

**MURF Students, 2008**  
**University of Michigan-Flint**

**Name: Christopher Fage**

**Faculty Advisor: Jessica Tischler; Chemistry and Biochemistry**

**Title of Project: Fluorometric Analysis of Histone Deacetylase Inhibition by 5 – Phenylvaleric Acid and Its Hydroxamate Derivatives**

Abstract: Histone deacetylase (HDAC) is an enzyme that induces a tight electrostatic association between histones and DNA, in turn repressing transcription. Inhibitors of HDAC have recently been examined in detail for their potential in cancer treatment. This presentation will focus on a study of 5 – phenylvaleric acid and its hydroxamate, N-methylhydroxamate, and N,O dimethylhydroxamate derivatives for their ability to inhibit rat liver HDAC. The methylhydroxamates were developed as alternatives to the effective but metabolically unstable hydroxamate, which interacts favorably in the catalytic pocket of HDAC. Valeric acid was selected for its ease of synthesis and its structural similarity to the short-chain fatty acid butyric acid, which is known to be effective *in vitro* and bioavailable *in vivo*. Percent inhibition values, calculated on the basis of enzyme activity, will be discussed by comparing the binding of the inhibitors student to that of potential inhibitor trichostatin-A and 4-phenylbutyric acid.

**Name: Michael Howart**

**Faculty Advisor: Jie Song; Chemistry**

**Title of Project: Theoretical Investigation of C<sub>2</sub>O<sub>4</sub>**

Abstract: Atmospheric chemistry has been of interest partly due to an increase of linear carbon oxide levels. The complex reaction mechanisms of carbon oxides with atomic/molecular oxygen are still unclear. Recent studies show that some unique structures with carbon dioxide or trioxide rings may exist. Only a few samples with carbon dioxide rings, dioxirane, and difluorodioxirane were synthesized experimentally. In addition, these molecules demonstrate very interesting chemical bonding. F-substitution on the C makes electrons delocalized throughout the entire molecule instead of just the CO<sub>2</sub> ring itself, which is considered the primary reason that CO<sub>2</sub>F<sub>2</sub> is more stable than CO<sub>2</sub>H<sub>2</sub>. However, it does not explain why CO<sub>4</sub> molecules are less stable than structures with a carbon trioxide ring. These stability issues imply that the central carbon atom may prevent the flow of electrons between two CO<sub>2</sub> rings and hinder the molecules ability to delocalize electrons. This study examined the structure of C<sub>2</sub>O<sub>4</sub> as well as the equilibrium structures and transition states of C<sub>2</sub>O<sub>4</sub>. The relative stability of each structure was also investigated.

**Name: Kathleen MacDonald**

**Faculty Advisor: Morys Perry; School of Management**

**Title of Project: The People's Republic of China: An International Trade Study in Dichotomies**

Abstract: Our paper and presentation are written as if we are consultants presenting to a potential entrepreneur considering some level of international trade with China: export, import, portfolio investments, joint ventures, merger and acquisition or wholly owned subsidiary. We explore the political, legal, cultural and economic environments that have various affects on international trade. We also examine the value stream activities of Chery Automotive, a Chinese international firm and compare them to those of a General Motors' GM China. We reviewed over fifty references on the internet to gather information. We assigned sections and each of the four members of the team prepared their written part. We then conducted a meeting of the minds marathon to group edit the paper for proper flow of ideas. Finally, we transferred what we had learned about China into a Power Point presentation to present to our University of Michigan – Flint International Business class as our final project. The choice of countries

was inspired by one team members strong curiosity about the facts of China's current and future status in the world economy and concern for human rights issues both widely publicized in the news.

**Name: Brendan Yonke**

**Faculty Advisor: Jie Song; Chemistry**

**Title of Project: Theoretical Investigation of Nickel Carbide**

Abstract: Transition metal carbides (TMCs) exhibit unique physical, chemical, and catalytic properties. These properties give TMCs a distinct advantage over their parent transition metal atoms, making TMCs useful components in many industrial applications (e.g. nanoparticles, surface catalysts, electrochemical cells). Current discrepancies between experimental work and theoretical modeling of TMCs indicate a limited theoretical understanding of such materials. In this research, the bonding of NiC was investigated over a range of internuclear distances. Such an investigation served as "proof of concept" for computational methods used to investigate the more complex NiC system. In the future, it is believed that the verified computational methods will allow for more accurate theoretical modeling of TMCs at reduced computational costs, ultimately serving for further understanding of TMCs' unique properties (e.g. conductivity, hardness, catalytic selectivity).

**Name: Corrienne Martin**

**Faculty Advisor: Denise Dedman; Social Work**

**Title of Project: The Garrett Lee Smith Memorial Act - Suicide Prevention**

Abstract: There are more than 30,000 suicides each year; suicide is the second leading cause of death for college students. Suicide affects all groups of people. In a study done by the 108<sup>th</sup> congress it was said, more children and young adults die from suicide each year than from cancer, heart disease, AIDS, birth defects, stroke, and chronic lung disease combined. The US congress categorized youth suicide as a "public health tragedy" that stemmed from unrecognized mental health problems. The congress also noted a report detailing the self-reported mental health of college students done by the American College Health Association. It was reported, that 61 percent of college students reported feeling hopeless, 45 percent said they felt so depressed that they could barely function, and 9 percent felt suicidal. Seeing that many states in the US had already had some form of suicide prevention the congress decided to develop a federal level program to curtail the suicide problem and provide financial backing for those programs. According to the 2003 Gallagher's Survey of Counseling Center Directors, the ratio of counselors to students is as high as 1 counselor per 2,400 students at institutions of higher education with more than 15,000 students. There were more students on the counselors' caseload than possible to attend to efficiently. Also the oversized caseloads were distressing to the counselors. Despite the importance of this public law at the end of the 2007 fiscal year, the authorization for this act expired, and has yet to be reinstated.

**Name: Sara Shaughnessy**

**Faculty Advisor: Jeanette Whitmore; Psychology**

**Title of Project: "Lighten up, it's just a joke": Gay stereotype activation through joke telling**

Abstract: It is too often in our society that individuals use humor as a means of expressing sexist, racist, homophobic, etc, ideas or beliefs. When another individual feels offended and speaks out against this humor, their offense is often negated by using a phrase similar to that of "Lighten up, it's just a joke". Is this "humor" really harmless or does it have the ability to influence how people think? The purpose of the present research is to determine what, if any, effects that the use of homophobic humor or non-humorous homophobic statements will have on the participants' implicit associations of gay individuals. Participants will be exposed to neutral humor, disparaging gay humor, or a homophobic remark. Participants will then complete a homosexuality attitude scale, which asks them to rate how much they agree with statements regarding homosexuality. Then, participants will complete an implicit association task which measures

the implicit associations or stereotypes of individuals. It is predicted that participants exposed to the neutral humor will have more positive implicit associations of gay individuals.

**Name: Cheng Yuan**

**Faculty Advisor: Michael E. Farmer; Computer Science**

**Title of Project: Motion Segmentation Based on Chaos Theory**

Abstract: Recent research in neural signals have shown biological neural systems are highly responsive to chaotic signals. In this project, we analyze image sequences using tools from chaos theory associated with the phase plot of time series signals. We demonstrate that the changes in pixel amplitudes due to the motion of objects in an image sequence result in interesting behavior, visible as fractal patterns in the phase space, reminiscent of chaotic strange attractors. Likewise we demonstrate that changes in image amplitude due to spatiotemporally varying illumination are non-chaotic and well structured in phase space. We use the Lambertian reflectance model to explain the source of the non-linearities responsible for this chaotic behavior.

**Name: Megan E. Edgar**

**Faculty Advisor: Heather Laube; Sociology**

**Title of Project: Michigan's Labor Movement: A Woman's Movement?**

Abstract: With the economic shift taking place in the United States and especially within the state of Michigan, one must ask what can be done to keep the middle and working classes with a decent standard of living and even lift the poor working class out of its current living conditions. As healthcare and other service industries become an increasingly important part of Michigan's economy and as some industries decrease, the question arises to what group is the majority in this sector. Realizing how great a role women are playing in Michigan's shifting economy, the labor market could very well be turning into a women's movement. Taking this into account, unions, government, and other workers could not only improve working standards and wages of women, but the entire working and middle classes as well.

**Name: Shannon E. Robbins**

**Faculty Advisor: Maureen Thum; English & Honor's Program**

**Title of Project: Approaching Extinction: Human Development and Global Warming Effects on Bears**

Abstract: Currently dozens of species of bears and either endangered or threatened to be endangered because of growing issues surrounding their shrinking habitat, climate changes, and confrontations with humans. To understand the seriousness of the dire situation that the bears are faced with currently a number of dimensions need to be considered. First a complete understanding of what the classifications for the bear's stability in the environment need to be found through definition. Examples of different ratings for specific species of bears around the world can be shown to illuminate the international aspect of the problem. Also historical data revealing the common facts among bears -- and their dominance in our world before the urbanization of the late 19th through 21st centuries -- must be given. This shows that the decline of bears is a human ailment. Then the devastating effects of global warming on the genus *Ursus* must be investigated on a worldwide perspective. Accordingly it must be illuminated how the same factors could one day lead to causing the same decline in other species including humans. Finally the solutions of this predominating problem must be brought to attention for every individual can help stop this chain reaction of demise. Individual citizen's actions however are not enough. The government must also begin to take action through legislation and enforcement to protect bears.