

WEST MICHIGAN
REGIONAL
UNDERGRADUATE
SCIENCE RESEARCH
CONFERENCE

ABSTRACT BOOKLET

Saturday, November 17, 2012



Van Andel Institute®

333 Bostwick Avenue, NE
Grand Rapids, MI 49503
www.vai.org

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SCIENCE RESEARCH CONFERENCE**

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SCHEDULE OF EVENTS

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|--------------|---|-----------------------------|
| 8:30 | ARRIVAL AND POSTER SETUP | <i>Cook-Hauenstein Hall</i> |
| 9:00 | WELCOME
Steve Triezenberg, Ph.D.
President and Dean of Van Andel Institute Graduate School | <i>Tomatis Auditorium</i> |
| 9:15 | KEYNOTE ADDRESS
Elizabeth H. Simmons, Ph.D.
Professor, Physics and Astronomy
Dean of Lyman Briggs College
Michigan State University
<i>"From Asteroid Orbits to the Higgs Boson: Why your Undergraduate Research Experience is so Important"</i> | <i>Tomatis Auditorium</i> |
| 10:00 | POSTER SESSION I
<i>Presenters at even-numbered posters</i>
Refreshments served | <i>Cook-Hauenstein Hall</i> |
| 11:15 | FACULTY TALKS
Greg Fraley, Ph.D.
Associate Professor, Department of Biology
Hope College
<i>"The Neuroprotective Effects of a Plant Hormone, Resveratrol: Implications for End-Stage Parkinson's Disease Therapy"</i>

Jonathan Fritz, Ph.D.
Assistant Professor, Department of Chemistry
Aquinas College
<i>"Regioselectivity of Direct Arylation Reactions"</i> | <i>Tomatis Auditorium</i> |
| 12:00 | LUNCH | <i>Cook-Hauenstein Hall</i> |
| 1:00 | POSTER SESSION II
<i>Presenters at odd-numbered posters</i> | <i>Cook-Hauenstein Hall</i> |
| 2:15 | FACULTY TALKS
Stanley Haan, Ph.D.
Dean for the Natural Sciences and Mathematics
Professor, Department of Physics
Calvin College
<i>"Computer Modeling of Double Ionization of Atoms by High-Intensity Near-Infrared Lasers"</i>

Bart Williams, Ph.D.
Associate Professor and Director, Center for Skeletal Disease Research and Head, Laboratory of Cell Signaling & Carcinogenesis
Van Andel Research Institute
<i>"Genetically Engineered Mouse Models to Study Bone Disease"</i> | <i>Tomatis Auditorium</i> |
| 3:00 | CONCLUSION | |

“Sea Turtle Nesting in Guanacaste, Costa Rica: Effects of Temperature and Sea Level Rise”

Climate change is altering sea level in coastal ecosystems, which will increase an additional 0.6 m by 2100, detrimentally affecting the availability and quality of sea turtle nesting habitat. I used a World Wildlife Fund protocol to monitor temperature and slope of beach habitat used by nesting sea turtles, including green (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys*), on San Miguel Beach, Guanacaste, Costa Rica. During July and August, 2012, I measured beach slope with an Abney level on 5 m transects located in three 100 m sections of beach (N = 20 per section). To model the inundation resulting from predicted sea-level rise, 0.6 m was subtracted from elevation values, resulting in a loss of 3% of the Guanacaste beach area. Beach topography is unstable within and among nesting seasons, and modeled to change in complex ways in response to storm events and human disturbances like tourism, off-road vehicle use and beachfront development. These combined effects will harm sea turtles relative to their body size and timing of nesting. Current beach temperatures support normal sea turtle development, but if the current trajectory of temperature increase continues, feminizing effects will occur by 2100, and lethal temperatures will be reached soon thereafter. If beach temperatures increase faster than modeled in the current study, feminizing and lethal effects will occur even sooner.

“Effectiveness of Paper Mulch as an Organic Weed Control Method in Lettuce Production”

This study took place at Fat Blossom Farm, a small USDA certified organic farm in Allegan, Michigan. The scope of the project was a 150 foot square plot in which 100 heads of Pablo Batavian head lettuce was planted. Five replications of five lettuce heads composed each of four weed treatment methods. Weed control is expensive in organic produce production, but is essential to reduce the competition among lettuce and weeds for light, water, and nutrients.

“Floral Inventory and Phenology at Flat Iron Lake Preserve”

During the summer of 2012, I inventoried and monitored the flowering progress of the flora—particularly forbs (i.e., herbaceous flowering plants, discounting grasses)—at Flat Iron Lake Preserve, a Calvin-owned, sixty-five acre preserve in Oakfield Township. My research was part of an ongoing phenology study that has the goal of documenting year-to-year variation in flowering periods. Once many more years of data have been accumulated, future researchers will examine the results for trends, particularly ones that could be associated with climate change. Between May 30 and August 2, I identified 221 species of forbs on the preserve. The only previous year with sufficient data for comparison was 2010; in that year, on average, forbs flowered three days later than in 2012. Though trends will not become apparent until several more years of standardized data are collected, it is clear that Flat Iron Lake Preserve hosts floral diversity of statewide significance, as measured by standard indices of botanical quality.