Examples of Abstracts from Previous Undergraduate Forums

**Samuel Berger and Eric Chitambar, Ph.D.**

Department of Physics

*Bell inequalities with relaxed measurement independence*

A tenant of classical physics is a principle known as locality. This says that within a small time frame, a physical system can only be affected by what is near it. The well-known Bell-CHSH Inequality often allows one to test whether a certain theory is local based on the measurement statistics described by that theory. Quantum mechanics, for instance, violates the Bell-CHSH Inequality, and it is therefore often concluded that quantum mechanics does not satisfy the principle of locality. However, there is an extra assumption employed in the derivation of the Bell-CHSH Inequality known as measurement independence. Under measurement independence it is always possible to perform uncorrelated measurements on two spatially separate systems.

**Cierra Branch-Harris and Amber Cox**

Department of Psychology

*The effects of divorce on college students’ attitudes*

Participants will be students taking an Introduction Psychology course at a large Midwestern University ages 18-25 years. Participants will be evaluated on their attitudes towards marriage based on their parents' marital status. The measures being used in this study are the Attitudes toward Marriage Scale (Kinnard & Gerrard, 1986), Attitudes towards Divorce Scale (Kinnard & Gerrard 1986), Children’s Perception of Interparental Conflict Scale (Seid & Fincham 1992), Couples Satisfaction Index (Funk & Rogge 2007), Commitment Scale (Rusbult, Kusashiro, Kubabcka & Finkel 2009), and Adult Romantic Attachment Questionnaire (Frayler, Waller & Brenan 2000). We hypothesize that parental divorce will have a negative effect on young adults’ attitudes towards marriage, parents who remain married will have positive effects on young adults’ attitudes towards marriage, parents who have high levels of conflict produce negative attitudes among young adults and parents who have low levels of conflict will exhibit positive attitudes. We also hypothesize that women will have more favorable attitudes towards marriage but more favorable attitudes toward divorce then men and that divorce will have a negative effect on adult romantic attachment.

**Gabriela Brito and Liliana Lefticariu, Ph.D.**

Department of Geology

*Stable isotope composition of water in Southern Illinois and Missouri*

The hydrologic cycle is the continuous movement of water among different reservoirs of the hydrosphere, atmosphere, and lithosphere. On Earth, water is in constant motion starting with evaporation from the ocean, transportation through the atmosphere, condensation during rain events,
and precipitation into the lakes, rivers and streams. Water is also a major constituent of the biosphere and plays an important role in all physiological processes. The movement of water among different reservoirs can be traced by using the stable isotopic composition of water. Both oxygen and hydrogen are part of the water molecule and thus the hydrogen and oxygen isotopes can be used to fingerprint water movement both in geological and biological systems. Variations in the isotope composition of precipitation can be used to figure out paleo-climate and paleo-hydrologic information, since isotopic compositions of sea water, ice, atmospheric water vapor, and meteoric water are distinct. To better understand the hydrological cycle in Southern Illinois, data will be presented on hydrogen and oxygen isotope values of river water from Southern Illinois and Missouri. These isotopic values will be correlated with isotopic values of precipitation. Temporal trends in isotopic composition of river waters can help us better understand the effects of climate change on local hydrological processes.

Curtis Brown and Regina Trevino, Ph.D.
Department of Business Economics

Non-traditional students: An analysis of the challenges of graduating from college

Student loan debt is a serious problem in the United States for both community colleges and private and public 4-year institutions. This intrigued me enough to explore how non-traditional students, more specifically single parents, are affected. In this study, I investigated if non-traditional students were more likely than traditional students to allocate student loan funds on expenses not related to school. In addition I analyzed if non-traditional students have a lower graduation rate than traditional students. I used data from 30 universities from the year 2010. The regression analysis indicates that non-traditional students have larger student debt loans and a statistically significant lower probability of graduation. My goal in this research project is to advocate for the government to create more specific policies to assist non-traditional students.

Krystal Chung
Department of Chemistry and Biochemistry

Determining the structure of JEV core protein

In Dr. Du’s lab, where I’ve been working in, there has been a lot of research on a human protein called Caprin1 (cytoplasmic activation/proliferation-associated protein-1). Caprin1 plays a role in many different biological processes such as cell proliferation, antiviral immune response, maintenance of healthy nerve cells, and cellular response to environmental stress. By using a technique called X-ray crystallography, the lab determined a structure (i.e. the 3-dimensional shape) of a portion of Caprin1. Insights from the structure suggest that this portion of Caprin1 may interact with the core protein of Japanese Encephalitis Virus (JEV). JEV is a mosquito-borne human pathogen that may cause fatal infection. Because Caprin1 mediates antiviral stress response against JEV infection, JEV uses its core protein to interact with Caprin1 as a counter measure. My job has been to determine the structure of the JEV core protein, so as to eventually determine to the nature of the interaction between Caprin1 and JEV. I recently obtained a pure protein sample of the JEV core protein. With this progress, I expected that my research will lead to the identification of the Caprin1 region responsible for binding the JEV core protein and molecular details of the interaction. Combined with results made by other Du lab members, my study will contribute to achieving a better knowledge about Caprin1 functions.