Celebrating
Student and Faculty/Staff
Collaborations

Tuesday March 29, 2011
1:00 – 4:00 presentations
and posters in Todd Wehr Hall
4:00 – 5:00 reception,
remarks, and recognition
in Bemis

Join us!

Come and go as your schedule allows.
Refreshments provided throughout the event.
During the reception and recognition ceremony in the Hendrickson Dining Room of Bemis, we will have remarks from John A. Corbett, Ph.D., Professor and Chairman of Biochemistry, Medical College of Wisconsin

"The Joys and Benefits of Undergraduate Research: One Alum's Journey"

John A. Corbett received his Bachelor of Science degree in Chemistry from Saint Norbert College in 1985 and his Doctorate in Biochemistry from Utah State University in 1990. He performed postdoctoral studies at Washington University School of Medicine in the Department of Pathology from 1990-94. In 1995, Dr. Corbett joined Saint Louis University as an Assistant Professor in Biochemistry and rose to the rank of Professor in 2005. In 2007, Dr. Corbett joined the University of Alabama at Birmingham as the Nancy R. and Eugene C. Gwaltney Family Endowed Chair in Juvenile Diabetes Research, Professor in Medicine, and Director of The Comprehensive Diabetes Center. Dr. Corbett joined the faculty of the Medical College of Wisconsin in 2010 where he is Professor and Chairman of the Biochemistry Department.

Dr. Corbett's research focuses on how the cells of the pancreas function in the face of disease, especially diabetes. He and his team investigate what factors cause the death of pancreatic cells and how these cells protect themselves, how they interact with various components and products of the body's immune system, and how the function of healthy and diseased pancreatic cells is related to changes in their DNA.
Celebrating Student and Faculty/Staff Collaborations focuses on the valued tradition at St. Norbert College of collaborations taking place in labs, studios, and other scholarly or creative settings, resulting in a rich array of scholarly research and creative works.

This celebration features collaborative projects that evolved out of independent studies, class assignments, and casual interactions, as well as those formal collaborations supported through the Office of Faculty Development, the Collaborative, and the Research Fellows Program.

Co-sponsored by the Office of Faculty Development, The Collaborative: The Center for Undergraduate Research, Scholarship and Creative Activities, and the Office of the Dean of the College
On behalf of the Office of Faculty Development, The Collaborative: The Center for Undergraduate Research, Scholarship and Creative Activities, and the Office of the Dean of the College, we extend

A Big Thank You to:

All Participating Student, Faculty and Staff Collaborators

Copy Center

Conference and Event Services

And We Especially Thank:

Niki Nelson (‘13)
Faculty Development Intern
Lead Student Organizer of this Event

Sarah Christensen (‘13)
Faculty Development Assistant

Tori Chenault (‘12)
Graphic Designer

for consistently practicing a high level of professionalism and foresight in the preparation for and execution of this event, making it possible for this Celebration to take place.
This program is put together listing oral presentations followed by posters and other exhibits in alphabetical order by the project title. Time(s), location and presentation type are listed along with collaborator names, titles, project title and abstract. Oral presentations and performances will occur during the time listed.

Posters and other exhibits will be displayed from 1:00 - 4:00 p.m., but are listed according to the time(s) members will be available to discuss their projects.

A list of all students and faculty/staff participating in Celebrating Student and Faculty/Staff Collaborations is available on pages 5 and 6, along with the page numbers where you can find their projects. Some students and faculty/staff may be involved in multiple projects or presenting their project more than once.
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Jody Kolter, Senior English and Philosophy Major  
Ed Risden, Professor of English

Aesthetic of Opposition and Resolution in Blake and Milton

In approaching John Milton’s and William Blake’s aesthetics concurrently, we can derive a new approach to reconciling the dichotomies that we have failed to notice as a curious and insightful epistemic and aesthetic. Friedrich Nietzsche’s *The Birth of Tragedy* will serve as the theoretical framework for our analysis of Blake’s *The Marriage of Heaven and Hell* and Milton’s *Paradise Lost* because, like tragedy, the epic and prophetic focus on the ills of the present state of society. We will argue that maintaining and incorporating the dynamic integrity and virtues of the *Apollonian* (characterized by self-control, reason, and order) and *Dionysian* (characterized by passion, instinct, and chaos) energies create an aesthetic of opposition. This aesthetic of opposition subsumes the moral resolution for Milton and creative symmetry for Blake under a sensory beauty in both.

Aaron Reynolds, Sophomore Music Education Major  
Michael Rosewall, Associate Professor of Music

Historical Performance Practice of Vocal Music

As part of his coursework in Applied Vocal Literature, Aaron Reynolds worked with his instructor to select and research advanced music for Baritone soloists. His work included researching stylistic practice from three historical periods, rehearsing with an accompanist, and the performance of a short recital at the North Central chapter of the National Association of Teachers of Singing (NATS) fall meeting at the University of Wisconsin – Milwaukee. As part of the College Division performance auditions at the event, Aaron progressed to the semi-final round of competition. This project includes his research into historical vocal performance and a short performance of vocal music.
Anna Czarnik-Neimeyer, Senior Communication Major
Nancy Mathias, Associate Director of Leadership and Service in the Office of Leadership Development, Service, and Engagement (LSE)

Multi-level Leadership Development Using Experiential Projects and the LID Model

St. Norbert College boasts a progressive and innovative focus on leadership development in both a curricular and co-curricular setting. A part of this focus is Emerging Leaders, a competitive co-curricular first year student program based on the Leadership Identity Development Model and Social Change Model of Leadership Development. In our project, originally presented in December at the Leadership Educators Institute at the University of South Florida, we share a detailed program description as well as quantitative and qualitative learning outcomes assessment data for the 2010 Emerging Leaders program, which Anna Czarnik-Neimeyer co-coordinated, supervised by Nancy Mathias. Through our session we also discuss effective and creative implementation of leadership theory into multi-level experiential programs at the college level.
Alison Schaefer, Junior Chemistry Major

David Poister, Associate Professor of Chemistry and Environmental Science

**Stimulation of *Aulacoseira granulata* Growth by Green Algae**

Weekly sampling of the Fox River in De Pere in 2010 revealed a July bloom of *Aulacoseira granulata*, a centric diatom common in eutrophic systems. The *A. granulata* bloom coincided with an increase in the abundance of the green algae *Gloeocystis planctonica*. Culture experiments were conducted to test the hypothesis that *A. granulata* growth was accelerated by a chemical signal from *G. planctonica*. Dormant *A. granulata* exposed to *G. planctonica*-treated medium grew faster relative to controls. These results indicate that a chemical cue from *G. planctonica* can trigger the transition of *A. granulata* out of dormancy and into rapid growth.
3:00-3:30                  Todd Wehr Lobby                           Poster

Kayla Pope, Junior Mathematics Major
John Frohliger, Associate Professor of Mathematics

A Variation of the Counterfeit Coin Problem

The counterfeit coin problem is a classic puzzle involving a number of coins and a balance scale used to determine a single counterfeit among them. We will discuss a variation of the problem in which the number of counterfeits is unknown. We explain how this problem could be interpreted using vectors and dot products. Finally, we will show that the number of weighings needed to solve the problem is sometimes greater than what might be expected at first.

3:30-4:00                      Todd Wehr 149                   Oral Presentation

Rakel Zarb, Freshman Biology and Spanish Major
Jason Senjem, Assistant Professor of Business Administration

Values-Centered Entrepreneurs and Their Companies

In doing background research in the emerging field of social entrepreneurship, we chose to read and review the book, Values-Centered Entrepreneurs and Their Companies, by David Choi and Edmund Gray. The authors explore ten major commonalities among the 46 entrepreneurs in their research sample. They present these commonalities as lessons for aspiring social entrepreneurs and supplement them with ample representatives of values-driven companies. Their analysis of the cases may lead to a universal definition for the area of social entrepreneurship.
Applications of Polymerase Chain Reaction (PCR): Detection of Parasite Larval Stages and Molecular Prospecting for New Species

We demonstrate two applications of PCR: First, molecular probes specific for the trout cecal nematode *Truttaedacnitis truttae*, were used to identify, for the first time, larval stages from intermediate hosts. Secondly, amplification of the rRNA genome helped resolve the status of a recently discovered species of tapeworm in the johnny darter. Morphological studies revealed differences with typical *Bothriocephalus cuspidatus* from walleye and pumpkinseed but sequence analyses showed differences only with *B. cuspidatus* from pumpkinseed. These results support the idea of host induced variation but question the conventional use of rRNA genes in arguing for species delineation or synonymy.

**Leivur Djurhuus**, Junior Art Major  
**Brian Pirman**, Associate Professor of Art

**Art History Gallery Installation Collaboration**

The project involves design and production of a site specific Installation for the Godschalx Gallery that will address Art History and Graphic Design. The exhibit will contain 10 3' by 3' panels that will be hung together to form one large 6' tall by 15' wide graphic that will be a rich visual account of different Art History movements. Each panel will address a specific movement. The 10 different movements (panels) include Dada, Abstract Expressionism, the Renaissance, Photography, Impressionism, Propaganda Art, Russian Graphic Design, Expressionism, Pointillism and Pop Art. The "Exquisite Corpse" will be the collaborative model used.
Biodiversity of the Sciuravids from the Eocene of the Wind River Basin, Wyoming

The Wind River Formation of central Wyoming preserves one of the best records of faunal and floral change during the Early Eocene Climatic Optimum (EECO) (53 to 48 million years ago) in North America. The EECO represents a period during the Cenozoic when the highest global temperatures were recorded. Many fossil species doubled in diversity and then significantly decreased when climatic cooling began (50 million years ago). This research documents the biodiversity of the Sciuravids, a group of fossil rodents that were abundant during the Early Eocene. Preliminary results indicate at least five different species of Sciuravids originated at the time of the EECO.

celestialrailroad.org

We are working together to build a digital edition and archive of Nathaniel Hawthorne’s short story, “The Celestial Railroad.” This story was widely reprinted, referenced, and pirated in the 19th century press. Our edition will present images of these editions alongside their text. Many of these editions tinkered with (or outright changed) Hawthorne’s text to better suit the readers of a particular newspaper or magazine. Our edition will allow scholars and students to compare different versions of the text, see these changes, and understand the story’s place in the larger context of antebellum print culture.
**Comparison of Flavobacterial Fish Pathogens in Zebra Fish**

The organism *Flavobacterium columnare* causes columnaris disease in fish, while *Flavobacterium johnsoniae* is normally not pathogenic. In an effort to determine what features of *F. columnare* are necessary for virulence, we used a zebra fish infection model of bacterial infection. Suspected virulence factors include motility, adherence, the secretion of toxins, and the production of digestive enzymes. Zebra fish were incubated with dilutions of wild-type *F. columnare* (Fc2), a mutant deficient in motility (Fc14), or a mutant deficient in the production of the enzyme chondroitin lyase A (Fc-CH-). The concentration of bacteria needed to kill 50% of the fish was compared among these strains. Preliminary analysis indicates slightly lower virulence of the Fc-CH- strain compared to wild type. In addition, two reportedly pathogenic strains of *F. johnsoniae* were tested in the same assay. In contrast to previous *F. johnsoniae* studies, both proved pathogenic, with one (YO-12) being more virulent than the other (YO-64).
1:30-2:00                  Todd Wehr Lobby                       Poster

Beth Baumann, Senior Elementary Education Major
Tynisha Meidl, Assistant Professor of Education

Developing Dispositions in Teacher Candidates Through Community Service

Research has indicated that pre-service teachers learn by doing, justifying the need for field experiences in teacher education programs (Erikson and Anderson, 2005). In addition, research posits that pre-service teachers retain little of what they learn from textbooks and lectures in education courses (Kennedy, 1991). As teacher educators seek to provide authentic classroom learning experiences for teacher candidates, they need to develop the necessary attitudes and behaviors to be effective classroom teachers. The presenters argue that community service is a way for students to develop desired dispositions because of the benefits of engaging in service connected with educational settings.
Haoqi Chen, Junior Mathematics and Physics Major
Teena Carroll, Assistant Professor of Mathematics

**Egyptian Fractions and Pythagorean Spirals**

Our research began by building sequences whose terms have the same sum and product. The first sequence we studied was related to the Sylvester sequence, whose reciprocals sum to one. This led us to the ancient idea of Egyptian fractions. We developed a tool to enumerate and study Egyptian fraction representations. Computationally, they are difficult to deal with--there are too many of them to examine meaningfully, and the largest denominators grow quickly. Using the largest denominators present in even representations, we found a connection to the Pythagorean spiral sequence, which encodes an infinite number of Pythagorean triples.
Fish Research Database Management System: 
Transitioning from Legacy System to a Modern Application

The goal of this project was to convert a thirty-five year old legacy flat-file database system used to store fish information based on forty years of research in the biology department at SNC into an optimized modern relational database system, along with providing necessary tools to access and update the data. A new database was designed with updated system requirements keeping the existing features and functionality intact. Also, a user-friendly Windows form interface using a C# application was created which allows users to enter data into the database easily and also to generate critical reports vital to the research based on the information stored in the database.
Gender Differences in Behavior Across Delay of Gratification Tasks

An important developmental milestone in childhood is learning how to delay gratification. Recent research suggests that girls and boys may respond differently to the demands of waiting for a reward. We hypothesize that boys will use avoidance as a strategy to delay more often during the tasks than girls will. Boys will also be more likely to touch the desired object and less likely to persevere on the task. Children (N=82; aged 4 and 5) participated in two tasks: the snack delay and the gift delay. These findings may have important implications for caregivers and educators.
Graphic Design and Rock and Roll

This is a class project that took place in Advertising Design. The professor presented it at the beginning of the semester and told the students that out of the four projects offered in the class this is the one where we (the professor and the respective student) will work collaboratively together. The professor indicated that it was going to be part of Celebrating Student and Faculty/Staff Collaborations in the Spring of 2011. The specific project is located at: http://home.snc.edu/brian.pirman/websyllabi/ad/adfour/adfour/adfour.html. It involves designing a new logo for a made-up rock band or musician (or use an existing one if the student desired to improve it). Then take the logo and apply it to a t-shirt and poster. How is this collaborative? As the students were working on their projects the professor made a concerted effort to be involved in terms of where the students may go directionally, and during the process we worked together to achieve their goals. The final result is 10 posters and 10 t-shirts.
Emily Klug, Senior Biology Major
Yekaterina Makeyeva, Freshman Biology Major
David Bailey, Assistant Professor of Biology

Localization of Vesicular Glutamate Transporter and Truncated Tyrosine Kinase B Proteins in Zebra Finch Neurons

In zebra finches (ZFs), a type of memory depends on the hormone estrogen, which increases neuron size, connectivity, and modulates neurotransmitter release. Hypothetically, estrogen acts by increasing growth factor production, which augments portions of (and facilitates communication between) “sending” and “receiving” neurons via tyrosine kinase B (trkB) receptors; whether a type of this receptor is present in ZFs is unknown. Additionally, estrogen increases glutamate neurotransmission, but it is unknown whether ZF neurons possess vesicular glutamate transporter (VGLUT) proteins, which prepare glutamate for release. Our project examines whether ZF neurons possess truncated trkB and VGLUT proteins, and whether these are co-localized.
201:30-2:00                  Todd Wehr Lobby                           Poster
2:00-2:30                  Todd Wehr Lobby                           Poster

Andrea Burklund, Senior Accounting Major
Stephanie Weiss, Senior Business Administration Major with
Finance Concentration
Amy Vandenberg, Assistant Professor of Business Administration

Mark-to-Market to What Market?

The United States’ economy has been struggling as it attempts to avoid plummeting into a crisis mode. The Financial Accounting Standards Board just recently released an exposure draft; one of the main concerns with this draft is the requirement to use fair value accounting for all financial assets and liabilities. The issue with the proposed disclosure requirements is one of valuation. The majority of the assets that will be affected are ones for which an active secondary market does not exist. We propose to examine the issues surrounding the implementation of this proposed valuation policy.

1:00-1:30                  Todd Wehr Lobby                           Poster
1:30-2:00                  Todd Wehr Lobby                           Poster

Blake Bashor, Senior Biology Major
Rachel Erickson, Senior Biology Major
David Hunnicutt, Assistant Professor of Biology
David Bailey, Assistant Professor of Biology

Microbial Colonization of the Zebra Finch Gut

Zebra finches are a common model system in neurobiological and endocrinological studies. The sexes display dramatic dimorphisms in brain structure and hormone levels. Many of the bird’s hormones may also be used as signaling molecules by bacteria. This raises the possibility that communication and interaction may occur between intestinal bacteria and the host. Understanding that the gut of the zebra finch is colonized by a variety of microbial species, we have begun to characterize species found in fecal samples using molecular techniques. Analysis of 16S rRNA PCR amplified from bacteria isolated from the zebra finch gut revealed the presence of Enterobacter, Acinetobacter, and other genera. Following characterization of these bacteria we hope to assess bacterial responses to manipulation of hormone levels in these birds.
Modeling Chemical Structures Using Origami

The ancient Japanese art of origami has become an important tool for both mathematicians and chemists in exploring and modeling three-dimensional shapes. Modular and polygonal origami can be used to represent chemical structures and molecular bonds. In particular, models of buckybolls and other molecules containing carbon rings lend insight into their underlying chemical structures.

Nasal Carriage of \textit{Staphylococcus aureus} in a Population of Healthy College Students

\textit{Staphylococcus aureus} is a Gram-positive bacterium that is a potential pathogen, but is also commonly carried by healthy individuals with no symptoms. In this experiment, sterile swabs of the external nares of participating individuals were processed to isolate \textit{S. aureus} and the resulting isolates assayed for resistance to specific antibiotics. Prior studies have shown that most antibiotic resistant strains of \textit{S. aureus} are developed in hospital settings, but other risk factors exist, such as exposure to livestock and misuse of antibiotics. A questionnaire was completed by participants in order to establish potential risk factors of being a carrier of \textit{S. aureus}. Further analysis of \textit{S. aureus} strains found is ongoing to discover both levels of antibiotic resistance and risk factors associated with them.
Photographing Small Rodent Specimens of the Family Ischyromyidae

It is common practice to photograph fossil dentition when analyzing various characteristics and defining features of specimens. It can be difficult to visualize crown pattern features such as crenulations because of two-dimensional limitations of a photograph. To improve visualization, teeth are coated with a vaporized form of ammonium chloride. Solid ammonium chloride was placed in a glass tube with a rubber bulb at one end. This tube was slowly heated via Bunsen burner until the ammonium chloride vaporized and flowed out freely. This vaporized powder was then expelled onto the crown of the tooth. The quality of visualization was greatly improved due to this refined procedure.

Problematic Emotion Regulation and Frustration during Interactions with a Distressed Simulated Infant

A parent’s ability to demonstrate successful emotion regulation (ER) when his or her child is upset may affect the child’s ER development. It was expected that students who self-reported having a low distress tolerance and more difficulties with ER would exhibit more frustration during the task. Non-parents completed self-report measures and took part in a laboratory interaction with an inconsolable infant simulator. Participants with a high distress tolerance displayed less frustration. Those with problems controlling impulsive behavior when experiencing negative emotions and those with difficulty flexibly using ER strategies to manage emotion displayed more frustration. The implications for children’s social-emotional development will be discussed.
Resveratrol and Polyamines: Effect on Biosynthetic and Catabolic Enzymes, and Interactions with DFMO and DenSpm in Breast Cancer and Uveal Melanoma Cell Lines

Resveratrol inhibits the growth and initiation of cancer cells in vitro and tumorigenesis in mice. In one cell line, resveratrol affected the metabolism of polyamines, compounds essential for the proliferation of cells. Affecting the enzymes involved in polyamine metabolism has been the object of potential anti-cancer treatments. Difluormethylornithine (DFMO), an inhibitor of ODC, and diethylnorspermine (DenSpm) have been shown to reduce growth of cancer cells. Resveratrol has been shown to reduce ODC activity and induce SSAT activity in a colon cancer cell line. The current study extended those findings to melanoma and breast cancer cell lines. Interactions between resveratrol, DFMO and DenSpm were also investigated. Resveratrol was found to affect the expression of ODC and SSAT. Combinations of resveratrol and DFMO or DenSpm reduced cell proliferation to a greater degree than any of the compounds used alone.
Chase Brosseau, Senior Biology Major
James Hodgson, Professor of Biology and Environmental Sciences

Sampling Implications from a Comparative Analysis of Largemouth Bass Diets (Pelagic vs. Littoral)

Largemouth Bass (*Micropterus salmoides*) are apex predators in many north temperate lakes. In 2006, we intensively sampled diets from littoral (shallows) and pelagic (open water) foraging bass of Paul Lake, a small, unexploited lake in Michigan’s Upper Peninsula. We hypothesized (null hypothesis) that there would be significant difference in the diets in fish sampled from the two foraging zones. Although littoral foraging fish consumed more odonates than pelagic fish, and pelagic fish consumed more *Chaoborus* than littoral fish, we reject our null hypothesis that the diets differ relative to where they are collected.

Chelsea Pintz, Senior Biology Major
Students in Endocrinology Fall 2010 class
David Bailey, Assistant Professor of Biology

Short-term Effects of Corticosterone on Spatial Memory in Zebra Finches

Studies in our lab (and in Biology 385: Endocrinology) suggest that a one week treatment of zebra finches with a stress hormone, corticosterone, is toxic to the hippocampus, a brain region important in declarative memory. However, no demonstrable effect on memory was observed with this treatment length. We hypothesized that a shorter-term (two day) treatment would decrease memory function. Corticosterone-treated birds learned a task more quickly than controls, but their performance during memory trials did not differ. Thus, while long-term corticosterone treatment is toxic to neurons involved in this type of memory, sustained and short-term release appears to accelerate learning.
Lauren Lathers, Senior Psychology and Sociology Major  
Jack Williamsen, Data Analyst, OIE

**SNC Seniors: How Do They Compare?**

Using data from recent national surveys, we compared SNC seniors with a national sample of seniors as well as with seniors from private colleges. More specifically, we looked at variables such as student-faculty interaction, active and collaborative learning, diversity, and overall satisfaction to see how SNC fared.

Jessica Richards, Junior Biology and Environmental Science Major  
Matthew Stollak, Assistant Professor of Business Administration  
Amy Vandenberg, Assistant Professor of Business Administration

**Student Budgeting and Spending Behaviors: A Comparative Study**

Free from the comforts of home, many students are experiencing being on their own for the first time. One of the challenges they face is budgeting. This becomes particularly problematic when an expected budget item changes. This study examines how students at a small Midwestern liberal arts college meet the budgeting challenge. Do students plan and budget for discretionary items differently than required items? Through this sample, student behaviors and a discussion of the implications for practice are assessed.
The Effects of DCA and Resveratrol on the Metabolism of Glucose by Cancer Cell Lines

In normal cells, glucose is oxidized by the mitochondria and converted into ATP, CO₂ and H₂O. In cancer cells the pyruvate produced from glucose is instead rerouted into the production of lactate. Cancer cells are thus inefficient in their metabolism of glucose, meeting their energy demands by consuming larger amounts of glucose. Breast cancer and melanoma cell lines were treated with dichloroacetate (DCA). Treatment with DCA resulted in an increase in glucose uptake and a decrease in lactate production. This suggests that the metabolism was shifted back to glucose oxidation. Treatment with resveratrol appeared to be more effective than DCA in reducing the utilization of glucose by the cells.

The North Wind: A Journal of George MacDonald Studies Digital Archive

The North Wind: A Journal of George MacDonald Studies Digital Archive is now complete, housing all 29 volumes of the critical journal, thus making the full-text journal sources accessible to scholars around the world. In addition, we published an article discussing the digital archive and the evolution of MacDonald scholarship: “George MacDonald in the Virtual Library: The North Wind Digital Archive and the Evolution of MacDonald Scholarship.”
Nicole Swanson, Senior Chemistry Major
Devin VandeWalle, Senior Chemistry Major
Louis Ayensu-Mensah, Sophomore Chemistry Major
Kari Cunningham, Assistant Professor of Chemistry

The Variable Reactivity Pattern of 1,10-Phenanthroline Derivatives

Creating derivatives of 1,10-phenanthroline can be accomplished by either ring-closure reactions that incorporate the desired groups onto the backbone of the ring or by reactions that modify the existing heteroaromatic ring system. Our research focuses on the latter process for the modification of the phenanthroline ring via nucleophilic attack of the alpha-carbon using alkyl lithium reagents such as methyllithium, isopropyllithium and t-butyllithium. We have found that the position of alkyl groups on the phenanthroline starting material can either activate or deactivate the ring toward this type of reaction. A step-wise approach to creating these compounds affords nearly quantitative yields of these novel phenanthroline derivatives.