. Using molecular tools, several attachment mutants have been generated. A student will test these mutants for biocontrol using grape vines, and use molecular tools to generate new attachment mutants.

Student Qualifications: All levels will be considered, but prefer a student who has completed BIOL 167 and at least one of the following courses: Genetics, Cell Biology, Microbiology, Molecular Biology, or Immunology.

Dates: May 21 – July 13

Inventory of Fish Communities in the Seneca Lake Watershed

Faculty Contact: Professor Susan Cushman (cushman@hws.edu)

Project Description: Little is known about the aquatic communities that inhabit streams in the Seneca Lake watershed, particularly organisms that are not considered game species. Considering the unique topography around the lake, and the stream channels that run through it, significant information will be gathered through fish (electrofishing) surveys. The student will be responsible for both working together as a team in the field as well as independently in the lab. This project involves intensive field work, which will require carrying heavy equipment, data entry and analysis.

Student Qualifications: Strong experience & interest in aquatic biology are encouraged to apply but must have a background in biological sciences. Must have at least sophomore status.

Date: Mid-May starting date.

Audubon's Seabird Restoration Student Intern Program

Faculty Contact: Professor Mark Deutschlander (deutschlande@hws.edu)

Project Description: Hobart and William Smith students have the unique opportunity to participate in the internationally-known Audubon Seabird Restoration Program (a.k.a. "Project Puffin"). Students will participate in behavioral studies and monitoring breeding colonies of seabirds such as puffins and terns. This project requires tent camping on small isolated islands off the coast of Maine for the summer. Students must be in good health, good shape, willing to "rough it", and prepared to live on a small island with one or a few other individuals for the summer. The position includes a stipend of \$262/week, room and board, and transportation to the islands. For more information about the program, visit www.projectpuffin.org. Interested students should contact Prof. Deutschlander for more information before applying.

Student Qualifications: This internship is available to graduating seniors as well as other undergraduate students.

Dates: May 26 – August 17

Investigating Genetic Mechanisms Involved in the Development of Sensory Systems

Faculty Contact: Professor Kristy Kenyon (kenyon@hws.edu)

Project Description: The goal of this work is to identify the key genes that regulate the process of neurogenesis during the formation of the olfactory system in insects. This research project will involve using the tools of molecular biology to study moth embryogenesis. Microdissection, RNA isolation, cDNA synthesis, PCR, DNA sequencing and fluorescence microscopy are a few of the techniques that may be used in this research project.

Student Qualifications: Sophomores that have taken either genetics (BIOL 220), cell biology (BIOL 232), or microbiology (BIOL 222).

Dates: May 14 – July 6

Exploring the Virulence of Plant Pathogen *Xylella fastidiosa*

Faculty Contact: Professor Patricia Mowery (mowery@hws.edu)

Project Description: *Xylella fastidiosa* is an economically important pathogen that induces virulence through motility, aggregation, and biofilm formation. We are using molecular techniques to tease apart the pathogen process in the hopes of preventing its diseases. Projects involve techniques such as cloning, sequencing, PCR, RT-PCR, protein expression, and Western blot analysis. It may be possible for the student to attend and present at the American Phytopathology Society annual meeting in Providence, RI in early August, however attendance is optional, but travel expenses will be covered.

Student Qualifications: Completion of a molecular based course such as Genetics, Cell Biology, Microbiology, Molecular Biology, Immunology, or Development.

Dates: May 14 – July 6

Applied and Basic Biology at the NYS Agricultural Experiment Station

Faculty Contact: Professor Patricia Mowery (mowery@hws.edu)

We anticipate multiple internships this summer and will place students according to their interests and academic backgrounds. Projects will be completed in the laboratories and field plots of the world-renowned NYS Agricultural Experiment Station in Geneva, NY, and students will live on the HWS campus.

Possible Projects

A] Drs. Cadle-Davidson, Gadoury, and Seem

Project Description: Identification of resistance to grape diseases by use of detailed phenotyping and QTL analysis to help breeders with information on resistance mechanisms to powdery mildew, the most important fungal disease of grape worldwide. The work would entail plant and fungus culture, inoculation, disease observation, microscopy, molecular biology, and data recording and analysis. It may be possible for the student to attend the American Phytopathology Society annual meeting in Providence, RI in early August, however attendance is optional, but travel expenses will be covered.

Student Qualifications: It is desirable for the student to have a strong biology background with an exposure to standard molecular tools and techniques.

Start Date: Flexible.

B] Dr. Cadle-Davidson

Project Descriptions: Project 1) work with computational biologists to discover QTL of many traits (using existing data) and translate complex output with user-friendly guidance. Project 2) develop outreach materials (videos, websites, etc.) describing complex genetic terms and processes in terms the public can understand.

Student Qualifications: A student with computer experience or strong interest in communication and genetic counseling.

Start Date: Flexible.

C] Dr. Cox

Project Description: Focuses on fungal interactions with plants. The work usually entails a mix of microbiology, field work, and molecular biology. The molecular biology depends on the skill level, and meticulous character of the student's lab skills.

Student Qualifications: An intuitive, hard working, and personally invested student.

Start Date: Start date probably first week of June.

D] Drs. Linn and Loeb:

Project Description: Drs. Linn and Loeb are studying the olfactory processes of plant kairomoes (pheromones) by generalist and specialist pest arthropods. Studies may include behavioral testing in the flight tunnel and collection of headspace volatiles.

Student Qualifications: Must have completed Biology 167 and be a hard working and responsible student.

Start Date: Flexible.

E] Dr. Shelton

Project Descriptions: Project 1) Insect movement from one area to another dictates pest management practices, especially in vegetables, which are important components in a healthy diet. Be part of a research team that is investigating the how and why of insect movement and how such knowledge can help agriculture. Project 2) Using the polyphagous insect known as the onion thrips, you will get a chance to work along side a European faculty member and a Cornell faculty member as they explore questions about why some insects like one plant and not another by conducting laboratory and field trials. Get familiar with the fascinating world of insect behavior, plant resistance and what can be done to improve insect pest management.

Student Qualifications: Completion of a college biology course.

Start Date: Flexible.

F] Dr. Chris Smart

Project Descriptions: All projects involve learning microbiology techniques (isolating plant pathogens, culturing, making media), DNA extractions, PCR analyses, and some field work. Project 1) Help detect one of the most devastating plant pathogens, *Phytophthora infestans*, which causes late blight of tomato and potato. Lab 70%, field 30% Project 2) Explore the microbial communities encouraged by cover crops, which have been used for centuries by traditional farmers world-wide and are integral for organic farming today. Lab 50%, field 50% Project 3) Help determine the efficacy of an ultraviolet water treatment system that fruit and vegetable growers could use to decrease the risk of introducing disease causing organisms to their crops through irrigation water. Lab 60%, Field 40%.

Student Qualifications: A good handle on basic biology is critical, and anything above that (Genetics, Microbiology, Biostatistics) is a bonus.

Start Date: Flexible, although May 30 preferred.

G] Dr. Larry Smart

Project Descriptions: Project 1) In the lab, we are doing genomics of willow and chemical analysis of wood composition. Project 2) In the greenhouse, we are hoping to develop controlled assays for susceptibility to rust, beetles, leafhopper, and nutrient deficiency. Project 3) In the field, we are doing phenotyping of mapping populations for stem development traits and pest and disease susceptibility.

Student Qualifications: Reliability, good communications skills, attention to detail, computer skills, and care for doing quality work are key skills. For project 1, preferred a student with strong biochemical and molecular biology background.

Start Date: A start in mid- to late-May is perfect.

Education

Computational Thinking Across the Disciplines

Faculty Contact: Professor Paul Kehle (kehle@hws.edu)

Project Description: Students will conduct applied research on topics in computational thinking drawing from many diverse disciplines. The work will involve three components: 1) research on an unsolved problem in one the above areas, 2) development of introductory curriculum in computational thinking for high school students, and 3) working as teaching assistants during a 2-week prototyping workshop for computer scientists, authors, teachers, and high school students exploring ways to engage high school teachers and students to the study of computational thinking. The emphasis among these three components can be varied to student interest.

Requirements: Curiosity and interests in: problem solving, teaching and learning, mathematics, computer science, and strong inter-personal skills. CPSC 124 and MATH 135 are preferred as is previous work on this project.

Dates: June – July

Chemistry

Measurement of the Rates of Indium Mediated Allylation

Faculty Contact: Professor Walter Bowyer (bowyer@hws.edu)

Project Description: Our research explores the kinetics and mechanism of indium mediated allylations, a Green chemistry reaction that is an important substitute for the Grignard reaction. We measure the rate of reaction of allyl halides at indium surfaces. The techniques we are developing for the measurement are of interest to analytical chemists, and the results are interesting to physical organic chemists. Recently we have developed three ways to increase mass transport in order to measure fundamental heterogeneous rate constants. We also continue recording NMR spectra in an effort to detect and characterize the transient intermediates.

Student Qualifications: Open to first-, second-, and third-year students with at least one year of chemistry by Summer, 2012.

Dates: TBD

Developing New Synthetic Methods in Heterocyclic Chemistry

Faculty Contact: Professor Erin Pelkey (pelkey@hws.edu)

Project Description: The objective of this research is to design and develop new synthetic methods that can be utilized in the preparation of nitrogen heterocycles with demonstrated biological activity. This summer, we will work on two projects: (1) investigation of new selective cross-coupling reactions involving 3,4-dihalo-3-pyrrolin-2-ones; and (2) synthesis of benzo-fused 3-pyrrolin-2-ones. These projects will target molecules that display a wide range of biological activity including anti-cancer and anti-inflammatory.

Student Qualifications: Open to first-, second-, and third-year students with at least one year of chemistry by Summer, 2012.

Dates: June 18 - 29, and July 10 - August 3

Application of RESTMD to Peptide Aggregation

Faculty Contact: Professor Alan van Giessen (vangiessen@hws.edu)

Project Description: We will apply the Replica Exchange Statistical Temperature Molecular Dynamics (RESTMD) algorithm to the study of protein aggregation. The goal of the project is to understand the process by which small peptides aggregate and form clusters that adopt an ordered structure that has a high degree of beta-sheet content. We will focus on understanding changes in the underlying Potential Energy Landscape during aggregation as well as the effects of chain length and sequence.

Student Qualifications: Students must have completed CHEM 110 by Summer 2012.

Date: TBD, 10 weeks

Studying Enzyme Kinetics in a Crowded Environment Like the Cell

Faculty Contact: Professor Kristin Slade (kslade@hws.edu)

Project Description: The research aims to investigate how the densely packed interior of cells affects the rate of enzyme-catalyzed reactions and the ability of these enzymes to bind their substrates. This summer, we will focus on citrate synthase, the first enzyme of the citric acid cycle, a key pathway in metabolic regulation. Due to the lack of quantitative cellular methods, we will create controlled *in vitro* environments containing crowding agents that mimic intracellular conditions.

Student Qualifications: Open to first-, second-, and third-years with at least one year of chemistry by Summer, 2012.

Dates: May 21 - July 20 (8 weeks of research distributed over a 9 week period)

Solid-Phase Synthesis of Cysteine-Containing Potential Anticancer Compounds

Faculty Contact: Professor Justin S. Miller (jsmiller@hws.edu)

Project 1 Description: Students will synthesize potential anticancer chemotherapeutics using new synthetic methodology that has been developed in the Miller laboratory. The new methodology is based on solid-phase resins capable of supporting the synthesis of peptidic molecules containing at least one cysteine residue. Along with the synthesis of potential anticancer agents, these resins will find a range of applications involving efficient synthetic routes towards other valuable, biologically relevant targets and their analogs.

Project 2 Description: This student will synthesize potential anticancer chemotherapeutics using new synthetic methodology that has been developed in the Miller laboratory. The new methodology is based on solid-phase resins capable of supporting the synthesis of peptidic molecules containing at least one cysteine residue. The goal of this project will be to develop a functional Intermediate Organic Chemistry laboratory protocol to be used beginning Fall, 2012. You might be designing the lab that you get to do in class!

Requirements: Open to first-, second-, and third-years with at least one year of chemistry by Summer, 2012.

Dates: May 14 – July 6

Environmental Studies

Asian Environmental Studies

Faculty contact: Professor Darrin Magee (magee@hws.edu)

Project Description: These two 8-week positions will support the Asian Environmental Studies Initiative at HWS, funded by the Henry Luce Foundation. Specific research topics and dates will vary based on the needs and interests of the faculty supervisor(s), but will likely relate to one or more of the following issues: forestry, water resources, energy, climate change, waste, or environmental justice.

Requirements: ES major or minor; Good library research and data analysis skills, including quantitative and qualitative data; coursework such as ENV 215, 330, or 340 desirable; experience with one or more Asian languages desirable but not required.

Dates: TBD

Finger Lakes Institute

Seneca Lake Macroinvertebrate Communities and Water Quality

FLI Contact: Lisa Cleckner (cleckner@hws.edu)

Project Description: One student will investigate aquatic insect communities and water quality working with a team throughout the Seneca Lake watershed. There will be field work as well as independent laboratory processing and data analysis associated with this position based at the Finger Lakes Institute.

Student Qualifications: Courses in natural sciences and ability to perform biological and water chemistry aquatic field work in heat, rain, and inclement weather situations.

Dates: TBD, but will be consecutive weeks

Water Quality, Green Infrastructure, and Resource Assessment in Geneva

FLI Contact: Lisa Cleckner (cleckner@hws.edu)

Project Description: A student will investigate the water quality and quantity aspects of green infrastructure installations including rain barrels and rain gardens in the Greater Geneva area. An aspect of the project may focus on restoration efforts at Seneca Lake State Park.

Student Qualifications: Courses in natural sciences and ability to perform field work and conduct independent research.

Dates: TBD, but will be consecutive weeks

Watercraft Education Assessor for Finger Lakes

FLI Contact: Lisa Cleckner (cleckner@hws.edu)

Project Description: Student will work with Finger Lakes Institute staff on project that will educate boaters about invasive species at several Finger Lakes boat launches. The student will design surveys and analyze data regarding the effectiveness of the education programs.

Student Qualifications: Courses in social sciences and statistics as well as an interest in invasive species, surveys, data collection and analysis.

Dates: TBD, but will be consecutive weeks

Geoscience

Community-Based Remediation of Agricultural Runoff (Seneca Lake, NY)

Faculty Contact: Professor Nan Crystal Arens (arens@hws.edu)

Project Description: This project will produce a community-based plan for creation of vegetated riparian buffers to ameliorate nutrient runoff from agricultural systems. For more information see http://www.erie.buffalo.edu/REU_projects.php Project L2. Applications are available at http://www.erie.buffalo.edu/REU_apply.php and students must apply through this program site NOT through the HWS application.

Solutions to environmental problems succeed when there is broad community participation. This project tackles nutrient runoff pollution from concentrated animal feed lots within the Seneca Lake watershed. We will design a community-centered plan for the creation of vegetated riparian buffers to ameliorate nutrient runoff. The student will (1) work with county Soil and Water Conservation agencies to identify candidate agricultural partners; (2) work with community partners to negotiate a collaboration with candidate farms; (3) perform baseline stream quality studies and design a follow-up stream monitoring plan with Citizen Science partners in the Finger Lakes Institute; (4) research tree, shrub and herb species candidates, document their growth needs, and develop a nursery plan that can be implemented by the Seneca Roots & Shoots chapter; (5) research the design of riparian buffers in our climate and soil type; and (6) develop a shovel-ready plan for creating a riparian buffer on the first candidate farm.

Interested students should contact Professor Arens for more information prior to applying. Students will need to have a car and be willing to go to UB one day a week (Friday) for professional development workshops that are part of the program.

Student Qualifications: Strong reading and writing skills. Good communication, organization and negotiation skills.

Dates: 8 – 10 weeks

Evaluating Seneca Lake's Productivity Using Stable Isotopes

Faculty Contact: Professor Tara Curtin (curtin@hws.edu)

Project Description: Stable isotope measurements of algae and biologically-induced calcite (CaCO₃) are used to reconstruct paleoenvironmental and paleoclimatic changes in lake systems. Carbon isotopes are used to detect changes in the amount or rate of primary productivity and/or anoxia in lake bottom waters. Oxygen isotopes are used to infer changes in the source of precipitation. The exact environmental reasons for isotopic variations in are not well known. In this study, we will use high-resolution sediment trap data from Seneca Lake to determine the reasons for isotopic changes in algae and calcite over the last several years.

Student Qualifications: Students who have completed the introductory geoscience courses are encouraged to apply.

Dates: TBD

Watershed/Lake Hydrogeochemical Interactions in the Finger Lakes

Faculty Contact: Professor John Halfman (halfman@hws.edu)

Project Description: Students will work on environmental/hydrogeochemical/water quality problems associated primarily with Seneca Lake, and its watershed, but the investigations also include a survey of the neighboring Finger Lakes and pending funding, detailed analyses in the Owasco Lake watershed. The projects involve a significant amount of field and laboratory work, at times in inclement weather, and are in cooperation with the Finger Lakes Institute, and other watershed protection agencies.

Student Qualifications: Strong background in geoscience/environmental science and desire to work outside in wet environments.

Dates: I'll need students to work most of the summer, and will stagger those I get to work with me, based on their summertime availability. Length: 8- 10 weeks.

National Weather Service Lake-Effect Snow Studies

Faculty Contact: Professor Neil Laird (laird@hws.edu)

Project Description: Research will include the study of the development and evolution of both intense single-lake lake-effect snow bands and events with multi-lake connections - snow bands extending from over one Great Lake to over another. This is a collaborative project with the National Weather Service Forecast Offices in Buffalo, NY and Binghamton, NY. Students will develop or enhance skills related to working with meteorological software and large databases, high-resolution satellite imagery, statistical analysis techniques, and scientific writing and presentation. See Professor Laird for additional information necessary for applying.

Student Qualifications: Coursework in meteorology is essential. Prior experience with meteorological data, statistical methods and established computer skills are preferred. Students should have excellent oral and written communication skills and be willing to work within a collaborative group setting and independently.

Dates: June 11 – August 3

Mesoscale Convective Systems in the Eastern Great Lakes and Finger Lakes Regions

Faculty Contact: Professor Nicholas Metz (nmetz@hws.edu)

Project Description: Mesoscale convective systems (MCSs), or organized regions of thunderstorms that produce widespread severe wind and rainfall, are ubiquitous features across the central and eastern United States during the warm season (April–September). These MCSs can cross the Great Lakes and Finger Lakes, which are often cooler than the surrounding land locations. However, the nature of any resulting interactions between the MCSs and the marine-modified air is largely unknown. This summer research opportunity will allow a student to investigate the frequency, duration, and structure of MCSs in the Great Lakes/Finger Lakes region from a climatological standpoint, as well as probe any interactions that may occur between these MCSs and the nearby lake environments.

Student Qualifications: Must have taken at least GEO 182/GEO 160 and be willing to work with computers and in the field taking measurements.

Dates: June 11 – August 3

The Effects of Extreme Precipitation Events on Climatology

Faculty Contact: Professor Nicholas Metz (nmetz@hws.edu)

Project Description: Extreme weather events can drastically affect local climate. For example, in September 2010, Albany, New York received 0.76 inches of rain over the first 29 days of the month. On 30 September, 2.68 inches of rain fell in association with a strong weather system, resulting in a 0.13-inch precipitation surplus for the month. On paper, the total precipitation recorded for this month appears to be nearly normal. However, this “normal” month resulted from a singular extreme event. This summer research opportunity will allow a student to examine precipitation data records from a number of historical sites across the country, in an attempt to understand how often extreme precipitation events significantly affect the precipitation climatology of a location.

Student Qualifications: Must have taken at least GEO 182/GEO 160 and be willing to work with computers and in the field taking measurements.

Dates: June 11 – August 3

Physics

Gravitational Physics

Faculty Contact: Professor Steve Penn (penn@hws.edu)

Project Description: Our research group is part of the LIGO Project (Laser Interferometer Gravitational Wave Observatory), which operates two observatories in the US and works closely with observatories in Europe. Our goal is to make a first detection of gravitational waves, first predicted by Einstein in 1916. Once we have the sensitivity to measure gravity waves, we will engage in observations of the many energetic phenomena in the universe that can only be seen using gravity waves. To get a sense for the LIGO Project you may watch the movie "Einstein's Messengers" which is located at <http://www.ligo.caltech.edu/einstein.ram>.

In our laboratory, we work on understanding and lowering the thermal noise in LIGO. Thermal noise is the main limiting factor to increasing the observatory's sensitivity. Thus our work has significant impact on the entire project. Yet the work is basically materials physics and the experiments can be successfully performed by undergraduate physics majors. While we all work together on lab projects, each student will have a project for which they will be mainly responsible and which will lead to publishable research work. In addition, students will learn many of the techniques useful to experimental physicists and engineers, including electronics, vacuum technology, optics, machining, and data analysis.

Student Qualifications: You must be a physics or engineering major or minor with a good GPA and a strong desire to do research.

Dates: May 21 – July 27 (flexible)

Psychology

Group Bias and Discrimination in a Cultural Context

Faculty Contact: Professor Brien Ashdown (ashdown@hws.edu)

Project Description: This project will explore the influence of cultural factors on group bias and discrimination. Daily tasks will include conducting literature searches, coding data, writing, maintaining databases, and so forth.

Student Qualifications: At least SO status; passed PSY210 with a B or higher; familiarity with SPSS and PsycINFO; strong writing and organizational skills; independent work ethic; interest in cultural psychology.

Dates: Flexible between May 14 and July 31

Biopsychosocial Factors in Health

Faculty Contact: Professor Jamie Bodenlos (bodenlos@hws.edu)

Project Description: This summer science position will involve work on a variety of research projects in the fields of clinical and health psychology. We will conduct data analysis on a longitudinal study examining health behavior and weight changes during the first year of college. After analyzing the data, the student will assist in the writing of a manuscript based on this project for submission to a scholarly journal. The student will also gain experience in the formatting and revising of a grant for resubmission to the National Institutes of Health. There will also be an opportunity for the student to help in the development of new research projects in health psychology.

Student Qualifications: Students who apply for this position should have prior experience conducting literature searches

with PsycINFO and using SPSS, well-developed writing skills, strong organizational skills, and an interest in *clinical or health psychology*. Students must have earned at least a B in Introduction to Psychopathology (PSY 221) and Statistics and Design (PSY 210).

Dates: TBD

Individual Differences in Emotional Contagion and Empathic Accuracy

Faculty Contact: Professor Portia Dyrenforth (dyrenforth@hws.edu)

Project Description: This summer science project will examine how personality traits are related to emotional contagion and social perception. The student will work with Professor Dyrenforth to investigate the existing literature on the personality correlates of “catching” and “transmitting” moods to other people in social situations. Daily tasks will include conducting literature searches for relevant articles and study measures, creating summaries of relevant research, and collecting and designing materials for additional studies.

Student Qualifications: Required: Strong interest in research (both experimental and literature reviews), creativity, and attention to detail. Successful completion of PSY 210 (Statistics and Design) and PSY 220 (Introduction to Personality). Preferred: Successful completion of PSY 322 (Research in Personality Psychology)

Dates: TBD

Mathematics and Computer Science

Computational Discrete Mathematics

Faculty Contact: Professor Paul Kehle (kehle@hws.edu)

Project Description: This ongoing project will focus on properties of circulant and hybrid circulant graphs in relation to graph Ramsey Theory. In addition to collecting and analyzing computer-generated data for numerical patterns, we will also be creating definitions for how to combine circulant graphs to obtain highly symmetric graphs with certain properties. Work will involve intensive use of Mathematica.

Student Qualifications: CPSC 124, MATH 135, and a love of mathematics, computer programming, problem solving; and preferably a course in graph theory or combinatorics, experience with Mathematica, and/or a strong interest in teaching mathematics and previous work on this project.

Dates: June – July

Interdisciplinary Projects

Testing Tragedy: Applying Mathematical Modeling to Anthropological Fish Market Data

Faculty Contacts: Professor Jonathan Forde (forde@hws.edu) and Professor Christopher Annear (Annear@hws.edu)

Project Description: This interdisciplinary research project combines the tools of anthropology and mathematical modeling to explore the dynamic interaction between the Mweru-Luapula fishery ecosystem in Zambia and the human communities that rely on it. Using data from fish markets in the region, we will develop and validate ecological models of the fishery, and explore how it has avoided the “tragedy of the commons,” which asserts that common resources exploited without regulation are inevitably exhausted over time.

The aim of the project is to develop a series of mathematical models on several temporal and spatial scales to understand the interactions of the human and fish populations, taking into account ecological and social influence on these interactions. The student researcher will work under the guidance of Professor Annear and Professor Forde to study the fishery both from an anthropological and a mathematical perspective. This will include an extensive literature search, data entry, model development, mathematical analysis and interpretation of the mathematical results in real-world terms.

Student Qualifications: Students must have completed MATH 237 or equivalent. Preference will also be given to students who have programming experience, MATH 353.

Dates: June 4 – July 27

Health and Social Reform in Central and Western New York, 1830 - Present

Faculty Contact: Professor Sarah Berry (berry@hws.edu)

Project Description: The first half (4 weeks) of this project examines archival material from the University of Rochester on mid-19th-century abolitionists and women's rights activists who were also advocates of health reform. In addition to identifying, retrieving (requesting photocopying), and reading through this material, the researcher will also retrieve, summarize, and in some cases identify relevant secondary documents on this topic. The second half will examine health discourses from the Civil Rights era to today in relation to ideologies of social change, primarily through public documents (newspapers, speeches) and media (interviews, etc.)

Student Qualifications: Excellent writing and research skills as demonstrated by transcript (ENG and/or WRRH courses), Writing Colleague training, or similar; at least two courses in Health Humanities-related inquiry, such as Literature and Medicine, Medicine in Media and Society, Public Health Policy, Medical History, etc. Students who have completed prior Health Humanities research projects will be given priority. Student with his/her own vehicle preferred.

Dates: May 21 – July 6 (This is an hourly position with hours to be determined by Professor Berry)

Research Assistant for New BiDisciplinary Course: The Politics of Reproduction

Faculty Contacts: Professor Kristy Kenyon (kenyon@hws.edu) and Professor Renee Monson (monson@hws.edu)

Project Description: The student hired will be responsible for searching the recent sociological and biological research literatures in various subfields related to reproduction – e.g., reproductive technology, surrogacy, in vitro fertilization, stem cell research, sex determination, abortion, genetic testing, gene therapy, cloning, and adoption. The literature search will aid the development of the syllabus for this new bidisciplinary course. In addition, this student will help Professor Kenyon develop new laboratory exercises. Work will involve using molecular biology techniques for studying frog embryos and other tissues.

Student Qualifications: Must have completed both SOC 100 and BIOL 167 with a grade of B or better in both courses. The student should be able to: conduct a search of the research literature using the academic journals databases through the H&WS library; write clear, concise summaries of journal articles; and have a strong interest in laboratory work.

Dates: May 14 – July 15

All positions are tentative and subject to final funding and approval from the faculty mentor and the Provost's Office.

Information about the program can be found at:

http://www.hws.edu/academics/undergrad_ops.aspx

APPLICATION DEADLINE: FEBRUARY 17, 2012

<https://www.surveymonkey.com/s/2012HWSSummerResearchApplication>

Students are paid a stipend and on campus housing is provided for the duration of the program.