

# Student Posters

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## **Rural Community Health Needs Assessment**

*Marlu Abarca, Grinnell College*

The Community Needs Health Assessment (CNHA) is an assessment conducted by the Grinnell Regional Medical Center as required by the new federal Patient Protection and Affordable Care Act. Under this act, all nonprofit hospitals are mandated to conduct a CHNA survey at least once every three years and create an action plan to address community needs and concerns. The Grinnell Regional Medical Center, the town of Grinnell, IA, Poweshiek County and surrounding counties are working in collaboration with Grinnell College and its students to create action plans to address the community's top ten concerns: 1) Obesity, 2) Mental Health, 3) Preventative care, 4) Wellness education, 5) Nutrition, 6) Access to care, 7) Urgent care, 8) Insurance, 9) Quality of care and 10) Transportation.

## **Spatial Variability in Wetland Denitrification Rates**

*Fidencio Balderas, Marshalltown Community College*

*Mentors: Ian Ellickson and Dr. W.G. Crumpton*

Nonpoint source loads of nitrate-nitrogen in agricultural drainage to surface waters in the U.S. corn belt are among the highest in the country (Iowa Department of Agriculture and Land Stewardship, 2013). These nitrogen loads can negatively affect human health where such water is used for drinking water supplies and are suspected to contribute to hypoxia in the Gulf of Mexico (Iowa Department of Agriculture and Land Stewardship, 2013). Strategically located and designed wetlands constructed through the Iowa CREP (Conservation Reserve Enhancement Program) are one of the most promising off-site strategies for reducing surface water contamination. Research conducted at Iowa State University has demonstrated that targeted wetlands have the potential to remove 40-90% of the nitrate in tile drainage from upper-lying croplands (Iowa Department of Agriculture and Land Stewardship, 2013). The effect of wetlands on large scale nitrate reduction is largely determined by the fraction of the total nitrate load that the wetlands intercept and the ability to remove nitrate which is determined by overall rate of denitrification. The objective of this study is to determine spatial variability in denitrification potential under ideal conditions and identify aspects associated with that variability. Observations from this study indicate cores containing live vegetation or with a substrate consisting primarily of sand within the top two inches of the soil core had the lowest rates of denitrification. Cores containing fine sediment within the top two inches of the soil core or containing large quantities of detritus had the highest rates of denitrification. Doing the experiment twice allowed for improvements in sampling technique which in the second experiment yielded less variation and overall spread in rates of denitrification. In the second experiment samples were collected from a wider variety of areas in the Schwartz wetland to enhance the scope of spatial analysis. Due to high variability within replicates taken in the same location, in comparison to variation between spatially distant samples, it was observed that individual core attributes affect rates of denitrification more than spatial location within the wetland.

## **How do Scallops Swim?**

*Stanley Barbel, Iowa State University*

*Mentors: Dr. Jeanne Serb and Dr. Dean Adams*

In my research I studied and implemented Computational-Fluid Dynamics (CFD) on the movement of scallops under different conditions using Reynolds Number, Bernoulli Principle and angles of attack. The Computational-Fluid Dynamics models would be developed in MATLAB following the same condition as Itaru Hayami (1991) experiment, which was a flow tank experiment to understand scallop swimming in term of hydrodynamics mechanism. He found that the scallop shell functions in a different way depending on the circumstances placed on it (much like an airfoil). My abstract idea was to recreate the experiment only using MATLAB by treating the scallop shell like an airfoil, and identify the mean camber line of a tracing of the shell profile from this, I would find the lift and drag coefficients and estimate my results. The idea of my project was to approximate coefficients of lift and drag for scallop swimming using a MATLAB simulation. Once a suitable code was put together I would then try different kinds of scallops to examine which is the most efficient swimmer and why. With my results I can predict and closely examine pitch, roll, and yaw paying partially close attention to the trailing edge. After all data is collected I would apply my findings to engineering, from ailerons to rotors and even marine craft.

## **Reactive Arrays of Colorimetric Sensors for Metabolite and Steroid Identification**

Gary Batres, *Doane College*

*Mentors: Talia Jones, Hannah Johnke, Dr. Mark Wilson, Dr. Andrea E. Holmes, and Dr. Sharmin Sikich*

The work described herein examines a rapid mix-and-measure method called DETECHIP suitable for screening of steroids and metabolites. The addition of steroids and metabolites to reactive arrays of colorimetric sensors generated characteristic color “fingerprints” that were used to identify the analyte. A color analysis tool was used to identify the analyte pool that includes biologically relevant analytes. The mix-and-measure arrays allowed the detection of disease metabolites, such as orotic acid and argininosuccinic acid; and steroids, such as androsterone and estrone. The steroid 1, 4-androstadiene was also detected by this method while dissolved in synthetic urine. Some of the analytes, such as androstadiene, stanzolol, and androsterone were co-dissolved with (2-hydroxypropyl)- $\beta$ -cyclodextrin in order to increase solubility in aqueous buffered solutions. The colorimetric arrays do not intend to eliminate ELISA or mass spectroscopy based screening, but to possibly provide an alternative analytical detection method for steroids and metabolites.

## **Tracking Stress & Fatigue in Composite Structures**

Jordan Becquer, *Iowa State University*

*Mentor: Daniel J. Barnard*

There has been a huge increase in the use of composites in military and commercial applications. Composites offer increased weather resistance, high strength-to-weight ratio, and stiffness. Following the rise in composite usage, the operator needs to determine the best way to way to increase their ability to detect and track fatigue.

Invisible, low energy damage (micro-cracks) can initiate de-laminations in composite laminates with subsequent fatigue. The ability to track the growth of damage can help prevent catastrophic failure in the field.

## **Synthesis and Reactivity of Oxenium Ions**

Lamin A. Ceesay, *Mashalltown Community College*

*Mentor: Patrick Harway*

Chemical reactions frequently occur within our bodies, in very quick chemical processes, as well as in commercial productions like the creation of polymers or plastics in the megaton scale. Many times these reactions go through intermediates that are extremely unstable and difficult to isolate. To understand these reactions and to better predict them, one must understand the intermediates. With a better understanding of these reactants, one can better predict biological reactions, and also increase production of polymers or plastics that would result in more profit. A reactive intermediate is an extremely short-lived species that lives in solution for only a fraction of a second (a billionth or a trillionth of a second). This is the reason why such a species can be extremely difficult to observe. However, one can infer their presence based on the products formed after the reactions occur. Some of these intermediates are called oxenium ions. A precursor compound refers to a compound that leads to the desired product. In order to gain a more comprehensive understanding of oxenium ions, we synthesized precursors to oxenium ions that can be generated using light or heat, which then can be detected using laser spectroscopy. Due to time factor, I was not lucky enough to actually do the laser studies as the nanosecond laser we have had some issues, and the femtosecond laser is only available at the University of Tokyo. The cool thing however is, we can actually predict these reactions ahead of time with the computational modeling without even going into the lab; and this software solves really complex equations that you do not have to do yourself. My mentor would continue more studies on these intermediates.

## **Experiencing LabVIEW**

Edgardo Diaz, *Iowa State University*

*Mentors: Dr. Richard Wlezien and Hephzibah Clemons*

Laboratory Virtual Instrumentation Engineering Workbench (LabVIEW) is a program used mainly for data acquisition (DA), instrument control and industrial automation. During the summer, this program was used to control linear rails and pressure sensors that would allow the graduate students to obtain the data needed to prove the low turbulence in the wind tunnel. The turbulence was measured using hotwires and linear rails. My main goal during the summer was to complete three programs: 1) translating a MatLab code to a LabVIEW code that would graph the pressure distribution on an airfoil, 2) programming the movement of three different linear rails that would represent the x, y, and z axis inside the wind tunnel, and 3) collecting data from pressure ports and storing them in a spreadsheet. Completing these tasks on time was challenging since it was my first time working with LabVIEW and every instrument used in the lab and had no prior experience with the different communication protocols. Despite the challenges faced in an effort to completing the assigned tasks, I was able to successfully finish the first two programs during the summer and completed the third one during the

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## Experiencing LabVIEW (cont.)

fall. Most importantly and additional to the results obtained for the programs at the lab, I had personal achievements regarding my professional career. Among other things, I had the opportunity to expand professional network and to have hands-on experience in an Aerospace Engineering lab. With this summer program, I also had the opportunity to participate in the LabVIEW Bootcamp and earn a globally recognized entry-level certification, the Certified LabVIEW Associate Developer (CLAD).

With its advanced graphical programming, LabVIEW facilitates the design and creation of a program that allows programmers to control their DA instruments and give users accurate and reliable results. With LabVIEW can communicate with thousands of instruments through different communication protocols, such as Universal Serial Bus (USB), Ethernet, which were used to communicate with the lab instruments. In addition to this, information in LabVIEW can also be sent to other programs, such as an Excel Spreadsheet.

## Making Images by Hand and By Code Motivating Students with Multi-Language Interactive Media

### Application Scripting

Martin Estrada, *Grinnell College*

*Mentors: Chukwunweike T. Abuah, Rogelio Calderon, Zarni Htet (Cornell )Adriana M. Hurley, Katherine Ingersoll, Hart Russell, Sydney Ryan, Kimberly Spasaro , Prashanna Tiwaree and Dr. Samuel A. Rebelsky*

Computer science has different focus areas. An area that draws people's interests in computer science is programming, drawing, and testing in code. We used interactively scripting applications to encourage non-programmers to learn programming concepts. We choose interactive scripting, because it is more efficient, precise, and let students explore alternatives. This research was performed using the following programs: Inkscape, D-bus, and Wingware Python IDE. Our goal was to get the Inkscape program, a drawing program, to communicate with Wingware program, a programming program, through the D-bus, a programming program. In Inkscape the SVG file formatting has the potential to support some kind of scripting such as sending SVG to script and having the script return modified SVG. Inkscape recently gained a D-bus extension. A downfall to the Inkscape D-bus interface was that not all important features were supported such as textures. Also some methods names conflicted with reserved word already in the program. The Inkscape D-bus procedures have intuitive names and limited number of parameters that will be easy on the non-programmers students. We concluded that designing a D-bus interface for an application can be difficult, because one must reveal a wide variety of functions. Also to support beginning programmers, one must provide appropriate simple versions of functions, easier way to select a service. Some scaffolding can be language-independent while other scaffolding might require new implementation for each language. In the future, we expect to rewrite the Inkscape D-bus interface to take advantage of new glib/gio libraries and to support additional operations.

## Tumor Suppression in Leukemia- Identifying Target Genes of Tumor Suppressor Ikaros in Leukemia Cells

Nathalie Fuentes, *Iowa State University*

*Mentors: Chunhua Song, Ph.D. (Penn State University) and Sinisa Dovati, MD/Ph.D. (Penn State University)*

Leukemia is a type of bone marrow cancer characterized by an abnormal increase of white blood cells. Studies indicate that mutations and genetic inactivation in the Ikaros gene play an important role in triggering acute lymphoblastic leukemia. The Ikaros family of zinc finger transcription factors is important regulators of immune system development. Loss or mutation of Ikaros results in dramatic decreases in T cells, B cells, NK, and lymphoid-derived dendritic cells. Our research is focused on the tumor suppression genes such as Ikaros that acts as a transcription factor, binding DNA to regulate gene expression.

We hypothesized that the tumor suppressor such as Ikaros exerts its inhibitory function on tumor by suppressing its target gene expression. To validate our hypothesis, we used Chromatin Immunoprecipitation (ChIP) assay combined with real-time PCR (qPCR), called qChIP, to identify the genes whose expression is directly regulated by Ikaros. Using this technique we calculate the difference in Ikaros binding to the promoter region of the target genes versus nonspecific binding (control). In addition, we cloned the promoter region of these genes into luciferase report vectors for in vitro luciferase transcription assays. HEK293T cells were transiently transfected with the indicated promoter reporter constructs and pcDNA3.1-Ikaros or pcDNA3.1 vector. Luciferase activities were expressed as -fold change relative to values obtained from pGL4.74[hRluc/TK] vector only control cells.

The results showed that the increased binding of Ikaros to MYC, and two other novel target genes are 4.4, 3.9 and 8.5, respectively as compared to control. These results indicate that Ikaros binds to the promoter regions of these genes.

Our data indicated that Ikaros binds to the promoter region of MYC, and two other novel target genes by ChIP-qPCR assay. Also, Ikaros suppresses the promoter activity of MYC and other two novel genes by luciferase report assay. C-MYC and other two novel genes are Ikaros target genes and it may exert its tumor suppression function by inhibition of their expression. Therefore, Ikaros dramatically inhibits the luciferase activity when it is co-expressed with the above constructs in HEK293 cells. Taken together, our results suggested that one of the mechanisms by which Ikaros exerts its tumor suppression function is by inhibition of expression of its target genes.

## **Electrical to Mechanical-Actuation of a Cantilever by Electric Field**

Norma Granados, *Marshalltown Community College*

*Mentor: Manan Sevak (Oakland University)*

The ability to convert biochemical reactions to mechanical work has been an ongoing research topic on the minds of researchers over many years. Many researchers have conducted different projects to try and convert chemical reactions to mechanical work, to use as means of motion for work in mechanical fields. The ability to convert the biochemical reactions into mechanical work, to incorporate artificial parts into biological structures successfully, can open many possibilities for the future. As the years pass, new nano-structures are being developed that can imitate biomolecules and structures. Two studies that have spoken about these possibilities is of Wenmiao Shu and his group and Ian Y. Wong and his group of researchers. The research project and Dr. Shrotriya et al are working on is a combination of what Shu et al and Wong, et al did in their project and extending it slightly further. Their study is very important as it would agree that we can use an electrical field to change the conformation of molecules that is associated with surface stress and deflection. What is being proven is that the electrical field will be the only factor that will change the conformation of a molecule and nothing else. They have already proven that the conformation change will affect the binding. It is an important step because if we know that the electrical field will change the conformation of a molecule, then we can use this change to control the cantilever and its bending and use it for future projects.

## **Center for Nondestructive Evaluation**

Courtnee Jackson, *Iowa State University*

*Mentor: Dr. Joseph Gray*

Over the summer I had the Pleasure of working at the Center for Nondestructive Evaluation doing NDE (Nondestructive Evaluation) work. NDE is referred to as the different methods of analyzing the properties of a component or system and identifying any deformities or cracks in its infrastructure that may cause it to destruct.

If you think about it, NDE work is very important. There are many things that are at our disposal for our convenience such as cars and airplanes or even our copy machines at work. What NDE does is insure our safe and reliable use of those things.

The method of NDE that I used this summer was radiography. I would take CT scans(a method using x-rays)of an object of interest. The images produced from taking the scans could then be manipulated into a 3-D representation of the object. The last step would be going through the images viewing and focusing in on any deformities or cracks in the object that may cause it to destruct.

## **Targeted Deletion of Zebrafish lncRNAs18 with TALENs**

Crystal Jones, *Iowa State University*

*Mentors: Staci L. Solin, Dr. Jeffery J. Essner and Dr. Maura McGrail*

Long non-coding RNAs (lncRNAs) are important players in epigenetic regulation of gene expression during development and disease (Niland et al, 2012). A number of mechanisms have been proposed for lncRNA action, however, few functional studies of lncRNAs have been described. We are using Transcription Activator-Like Effector Nucleases (TALENs), engineered site-specific nucleases, to create targeted mutations in a novel zebrafish lncRNA. We previously mapped a highly penetrant retinal tumor model to transgene disruption of the zebrafish lncRNAs18 gene. The objective of this project is to isolate a second zebrafish lncRNAs18 allele that contains a deletion of part of the lncRNAs18 gene. Two TALEN pairs were designed to simultaneously target double-strand breaks to exons 2 and 5 of lncRNAs18. Injection of 25-40pg of the TALENs targeting individual exons into zebrafish embryos resulted in efficient mutagenesis of the target sites. To isolate the lncRNAs18 deletion allele we co-injected embryos with the TALEN pairs targeting both exons 2 and exon 5. We predicted co-injection of TALEN pairs targeting exons 2 and 5 of lncRNAs18 would create a 147kb deletion after loss of the intervening sequence and repair by the non-homologous enjoining pathway. PCR products spanning the fusion of exons 2 to 5 were amplified from somatic tissue in 9 out of 14 co-injected embryos. We verified the deletion allele by sequencing PCR products from 3 embryos. We have identified one founder that transmits the deletion allele to the F1 generation. F1 embryos are being raised to establish a new lncRNAs18del line. The lncRNAs18 deletion allele will provide a new genetic tool to study the function of lncRNAs18 in zebrafish development and cancer.

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## **The Effect of a Change in pH Levels on the Surface Tension of Water in Vegetable Oil**

Hyaquino Hyacinthe, *Iowa State University*

*Mentor: Dr. Thomas Ward*

The purpose of this project is to try to stabilize a water-in-vegetable oil emulsion for use as a biofuel. Adding water to the fuel mixture has been shown to significantly reduce NO<sub>x</sub> and smoke emissions, however the shelf-life of these emulsions is limited by how long it takes for the drops to settle out. Adding surfactants can significantly slow the sedimentation rate by inducing Marangoni stresses. In the case of a vegetable oil-based fuel adding sodium hydroxide to the water can create surfactants through saponification. Aqueous sodium hydroxide drops with pH between 11 and 13 are allowed to settle in several oils such as corn, canola, soybean and olive. Each oil has a different composition of fatty acids and different sedimentation rates. The decreased, and in some cases increased, settling time of the drops compared to a clean water drop is observed.

## **L.A.S.E.R. (Light Aircraft Solar Extended Range)**

Jan Michael Lopez, *Iowa State University*

*Mentors: Matthew Nelson and Rohan Sharma*

The Light Aircraft Solar Extended Range (LASER) team is building an aircraft capable of flying on alternative energy. The team has been able to successfully integrate flexible solar cells into the aircraft wings and is currently exploring Hydrogen fuel cells usage. My contribution Summer 2013 with team members included but is not limited to the design and manufacturing of the wings and fuselage of the LASER prototype. We have flown the prototype with different propeller sizes and a battery operated motor. Unfortunately, the motor used was not strong enough to sustain flight. Based on results, it is our hope to utilize a new motor that has durability and power to launch and stabilize while in flight.

## **Annual Energy Consumption in a Community Lab and Analysis of the Electricity Energy Flow**

Esdras Murillo, *Des Moines Area Community College/Iowa State University*

*Mentors: Shan He and Ulrike Passe*

In order to achieve net-zero energy buildings, the electricity energy flow throughout a whole year needs to be analyzed because net-zero energy buildings requires the utility meter gain a zero balance throughout an entire year. This can be achieved with improving energy consumption efficiency and renewable energy production. A community lab designed to be a net-zero building was set up to study the balance between the electrical energy consumption and solar electrical energy production; it was set up with an advanced data acquisition system collecting the electrical energy consumption every minute. An advanced data acquisition system monitors the energy flow among all the appliances and mechanical systems in this house. With real time and history data, the energy consumption proportion of different terminals is analyzed. By analyzing the different percentages of energy consuming terminals and the energy production all year round, it is revealed that the system design and operation of the solar house has great potential to achieve net-zero. The air conditioner and the hot water heater are the biggest energy consumers in the house. Suggestions are made to improve the energy efficiency. With this study house users will be able to understand and better manage the energy flow for a net-zero energy building, and researchers can design the structures and mechanical systems of buildings with higher energy efficiency.

## **Length of Crop Rotation Influences Dynamics of Microbial Biomass and Inorganic Nitrogen in Soil**

Queenster Nartey, *Grinnell College*

*Mentors: Alison King (Iowa State University), Ryan Williams (Iowa State University) and Kirsten Hofmockel (Iowa State University)*

As demand for crops increases, farmers are faced with the challenge of yielding more crops while being mindful of environmental factors. Using synthetic nitrogen fertilizers is one way some farmers meet the high demand. After rain, however, some nitrogen may leach into waterways, promoting eutrophication. Diversified crop rotation is an alternative cropping system that previous studies have shown decreases the need for synthetic fertilizers and increases yield. Although declining with agricultural intensification, soil microbial biomass is vital for nutrient cycling, decomposition, soil aggregation and soil organic matter. In general, longer crop rotations have higher carbon inputs, which increases the soils microbial biomass carbon. The overall goal of this study is to test if longer crop rotations will minimize the risk of synthetic fertilizers leaching into waterways and increase the microbial biomass in soil. We observed that nitrogen levels significantly decreased in the 3 and 4 year rotations compared to the 2 year rotation. Microbial biomass carbon increased significantly in the 3 and 4 year rotations compared to the 2 year rotation, however, increased levels of microbial biomass nitrogen in longer rotations were not significant. Most of our hypotheses were supported by our data, which shows the positive influence longer crop rotations have on microbial biomass and inorganic nitrogen in soil. Future work will include measuring rates of protein breakdown in soil and integrating more sampling times.

## **Impact of University Of Iowa STEM Seminars 2013 on Enriching Upward Bound's Science Curriculum**

*Mary Nyaema, University of Iowa*

*Mentors: Brent Studer, Deandrea Watkins, Alexander Lodge, Elizabeth Smith and Tonya Peeples*

To enrich the program's science and math portion of the program, Iowa NSF EPSCoR funded 32 under-represented and minority university graduate students and young professionals to share their science, technology, engineering, and mathematics (STEM) expertise and personal backgrounds with the high school students. Throughout the summer, instructors led STEN seminars that encouraged in-depth investigation and hands-on experiences. With the instructors, students were able to experience lab research at the Genomics Laboratory at the University of Iowa, and make visits to science-related sites around Iowa including the Neal Smith National Wildlife Refuge in Polk City and the Iowa Energy Center's Biomass Energy Conversion Facility in Nevada.

At the beginning of the seminars most of the students lacked interest in STEM Careers was low, as indicated in the pre-test. Most students had no ideas if what the acronym meant. The field trips and tours expanded the horizon of the number of career opportunities that they could engage in. Positive role models gave them an opportunity at hands on learning in an interactive way. It helped them look at science in a different way removed from the rigor of everyday school work. By the overwhelming improvement in their post test scores, more opportunity should be given to such students to help them become more actively engaged in STEM fields and look at Science from a different perspective. From the feedback given from the students, it was recommended to involve the students in more hands on activities and also work on building their critical thinking skills in STEM fields. This would have a huge impact on their likelihood of entering into a STEM based career.

## **Goat grazing and invasive species re-growth**

*Brad Ryan, Eastern Iowa Community Colleges*

*Mentors: Victoria Green (Eastern Iowa Community College and Western Illinois University), Brian Ritter, Jacob Veal and JaeLin Smith (Eastern Iowa Community College and Western Illinois University)*

Invasive plants are defined as a non-native species whose presence does or is likely to cause harm to human, animal, plant, and environmental health. Land managers of natural areas have long struggled to control the impact of such species through several techniques. Mimicking the natural cycles of disturbance in this environment is one to limit the propagation of invasive species. For thousands of years, there have been natural disruptions throughout the Midwest prairies such as floods, wildfires, and animal grazing. Some of the native plant species depend on this natural disturbance to survive. Land managers have sought to re-create this environment in modern times. At Nahant Marsh in Davenport, IA, goat grazing was used to clear invasive brush on a selected area. Pre- and post- grazing surveys were conducted to determine the effectiveness of controlling invasive species. Further research is needed to determine the long-term impacts.

## **Trail camera data and analysis**

*Jaelin Smith, Eastern Iowa Community Colleges*

*Mentors: Brad Ryan, Jacob Veal, Victoria Green (Eastern Iowa Community Colleges and Western Illinois University) and Brian Ritter*

Scientists and researchers often times use trail cameras to survey the populations of animals in certain area. Trail cameras are generally strapped to trees or some other stationary object and left for a few days. The motion activated camera will then take photographs of any item that crosses the path of the lens. Trail Cameras are used to get up close and personal with animals that would usually be more apprehensive around humans. For this reason, cameras can be very useful to researchers in taking inventory of the animal populations of a certain area. Trail cameras were used at Nahant Marsh in Davenport, IA in order to gain a better understanding of the animals that inhabit this property. Further surveys are recommended.

## **A Journey of Exploration: Seeking a future in the intriguing and interesting field of Genetics**

*Hayley Vaughn, Upper Iowa University*

In pursuing my undergraduate education, I have always been interested in the field of Biology, but I was not sure which direction that would take me in my graduate studies. I took a Genetics class and found out that I am highly fascinated by this unique field. I am interested in finding a future career in this field, and hope to continue my study of human genetics at the graduate level close to home. By carefully planning my education and seeking internship and research experiences, I hope to make a decision in the back and forth battle between continuing my education in Genetic Counseling or Genetics.

## **Turtle monitoring program**

Jacob Veal, *Eastern Iowa Community Colleges*

*Mentors: Jaelin Smith (Eastern Iowa Community Colleges and Western Illinois University), Brad Ryan, Jacob Veal, Victoria Green (Eastern Iowa Community Colleges and Western Illinois University) and Brian Ritter*

Turtle populations in the Midwest vary in levels of threat of extinction. The Blanding's turtle (*Emydoidea blandingii*) was placed on the IUCN's red list in August 2010 and is considered endangered in Illinois and Indiana. Major threats to turtles are road mortality and predation of adults and their offspring. These risks are increased when food resources or ideal habitat are located close to human settlements and transportation routes. Studying their habitat preferences and population structure is important to conservationists in understanding why the Blanding's turtle is at risk and how to effectively manage these populations.

Researchers at the Nahant Marsh in Davenport, Iowa utilized mark and recapture methods to monitor turtle populations. During capture events, carapace and plastron length (as well as width in Blanding's turtles) were also recorded. These dimensions have been compared to data that was recorded over the last three years to determine growth and reproduction rates of turtle populations at Nahant Marsh. If the growth rates are positive and number of caught unmarked turtles increased, this is indicative that Nahant Marsh is a suitable environment for turtles, resulting in increased growth, reproduction, and immigration to the site. This was the fourth year of surveying turtle populations at Nahant Marsh. Results are presented here.