SAMPLE B
Environmental Health Science

Bachelors of Science
Date When Proposal To Be Presented

Proposed by:
Name of Student
UID
Address
Phone Number
Email

Sponsored by:
Name of Faculty Mentor
Position or Department
Phone Number
Email

Introduction

Last summer, I participated in the Summer Medical and Dental Education Program at New Jersey Medical School in Newark, NJ, which is a pre-health program that teaches enrichment courses in the basic sciences, and hands-on field work in health practices. As part of the program, we would go to the hospital and spend time with the staff and the patients. We often went on rounds with doctors and talked to the patients to gauge what we thought was wrong and how we could help them. We asked questions like “What is your family’s medical history?” and “Have you had these symptoms before?” A lot of the patients who came in to the hospital had heavy exposure to hazardous substances like lead paint and bacterial mold. This peaked my interest on studying how the environment around us plays an integral part in our health.

Close to the conclusion of the program, we had the opportunity to attend a Health Professions conference. A representative from the Philadelphia College of Osteopathic Medicine told me about osteopathic medicine and how different it is from the allopathic approach. Osteopathic medical schools instruct students in looking at the whole patient whereas allopathic medicine only looks at the injured or diseased part. Osteopathic doctors see past the absence of infirmity as health. They take into consideration the patient’s family history, socioeconomic status, as well as the built and natural environments in which they live and come in contact with as part of their diagnosis.

While my summer program peaked my interest in how the environment affects health, the classes I took in the following semester reinforced it. They focused on health inequities and how the built and natural environment adds stress to marginalized groups. I also work with the University Health Center as a Substance Use peer educator and have seen first-hand how different environments influence health and lifestyle

choices. Creating an Environmental Health Science major through IVSP will give me the opportunity to use a multidimensional approach to health and medicine by integrating the science behind health, factors that affect health care, and environmental topics. This major allows me to tie my passion for clinical healthcare and my deep interest in the health disparities that can arise as a result of the built and natural environment.

My goal is to attain a Masters of Public Health in Environmental Health Sciences at the University of Maryland and then possibly pursue an advanced medical degree in osteopathic medicine.

Environmental Health Science Defined

The Environmental Health Science major studies how the environment affects the prevalence of disease among different populations by exploring the interconnections between the environment and health. There are two sectors of the environment: the built and the natural environment. The built environment is the man-made surroundings where people live and work, like homes, streets, infrastructure, and buildings. The natural environment encompasses all living and non-living things that occur naturally including, species, climate, and natural. This major builds on a core scientific background to explore the determinants of health-related events. It also integrates the topics of public health and environmental science to allow for an advanced understanding of the impacts of the environment on health. Therefore, Environmental Health Science combines three different concentration areas: Health Science, Public Health, and Environmental Health.

Health Science courses lay the basic scientific foundation about the biology and physiology of the human body. Courses in this subject area are key parts in understanding the fundamental biological, chemical, and biochemical processes that are affected by global factors. The topics covered in these courses are essential in uncovering the underlying factors behind disease biology in the global population by building an understanding of how the human body works at a molecular level.

Public Health analyzes factors that affect health in the public arena and evaluates policies and disparities that arise in the realm of public health. These courses also focus on the culture, demography, and socioeconomics of health. The coursework

will enable me to think intellectually about the design of equitable public health initiatives based on population-based evidence. Learning about the challenges involved in implementing effective health initiatives will aid in building an understanding of holistic decision-making in the realm of public health.

Environmental Health courses develop an understanding of the environment and how it impacts human health. These courses examine the interrelationship between humans and the different trends in health associated with the nature of the built and natural environment. The coursework will show effective reduction and elimination strategies of environmental hazards and help me play a role in improving and maintaining the environment for optimum human health.

Learning Objectives

Through the Environmental Health Science major I hope to develop my understanding of how the environment affects public health. I want to delve deeper into the intersectionality of health and the environment in order to be able to think outside the box to solve public health problems. I am planning on pursuing a Master's in Public Health with a concentration in Environmental Health Science at the University of Maryland. I eventually plan to pursue a dual doctoral degree with the DO/PhD program possibly at Michigan State University College of Osteopathic Medicine. Therefore, I am completing the Pre-Medicine courses under my Health Sciences concentration. It is also important to understand the underlying biological processes in different systems to have a better understanding of how the built and natural environment affects health and how microbiological processes affect microbiological organisms. I hope to become a Doctor of Osteopathic Medicine and thus be trained to use a holistic approach to healthcare.

I was accepted into the McNair Scholars Program for this summer. This will allow me to gain exposure into research to prepare me for the PhD track. I am during research with Dr. Sacoby Wilson who is in charge of the Community Engagement and Environmental Justice Health Lab. Since Fall 2015, I have also been mentoring disadvantaged and underrepresented children through the Terps and Eagles Science Club (TESC). During mentoring sessions, we talk to the students about school, health, and future careers. We discuss the state of the communities they live in as it relates to infrastructure (like sidewalks), air quality, water quality and the anthropogenic effects on them. I plan to continue this activity both in the immediate and the more distant future.

Capstone

Although human health is often talked about, it's rarely in the context of environmental degradation and deprivation. My capstone research project will assess the role of anthropogenic factors on environmental health through public health intervention and then will suggest recommendations for new policies and programs.

Pollution from pharmaceutical companies has been on the rise being seen as one of the newest breakthroughs in science. Antibiotics, hormones, mood stabilizers and other drugs have been found in our drinking water supplies. Because they run into our groundwater, rivers, and lakes, the aquatic life is being affected. A percentage of fish have been introduced to endocrine disruptors as a result of different disposal methods of pharmaceuticals. These endocrine disruptors cause tumors, intersex fish, and increased mortality rates of aquatic life.

My research question is "How does pharmaceutical pollution in the Anacostia River affect food security for locals?" To answer this, I will conduct a literature review and a statistical analysis of the Anacostia River. I will also do a series of interviews of local fishers who rely on the fish supply as a means of supplement. I will explore ways in which the built environment and natural environment negatively or positively affect biodiversity.

This is an exigent topic in society because of the unknown risks of pharmaceuticals at different toxicities in our food supply. I will develop possible risk management strategies through a literature review of peer-reviewed journals. This analysis will provide prose on how to find viable solutions to this public health problem. I

will investigate the effects of how pharmaceutical pollution policies will affect human health and assess the pharmaceutical pollution risk management strategies.

Courses by Concentration

Health Science

PHYS132* **(4)** **Fundamentals of Physics for Life Sciences II:** The second part of a two-semester course in general physics specifically oriented towards applications relevant for students in biology and pre-medical programs. The course covers basic statistical physics, electricity and magnetism, and optics done in authentic biological contexts. *Prerequisite: PHYS131; or students who have taken courses with comparable content may contact the department. Credit only granted for: PHYS122 or PHYS132.*

BSCI160* **(3)** **Principles of Ecology and Evolution:** Basic principles of biology with special emphasis on ecological and evolutionary biology. *Prerequisite: Must have math eligibility of MATH120 or higher. Restriction: For Science Majors. Credit only granted for: BSCI106 or BSCI160. Formerly: BSCI106.*

BSCI223 **(4)** **General Microbiology:** Fundamental concepts in morphology, physiology, genetics, immunology, ecology, and pathogenic microbiology. Applications of microbiology to medicine, the food industry and biotechnology. *Prerequisite: BSCI170 and BSCI171; or BSCI105.*

BSCI330 (CE) **(4)** **Cell Biology and Physiology:** Biochemical and physiological mechanisms underlying cellular function. Properties of cells which make life possible and mechanisms by which cells provide energy, reproduce, and regulate and integrate with each other and their environment. *Prerequisite: Minimum grade of C- in CHEM131 and CHEM132. And minimum grade of C- in BSCI170 and BSCI171; or minimum grade of C- in BSCI105. Restriction: Must not have completed BSCI230. Credit only granted for: BSCI230 or BSCI330. Formerly: BSCI230.*

BSCI440 **(4)** **Mammalian Physiology**: A study of the cardiovascular, hemopoietic, gastrointestinal, renal and respiratory systems. Chemical and endocrine regulation of physiological functions in mammals. Course does not count as an upper level lab for BIOL majors (see BSCI441). *Prerequisite: BSCI330; and (CHEM231 and CHEM232; or must have completed CHEM233). Or permission of CMNS-Biological Sciences UG Program.*

BCHM461 **(3)** **Biochemistry I:** First semester of a comprehensive introduction to modern biochemistry. Structure, chemical properties, and function of proteins and enzymes, carbohydrates, lipids, and nucleic acids. Basic enzyme kinetics and catalytic mechanisms. *Prerequisite: Minimum grade of C- in CHEM271 and CHEM272; or minimum grade of C- in CHEM276 and CHEM277. Credit only granted for: BCHM461 or BCHM463.*

Public Health

AMST120* **(3)** **Race, Gender & Economy:** An exploration of the building blocks of the global economy (e.g. free trade, financial institutions) in relation to racial and gender difference, hierarchies, and ideologies.

HLTH366 (CE) **(3)** **Behavioral and Community Issues in Public Health:** The exploration of how social and behavioral science theories and public health concepts and methods can be applied to both the health-illness experience and community interventions.

HLTH371* **(3)** **Communicating Safety and Health:** The communication and evaluation of safety and health information. Emphasis on various types of communications and recipient factors which contribute to their success or failure. *Restriction: Must be in a major within SPHL-Behavioral & Community Health department.*

HLTH377* **(3)** **Human Sexuality:** The biological and developmental aspects of human sexuality; the psychological and emotional aspects of sexual behavior; sexual identity; the historical, cultural, social, linguistic, legal and moral forces affecting sexual issues; the importance of communication, disclosure and intimacy in interpersonal relationships; and research trends in the area of human sexuality.

ANTH413 (CE) **(3)** **Health Disparities in the United States:** Powerful economic, political, social, and cultural forces shape who gets sick, what illnesses/diseases they get, how they are treated while seeking care, what treatment options they have, and what their ultimate health outcomes are. The goal of the course is to understand these processes through the lens of critical medical anthropology.

Environmental Science

ENST233 **(3)** **Introduction to Environmental Health:** How humans are affected by the quality of our air, water, soil, and food supply as well as how human activities altered these survival necessities are examined. Students will learn how the evolution and prosperity of human populations have resulted in degradation of our environment and the impact of environmental degradation on the health of people.

MIEH300* **(3)** **A Public Health Perspective: Intro to Environmental Health:** Environmental health is that branch of public health that deals with the human health effects of exposure to chemical, physical, and biological agents in the community, workplace, and home. Activities within Environmental Health Sciences are associated with recognizing, assessing, understanding, and mitigating the impacts of chemical, physical, and biological agents as well as understanding how human behavior and action impacts the environment. The Environmental health field is a broad, multi-disciplinary field. Environmental health scientists face complex problems requiring multi-

disciplinary approaches. This course focuses on the central concepts, principles, issues, and applications of the essential scientific components and strategies of control of major environmental health problems. *Prerequisite: CHEM131 and CHEM132. Restriction: Junior standing or higher. And must be in Public Health Science program; or permission of SPHL-School of Public Health. Credit only granted for: SPHL498N or MIEH300. Formerly: SPHL498N.*

MIEH330 (3) Environmental Justice, Racism, and Environmental Health Disparities: Introduction of environmental justice history, theory and science, with discussion of linkages between the built environment and environmental injustice. Examination of how the built environment can lead to adverse health conditions and racial/ethnic health disparities. Credit only granted for: MIEH210; MIEH330. Formerly: MIEH210.

MIEH331 (3) The Built Environment, Sustainability, and Public Health: The Good, the Bad, and the Ugly: Provides students with a fundamental understanding of theory, concepts, and issues related to the built environment; how the built environment influences behaviors and health outcomes; and opportunities to improve the built environment through planning, zoning, and community development initiatives that can make communities healthier, just, and more sustainable. *Recommended: Completion of MIEH300 with a C- or higher is recommended. Restriction: Must have earned a minimum of 45 credits. Credit only granted for: MIEH215 or MIEH331. Formerly: MIEH215.*

LARC461 (3) People and the Environment: Focus is placed on human and environmental interactions. Students will look at both natural and built environments and how they influence human health and well-being. Many environmental settings will be examined. These include hospitals, public housing neighborhoods, school settings, retirement communities, transportation corridors and green spaces. We will also explore how racial and socio-economic factors affect living and working environmental conditions. Ultimately, students will be using this knowledge to create environments that support individuals, families and various community groups' health *Repeatable to 3 credits if content differs. Credit only granted for: LARC489K or LARC461. Formerly: LARC489K.*

IVSP Courses:

IVSP317	(1)	Progress Monitoring
IVSP420	(3)	Capstone
ENGL393	(3)	Technical Writing

General Education Coursework

FUNDAMENTAL STUDIES			
Category	**COURSE#**	**Course Title**	**Semester Taken**
FSAW	XENG101	ENGLISH WRITING (Transfer)	SP15
FSPW	ENGL391	ADVANCED COMPOSITION	SP17
FSOC	INAG110	ORAL COMMUNICATION	FA15
FSMA	MATH140	CALCULUS	SP15
FSAR	MATH140	CALCULUS I	SP15

DISTRIBUTIVE STUDIES			
Category	**COURSE#**	**Course Title**	**Semester Taken**
DSNL	BSCI105	PRINCIPLES OF BIOLOGY I	SP15
DSNS	PSYC100	PSYCHOLOGY/ SCR 4 XPSYC4	SP13
DSHS	EDSP289I	DISABILITY: STIGMA & SIDESHOW	FA14
DSHS	HIST133	CRUSADES MEDIEVAL & MODERN PRSP	FA14
DSHU	CMLT275	WORLD LITERATURE BY WOMEN	FA14
DSHU	LGBT265	LGBT LITERATURES	FA14
DSSP	ENES140	DISCOVERING NEW VENTURES	FA15
DSSP*	PEER313	PEER EDUCATION: ALCOHOL AND DRUG	FA16

I-SERIES			
Category	**COURSE#**	**Course Title**	**Semester Taken**
SCIS	EDSP289I	DISABILITY: STIGMA & SIDESHOW	FA14
SCIS	HIST133	CRUSADES MEDIEVAL & MODERN PRSP	FA14

DIVERSITY			
Category	**COURSE#**	**Course Title**	**Semester Taken**
DVUP	EDSP289I	DISABILITY: STIGMA & SIDESHOW	FA14
DVUP or DVCC	CMLT275	WORLD LITERATURE BY WOMEN	FA14

OPTIONAL REQUIREMENT			
Category	**COURSE#**	**Course Title**	**Semester Taken**
Experiential Learning			

*Outside Major Requirements

Courses by Semester

Spring 2017

CHEM272: General Bioanalytical Chemistry Laboratory	(2)
BSCI330: Cell Biology and Physiology	(4)
ANTH413: Health Disparities in the United States	(3)
HLTH366: Behavioral and Community Issues in Public Health	(3)
PEER323: Advanced Peer Education: Alcohol and Other Drugs Education	(3)
ENGL391: Advanced Composition	(3)
CHEM232: Organic Chemistry Laboratory I	(1)
	19

Fall 2017

MIEH330: Environmental Justice, Racism, and Environmental Health Disparities	(3)
BSCI223: General Microbiology	(4)
LARC461: People and the Environment	(3)
BCHM461: Biochemistry I	(3)
ENST233: Introduction to Environmental Health	(3)
	16

Spring 2018

BSCI440: Mammalian Physiology	(4)
MIEH331: The Built Environment, Sustainability, and Public Health: The Good, the Bad, and the Ugly	(3)
IVSP420: Senior Capstone	(3)
ENGL393: Technical Writing	(3)
IVSP317: Progress Monitoring	(1)
	14

Name: Crystal Agha
Major Title: Environmental Health Science

For Office Purposes Only	COURSE#	Course Title	Credits
Concentration 1: Environmental Health			
	ENST233	Introduction to Environmental Health	3
	MIEH300	A Public Health Perspective: Intro to Environmental Health	3
	MIEH330	Environmental Justice, Racism, and Environmental Health Disparities	3
	MIEH331	The Built Environment, Sustainability, and Public Health: The Good, the Bad, and the Ugly	3
	LARC461	People and the Environment	3
Concentration 2: Health Science			
	BSCI106	Principles of Ecology and Evolution	4
	PHYS132	Fundamentals of Physics for Life Sciences II	4
	BSCI223	General Microbiology	4
	BSCI330	Cell Biology and Physiology	4
	BSCI440	Mammalian Physiology	4
	BCHM463	Biochemistry of Physiology	3
Concentration 3: Public Health			
	AMST120	Race, Gender & Economy	3
	HLTH366	Behavioral and Community Issues in Public Health	3
	HLTH371	Communicating Safety and Health	3
	HTLH377	Human Sexuality	3
	ANTH413	Health Disparities in the United States	3
Total 300+ Level Credits (excluding IVSP courses)			
	IVSP317	Progress Report	1
	IVSP318 (optional)	Independent Learning Activities	3 - 9
	IVSP420	Senior Paper	3
	ENGL393	Technical Writing	3
Total Credits (including IVSP courses)			