

2015 Summer Undergraduate Research Fellowship Awards

Student Name: Jeffrey R. Hall
(2015 Bruce LeVine Mellon '69 SURF Fellowship recipient)

Project Title: Synthesis and Examination of Novel $\text{PN}_{\text{HC}}\text{P}$ Pincer Ligands And
their Associated Metal Complexes

Faculty Sponsor: Brian Anderson

Project Abstract:

Organometallic catalysts are a diverse class of molecules utilized in the manufacture of natural products, pharmaceuticals, and other specialty chemicals. Catalysts act to accelerate the rate of reaction by which chemical starting materials can be transformed into products. Some of the most powerful and synthetically useful catalytic reactions are coupling reactions. Recent reports have shown catalysts featuring pincer type ligands to be increasingly appealing in carbon-carbon and carbon-nitrogen coupling reactions. While many publications have focused on pincer type catalysts with palladium, platinum, and ruthenium centers, very little has been reported on more sustainable, benign metals such as iron. To test whether novel iron-pincer catalysts can perform with similar activities to published compounds, a small library of novel catalysts will be synthesized, characterized, and examined with representative cross coupling reactions. As further efforts are made to understand catalytic mechanisms and abilities, a broader range of viable and economical alternatives to current production methods can be established.

Student Name: Thomas L. Fox
(2015 KSC SURF Fellowship recipient)

Project Title: In-Depth Study and Composition of the Orchestral Tone Poem

Faculty Sponsor: Heather Gilligan

Project Abstract:

The goal of this project is to create a symphonic tone poem that will animate Ray Bradbury's *The Illustrated Man*. The project will first address the structure and content of Bradbury's work and will then transition toward a musical interpretation of its narratives, making use of the concept of leitmotif, in which musical ideas recur in association with characters throughout a story. A critical component of the project will include the study of pivotal works that make use of leitmotif, including Wagner's Ring Cycle titled *Der Ring Des Nibelungen*, Strauss's tone poems, *Don Juan* and *Don Quixote*, and various orchestral works by Debussy, Berlioz, Berg, and Schoenberg. Aspects of compositional development will be addressed, including orchestration, instrumentation, and motivic development, through the study of texts by Alfred Blatter, Nikolai Rimsky-Korsakov, Arnold Schoenberg, and Kent Kennan. Time will be spent focusing on specific tasks to improve and facilitate orchestral writing, including hands-on instrumental study, small-scale compositional exercises which will help to develop material for the larger orchestral work, and score study of the aforementioned works and composers. Each day will be devoted to the creative process of composing. Each week, three to four chapters from *The Illustrated Man* will be set to music; the remaining two weeks will be spent editing and finalizing the score. This schedule will allow for the completion of an orchestral composition comprised of musical settings for 20 short stories which capture, through the use of leitmotif, both the substance and the essence of *The Illustrated Man*.

Student Name: Chelsea Freleng
(2015 KSC SURF Fellowship recipient)

Project Title: Effects of Fitbit® on Sedentary Behavior and Physical Activity in Office Workers

Faculty Sponsor: Melanie Adams

Project Abstract:

Despite being widely available, few researchers have tested the efficiency of wearable fitness monitors. These wearable devices track minutes of physical activity and display data online for customers. The purpose of this study is to examine the effect of wearing the Fitbit® monitor and using the online program on workplace sedentary behavior

(SB), physical activity (PA) and self-efficacy (SE) for physical activity in adults who do not exercise. Volunteers from the college's professional staff will be asked to use a monitor for 3 weeks and then be randomly assigned to continue or discontinue use for another 4 weeks. This design will evaluate both the effects of initial use and the differences in between wearers and non-wearers. Fitbit's® online program incorporates aspects of the Social Cognitive Theory¹ and should increase participants SE for physical activity. Objective and self-report measures will be taken at baseline, mid-point and post intervention. Workplace SB and PA is expected to improve while participants are wearing the Fitbit®, but these behaviors will likely regress when participants are not wearing the monitor. A positive effect is also expected for SE from the intervention, but how well SE is maintained after use of the use of the Fitbit® is exploratory. This study expands the current literature by lengthening post intervention follow-up and using a randomized control design. The results may provide evidence for the use of physical activity monitors in employee health programs.