**Project description 1: CFD Simulations of Transport of Atmospheric Aerosols and Nanoparticles in Models of Human Respiratory System**

The project will involve numerical simulations of transport of atmospheric aerosols and nanoparticles in models of various parts of human respiratory system using the Navier-Stokes equations in continuum regime and slip/transitional flow regime. Although the primary interest of this investigation will be the study and understanding of aerosol transport in human respiratory system, the computational modeling and analysis of the entire system is currently not feasible because of extreme complexity of airflow in the nasal cavities, oral and bronchial airways of the respiratory system. Because of geometric complexity of pathways, the flow field features include turbulent jet-like flow, recirculating flow, secondary flow, vortical flows, large pressure drops etc. Such complex flows generated in nasal cavities and oral airways eventually propagate into the tracheobronchial airways. In order to make the problem tractable, simple rigid models of nasal cavities, oral and bronchial airways will be considered; fluid/structure interactions will be neglected. CFD modeling software ANSYS – FLUENT, available in the CFD lab will be employed in the study. It will be assumed that aerosols are spherical, non-interacting and mono-disperse, and deposit upon contact with the airway surface. These dilute particle suspensions will be modeled with the Euler-Lagrange approach for micron size particles and in the Euler-Euler framework for nanoparticles. These simulation studies will have implications in assessing the detrimental health effects in the case of inhaled toxic nanoparticles. The variations in several parameters employed in the models such as the geometric features (which can be individual-specific), the inhaling/exhaling patterns, particle distributions (from micron to nanoscale), boundary conditions etc. can significantly affect the particle deposition in the respiratory system pathways.

**Required skills:** Basic skills in math and computer usage at undergraduate level and interest in numerical simulations.

**Student level:** Undergraduate (junior/senior), Masters in engineering/sciences or Medical Student preferred. MPH is eligible.

**Learning experience:** The students will learn how to create models and solve problems using numerical simulations or experimental data to assess the detrimental health effects due to inhaled toxic pathogens/nanoparticles. The learning experience will be general enough that it can be applied to understand and determine solutions for many other health related problems by computer simulations.

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**Project description 2: CFD Simulations of Transport of Magnetic Nanoparticles in BioMEMS for Applications to Drug Delivery**

Microfluidic devices employing magnetic nanoparticles can serve as a useful platform for understanding and developing diagnostic and therapeutic instruments and techniques for medical applications. Magnetic particles based sensors have many advantages over the standard laboratory based diagnostic protocols. The focus of this research is to study the transport of magnetic particles in microfluidic devices by numerical simulations. Numerical simulations of transport of magnetic particles and their interaction with the fluid in the presence of a magnetic field will be conducted in microfluidic devices by solving the governing equations of fluid dynamics and electrodynamics. CFD simulation software exists in the CFD lab to conduct these types of studies. These studies are of relevance in development of bioMEMS for Magnetic Drug Targeting (MDT) applications.

**Required skills:** Basic skills in math and computer usage at undergraduate level and interest in numerical simulations.

**Student level:** Undergraduate (junior/senior), Masters in engineering/sciences or Medical Student preferred. MPH is eligible.

**Learning experience:** The students will learn how to create microfluidic models and study the transport of magnetic nanoparticles problems for drug delivery applications for many health related treatments including diabetes and certain types of cancer. The learning experience will be general enough that it can be applied to understand and determine solutions for many other health related problems by computer simulations.
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<th>Faculty Website</th>
<th>Project Description</th>
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<tr>
<td>Homepage Dr. Agarwal</td>
<td>Project description 3: Poverty, Nutrition, Health and Education Nexus</td>
<td>USA</td>
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<td>In recent years, because of great emphasis on “Energy and Environment” because of their global impact on Climate Change, the study of Water-Energy-Food-Environment Nexus has been a topic of recent research worldwide. However, the study of Poverty-Nutrition-Health-Education Nexus has been rather limited. The goal of this research is to use the available data to model and study both the implications of this nexus on both the individual and society at large in terms of improving the Human Welfare Index (HWI) both in developing and developed societies. It is clear that the current models relating these four elements have serious flaws leading to policies with little or very incremental improvement. Alleviation of poverty does improve nutrition, health and education but not necessarily with a positive societal impact. This situation is prevalent in relatively smaller percentage of population in highly developed societies such as US and in very large percentage in developing societies such as India and underdeveloped societies of Africa. The students will create models and validate them using the existing data and extrapolate them to speculate future trends that may be useful to policy makers.</td>
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<td><strong>Required skills:</strong> Basic skills in math and statistics, and MATLAB usage (not essential)</td>
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<td><strong>Student level:</strong> MPH, MPH preferred. MSW also eligible.</td>
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<td><strong>Learning experience:</strong> The students will learn how to create models to study Poverty, Nutrition, Health and Education Nexus and determine from them their impact on HWI both in developed and under-developed societies. The learning experience will be general enough that it can be applied to understand and determine solutions for many other poverty and nutrition, and poverty and health related problems related to other aspects such as childhood development and impact of gender based biases.</td>
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<td>Homepage Dr. Amarasinghe</td>
<td>Project description: Structural and biochemical mechanisms of negative sense RNA viruses at the host-virus interface</td>
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<td>A long term goal of the research in the Amarasinghe lab is to understand the structural basis for host-pathogen interactions that contribute to immune evasion and pathogenesis. Currently work is focused on characterizing proteins from several negative sense RNA viruses such as Ebola virus, Marburg virus, and influenza virus and the host immune signaling pathways. Seasonal and pandemic influenza infections and recent Ebola virus outbreak in West Africa suggest that these viruses are not only highly pathogenic, but they also have the ability to impact the global health landscape. Ongoing projects in the laboratory are investigating: 1) the role of Ebola and Marburg viral proteins in innate immune evasion, 2) mechanisms of negative strand RNA viral replication and transcription using influenza and respiratory syncytial viruses as model systems, and 3) structure-based approaches to develop antivirals. These projects utilize a range of techniques from structural biology and biochemistry, including x-ray crystallography, nuclear magnetic resonance spectroscopy (NMR) as well as kinetic and thermodynamic studies. Through these studies we expect to define regulatory mechanisms and identify previously unrecognized opportunities for antiviral development. We are interested in working with highly motivated students.</td>
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<td><strong>Required skills:</strong> Some training and experience in biochemistry is preferred and interest in host-pathogen studies is required.</td>
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<td><strong>Student level:</strong> Undergraduate, Masters (MPH, MSW, MPHS), Medical student</td>
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<td><strong>Learning experience:</strong> The student will learn how to use biophysical and biochemical techniques to define cellular signaling at the host-viral interface.</td>
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<td>Homepage Dr. Barnoya</td>
<td>Project description: All projects are related to chronic disease control and are policy relevant to Guatemala.</td>
<td>Guatemala</td>
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<td>Students will work on research projects lead by fellows in Guatemala. Therefore, they will be paired with a dyad in Guatemala. Specific topics are defined in March by the local fellows every year and data collection usually happens between June and August. Students then can work on protocol development (no need to be in Guatemala) data collection, entry and analysis. In addition, they will have the opportunity to co-author posters and manuscripts.</td>
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<td><strong>Required skills:</strong> Data analysis using STATA or another statistical program. Building databases. Ideally fluent in Spanish, but not mandatory.</td>
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<td><strong>Student level:</strong> Masters (MPH, MSW, MPHS)</td>
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<td><strong>Learning experience:</strong> Working with another research fellow in Guatemala, students will learn about research and data collection in Guatemala. In addition, they will learn writing and presentation skills and further expand their statistical analysis skills. Some project are also qualitative and therefore there is also an opportunity to interact and work in this field.</td>
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<td>Homepage Dr. Bierut</td>
<td>Project description: Twin studies have long recognized that genetic factors contribute to smoking tobacco. Our group led the first study to report a genetic association between nicotine dependence and the region surrounding the CHRNA5-CHRNA3-CHRNB4 cholinergic nicotine receptor subunit genes. Subsequently, this region has been strongly replicated in large meta-analyses and has emerged as the strongest genetic risk factor for smoking related behaviors. Studies from our group and others have also demonstrated that variation in the CHRNA6-CHRNB3 receptor subunits and nicotine metabolizing gene CYP2A6 are also associated with heavy smoking and nicotine dependence. The goal of the parent study of this summer project is to further characterize genetic findings for nicotine dependence and then to integrate how these associations contribute to smoking cessation. Students will interview research participants who are current smokers using a standardized questionnaire that assesses personal history and history of substance use. Students will also collect saliva samples from participants for genotyping purposes. By collecting a large diverse sample of genotyped smokers, the goal of this project is to further dissect how genetic variants contribute to smoking related behaviors. The collaborative environment at Washington University will provide the opportunity to interact with researchers at a wide variety of training levels, providing diverse perspectives on substance use research. Required skills: Student should be comfortable interacting with patients and research participants. Learning experience: Students will learn the procedures involved in recruiting research participants, obtaining informed consent and conducting assessments. They will gain experience administering structured research interviews. They will develop a summer research project and present findings at a research seminar. They will also be involved in classwork and journal club for career development.</td>
<td>USA</td>
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<td>Homepage Dr. Boon</td>
<td>Project description: To develop novel antiviral therapeutics against influenza virus we are interested in identifying host proteins that are important for influenza virus replication and pathogenesis. We have identified a series of host proteins using genetic and bioinformatics analysis that may play an important role during virus infection and disease. The summer projects that we offer allow the students to study one or more of these host protein and determine if the protein impacts virus infection, replication, or the innate immune response to the pathogen. Required skills: No particular skills required, only enthusiasm Learning experience: Many basic research procedures including molecular biology, tissue culture, virus handling, DNA sequencing, working safely in an enhanced Biosafety level 2 environment.</td>
<td>USA</td>
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<td>Homepage Dr. Brown</td>
<td>Project description: The Atahualpa Project is an ongoing population-based cohort study designed to reduce the increasing burden of non-communicable diseases in rural Ecuador. Atahualpa was selected as a village representative of the region. As detailed elsewhere, more than 95% of the population belong to the Native/Mestizo ethnic group (Amerindians) and their living characteristics are homogeneous. The idea is to conduct follow-up Ankle-Branchial Index (ABI) exams in the population aged ≥60 years to assess disease progression and correlation with stroke and ischemic heart disease. All persons to be investigated were screened one year ago. Required skills: Students should be familiar with ABI (ankle-brachial index) determinations and EKG recordings. Fluency in Spanish. Student level: Medical student Learning experience: This research training will familiarize the students with the general principles and conduct of an epidemiologic study. It will teach them how to perform several useful medical tests on patients. In addition, the students will experience the relation between culture and disease in a very different society than the United States.</td>
<td>Ecuador</td>
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### Project Description 1: Longitudinal data from an epidemiologic high risk family study are available to study the pathways to development of alcohol, tobacco and cannabis use disorders in a diverse sample of youth from adolescence to young adulthood. In particular, the changing nature of home environment, and parenting practices have not been fully studied in ethnically diverse samples. This family study over-sampled African American families, collecting data from over 800 youth in 450 African American families, and 600 youth in 300 European-American families. The student could explore the influence of various dimensions of home environment in the development of heavy and problem drinking, and alcohol use disorders in an ethnically diverse sample stratified by risk for alcoholism based on paternal drinking problems. Consistency of results across race/ethnicity could be studied. The availability of measured genotypes may be added to the analysis to expand beyond self-reported items. This is suggested as one possible set of analyses, but given the comprehensive nature of the assessments that were obtained, the individual interests of the student in investigating influences on development of substance use problems and disorder, or other psychopathology, could also dictate the direction of analyses.

**Required skills:** Experience with data analysis, and some grounding in basic statistics is very important.

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** Students will learn to formulate research questions and hypotheses based on literature reviews, to undertake data analyses that address the questions, and to produce a presentation that will summarize the results of the investigation (and even possibly a draft of a paper.) The student will also gain an appreciation of study design, sample selection, research interviews and operationalization of behavioral constructs in epidemiologic samples, and statistical techniques (including e.g., logistic regression, survival analysis, latent transition modeling among others as suited to the question), and familiarity with specialized statistical packages to implement the analyses.

### Project Description 2: One consistently identified factor that protects against the development of substance use disorders in youth is high religiosity. The nature of this construct over development has not been fully explored. In several high risk family studies of youth (twin, ordinary siblings, and offspring of twins) that have been collected in our research group, measures of religiosity and spirituality have been collected over time, as well as measures of substance use and problem use over the same time frames. Examining the influence of this domain on trajectories of substance involvement in these data could be a potential focus. However, given the comprehensive nature of the assessments, the student’s own interests in exploring a class of protective factors for substance use disorder development, or other psychopathological development, could drive the analyses.

**Required skills:** Experience with data analysis, and some grounding in basic statistics is very important.

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** Students will learn to formulate research questions and hypotheses based on literature reviews, to undertake data analyses that address the questions, and to produce a presentation that will summarize the results of the investigation (and even possibly a draft of a paper.) The student will also gain an appreciation of study design, sample selection, research interviews and operationalization of behavioral constructs in epidemiologic samples, and statistical techniques (including e.g., logistic regression, survival analysis, latent transition modeling among others as suited to the question), and familiarity with specialized statistical packages to implement the analyses.

### Project description: Participants in this summer research project will work with faculty on the development of quality improvement programs, which will be implemented locally at the Barnes-Jewish and St. Louis Children’s Hospitals. In addition, the participant’s project may be jointly developed with an international teaching site located in Ghana and/or India, providing the opportunity to explore the delivery of health care in other countries.

**Required skills:** Students with previous research experience pertaining to methodology and data analysis would be optimal but not essential. In addition, some familiarity with the delivery of perioperative clinical care would be helpful. However, any/all students with an interest in quality improvement, behavioral survey and study design, as well as domestic and/or global health care would be welcomed.

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** Participants will have the opportunity to work with educators and quality improvement experts in the Division of Quality Improvement, Research, and Informatics [INQUIRI]. In this regard, participants will be intimately involved in the genesis and development of unique and potentially high-impact quality improvement initiatives, quality assessment programs and databases, practitioner and patient surveys, and comparison studies. Ideally, participants will have an interest in this area of study as a focus for a future career in the healthcare sector and therefore, will be provided an inimitable opportunity to explore this career path. In addition, participants will gain foundational experiences in study design, methodology, and data analysis.
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<th>Faculty Website</th>
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| **Homepage Dr. Curiel** | **Project description 1:** Adenoviral vector vaccine development  
Required skills: Lab experience  
Student level: Medical student  
Learning experience: Background in translational, bench-to-bed research. | USA |
| **Homepage Dr. Curiel** | **Project description 2:** Virotherapy agent for cancer  
Required skills: Lab experience  
Student level: Medical student  
Learning experience: Background in translational, bench-to-bed research. | USA |
| **Homepage Dr. Drake** | **Project description:** There are two related projects that the student may work on:  
1. DOD funded study to utilize VA data to assess predictors of prostate cancer outcomes and explore any differences between race or socioeconomic status.  
2. Prostate Cancer Prospective Cohort in which we are following-up with prostate cancer patients using clinical records, phone calls, etc. to determine recurrence status.  
Required skills: Willingness to learn quickly, literature review, data entry  
Student level: Undergraduate, Masters (MPH, MSW, MPHS), Medical student  
Learning experience: Data entry, epidemiological research methods, statistical analyses, manuscript preparation, patient recruitment | USA |
| **Homepage Dr. Evanoff** | **Project description 1:** Analyze existing data and write-up the results. Project ideas may be one of the following:  
a. Descriptive and qualitative analysis for early results of the Healthy Worker Participatory Program intervention with grocery store workers  
b. Comparison of interview versus self-reported survey for assessing physical work exposures  
c. Other projects linking work injuries and productivity data to physical work exposures  
Required skills: Analytic project: should have some knowledge with database software (SPSS or SAS), basics statistics, and writing in English.  
Student level: Masters (MPH, MSW, MPHS), Medical student  
Learning experience: Students will learn skills and procedures in data collection, data analysis, field research, data coding, and workplace health and safety. | USA |
| **Homepage Dr. Evanoff** | **Project description 2:** Assist with field-based data collection on injuries and safety programs of construction companies. Duties would include collecting data at construction sites including daily records of job tasks, questionnaires, and other documents of safety training and worksite audits.  
Required skills: Field data collection project: should be proficient in spoken English, interact well with blue-collar workers, and be personable.  
Student level: Masters (MPH, MSW, MPHS), Medical student  
Learning experience: Students will learn skills and procedures in data collection, data analysis, field research, data coding, and workplace health and safety. | USA |
Faculty Website | Project Description | Country
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Homepage Dr. Fleckenstein | **Project description:** Our laboratory works on molecular pathogenesis and antigen discovery for enterotoxigenic Escherichia coli (ETEC), a leading cause of diarrheal illness among young children in developing countries. The overall goal of the laboratory is to define novel antigens that could be incorporated in a vaccine (aka “translational vaccinology”). In general, projects amenable to student involvement during the short timeframe available for SPRINGH involve molecular cloning and/or expression of candidate vaccine antigens, as well as interrogation of immune responses to novel antigens by kinetic ELISA. Because of the amount of time for student involvement is limited to essentially two months the student would likely be assigned to one aspect of an ongoing project with a post-doctoral research scientist in the laboratory.

**Required skills:** There are no specific skills required. Basic familiarity with lab techniques (e.g., pipetting, etc.) would be preferred. The student should however be particularly interested in vaccine development for developing countries. Because the laboratory routinely handles serum samples from patients or human volunteers, the student must demonstrate proof of immunity to hepatitis B, and take appropriate biosafety courses prior to working in the laboratory.

**Student level:** Undergraduate, Masters (MPH, MSW, MPHS), Medical Student

**Learning experience:** During the course of the 8 week program, the student will learn basic aspects of molecular vaccinology and immunology as they apply to vaccine development for a pathogen that causes hundreds of thousands of deaths and is associated with tremendous morbidity in millions of children worldwide.

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Homepage Dr. Goodman | **Project description 1:** We collected surveys (n=975) on health information seeking, segregation experience, social networks, health behaviors and health outcomes. The student (in collaboration with Dr. Goodman) will develop a hypothesis or research question and use the data to examine their hypothesis.

**Setting**
This study was conducted in the primary care clinic of a large urban hospital. In one year the Primary Care Clinic in the Center for Outpatient Health (COH) at Barnes-Jewish Hospital saw 16,907 unique patients; 64% African American, 30% white, and 6% other. The majority of patients are female (67%), between 35-64 years of age (59%) and live in St. Louis City (46%) or St. Louis County (31%). About 40% of patients are covered by Medicare; 40% by Medicaid; and 3% uninsured.

**Data collection**
Participants in this study were recruited between July 2013 and April 2014. Participants were asked to complete a self-administered written questionnaire and a verbally administered survey component. The latter component assessed health literacy and was administered by a trained data collector who recorded responses. All participants completed a verbal consent process and signed a written consent form before completing the survey. As part of the consent process participants could opt-in to have information abstracted from their medical record and merged with survey data.

**Required skills:** Data analysis and use of a statistical software package (e.g., SAS, Stata) or qualitative analysis package (Atlas.ti)

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** How to interpret research findings and develop research presentations and manuscripts for peer-reviewed publications.

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Homepage Dr. Goodman | **Project description 2:** Participants in the Community Research Fellows Training (CRFT) program participated in focus groups as part of their Photovoice homework assignment. This assignment focuses on social capital in their communities as they relate to health, faith, work environment, education, policy, crime/violence, healthy eating, neighborhood/community resources.

Student will help code and analyze focus group transcripts using qualitative analysis software. In collaboration with Dr. Goodman student will examine a few major themes that arose in the qualitative analysis and develop a presentation and manuscript for peer-reviewed journal.

**Required skills:** Data analysis and use of a statistical software package (e.g., SAS, Stata) or qualitative analysis package (Atlas.ti)

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** How to interpret research findings and develop research presentations and manuscripts for peer-reviewed publications.
Project description 1: Student will work with me on developing a triple bottom line neighborhood sustainability plan, performance metrics and applicable case studies.

Required skills: Some back ground in environmental, urban or sustainability issues

Student level: Masters (MPH, MSW, MPHS)

Learning experience: How to complete a sustainability audit, public health analyses and develop performance measure of said.

Project description 2: Student will work on issues of public housing globally understanding how public health, aging and youth issues impact the daily life of residents and the structure of the neighborhood.

Required skills: Some back ground in environmental, urban or sustainability issues

Student level: Masters (MPH, MSW, MPHS)

Learning experience: How to complete a sustainability audit, public health analyses and develop performance measure of said.

Project description: For a 2-year randomized controlled trial, we developed a technologically innovative, culturally tailored, interactive cancer-communication intervention for African American breast cancer patients being treated at Siteman Cancer Center. We loaded video clips of African American survivor stories on a touch-screen computer, which patients could view searching by topic or by storyteller; video clips were categorized as fitting one of 12 topics, and storytellers were categorized as fitting one of 4 age groups. We are examining the effect of the intervention on patients’ clinical outcomes, including quality of life and adherence to follow-up care recommendations. The sample includes 227 newly diagnosed African American breast cancer patients (stage 0-3 at diagnosis; 76% early-stage [0-2A]; mean age 56, range 39-78 years; 60% <$25,000 annual income). The intern’s project will entail conducting a search of the literature and writing a literature review, completing audits of the medical record for clinical data, and perhaps other substantive contributions to preparation of manuscripts for publication (e.g., creating tables and figures, writing, and potentially analysis of data), depending on the intern’s skill sets and training.

Required skills: The ideal student for this project will be very detail oriented and possess excellent written and oral communication skills (English).

Student level: Masters (MPH, MSW, MPHS), Medical Student

Learning experience: The student will gain experience in: 1) conducting audits of patients’ medical records for data collection, 2) conducting a search of the literature to answer the research question, and 3) writing a literature review for use in publications. The student also might gain experience in data analysis, depending upon the student’s interest and prior training. This study has been approved by the Institutional Review Board at Washington University School of Medicine, and the student intern will be added to Dr. Jeffe’s research team after completing HIPAA and human subjects research training. In making substantive contributions to the research project, the intern will be given the opportunity to be a co-author on presentations and manuscripts that result from the intern’s work during this summer program.

Project description: Mycobacterium tuberculosis (Mtb), the etiological agent of tuberculosis (TB), currently infects one third of the world’s population, causing pulmonary active TB in ~9 million people and resulting in ~1.3 million deaths per year. The variable efficacy of the current TB vaccine Mycobacterium bovis BCG (BCG) along with the recent emergence of multi drug-resistant (MDR) Mtb strains has prompted the search for novel vaccines for TB. In recent years, our work has described T helper type 17 (Th17) cells producing the cytokine Interleukin-17 (IL-17) as critical effector cells that mediate vaccine-induced protection against Mtb. In addition, in our recent work we have identified a Single nucleotide polymorphism (SNP) in the IL-17 gene in humans that is associated with susceptibility to clinical active TB. The identified SNP is in the promoter region of IL-17 gene and associated with low IL-17 production,. Thus, we put forth the new hypothesis that humans with the identified SNP in IL-17 gene produce lower IL-17 production and thus may be predisposed to increased susceptibility to TB. During the 8 week period in the lab, the student will PCR amplify the fragment of DNA containing the IL-17 SNP and clone it into a reporter expression system, to study how the IL-17 SNP modulates gene expression of a reporter gene. Understanding how the identified IL-17 SNP regulates gene expression in lab assays will help us understand the overall role of IL-17 in TB pathogenesis in humans.

Required skills: Previous lab experience with molecular or immunological techniques would be a plus.

Student level: Undergraduate, Masters (MPH, MSW, MPHS), Medical student

Learning experience: The student will learn molecular and immunological lab assays and protocols while applying this knowledge to test a scientific hypothesis.
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| Homepage Dr. Lian | **Project description:** Colorectal cancer (CRC) is one of the most common cancers and leading causes of cancer death in the United States. The summer student is expected to work on the National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) data. The study will examine geographic heterogeneity and racial disparity in CRC incidence and mortality. We will quantify small-area variation in CRC outcomes and identify neighborhood characteristics associated with CRC incidence and mortality. We will also examine geographic heterogeneity in racial disparity of CRC incidence and mortality. Given the current funded R21 project in which we’re modeling spatial accessibility to lower endoscopy services in the United States, I will help the student link the spatial accessibility measure to the SEER data for examining if spatial accessibility to lower endoscopy services can account for geographic variation in CRC incidence and mortality. The study findings will provide helpful information for future public health intervention efforts aiming to reduce health disparity in CRC incidence and mortality. 

**Required skills:** No lab experience is expected. Experience in data analysis is not expected, but is preferred. The student is expected to have a strong English writing skill.

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** The student will get general knowledge in advanced spatial epidemiological analysis and Geographic Information Systems (GIS) modeling, and also obtain experience in working on a large-scale dataset. The student will learn how to identify an important public health issue in the prevention and control of colorectal cancer, and how to utilize existing national data to address a research question to fill the current research gap. A manuscript is expected to be ready to submit for publication after the 8-week research training. | USA |
| Homepage Dr. Lobb | **Project description:** The student will be working on a mixed methods study that examines use of patient navigation services in rural healthcare organizations to promote early detection of breast cancer. In June and July 2015, we will be analyzing data from interviews with patients and staff from healthcare organizations. The study will work with a study team and have the opportunity to apply qualitative methods to a research project. 

**Required Skills:** Some experience with or a strong interest in data collection and analysis using qualitative methods.

**Student level:** Masters (MPH, MSW, MPHS)

**Learning experience:** The student will be immersed in the analysis of interview data. The student will learn to apply qualitative methods for analysis strategies and methods for integrating qualitative data with quantitative data from a structured survey. This is an excellent opportunity for students who want hands-on experience with qualitative research methods. | USA |
| Homepage Dr. Manary | **Project description:** Analyzing a data set from a nutritional intervention in Africa. They will be given a book about clinical trials to read, have a tutorial about its content, then they start with the data set. Through weekly mentoring they will finish with a rough draft of a manuscript. 

**Required skills:** Able to read a scientific paper. Be familiar with the language surrounding study design. Basic course in statistics.

**Student level:** Undergraduate, Masters (MPH, MSW, MPHS), Medical Student

**Learning experience:** The baseline state of the nutritional status in Africa, good and bad features of clinical trials, a working knowledge of basic statistical methods. | USA |
| Homepage Dr. McQueen | **Project description 1:** A literature review of the use of narrative communication as an intervention strategy for addressing [fill in health behavior or health outcome of interest here]. I have been previously asked to lead a paper for diabetes, but other health topics could be addressed using the same literature reviewed thus far. 

Expected outcome would be a conference abstract and/or (at least contribution to a) manuscript for publication in an academic journal.

Skills used to complete this project include systematic literature review, creating tables of references by variables of interest, writing up article summaries and/or synthesizing findings/conclusions across articles/studies.

**Required skills:** Some experience with literature reviews, research writing, and data analysis is preferred. The project will be adjusted to the level of the student.

**Student level:** Undergraduate, Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** Each project has a different set of potential skills and either project can be tailored to the particular student to be appropriate for the skills and interests they have when starting the summer program, and providing them with a chance to enhance or obtain new skills and experiences in the research enterprise. | USA |
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<td><strong>Homepage Dr. McQueen</strong></td>
<td><strong>Project Description 2:</strong> Testing a smoking cessation web tool that recommends pharmacologic cessation aids to smokers based on their medical and personal factors. Options include developing and conducting a validation of the tool’s recommendations, or administering the tool to a specific population of smokers (clinic patients, community residents, treatment seekers, online panel) as a pilot study. This project will be tailored to the student’s interest &amp; skill-level, and some elements may be contingent on funding. All IRB approvals would be obtained as part of ongoing protocols or obtained prior to the student’s involvement with human subjects. Skills used to complete this project may include literature review, study design, participant recruitment and Interviews/data collection, data entry, data management, and data analysis, and writing for conference abstracts and/or contributions to a manuscript for publication. <strong>Required skills:</strong> Some experience with literature reviews, research writing, and data analysis is preferred. The project will be adjusted to the level of the student. <strong>Student level:</strong> Undergraduate, Masters (MPH, MSW, MPHS), Medical student <strong>Learning experience:</strong> Each project has a different set of potential skills and either project can be tailored to the particular student to be appropriate for the skills and interests they have when starting the summer program, and providing them with a chance to enhance or obtain new skills and experiences in the research enterprise.</td>
<td>USA</td>
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| **Homepage Dr. Mills** | **Project description:** We work with how Helicobacter pylori influences gastric cancer progression at a basic and translational science level. So we look for genes that may regulate response to infection, try to manipulate them in tissue culture and in mouse models and then look for parallels in human H. pylori infected tissues. One agent we have worked with, we have taken all the way to phase I clinical trial, though my lab does not oversee the clinical side of things. A student in the lab would work on the basic science projects we have been seeing how Helicobacter or models of it in mice influence differentation, metaplasia, and carcinogenesis. H. pylori infects half the world’s people, and gastric cancer is the third leading cause of cancer deaths, especially in Central and South America, so it is a global health problem. **Required skills:** Lab experience **Student level:** Medical Student **Learning experience:** Lab techniques, especially microscopy, immunostaining, working with tissue, mice, as well as information about an understudied disease that has tremendous global health import. Our collaborations are in Nicaragua, Korea, and Japan. | USA |

| **Homepage Dr. Mitreva** | **Project description 1:** Paragonimiasis Paragonimus spp., the lung flukes, represents one of the most injurious of the food-borne helminths. These flukes cause paragonimiasis in people and other crab-eating mammals in Asia, parts of West Africa, and South and Central America. About 20 million people are infected with lung flukes and an estimated 293 million people are a-risk. Pathogenesis ensues because of the migration of the lung form from the gut to the lungs and indeed through not infrequent ectopic migrations to aberrant sites including the brain and subcutaneous sites at the extremities, and toxin and other mediators released by the migratory parasites. The presence of the flukes in the lung causes hemorrhage, inflammatory reaction with leukocytic infiltration and necrosis of lung parenchyma that gradually proceeds to the development of fibrotic encapsulation except for an opening from the evolving lesion to the respiratory tract to allow the fluke eggs to exit to the outside environment. There are signs and symptoms that allow characterization of acute and chronic stages of paragonimiasis. There are about 15 species of Paragonimus known to infect humans. P. westermani infection is the most common, while P. heterotremus is the etiologic agent of human paragonimiasis in China, Lao PDR, Vietnam and Thailand. Species of Paragonimus are reported to infect humans outside Asia, including P. africanus and P. kellicotti in North America. Paragonimus miyazakii may be synonymous with P. skrjabini. We sequenced the genomes and transcriptomes of several Paragonimus species with a goal to understand the conservation and diversification of molecular characteristics among species and determine the gene expression dynamics over development. **Required skills:** Sequence data analysis experience, especially comparative genomics and transcriptomics analysis experience would be a plus. General bioinformatics experience is required. **Student level:** Masters (MPH, MSW, MPHS), Medical student **Learning experience:** * perform analytical processing of next generation sequencing data. * perform comparative genomics and transcriptomics analysis or genome vete variant discovery depending on the project they are associated with. | USA |
Project description 2: Genomic diversity among clinical isolates of helminthes.

Helminth infections are estimated to have a disease burden equivalent to 25% of that of HIV/AIDS and 50% of that of malaria. In recognition of the enormous health burden caused by these helminth parasites there has been an unprecedented effort by us to increase available parasitic helminth sequences by few orders of magnitude, adding 60 draft genomes of species that span the two main phyla, Nematoda and Platyhelminthes. However, for almost all species, the reference genomes are from strains long time maintained in a lab. There is no information on intraspecies genomic variations among natural populations. Therefore, this project’s main goal to sequence clinical isolates from different geographic regions especially in endemic areas where mass drug administration to control these infections is underway. In these areas re-infection after drug therapy is common and anthelmintic resistance is emerging and spreading as a problem.

The intraspecies comparative genomic analysis of the genomes and transcriptomes of clinical isolates of human helminthes will identify genetic markers suitable for fingerprinting of nematodes in order to differentiate persistent or reintroduced infections, determine polymorphic genes/gene families, determine genetic differences and similarities between phenotypically different field strains and identify genes/gene families affected by the different drug regimens. The clinical strains are obtained from ongoing projects in endemic countries. The sequence data will create a comprehensive map of genetic diversity in helminth parasites which in a long run, the expected outcome will improve the molecular profiling of human helminthiasis, providing additional power to identify genetic markers so that the development and spread of resistance can be monitored and managed.

Required skills: Sequence data analysis experience, especially comparative genomics and transcriptomics analysis experience would be a plus. General bioinformatics experience is required.

Student level: Masters (MPH, MSW, MPHS), Medical student

Learning experience:
- perform analytical processing of next generation sequencing data.
- perform comparative genomics and transcriptomics analysis or genome wide variant discovery depending on the project they are associated with.

Dr. Wolfgang Munar

Project description: To engage policy-makers in the Ministry of Health of Honduras in a formative evaluation project focused on improving public policy to reduce preventable and premature obstetric and neonatal mortality.

This is part of an ongoing project led by Peter Hovmand, Director Social System Design Lab that has developed several system dynamic (SD) models of maternal mortality in Honduras. The purpose of the project I may undertake is to engage the Honduran MOH actors that have taken part in the system dynamics work in policy dialogue activities to translate model insights into specific policy actions. The student will support this project during the formative research period to: (i) Develop a synthesis of the process followed by actors involved in the SD group model building process to date; (ii) Synthesize the insights that different actors have acquired from working with the various SD models of maternal mortality; (iii) Assess the intent to change health and other public policies that participating actors identify; and (iv) Assess the perceptions of strengths, weaknesses, usability and applicability that the actors identify from the cumulative system dynamics modeling experience to date. The student is expected to co-design the interview instruments, participate in the in-person interviews in Honduras, record and synthesize the interview data.

Required Skills: Qualitative methods; semi-structured interview design and application; Recording & Reporting interview material; Spanish comprehension and writing skills a must.

Student level: Masters (MPH, MSW, MPHS)

Learning experience: This is an applied policy analysis research project that will allow the student to (i) design, validate and implement qualitative research (semi-structured interviews); (ii) analyze complex, policy narratives in a context of change and health system performance improvement; and (iii) acquire hand-off experience in the health policy process in a low-income country and in the critical policy issues of maternal and neonatal survival.
Project description: Urinary tract infections (UTIs) – are among the most common and frequently recurring infectious diseases worldwide and principally caused by uropathogenic E. coli (UPEC) bacteria. How the urinary tract responds to the bacterial infection and which signaling pathways are critical for the host response is a major question that remains to be answered. Autophagy, a cellular degradation pathway, plays important roles in pathogen control and clearance and a specific autophagy gene, Atg16L1, plays key roles in host response to intracellular bacterial pathogens, and deficiency in ATG16L1 causes a hyper-inflammatory response. We have shown that mice with a deficiency in ATG16L1 are resistant to UTIs.

Interestingly, a commonly occurring genetic polymorphism in the human ATG16L1 gene (T300A) is known to confer increased susceptibility to Crohn’s Disease, a form of inflammatory bowel disease, characterized by severe inflammation in the intestinal tract. However, the mechanisms whereby ATG16L1 regulates and balances pathogen control and innate immunity are unknown and why this deleterious allele remains at such high prevalence in human populations remains to be determined. Here, we will test the overall hypothesis that ATG16L1-dependent protection from UTIs provides a selective pressure on the T300A mutation. We will determine the effects of the T300A allele on the incidence of UTI in humans. This project is anticipated to lay the groundwork for understanding the role of ATG16L1 in modulating the host immune response to uropathogens. Finally, our studies will shed light on the evolutionary question of why the seemingly deleterious T300A allele of ATG16L1 is maintained in the human population, despite being associated with Crohn’s Disease.

Required skills: Research experience or have real ambition to go into research.

Student level: Undergraduate, Masters (MPH, MSW, MPHS), Medical Student

Learning experience: Basic-translational research; how to plan and conduct experiments, how to interpret data, read the literature critically, and how to present.
### Project Description: Masculinity, Rum Shops, and Geographies of Risk in Grenada

In May 2014, the WHO announced that the Eastern Caribbean island of Grenada has the highest rate per capita of yearly alcohol consumption in the Americas and one of the earliest ages of alcohol debut. A variety of negative health outcomes have been associated with patterns of heavy drinking on the island, including road accidents, liver problems, TB, pneumonia, intimate partner violence, violence, and risk behaviors such as unprotected sex. The sale of locally made and low-cost rum distributed through a network of community rum shops serve as a central site for men's drinking and socializing. While the importance of rum shops in shaping risky behaviors is well known, to date much of the surveillance and formal data on the sale and consumption of alcohol focuses on commercial bars and beverages. Furthermore, current behavioral and sales data are unable to capture geographic and social factors that facilitate or discourage men's participation in public drinking and associated behaviors. This summer project in Grenada is a pilot survey of the social and physical geographies of rum shops as they are scattered in one region of the island. The student will create a social map and typography of the different types of rum shops, with particular attention to the shop's location to residential and work areas, status and interactions of men patronizing the shop, and regulations faced by the shops. To facilitate the creation of the map of rum shops, the student will work with a local taxi driver who is familiar with the region of the island. The student will also interview key players familiar with the rum shop industry in order to examine how the relationship between the geography of rum shops and male drinking patterns. Key players include rum shop owners, the Drug Control Officer, public health officials, and customers.

**Required skills:** Students should have experience or interest in: health and research in a developing country and with vulnerable populations; be culturally sensitive; quantitative and/or qualitative methods of exploring social determinants of health; and working on interdisciplinariy teams. Previous independent research experience and overseas experience is strongly preferred. Students will need to be able to work independently and feel comfortable moving around a developing country.

**Student level:** Undergraduate, Masters (MPH, MSW, MPHS), Medical Student

**Learning experience:**
- Qualitative research methods such as interviewing, observation, social mapping
- Evaluating gaps in quantitative data that can be answered with qualitative methods
- Developing relationships with Ministry of Health and Public Health staff in identifying gaps in current data
- Determining social determinants of risky behavior (e.g. alcohol consumption) as well as distal factors (i.e., further removed or environmental factors)
- Evaluating current messages (both public health and popular culture) in regards to gender and alcohol
- Evaluating health consequences associated with drinking

### Project Description: High consumption of ready-to-consume products, either processed or ultra-processed, has been associated with overweight and obesity.

Unfortunately most National Nutrition Surveys and National Dietary Guidelines are still focused on narrow views and diets and Calories or nutrient focused thinking, instead of providing a more holistic, broad and nuanced thinking. In this project the student and team of researchers will conduct a critical review of dietary guidelines from several Latin American countries (i.e. Guatemala, Colombia, Peru and Puerto Rico). The review will identify pitfalls and strengths given current evidence on obesity and nutrition, including consumption of ultra-processed products, food systems and sustainability, commensality, mindfulness, and relationships with the food industry among other aspects. This will be a first step to then explore what can be learned from the approach taken in the New Brazilian Dietary Guidelines (http://www.foodpolitics.com/2014/02/brazils-new-dietary-guidelines-food-based/) and how this can be applied to other countries in Latin America.

**Required skills:** Experience with: data analysis experience (SPSS or STATA), research writing, literature searches and Spanish or Portuguese proficiency preferable.

**Student level:** Masters (MPH, MSW, MPHS)

**Learning experience:** The student will learn how to conduct literature review and abstractions. He or she will participate in the writing of a scientific manuscript and learn about a broad and comprehensive view of diets and food systems and how they impact obesity and overweight.

### Project Description: Students will be working in our Community-Academic Partnership on Addiction (CAPA) project. CAPA is made up of six organizations in the St Louis area that provide addiction services. There are opportunities to work with CAPA organizations, workers, and clients. Our goal is to bring science to services. We study implementation of best clinical practices, fidelity of practices, using technology to improve services.

**Required skills:** Some data analysis experiences and interested in community-based health and wellness research.

**Student level:** Undergraduate, Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** Students will learn about community-academics research partnerships, how to sustain research in community health organizations, how to incorporate empirically supported treatments into practice, collecting and analyzing data, and manuscript development.
### Project 1: Analyzing specific global burden of disease data for region of interest. Potential local fieldwork. Specific fieldwork can be arranged.

**Potential local fieldwork**

**Required skills:**
- English proficiency required;
- Basic to mid-level data analysis skills (SAS) very preferable for MPH/MSW/MPHS students;
- Basic level needed for a medical student.
- Epi 101 level prerequisite for those who wish to undertake population data analysis.

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** Hands on skill learning of analysis and data manipulation related to specific GBD problems and/or US psychiatric or addiction populations. Patient contact is possible to learn disease experience.

**Potential poster presentation or work toward publication of student’s summer project.**

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### Project 2: Understanding the role of trauma and psychiatric disorders in military/veteran population or the population/country of choosing. Shadowing patient care is possible.

**Required skills:**
- English proficiency required;
- Basic to mid-level data analysis skills (SAS) very preferable for MPH/MSW/MPHS students;
- Basic level needed for a medical student.
- Epi 101 level prerequisite for those who wish to undertake population data analysis.

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** Hands on skill learning of analysis and data manipulation related to specific GBD problems and/or US psychiatric or addiction populations. Patient contact is possible to learn disease experience.

**Potential poster presentation or work toward publication of student’s summer project.**

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### Project 3: The primary aim of this summer project will be to determine if environmental manganese (Mn) exposure is associated with higher signal intensity on brain MRI.

**Project description:**

Environmental exposure to Mn is associated with higher signal intensity on brain MRI and a variety of motor, cognitive, and behavioral health effects. This has been presumed to be due to deposition of paramagnetic Mn in the basal ganglia. Occupational exposures are much higher than environmental exposures, but many studies demonstrate cognitive and behavioral abnormalities in adults and children with environmental Mn exposure. To determine if environmental Mn accumulates in the basal ganglia, we have identified “normal” MRI’s from the Barnes-Jewish hospital system from patients who live in counties with high industrial Mn emissions and patients who live in low Mn emissions. Under the guidance of the PI and his research team, the student will help select a group of 50 age- and sex-matched exposed and 50 non-exposed subjects. The student will be trained and validated to outline basal ganglia regions of interest. From these regions of interest, we will extract the intensity indices for the caudate, putamen, and globus pallidus and compare exposed and non-exposed patients using standard analytic methods. Demonstrating higher signal intensity in patients residing in high Mn regions may influence regulatory policy since current ambient Mn exposure levels are considered to be a low health risk to the population since these are largely below EPA lowest observed adverse effect level.

**Required skills:**
- Student should have basic word processing and excel experience. Experience with SPSS and/or Access would be ideal. (Our data is housed in EpiInfo which uses an Access platform). The project will not require sophisticated analytic experience.

**Student level:** Masters (MPH, MSW, MPHS), Medical student

**Learning experience:** The student will learn the following: pharmacology of Mn, basic geographic information systems approaches, basic neuroanatomy, basic MRI sequence recognition, case-control methodology, and basic analytic methods.
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<tr>
<th>Faculty Website</th>
<th>Project Description 1: Mapping Elderly Care in Urban China</th>
<th>Country</th>
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<tr>
<td>Homepage Dr. Song</td>
<td>The goal of this research project is to map emerging and established elderly care practices in urban China. With over 120 million persons aged 65 and older, China has the world’s largest elderly population and is also one of the most rapidly aging societies in the world. This dramatic demographic transition poses a critical problem for China’s elderly care system. While the family traditionally has been responsible for taking care of aging elders, institutional forms of elder care are beginning to emerge. Both the public and private sector are experimenting with services and facilities such as nursing homes, community health centers, aging-in-place models, hospice programs, and geriatric medical training. The student will work with faculty mentors at Washington University and Fudan University (Shanghai) to examine how different public policies, institutional models, family dynamics, cultural values, and health conditions impact elderly care practices. The student will gain experience conducting field research using a mixed methods approach to document government and private sector initiatives on home, community, and institutional eldercare in either Beijing or Shanghai. Depending on the student’s interests and qualifications, he or she will have the opportunity to conduct semi-structured interviews with Chinese eldercare providers, collect GIS data to map elderly care practices, and/or perform thematic analysis of qualitative interview transcripts using NVivo software. Required skills: Student must have proficiency in Mandarin Chinese (at least 3 years of college-level language training required). Previous experience living, studying, or working in China beneficial. Previous experience conducting qualitative research and data analysis desirable (although students without the requisite skills will receive training). Student level: Undergraduates, Masters (MPH, MSW, MPHS), Medical student Learning experience: The student will have the opportunity to work closely with an interdisciplinary team of faculty mentors at Washington University, Fudan University (Shanghai), and/or Peking Union Medical College (Beijing), including experts in the fields of anthropology, sociology, social work, medical humanities, and clinical medicine. The student will also gain valuable experience conducting field research and analyzing qualitative data in urban China using a mixed methods approach (including interviewing, ethnographic observation, focus group sessions, surveys, and/or GIS mapping).</td>
<td>China</td>
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<th>Faculty Website</th>
<th>Project Description 2: The Culture and Ethics of End-of-Life Care in Urban China</th>
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<tr>
<td>Homepage Dr. Song</td>
<td>This research project examines the culture, ethics, and political economy of end-of-life care in urban China. The goal of the project is to illuminate how transformations in intergenerational relations and the growing medicalization of death are reshaping familial, professional, and societal responsibilities toward the dying. How are changes in family structure and traditional values such as filial devotion shaping expectations of reciprocity, the everyday routines of caregiving, and decisions to forego life-sustaining treatment for the ailing and critically ill in urban China? With nearly half of all deaths in urban China now occurring in medical facilities, how is the growing medicalization of death transforming the ways in which Chinese patients, their family caregivers, and medical professionals experience and come to terms with processes of dying in a shifting demographic and cultural landscape? This study will give students the opportunity to study first-hand the institutional norms and interpersonal dynamics of end-of-life care and hospital-managed death. The student will gain experience with qualitative research methods by participating in ethnographic fieldwork at a major tertiary-care hospital in Beijing. The student will conduct semi-structured interviews, administer surveys, and/or analyze qualitative data to illuminate how Chinese health professionals and family members negotiate the practical and moral challenges of caring for those suffering from end-stage conditions in an increasingly privatized healthcare system. Required skills: Student must have proficiency in Mandarin Chinese (at least 3 years of college-level language training required). Previous experience living, studying, or working in China beneficial. Previous experience conducting qualitative research and data analysis desirable (although students without the requisite skills will receive training). Student level: Undergraduates, Masters (MPH, MSW, MPHS), Medical student Learning experience: The student will have the opportunity to work closely with an interdisciplinary team of faculty mentors at Washington University, Fudan University (Shanghai), and/or Peking Union Medical College (Beijing), including experts in the fields of anthropology, sociology, social work, medical humanities, and clinical medicine. The student will also gain valuable experience conducting field research and analyzing qualitative data in urban China using a mixed methods approach (including interviewing, ethnographic observation, focus group sessions, surveys, and/or GIS mapping).</td>
<td>China</td>
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Project description 1: Keywords: Community, older adults, medication adherence, environmental barriers

Community-dwelling adults over 65 years old disproportionately consume 30% of the nation’s medications in order to cure or manage acute and chronic disease, extend life-expectancy, and to improve quality of life. The ability to live independently in the community is dependent on medication adherence. Non-adherence to medication routines can result in serious, preventable health consequences. Students will be engaged in an ongoing study of the barriers to medication adherence for frail, underserved older adult with multiple chronic conditions. The objectives of the study are to 1) determine if older adults are taking inappropriate medications and 2) identify the barriers to medication adherence. Students will participate in prospective data collection in the homes of older adults. They will be trained to administer assessments in the field and will work with occupational therapists to deliver interventions to reduce barriers to medication adherence.

Required skills: Ability to visit community (having a car is helpful)

Student level: Masters (MPH, MSW, MPHS), Medical student

Learning experience: Students have the opportunity to work within an ongoing research project. Some skills include gaining knowledge about:

- Aging and community living issues
- Funding
- Community engaged research approaches
- Ethical issues in underserved communities and cultural competency
- Assessment in the community
- Data collection, entry, cleaning and analysis
- Dissemination of findings to community; professionally

Project description 2: Keywords: Older adults, falls, environmental barriers, home hazards

Falls remain the leading cause of injury, long-term disability, premature institutionalization, and injury-related mortality in the older adult population. Falls are the most common cause of traumatic brain injury and fracture for older adults, and they have serious complications such as institutionalization, functional dependence, and paralyzing fear of falling. Every 29 seconds, an older adult dies from the consequences of a fall. Falls are an eminent threat to a frail, older adult’s ability to maintain independence in the community. Approximately 1 in 3 community-dwelling adults aged 65 years and older fall each year, and those older than age 70 have an especially high fall risk. Older adults who have experienced a previous fall are at a greater risk of falling again. The majority of falls experienced by older adults, particularly more frail, high-risk older adults, occur in the home, and measurable home hazards are associated with an increased risk of older persons falling in the US. There is currently no evidence based list of fall hazards available to guide intervention. Students will be involved in secondary analysis of an existing dataset of over 200 fall reports. Students will identify the 1) environmental hazard causing the fall; 2) the severity of falling associated with different environmental hazards.

Required skills: Ability to visit community (having a car is helpful)

Student level: Masters (MPH, MSW, MPHS), Medical student

Learning experience: Students have the opportunity to work within an ongoing research project. Some skills include gaining knowledge about:

- Aging and community living issues
- Funding
- Community engaged research approaches
- Ethical issues in underserved communities and cultural competency
- Assessment in the community
- Data collection, entry, cleaning and analysis
- Dissemination of findings to community; professionally
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<th>Faculty Website</th>
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| Homepage Dr. Steensma | **Project description:** Dr. Steensma seeks to work with students who are passionate about public health and entrepreneurship. Specifically, he is interested in commercializing tools and technologies that have demonstrated promise in improving the health and well-being of the most vulnerable people in society. Students will learn the entrepreneurial process and gain experience in social entrepreneurship. The products and services most likely to be on the docket for commercialization are health communication technologies, but other opportunities may present themselves and we will work to assess the commercial viability of those services/technologies as they come. Examples of technologies that are prime for commercialization are "Make it Your Own" an intuitive and easy to use health communication tool (see: www.miyoworks.org) and "2-1-1 Counts", a data dashboard that helps communities understand community health needs by geographical region and in real-time (see: www.211counts.org).  

**Required skills:** Someone who has (1) an interest in either environmental or occupational health or (2) an interest in starting a venture that could positively impact the health and well-being of the public.  

**Student level:** Masters (MPH, MSW, MPH), Medical student  

**Learning experience:** How to plan, fund, and launch a social venture.                                                                                                   | USA     |
| Homepage Dr. Thompson | **Project description 1:** The student will assist in updating a literature review that examines factors associated with colorectal cancer screening among African Americans. They will be involved in descriptive data analyses that include the use of SPSS to obtain information on the psychometric properties of items and scales used in a telephone survey of older African Americans in the St. Louis region.  

**Required skills:** Student should have basic social science statistics course and knowledge of SPSS.  

**Student level:** Undergraduate  

**Learning experience:** The student will gain an understanding of data management and statistical analysis involved in public health research, as well as knowledge about the literature on health communication and education. They will also gain experience with community based participatory research processes.                                                                                             | USA     |
| Homepage Dr. Thompson | **Project description 2:** The student will assist in updating literature reviews that examine factors associated with colorectal cancer screening and HPV vaccination attitudes among African Americans. They will be involved in recoding data and completion of descriptive data analyses using SPSS. The first data set includes colorectal cancer and cultural items and scales used in a telephone survey of older African Americans in the St. Louis region. The second data set involves demographic and social variables associated with HPV vaccination among African American college students. Additional opportunities may include the opportunity to attend community meetings, trainings and lectures related to cancer education and research and/or mental health.  

**Required skills:** Student should have basic social science statistics course and knowledge of SPSS.  

**Student level:** Undergraduate  

**Learning experience:** The student will gain an understanding of data management and statistical analysis involved in public health research, as well as knowledge about the literature on health communication and education. They will also gain experience with community based participatory research processes.                                                                                             | USA     |
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<th>Faculty Website</th>
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<td>Homepage Dr. Tolia</td>
<td>The Tolia Laboratory study the molecular events required for Plasmodium parasite invasion of red blood cells. We use the tools of structural biology, biochemistry, biophysics and parasitology to examine proteins and protein complexes associated with these events. Malaria is a significant global health problem that affects a third of the world's population resulting in 600,000 deaths annually, 80% of which are in children under the age of five. The clinical symptoms of malaria culminate upon red blood cell invasion by Plasmodium parasites. Therefore, recognition and invasion of red blood cells is an attractive target for therapeutic intervention and an active area of research. Towards vaccine design, we study the molecular mechanisms and antibody-neutralization of receptor-recognition during host-cell invasion. For novel drug design to combat drug resistant malaria, we characterize the enzymes of the MEP pathway essential for isoprenoid biosynthesis and growth of parasites. The MEP pathway is an excellent target for drug development as the pathway is absent in the human host. Several projects are available to study receptor-recognition, antibody-neutralization, MEP pathway enzymology and MEP pathway inhibition. These studies will ultimately inform strategies to combat malaria.</td>
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<tr>
<td>Homepage Dr. Toriola</td>
<td><strong>Project description 1</strong>: Working on research evaluating the associations of factors associated with pancreatic cancer risk and prognosis. This will involve statistical analysis and manuscript draft depending on the skill set of the student. Required skills: Data analytic skills, Good English writing skills. Student level: Masters (MPH, MSW, MPHS), Medical student. Learning experience: Data analysis, drafting scientific manuscript, project management and involvement with recruiting study participants.</td>
<td>USA</td>
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<tr>
<td>Homepage Dr. Toriola</td>
<td><strong>Project description 2</strong>: Biomarkers of risk and prognosis in breast and ovarian cancer. Required skills: Data analytic skills, Good English writing skills. Student level: Masters (MPH, MSW, MPHS), Medical student. Learning experience: Data analysis, drafting scientific manuscript, project management and involvement with recruiting study participants.</td>
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<td>Homepage Dr. Trani</td>
<td>Analysis of data on access to services, social inclusion or poverty for people with disabilities in a country where Dr. Trani recently conducted fieldwork: Afghanistan, India, Morocco, Sudan and Tunisia. Also, review of the literature and writing a paper. Required skills: Data analysis experience. Student level: Masters (MPH, MSW, MPHS) Learning experience: * How to elaborate a review of the literature * How to analyze data on disability using a statistical software * Writing scientific paper.</td>
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<td>Dr. Wang</td>
<td><strong>Project description:</strong> This project entails characterization of novel viruses that are part of the enteric virome of human, non-human primates and/or mice. Goals will be to sequence the complete genomes of novel viruses, perform genome annotation, phylogenetic analysis and other comparative genomic studies of the novel viruses. Depending on progress, the project may also include epidemiological studies to define the prevalence of the novel virus in various cohorts. <strong>Required skills:</strong> Requires basic laboratory experience in molecular biology. Experience working with RNA a plus, but not required. <strong>Student level:</strong> Masters (MPH, MSW, MPHS), Medical Student <strong>Learning experience:</strong> Cloning, viral genome sequencing, sequence analysis, genome annotation, phylogenetic analysis, virome/microbiome analysis.</td>
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<td>Dr. Wilfley</td>
<td><strong>Project description 1:</strong> Colleges are faced with an elevated prevalence of eating disorders (EDs), yet less than 20% of students report receiving treatment. Online interventions have been used to treat and prevent EDs with high user acceptability given their accessible and anonymous format. However, an online platform through which screening and tailored interventions are provided to individuals with EDs has not been deployed. Over the past 20 years, our team’s programmatic line of research has resulted in a comprehensive, online platform through which we identify and offer tailored evidence-based interventions to individuals across the ED risk and diagnostic spectrum, using minimal person-based resources. The newest intervention in our suite of programs, Student Bodies–Eating Disorders (SB-ED), has not yet been tested in a large-scale trial or via platform delivery. The aim of the current study is to conduct the first national deployment of our comprehensive platform and demonstrate that our transdiagnostic guided self-help program, SB-ED, yields measurable and significant improvements in access, costs, and outcomes for ED treatment over referral to usual care (i.e., treatment per protocol at students’ corresponding college’s mental health services center). Twenty-eight colleges have been randomly assigned to receive either SB-ED or referral to usual care. We will enroll at least 650 students from these campuses who screen positive for a DSM-5 clinical or subclinical ED (excluding anorexia nervosa, which warrants more intensive medical monitoring). We hypothesize that SB-ED, as compared to referral to usual care, will produce significant improvements in treatment access, costs, and outcomes. <strong>Required skills:</strong> Past research experience preferred, interest in clinical mental health delivery – clinical experience preferred (D&amp;I project 1), background in psychology or related field and familiarity with SPSS <strong>Student level:</strong> Masters (MPH, MSW, MPHS) <strong>Learning experience:</strong> Students participating in these projects will gain an understanding of eating disorders and exposure to large-scale research projects involving colleges and universities across the country. Students are expected to gain experience in various aspects of the research process (e.g., recruitment, literature reviews, data management, working with collaborators across the country).</td>
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<td>Dr. Wilfley</td>
<td><strong>Project description 2:</strong> Evidence-based treatments for eating disorders, including Interpersonal Psychotherapy (IPT) have been identified but relatively few practitioners use them in daily clinical practice. Colleges are faced with an elevated prevalence of eating disorders (EDs), yet relatively few college counseling center therapists employ evidence-based methods. We are currently conducting two studies to try to increase the use of IPT, an evidence-based treatment for Eating Disorders. The aim of our first study is to evaluate two different methods of training therapists. The first – Expert Condition – our WU expert will train all therapists at a counseling center and be available for monthly consultation. The second, Train-the-Trainer – will have one therapist selected as the trainer who will come to WU for training in IPT, receive consultation from our expert to gain proficiency in IPT and return for a second training in how to train other therapists. Our second study is examining the effectiveness of online training in IPT and comparing it to individuals getting the in person training in our first study. Students will help carry out research procedures for these projects and learn about IPT. Some data from these current projects or projects that have led from this work will be available to analyze to present at the end of the summer program and ideally turn into a publishable paper. <strong>Required skills:</strong> Past research experience preferred, interest in clinical mental health delivery – clinical experience preferred (D&amp;I project 1), background in psychology or related field and familiarity with SPSS <strong>Student level:</strong> Masters (MPH, MSW, MPHS) <strong>Learning experience:</strong> Students participating in these projects will gain an understanding of eating disorders and exposure to large-scale research projects involving colleges and universities across the country. Students are expected to gain experience in various aspects of the research process (e.g., recruitment, literature reviews, data management, working with collaborators across the country).</td>
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**Project Description**: Exploring respiratory health outcomes from sustained use of efficient cookstoves

Nearly 4 million people die annually due to indoor air pollution from solid biomass combustion and 99 percent of these deaths are in developing countries. Biomass combustion is a leading risk factor in acute respiratory infections (ARI) and Chronic Obstructive Pulmonary Disease (COPD), especially among women and children. Clean – high efficiency and low emissions – cookstoves offer a solution to this public health challenge, but their uptake and prolonged use have been disappointing. Although more efficient and emissions-reducing stoves can be produced in the laboratory, designing them to meet the needs of users in various social, economic, cultural, and community contexts has proved challenging.

The specific aims of this project are:
1. Evaluate factors which enable and hinder sustained use of clean cookstove technologies by the rural poor in India, so we can develop a more refined pivotal intervention focused on improving respiratory health; 2. To generate effect size data that establish the feasibility and inform the sample size of a pivotal trial whose primary objective will be sustained improvements in the respiratory health (measured by FEV1) of women and children in rural India; and 3. To generate preliminary emissions data (particulate matter – mass and surface area based, CO, SOX) from clean cookstove technology and its effect on respiratory health outcomes that will facilitate the development of a pivotal clean cookstove intervention.

**Required skills:**
1. Openness to work and learn in transdisciplinary teams covering aerosol, pulmonary, and system science
2. Understand and able to train others in pulmonary function tests and use of spirometers
3. Field implementation experience in India and use of participatory rural appraisal techniques (PRA) and causal loop model building
4. Knowledge of household air pollution monitoring using a variety of instruments
5. Data organizing and management to integrate pulmonary, aerosol, and household data

**Student Level**: Masters (MPH, MSW, MPHS), Medical Student

**Learning experience**: Students can expect to learn how field randomized control trials are done. How transdisciplinary research is designed, the complexities of transdisciplinary work, and the payoffs to such research in addressing complex global health challenges such as household air pollution and its health effects on women and children.