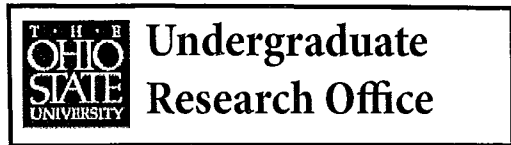


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6th Annual
**Fall Undergraduate
Research Week**
&
Student Poster Forum

P-60
**Poster Forum
Abstracts**

September 14, 2012
Thompson Library
Buckeye Reading Room

Poster
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Ethan Palay

Majors: Astronomy and Physics

Advisors: Anil Pradhan and Sultana Nahar (Astronomy)

The Solar Abundance Problem and the Iron Project

New highly precise 3D non-LTE spectroscopic models yield solar abundances (Asplund et al. 2009) that are up to 50% lower than standard solar abundances in common light elements (C, O, N, and Ne). It is widely accepted that the problem in these spectroscopic models lies in opacity. It has been suggested that a 10-30% increase in opacities can help if not resolve this solar abundance discrepancy. We present partial results for theoretical investigations of this problem. Previous calculations treated resonance profiles as lines; whereas our calculations accurately treat these resonances as asymmetric frequency dependent profiles in photoionization cross sections. Emphasis was placed in finding photoexcitation of the core (PEC) resonances which are believed to be the site of the missing solar opacity. Partial results are presented for FeXVII, one of the dominant ions in the solar convective/ radiative zone boundary where these PEC resonances are important. Calculations of Rosseland Mean Opacities were also carried out to prepare for comparison with experimental observations carried out by various national labs. Investigations of the Opacity Project's precision are also presented.

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Eric Parker

Major: Earth Sciences

Advisor: E. Scott Bair (Earth Sciences)

An Inquiry into the Evolution and Sediments of Caves along the Scioto River

Cave passages and the sediments contained in them often preserve large scale climate changes. The major rivers and tributaries in the Columbus area served as outlets for glacial melt waters. The down cutting of these rivers led to the formation of a phreatic to vadose transition in numerous local caves. There were two components to the research: Collection of sediment samples and searches of the surrounding area for clues to explain the caves' evolution. Samples were collected in two major ways. The first, involved extracting surface sediment from caves with a rock hammer. The second employed a manual corer to extract deeper layers of sediment whenever possible. After collection, images of the samples were recorded to scale using a light station and camera. Many aspects of the caves were discovered, including that the parallel sets of caves on the banks were likely bisected by the river / stream. The sediment from the caves is a fine,

clay-based mixture with some larger grains intermixed. Unfortunately, this composition is incompatible with the planned sieve analyses. Further research will explore the changes in spring locations along the Scioto River over time and analyze pollen and carbon data from new sediment samples.

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Anjni Patel

Major: Psychology

Advisor: Julian Thayer (Psychology)

To Forgive Is Divine: Forgiveness of Negative Emotions & Women's Cardiovascular Health

Researchers have explored the link between health and emotion, grounding their work on findings that emotional experiences can directly influence physical well-being. Findings suggest those who ruminate on negative emotions, and maintain the associated frustration, also prolong the physiological experience of these emotions. Intuitively, those who mentally release negative emotions may counteract these prolonged physiological responses, subsequently leading to a positive impact on cardiovascular health. In the present study, we further evaluated the psychophysiological impact of forgiveness on heart rate variability (HRV), an index of cardiovascular health. HRV measures were obtained using an electrocardiography (EKG) machine during a resting baseline phase and a negative emotion induction phase. Sub-samples of participants were then randomized into one of three manipulations. 40 women participants were asked to imagine forgiving someone with whom they had been frustrated, read a neutral reading passage, or do nothing, leading to maintenance of their frustration. Data collection is currently ongoing, however, preliminary results suggest that our final results will be consistent with previous research; those able to forgive successfully will have a higher recovery HRV and better overall physiological and psychological health.

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Kishan Patel

Major: Physics

Advisor: Richard Hughes (Physics)

Measuring for ttbb using Neural Networks

The Standard Model of particle physics stands as the best theory for the interactions of the known subatomic particles. The origin of mass of the fundamental particles, in the Standard Model, is not yet fully understood. One possible solution to this problem, which makes it the main focus of Standard Model physicists today, is the Higgs boson. One of the mechanisms of Higgs production is the ttH channel, where a Higgs is produced in association with a top quark pair. This process of Higgs production is important, as it is the only way to measure the coupling of the Higgs boson