

# PURDUE

---

## HONORS COLLEGE

### Scholarly and Creative Project Proposal Examples

#### **Nick Cinko**

College of Science, Physics

[ncinko@purdue.edu](mailto:ncinko@purdue.edu)

Faculty mentor: Professor Ephraim Fischbach, [ephraim@purdue.edu](mailto:ephraim@purdue.edu)

Classically, the decay processes of radioactivity are unaffected by their local environment. However, recent observations of radioactive decay rates suggest a solar influence on nuclear decays. We hypothesize that this influence is due to solar neutrinos. To test this hypothesis, the decay rates of several radioactive isotopes were closely studied under a changing electron antineutrino flux from a reactor at Oak Ridge National Laboratory. The data, collected over 9 months, allowed us to quantify the fractional change in decay rate, between a minimal (reactor off) and maximal (reactor on) antineutrino flux. Results of this experiment have been compiled and submitted as a paper to Phys. Review C. We have received one referee report and recently returned a revised copy of the paper. With luck, the revision process will be complete before the end of the semester.

My contributions include developing software for both processing the raw data and performing statistical analyses on the processed data. Additionally, I assisted in the writing process and produced nearly all figures/plots used in the paper.

#### **Courtney Best**

Engineering, Aeronautical and Astronautical Engineering

[Best4@purdue.edu](mailto:Best4@purdue.edu)

Faculty Mentor: Professor Michael Grant, [mjgrant@purdue.edu](mailto:mjgrant@purdue.edu)

Project Argonaut is a proposal for a Mars sample return mission in which a soil sample is retrieved from the surface of Mars and brought back to Earth for study. With increasing interest in the colonization of Mars, there is a focus on determining whether Mars is even capable of supporting life. Answering this question requires an in-depth analysis of the soil that is not possible with robotic instruments sent to Mars. The report aims to propose a plausible solution to the key issues associated with a Mars sample return mission by integrating existing research with innovative concepts.

The project proposes a design that is innovative, using new technologies and combinations of ideas, yet feasible and cost effective. Concepts are explored within the proposal that distinguish it from other proposed Mars sample return missions, including mission architectures that provide

flexible time frames, hybrid Mars ascent vehicle propulsion, interplanetary ion propulsion, and inflatable heat shield Mars descent.

The independent deliverable of this project is a mission proposal in the form of a report. This report outlines the mission requirements, discusses trade studies, provides a detailed description of each chosen design, and integrates the design of each component to create a single cohesive mission.

Project Argonaut is the result of the collaborative effort of a team of ten Purdue students over the course of the Fall 2015 and Spring 2016 semesters. As the Project Manager I organized the team, lead meetings, and consolidated the work of each team member into the final mission and report. Throughout the project, I contributed to the research, design, and writing of the Mars Descent Vehicle and Mars Ascent Vehicle sections. As Project Manager I also wrote the mission requirements section, the vehicle health monitoring and contingency planning section, and the conclusion, as well as creating tables of technical requirements and affected systems for almost every section within the report. Finally, I compiled the contributions of each team member into the final report in a LaTeX program, and edited the entire report in detail before its final submission.

**Sarah Barnes**

HHS, Speech

barnes65@purdue.edu

Faculty Mentor: Dr. Jessica Huber, [jhuber@purdue.edu](mailto:jhuber@purdue.edu)

After being granted the opportunity to compose a thesis and present my research at the poster symposium, I decided that I wanted to follow a different path compared to my Speech, Language, and Hearing Science peers. I am currently working in a Speech, Language, and Hearing Science lab headed by Dr. Jessica Huber mainly concerning research on Parkinson's disease and telemedicine. Telemedicine is the secure sharing of medical information and expertise between professionals across geographical boundaries through telecommunications technology. The main goal regarding telemedicine in the Huber lab is communication with Columbia University on the success of the Speech Vive device for Parkinson's patients that Dr. Huber developed.

I am participating in Dr. Huber's lab, specifically dealing with transcribing language samples to help illustrate the major hallmarks in the speech of Parkinson's patients before and after using the Speech Vive. As a part of the telemedicine focus, I transcribe the language samples of patients who live in New York and are recorded by Columbia University. These patients are provided a Speech Vive device to use during parts of pre-therapy sessions and then are allowed to take the device with them to use during eight weeks of therapy and daily activities. Progress is then monitored in the post-therapy recordings, which I am also transcribing. In working on documenting language samples in Dr. Huber's lab, I have been observing how valuable telemedicine is in providing the lab with diverse language samples. In my thesis, I will include a brief background of Parkinson's, discuss the transcription process, and how the use of telemedicine enriches the databases of both universities.

**Jordan Paine**

College of Agriculture, Agricultural Education and Political Science

[painej@purdue.edu](mailto:painej@purdue.edu)

Faculty Mentor: Professor Patricia Boling, [boling@purdue.edu](mailto:boling@purdue.edu)

*\*\*note: mentor is in CLA, major is in AG*

The overall goal of this research is to develop a comprehensive study on how GMO policies affect producers. It will address how GMOs enhance productivity for producers and reduce food costs. The purpose is to provide possible solutions for overcoming issues with the current policies, and provide an avenue for producer's voices and concerns to come into the realm of research on this issue. The research will focus on corn and soy, as they are the crops using GMOs most extensively and prominent in the international market. Interviews will be based out of Nebraska (red state, and top 5 production in corn and soy) and Illinois (blue state, and top 5 production in corn and soy), as well as the other stakeholders: including cooperatives, large corporations using these products, and governmental officials. If time permits, an expansion of interviews to producers in Minnesota, Iowa, and Indiana may be made to some or all.

There has been a heightened interest in the safety of genetically modified foods and their potential risks, as well as benefits. Many studies have been done that address environmental and nutritional concerns, or the role of "big agriculture." This research will look into the arguments on all sides and focus on how these arguments influence the policies, and how the policies affect U.S. producers. Not only will U.S. policies be considered, but also nations whom the U.S. producers trade with, as their policies directly affect the production in the U.S.

The research stems from working on a GMO-labeling bill in the senate this summer, and the literature review that is currently underway.

At the conclusion of the research, a paper will be written and submitted to JPUR, a condensed version of the paper will be made for appropriate magazines, poster presentations to be made on campus and at the Midwest Political Science Association Conference. Additionally, the International GMO Policy component of the literature review will be presented at Purdue's Discovery Park Open House in September.

The student will conduct all research, with guidance from the primary research mentor, and a team of other faculty members across campus.

**Michelle Lockhart**

College of Agriculture, Landscape Architecture

[lockharm@purdue.edu](mailto:lockharm@purdue.edu)

Faculty Mentor: Professor Paul Siciliano, [sicilian@purdue.edu](mailto:sicilian@purdue.edu)

The end result of the project will be a paper dealing with the varying roles of art, functionality, and environmental design within the profession of landscape architecture. As landscape architecture is considered closely related to art, or even as an art itself, the functional and environmental responsibilities of the profession are commonly overlooked. The paper will question how landscape architecture is similar to the arts and how it differs, discuss the

differences between art and design, and further implement the differences between landscape architecture and other facets of design: fashion, product, architecture, etc. Professor Siciliano and I began discussing the idea of such a paper early last semester; an outline and abstract have already been drafted. The paper should be finished before the second semester of my senior year to allow for the submittal of the paper to be published. In addition, I would be glad to present the work to a collection of students in the landscape architecture program, or to other committees displaying interest. The paper will be contentious, as it aims to dissect the fundamentals of landscape architecture to further direct the movement and reception, both academic and commonplace, of the profession. The paper will be careful to address differing viewpoints and definitions of landscape architecture, as an attempt to promote a clearer vision of how the profession should be defined, critiqued, and how fundamentals of the profession: art, functionality of design, and environmental design work together and, at times, against each other. Looking at art as an extension of human emotion and functionality of design as an extension of human efficiency, does landscape architecture ascend the realm of human use to touch upon greater ecological and environmental benefits? Studies of former projects with varying degrees of these three elements will be compared to better understand what is the most successful balance of the elements: art, functionality of design, and environmental design. A discussion of how these elements have progressed together through history will evolve into a conclusion debating how this balance should evolve in the future, taking into account growing environmental concerns and ever-changing design standards.

**Megan Morris**

CLA, Anthropology

[morri199@purdue.edu](mailto:morri199@purdue.edu)

Faculty Mentor: Laura Zanotti, [lzanotti@purdue.edu](mailto:lzanotti@purdue.edu)

During an Anthropology study abroad course, I was able to learn research design and ethnographic field methods, while also discovering the importance and cultural context of past and present indigenous and conservation issues, such as deforestation and threats to indigenous land and culture. Individually, each student focused their research on a specific aspect of indigenous life. My research combined both my educational interests of graphic design and anthropology, resulting in an analysis on the age-old tradition of Kayapó body painting. In the field, I conducted an interview with a Kayapó mother, was painted twice by Kayapó women, attempted the skill of painting myself, and observed the patterns in the villagers' own designs, all to further my understanding of the phenomenon that is indigenous body painting. Utilizing multiple ethnographic methods allowed me to first observe and translate Kayapó body art into a basic idea of design, then follow up with a more in-depth conversation about the meanings and symbolisms behind both specific designs and body painting as a whole. My research complied the handful of pre-existing articles with my own careful and detailed examination, creating a document with both anecdotal evidence and technical clarifications. The approach I took varies from already existing research due to my graphic design standpoint.

The in-field research spanned over three weeks in July 2015. After returning from Brazil, I completed individual research to finish a 15-page paper that I turned in at the end of August. During the next semester, I was selected to present my research for the Honors Colloquium,

and therefore created a 60" poster visually illustrating my research. Overall, I completed a final research paper, a poster, and presented to the public over the course of a semester's time.