Below are nine faculty proposals submitted for Summer 2016. Read each one and choose two projects that interest you the most.
Faculty Name and Department: Amy Bohnert, Ph.D.; Psychology Department

Project Title: Space to Grow Health and Wellness Evaluation

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.

Currently there is a global movement to naturalize schoolyards; however the research linking green schoolyards with improved health and wellness outcomes (e.g.: improved nutrition, increased physical activity, decreased obesity rates and improved learning readiness/test scores) is still in its infancy. The 2015-16 Health and Wellness Evaluation of STG will support and add to this body of knowledge by using both observational and quantitative data.

Space to Grow is an innovative program lead by the Healthy Schools Campaign that brings together capital funds and leadership from Chicago Public Schools, the Chicago Department of Water Management, and the Metropolitan Water Reclamation District of Greater Chicago, with the purpose of transforming CPS schoolyards into vibrant outdoor spaces that benefit students, staff, community members and the environment. Schoolyard renovations prioritize physical activity, outdoor learning, exploration and community engagement. The green schoolyards also incorporate landscape features that capture a significant amount of rainfall, helping keep the city's water resources clean and resulting in less neighborhood flooding.

The current evaluation will serve to inform green space literature in new and unprecedented ways. The evaluation is informed dually by the most current research on greenspace and the needs and goals of CPS and the STG Healthy Schoolyards initiative, creating a truly unique evaluation strategy that targets the most relevant outcomes for both research and practice. Furthermore, the multi-method strategy to be utilized is unique in the literature.

Relying on multiple methods of assessment including observational data collection via Behavioral Mapping, survey data collection, and a program process evaluation, this project will recruit a sample of parents/caregivers, school administration, teachers, and staff, and community members from three CPS schools whom have undergone a recent STG schoolyard redesign to address the following aims during the summer of 2016:

**Specific Aim 1**: Examine utilization and characteristics of the schoolyard post-redesign by youth & families during distinct periods of the day: prior-to-school, school hours (PE & traditional instruction), after-school, and on weekends via behavioral mapping observational coding.

**Specific Aim 2**: Examine changes in students’ health, well-being, and academic outcomes via parent report and aggregate school-level variables.

**Specific Aim 3**: Examine changes in the school environment via parent and teacher report.

**Specific Aim 4**: Examine changes in school and community engagement and cohesion via parent, teacher, and community member report.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?

An undergraduate student would be a valued member of our research team. Our research team will be closely involved with the Space to Grow (STG) initiative and the Healthy Schools Campaign organization in order to collect the data described above. During May and June, this student will be involved in organizing relevant materials, participating in data collection training sessions, recruiting participants, collecting observational data on the schoolyard via behavioral mapping techniques, and collecting survey data from caregivers, teachers, and community members. A didactic experience will also be offered involving reading and assessing relevant literature throughout the summer so that the student can develop a strong foundation in this specific research area, and develop an area of inquiry in the dataset. It is our hope that the student would stay involved with in our Activity Matters lab during the 2016-17 academic year to assist with data coding, analyzing data related to their own research questions, as well as preparing abstracts for conferences as part of dissemination of research findings. We expect that undergraduate research assistants who work with our research team will demonstrate a high level of critical inquiry, professionalism, punctuality, and attention to detail.
3) Provide a short paragraph including both personal and professional biographical information.

I have been a full-time faculty member at Loyola University Chicago Psychology Department (clinical & developmental psychology) since 2003. Over the past ten years, I have relished the opportunity to mentor and work with numerous Loyola undergraduate students in both the classroom and laboratory settings. I direct the Activity Matters Lab (www.activitymatters.org) which offers an enriching, inter-disciplinary research environment that promotes scientific literacy, curiosity, and independent mentored inquiry. I provide a supportive and stimulating environment, and encourage my students to present their work at national conferences as well as publish. When I am not working, I love spending time with my husband and kids, exercising in almost any form, cooking, entertaining friends, and exploring both within and beyond the Chicagoland area.
Women in Science Enabling Research
Faculty Research Proposal

Faculty Name and Department: Jessica Brann, Department of Biology

Project Title: Understanding of repair and regeneration in the nervous system

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.

Our understanding of repair and regeneration in the nervous system is limited at best. The brain exhibits a regenerative capacity in three key areas. One is deep in the brain in the hippocampus, while the other two reside in the olfactory system. The olfactory system is a unique neuronal system in which to study cell growth, differentiation, maturation in both young and aged animals. This is because it is one of the few brain regions that undergo continuous cell loss, replacement, and growth. The olfactory neuroepithelium (the sensory lining of the nose) makes new neurons by activating a population of neural stem cells at the base of the epithelium. It is an excellent model system because it is easily accessible and we know many details about the mature sensory circuitry involved in odor detection. In addition, the neurons born from these neural stem cells are excitatory with a long axon – specifically, the same type of neuron we might be interested in replacing in neurodegenerative diseases like Parkinson’s disease. However, the specific molecular players required to initiate the neural stem cell activation process are unknown.

We are interested in examining the role of chemokine receptors and their respective ligands in this process. Our hypothesis is that the activation of a chemokine receptor expressed by the neural stem cell is mediated by a ligand secreted by the underlying vasculature surrounding this neuroepithelium. There is evidence in the literature that some types of chemokine receptors may be present in the olfactory neuroepithelium, but detailed examination of the receptor types as well as their cognate ligands has not been completed. Recently we have been probe this tissue with immunohistochemistry as well as protein analysis (Western blotting) for the expression (presence as well as localization) of chemokine receptors. We know now that several of these receptors are expressed in olfactory tissue and that the expression of several ligands is altered during neurogenesis. We are now investigating at which point these receptors exert their effects; do they activate neural stem cell division? Are they necessary or sufficient for this process? We are using genetically-modified mice to probe the onset of expression of these receptors and also to selectively knock out functional proteins. The results from these experiments will aid in the identification of molecular and cellular players involved in neuronal differentiation.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?

This project will utilize immunohistochemistry and protein expression analysis with Western blotting, as well as cell culture work. In my experience, all techniques are amenable to undergraduate involvement. The student would be expected to aid in tissue collection, preparation, cell culture maintenance, immunostaining with antibodies, imaging (confocal microscopy), and analysis (statistical if necessary). For Western blotting, tissue preparation, gel electrophoresis, detection/imaging and quantification will be involved. The student is not expected to have a laboratory skill set at the outset; all skills will be taught.

3) Provide a short paragraph including both personal and professional biographical information.

I joined the faculty as an Assistant Professor in the Biology department at Loyola University Chicago in August 2013. I obtained my undergraduate degree in Biology with an emphasis on Neurobiology from Northwestern University in 2000. I was fortunate to be able to conduct an undergraduate research project while at Northwestern, and that ultimately influenced my choice for graduate school. Upon a recommendation from my undergraduate advisor, I ventured down to Florida State University, where I
completed my Ph.D. on signal transduction in the olfactory system in late 2005. I next headed to Columbia University in New York for my Postdoctoral Fellowship where I was fascinated to examine the regenerative capacity of the olfactory system in the face of the “normal” aging process (as well as “diseased”). While at Columbia I obtained a Ruth L. Kirschstein National Research Service Award, and became a co-Investigator on my first R01 grant to pursue this research.

Personally, I enjoy a variety of interests. I am an avid reader, but also enjoy pursuits such as running, biking, hiking and traveling. My latest interest is reading about the effects of dietary intake on neurological function – a crossover into my professional life, to be sure, but an interest all the same.
Faculty Name and Department: Paul Chiarelli, Department of Chemistry and Biochemistry

Project Title: Determination of Unknown Pollutants in Chicago River and Lake Michigan.

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.

The goal of our research is to determine the identities of unknown water pollutants that may pose human health risks or a threat to aquatic environments (e.g., Lake Michigan). We will analyze water from different sources to determine the identities and concentrations of unknown pollutants that are suggested to have potential human or environmental toxicity based on their chemical structures. We are particularly interested in the analysis of compounds containing halogen atoms (such as chlorine and bromine).

The lack of safe drinking water is believed to be leading cause of death and disease throughout the world (1). Water pollution occurs when waste or hazardous material of some kind is discharged directly into a natural body of water without satisfactory remediation. The agents of water pollution that lead to adverse health effects are classified into two general groups, chemicals and pathogens. Pathogens are disease-causing microorganisms, such as bacteria or viruses, that are destroyed by disinfecting the water with chlorine or bromine. The disinfection by products (DBPs) that are formed as a result of this process may pose health hazards. Our work is focused on the identification of novel chemical water pollutants such as DBPs and Personal Care Products and Pharmaceuticals (PCPPs).

In the summer of 2016 we will be analyzing water samples that have been treated with chlorine (Kirie Wastewater treatment plant, Des Plaines, IL) and bromine (hot tub water from the Norville Center on Loyola’s Lakeshore campus). Water samples taken from these sources are anticipated to contain large concentrations of brominated and chlorinated disinfection by-products. We will characterize the most abundant compounds from these sources and then analyze water from Lake Michigan and the Chicago river to see if any of the compounds observed in the concentrated sources are present in these natural water sources.

References


Roberts, J.; Kumar, A.; Du, J.; Hepplewhite, C.; Ellis, D. J.; Christy, A. G.; Beavis, S. G.; “Pharmaceuticals and personal care products (PPCPs) in Australia’s largest inland sewage treatment plant, and its contribution to a major Australian river during high and low flow” Science of the Total Environment 2016, 541, 1625-1637.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?

Our undergraduate researcher will assist in acquiring water samples from different sources (Chicago River, Lake Michigan, Spa and pool water from campus. They will become proficient at solid-phase and liquid-liquid extractions. They will assist (be introduced to) analytical methods that permit the detection and structure determination of halogenated pollutants such as gas chromatography coupled with electron-capture detection and mass spectrometry.

3) Provide a short paragraph including both personal and professional biographical information.

Paul Chiarelli is a professor in the department of chemistry and biochemistry at Loyola University. He received a Ph.D. in Analytical Chemistry from the University of Nebraska in 1988. Upon graduating he split a postdoctoral assignment between the University of Pittsburgh and the University of Münster (Germany). In 1990 he accepted a position at the National Center for Toxicological Research (NCTR) where his research centered on the analysis of environmental carcinogens. In 1994 he joined the Chemistry faculty at Loyola University.
Faculty Name and Department: Anne Grauer, Department of Anthropology

Project Title: Dead Folks Do Tell Tales: The analysis of humans skeletal remains in historical contexts

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.

The human skeleton provides a rich resource for information about the past. Through careful analysis of bone processes, age-at-death, sex, ancestry, and aspects of health and disease can be explored on the individual and populational level. These data, along with the context within which a skeleton was found, provide a window into the past. During the summer of 2016, I will be working at the Field Museum in their human remains collection. The goal of my work is to assist the museum in determining the number of individuals currently in their collection, providing them with information about each individual, and assisting them as they link each individual with historical records in their archives.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?

Although having an understanding of human skeletal anatomy would be helpful in this project, it is not necessary. All students on this project work in teams, so novices are paired with advanced students as part of the learning process. Thus, the WISER Intern will be paired with one or more of my students throughout the summer. Importantly, the WISER Intern will be working directly with human remains. She will be introduced to the process of data collection and analysis, and will begin to develop familiarity with disease processes that affect human skeletal tissue. Students on the project need to be detail-oriented, extremely careful, good listeners, problem-solvers, and able to work alongside others. Oh yeah, having a good sense of humor helps as well!

3) Provide a short paragraph including both personal and professional biographical information.

I am a fun-lovin’ Leo who hates quiet walks in the rain and bubble-baths. I am a devoted Bears fan, a chocoholic, and an ex pasta-junkie. I’ve been interested in human biology, anthropology, medicine, and history ever since I was young (Wait! I’m still young, aren’t I?), and thus adore the fact I have found a field of research that allows me to explore everything and anything that catches my fancy. I received my Ph.D. from the University of Massachusetts-- Amherst in Biological Anthropology, and have been here at Loyola since 1988. I have two kids, one who’s 25 and the other who will be 13 years old, and a husband who copes reasonably well with the fact that I enjoy spending most of my time with dead people.
Faculty Name and Department: **Howard Laten, Biology**

Project Title: Experimental detection of methylated DNA in soybean mobile DNA elements

1) Please provide a short discussion of your research agenda and goals for the summer of 2016. My students and I will be designing and carrying out experiments to more fully characterize the methylation of multi-copy families of soybean mobile DNAs. Methylation of DNAs is known to inhibit gene expression in general and to inhibit the ability of mobile DNAs to move from site to site in the chromosomes of host species like soybean. This is called epigenetic control. Transposition of mobile DNAs can disrupt genes at new element insertion sites, so mechanisms that inhibit such events have evolved in all organisms. Soybean is a suitable subject for this project since its genome has been fully sequenced, it contains many families of mobile DNAs that constitute 80% of its genome, and unlike model organisms, methylation of its mobile DNA content has not been examined. For the WISER project, we will use well-established experimental protocols (DNA extraction and quantitation, enzymatic DNA digestion, polymerase chain reaction, gel electrophoresis) that are amenable to short-term projects and feasible for students without prior research experience to evaluate the methylation status of a single mobile DNA family.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student? Students do not need any specific research skills, but must be organized, able to follow directions, be detail-oriented, and have a passion for discovery. With my direction, training, and assistance, the student will be expected to learn to work with user-friendly databases and bioinformatics software, to learn and perform basic techniques of DNA isolation and analysis, and to develop a degree of technical and intellectual independence that includes literature searches, experimental design, and data interpretation. She will have the major responsibility for carrying out all “wet-lab” experiments, will be expected to complete the project during the summer, and to compare her results with those of students working on parallel projects.

3) Provide a short paragraph including both personal and professional biographical information. I have been a faculty member in the Biology Department for 35 years. I grew up in a suburb of Washington, DC, and earned my B.S. in Biology and Chemistry at a small liberal arts college near Cleveland. My doctorate is in Biochemistry from the University of Wisconsin-Madison, and I continued there for two years in the Molecular Biology Department as an American Cancer Society Post-doctoral Fellow. I spent the summer of 1980 as an AAAS Science Writing Fellow at *The Milwaukee Journal* where some of my articles made the front page. I was a Fulbright Research Scholar in 2012 at the French National Agricultural Research Institute in Versailles. From 2006-2009, I directed a National Science Foundation Research Experience for Undergraduate program site which hosted and supported a total of 35 students from across the country. I am currently teaching Genetics (undergraduate), Genomics (grad and undergraduate), and a Special Topics course on Mobile DNA and was the founding director of the LUC Bioinformatics B.S. program. I have mentored the research of 105 undergraduates (including five WISER students) and 15 M.S. students. There are currently eight undergraduate research students in my lab performing experiments and/or carrying out bioinformatics analyses. My research output includes 25 peer-reviewed full-length journal articles (excluding one recently submitted), 26 short DNA sequence-based articles, and 235 Genbank DNA sequence contributions. Sixteen different undergraduates have been co-authors on the last five years of these publications.
Faculty Name and Department: Dr. Aaron Lauve, Department of Mathematics and Statistics

Project Title: When is a matrix invertible? What about the sum of two matrices?

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.

When mathematicians describe what they do for a living, they frequently get the question, "hasn't everything been done already?" Well, no. Not by a long shot! Indeed, many seemingly elementary phenomena are left unexplained. In this project, we look at two such questions about matrices.

I. First posed by M.-P. Schutzenberger over 30 years ago, we ask for criteria (knowledge) about matrix products $AB$ and $BA$ guaranteeing that $A$ is invertible.

II. First posed by the late, great I.M. Gel'fand over 15 years ago—and closely related to a problem of A. Horn from over 50 years ago—we ask for a better understanding of the determinant of $A+B$. (Yes, some two hundred years after its formal definition, and some 2300 years after its first informal use, the determinant is still a mystery.)

We will make some progress towards solutions using tools from algebra, geometry, and combinatorics. The student will also gain some computer programming experience.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?

The student will help generate data and formulate conjectural criteria for invertibility (of $A$ in Problem I, and $A+B$ in Problem II). Some experience with abstract algebra, geometry, or combinatorics could be helpful, but nothing beyond basic linear algebra is required to hit the ground running. As a byproduct, the student will gain some valuable computer programming experience.

3) Provide a short paragraph including both personal and professional biographical information.

Dr. Lauve received his B.S. in mathematics from the University of Oklahoma and his Ph.D. in mathematics from Rutgers University. Before joining the faculty at Loyola in 2010, he held postdoctoral positions at the University of Quebec at Montreal and Texas A&M University. He also taught at McGill University and was a Project NExT fellow (sun dot). He loves film and food. And Chicago. And collaborative research in mathematics.

Dr. Lauve’s research has been supported by the National Security Agency. His research interests lie in algebra and combinatorics, especially when they appear together, as in combinatorial representation theory, pointed Hopf algebras, or the mathematical theory of words. His results has appeared in leading journals, including International Mathematics Research Notices, Journal of Algebra, Advances in Mathematics, and SIAM Journal on Discrete Mathematics.
Faculty Name and Department: Ken Olsen, Department of Chemistry and Biochemistry

Project Title: Molecular dynamics of Drug-Protein and Drug-Polymer Interactions

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.

This is a computational project that involves simulating how small molecules bind to proteins. In the past we have studied the binding of gasses to globin proteins like hemoglobin and myoglobin and metal ions to the signaling protein calmodulin. We have also examined the control mechanisms of allosteric enzymes and G-proteins involved in signal transduction. These projects have enabled us to develop a new method to study the binding of pharmaceutical drugs to proteins. We want to apply the method to a number of interesting projects, including the design of new antibiotics. We are also interested in drug-polymer and drug-surfactant interactions. The student would learn about computational methods used to both simulate the motions of proteins and other molecules and to display these motions as a movie on her own computer. The simulations would be run on advanced computers in my research laboratory that allow the problem to be broken into many smaller calculations, speeding up the entire process. **No computer programing is required for this project.** All of programs already exist and are easy to use. The emphasis of the project is on understanding how molecules interact in solution and on crystal surfaces. If the results are as good as previous simulations, the project is likely to lead to a publication.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?

The student would be responsible for her own project within the larger scheme of my laboratory’s research. The project would be computational. In this case the student would be using the computer clusters to predict how the properties of a protein change due to binding a small molecule. The analysis of these results could be done at home of the student’s computer. I have a large number of undergraduate students working in my laboratory during the academic year. Most of them are doing computational projects because it fits into their schedules better. No special skills are assumed before joining the laboratory. I will teach you what you need to know during the summer. If the student continues in my laboratory during the academic year, I will help her apply for Carbon, Mulcahy and Provost scholarships to support her and her research.

3) Provide a short paragraph including both personal and professional biographical information.

I received my BS in Biochemistry from Iowa State University in 1967 and my PhD in Biochemistry from Duke University in 1972. I then did post-doctoral research in protein crystallography at Purdue University for 3 years before taking my first faculty position at the University of Mississippi Medical Center. I moved to Loyola University in 1983 as an Associate Professor of Chemistry. I was promoted to full Professor in 1991 and was Chair of the Department for nine years beginning in 1993. During my tenure at Loyola I have been a visiting scholar at Harvard, Northwestern and the University of Illinois. I gave up the chair’s position in the Summer of 2002 so that I could devote more time to research and teaching. My current research group consists of three full-time graduate students and 15 undergraduates. The group will be much smaller during the summer because most of the undergraduates are either graduating or are gone for the summer. There will be only a few undergraduates involved in my research during that time period. I have published approximately 80 papers on my research.
Women in Science Enabling Research

Faculty Research Proposal

Faculty Name and Department: Dr. Martina Schmeling, Department of Chemistry and Biochemistry

Project Title: Investigation of Metal Deposition Metals in Zebrafish Embryos

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.

Heavy metals such as iron and cobalt are essential for many biological processes, but others, specifically lead and mercury, are highly toxic by interfering in those same biological processes. Our research group tries to understand the role some of these heavy metals play in biological systems. One of the questions we are investigating is the concentration at which heavy metals are detrimental to the development of an organism. Another question to be understood is the location where those metals are deposited within the organism. Depending on the location i.e. bones, tissue, organs, the metal will interfere differently in the organisms development process and also its toxic concentration will be different.

Zebrafish embryos are ideal model organisms for such a study as early embryonic development has been conserved during the evolutionary process and the data obtained can be applied to other organism as well. Zebrafish are easy to breed and maintain and produce a large number of offspring of the same genetic strain. We are currently in the process of developing a protocol by which heavy metal deposition in zebrafish is analyzed at a late embryonic stage. For this the zebrafish will be first exposed to a heavy metal and then sacrificed and embedded into resin for sectioning after 4 days of development. The resin with the embedded embryo will be cut via microtome into thin sections in such way that a cross section of the organism is obtained. Each cut section will be analyzed for heavy metal concentration. Since it is known how the fish was embedded and cut, the metal concentrations can be related to certain body parts.

The following steps are involved in the research protocol:

- Zebrafish embryos will be exposed to a metal (Pb, Ni, or Cr) then humanely euthanized at 4 days post fertilization.
- The zebrafish samples will then be preserved from decay and embedded in resin.
- By using a rotary microtome (an instrument that cuts very thin slices of a material) 1µm - 4µm sections of the embedded zebrafish will be obtained.
- These sections will then be analyzed for the metal of interest by total reflection x-ray fluorescence.
- Analysis will indicate where in the zebrafish organism the metal is depositing.

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?

- The student will participate in the preparation of metal solutions, exposure of the zebrafish to these solutions, preparation of zebrafish for preservation and embedding, and performing microtome sectioning.
- The student will have to make all solutions necessary for zebrafish preservation and perform the 7 day procedure necessary to reach the embedding step.
- The student will have to prepare polycarbonate slides to mount the sections.
- The student will develop the skills necessary to analytically prepare solutions.
- The student will learn to handle toxic materials and biological organisms safely and correctly.
- The student will learn how to perform literature searches and understand advanced scientific writing.

3) Provide a short paragraph including both personal and professional biographical information.

Dr. Schmeling is an associate professor in the department of chemistry and biochemistry. This is her 16th year at Loyola and she has been teaching a variety of courses including freshman chemistry, environmental chemistry and several honors courses. Her research interests are in analytical chemistry, specifically in analysis of heavy metals in various types of samples ranging from nanomaterials to biological specimen. She has currently three graduate students and a number of undergraduate students assisting with the research.

She has enjoyed being part of the WISER program in the past and is looking forward to host a student this summer.
Women in Science Enabling Research
Faculty Research Proposal

Faculty Name and Department: Heather Wheeler, Departments of Biology and Computer Science

Project Title: Predicting gene regulation across the globe

1) Please provide a short discussion of your research agenda and goals for the Summer of 2016.
   Your genome is composed of a vast array of 3 billion bases (A’s, C’s, G’s and T’s), yet less than 2% of these bases encode proteins. What is the rest of the genome doing? Some of the non-coding regions are involved in gene regulation, controlling whether a gene is on or off and how much of it is expressed. Differences in DNA sequence among individuals can lead to differences in gene expression levels, which in turn can lead to trait differences. We have developed a method that harnesses these DNA differences to predict gene expression levels. The gene expression levels are then tested for correlation with a disease or other trait of interest. For example, my collaborators and I discovered that people with bipolar disorder are more likely to have increased expression of a gene called PTPRE. The directional information provided by the method is key: genes with increased expression associated with a particular disease represent potential drug targets for treatment of that disease because it is much easier to take away function than increase function.

   Thus far, most of our analyses have been done in individuals with European ancestry. Healthcare disparities extend to the field of human genetics, and as a result, more genetic data has been collected from individuals of European ancestry. This summer, we will extend our expression prediction method to populations understudied and underserved in the human genetics community. We currently have data for populations with East African (Kenya), West African (Nigeria), East Asian (Japan and China), South Asian (India), and Mexican ancestry. We will use machine learning approaches to build prediction models in each cohort and test model performance across cohorts. Questions we would like to answer include: (1) Are the predictors similar among populations or are they unique? (2) When we test predicted expression for association with available traits (e.g. breast cancer incidence, chemotherapy side effects), are new genes implicated or were the genes previously found in studies of European populations?

2) In what capacity will the student participate in your project? What tasks might the student be expected to complete and what skills might be required of the student?
   You will focus on developing predictors of gene expression in one population of interest and work with others in my lab to compare populations using statistical software. This project is computational and will help you gain data analysis skills critical for many future careers. The size of data sets will continue to grow and the ability to work with large data sets will give you an edge in many fields. Prior computer programming experience is helpful, but not required; we will teach you what you need to know. We would like to work with someone who is interested in genetics and excited about learning new things!

3) Provide a short paragraph including both personal and professional biographical information.
   I became interested in science, specifically forensic science, when I was a teenager. I loved reading gory crime novels centered on forensics by authors like Patricia Cornwell and Jeffery Deaver. As an undergraduate at Hamline University, I worked at the Minnesota state crime lab in the DNA unit. While it was amazing that you could use DNA as a fingerprint to identify someone, I realized I was more interested in how the DNA variation we were measuring led to differences among people. My undergraduate advisor encouraged me to go to graduate school and I went to Stanford and got a PhD in genetics and did postdoctoral research in genomics at The University of Chicago. Along the way, I picked up programming and data analysis skills to further my research. I was often the first person to put all the data that had been collected in the clinic and DNA sequencing centers together, run the analysis pipeline that I built, and visualize the results. I found data analysis to be very exciting, especially when I discovered something new because I was the first to see the result! I became an assistant professor at Loyola in Fall 2015 and will now get to pass on the thrill of discovery to my students. For more information on our lab’s research, see http://hewlab.org.

   I live in the South Loop neighborhood with my husband Marty and our 3-year-old daughter Violet. We enjoy having family dance parties—Violet’s favorite tunes include “Let it Go” from Frozen and “Life on Mars?” by David Bowie. Guess which one her mom prefers? Chicago is a fabulous city: I love going to world-class restaurants with Marty, taking Violet to great parks and museums, attending baseball games and live music shows, and not having to drive!