



*Program of Events*

*Discovery Day Symposium*

*April 18, 2012*

## *Welcome to Discovery Day 2012*

“At Benedictine College, academic excellence necessarily goes beyond the classroom.” That’s one of the first things you read in *Benedictine 2020: A Vision for Greatness*. This exciting new strategic plan seeks to make our vision statement a reality: “We are building one of America’s great Catholic colleges.”

*Benedictine 2020* understands that some of the best learning at Benedictine College happens not in the classroom, but when faculty and students seek the truth together outside the classroom. Discovery Day is a showcase for the education within a community of faith and scholarship that makes Benedictine College unique.

Thank you so much to all who contributed so much time and effort to make the critical difference for this program.

I invite the entire College community to join me in supporting Discovery Day.

President Stephen D. Minnis



Discovery Day 2012 marks the seventeenth year of the Discovery Day Symposium. Since 1996, more than 2000 students have presented or co-authored a Discovery Project, involving virtually all the faculty and representing all academic departments. Discovery Day 2012 will present 62 projects, the result of the work of 168 students, 39 faculty/staff, and 23 academic departments. The Discovery Committee invites you to join in recognizing our students for their creative efforts being showcased today.

Discovery Week is always the highlight of our academic year. For months (or, in some cases, years) students and faculty have worked together to find out something new about the world. Now they are ready to share their findings, and we all have a chance to learn something that no one ever knew before their project was undertaken. We are so proud, at Benedictine College, that we offer all of our students the opportunity not only to learn what others have discovered in the past, but also to add to what people will know in the future. Discovery Day gives us all the opportunity to see the fruits of this work.

The Discovery Program is an integral part of Benedictine College, and its benefits go far beyond the results of the projects you will see during this symposium. Original research fosters and strengthens the curiosity and love of learning that are the foundation of a liberal arts education. Collaborative work develops the bonds of community among students and faculty that make Benedictine such a special place.

Through our commitment to developing students' confidence in their ability to make an original contribution to our understanding of the world and how it works, we are preparing leaders who will know that they can draw on their knowledge and creativity to face the challenges that await the future. This year our community has adopted as a theme Blessed John Paul II's motto, "Be Not Afraid." The students who have engaged on this journey of discovery have embodied that spirit of courage, boldly pursuing the truth through their own research, guided by the experience of their faculty collaborators.

On behalf of the faculty and administration of Benedictine College, I encourage you to participate fully in the activities of this day. We are particularly proud this year that most of the Discovery Day activities will be held in the new Ferrell Academic Center. This newly opened building is a testament to the college's commitment to academic excellence, and is a particularly appropriate showcase for the accomplishments of the many students whose work is featured. Special thanks are in order for the Discovery Program Committee and the Discovery Directors: their efforts throughout the year have culminated in this unique and exciting academic experience.

Kimberly C. Shankman  
Dean of the College

## *The 2011–2012 Discovery Program Committee*

The Discovery Program Committee is committed to the advancement of Discovery learning at Benedictine College. The committee's responsibilities include encouraging and supporting faculty and students in their own Discovery activities, the awarding of Discovery grants, planning the Discovery Day Symposium, and designating the Discovery Scholars. Members of the committee for the current year are student member Lisa Willis, and faculty members Daniel Bowen (Biology), Theodore Hanman (Music), Larry Sutton (Chemistry and Biochemistry), Mark van de Logt (History) and Terrence Malloy and Julia Bowen (Discovery Program Co-Directors).

The Discovery Program committee awarded over \$11,000 in Discovery grants to students this year in support of thirty-two Discovery projects. The 2011–2012 Discovery grant recipients are the following:

Allison Ashburn	Joseph Heron	Matthew Pesely
Christine Baehr	Anna Hicks	Simon Pick
Casey Barnett	Anthony Hock	Joshua Piper
Michael Bechina	Brian Hoytal	Mary Pistek
Katherine Bittner	Dominic Ishmael	Daniel Porter
Justin Brandl	Jenica Jarchow	Stefan Ranieri
Virginia Brungardt	Katrina Keat	Olivia Ritter
Chase Brunick	Benjamin Kelly	Lauren Rogers
Paul Burghart	Aaron Kranz	Amy Ross
Jono Casino	Benjamin Lafser	Grace Ruedi
Hillary Chilcote-Crawford	Brooke Larson	Vincent Scavuzzo
Amelia Christ	Lauren Linton	Katelyn Schaefer
Patricia Clinesmith	Samuel Litz	Laura Lynn Schneller
Kelley Cofield	Erin Martin	Kathleen Shaneyfelt
Lindsay Collar	Erin McDonough	Maria Skorey
Rebecca Duckworth	Patrick McGuire	Elizabeth Stackpole
Christopher Ekiss	Samantha McIntosh	Zachary Stark
Karina Estee	Kevin Miller	Christine Steele
Karl Fischer	Leah Miller	Elizabeth Szalewski
Nicholas Gawarecki	Daisuke Mori	Ana Taylor
Grace Gawatz	Meghan Ortiz	Elizabeth Tharman
Peter Gifford	Kristen Oswald	Rachel Toner
Valerie Gonzales	Ryan Page	Matej Voboril
Katherine Gorman	Keegan Park	Paul Wagle
John Hanson	Shannon Parks	Timothy Warnke
Mary Harrity	Anna Pavlovich	
Ean Henninger	Amy Peredo	

## *Discovery Scholars*

Last year marked the ninth year that students were honored as Discovery Scholars. This award recognizes students who have demonstrated an outstanding commitment to Discovery learning while at Benedictine College. Awardees receive the Discovery Scholar Medal to be worn during Commencement ceremonies, signifying their exceptional contribution to the Discovery Program. In 2011, these seniors were honored as Discovery Scholars:

Joshua Beckman .....	Mound City, KS
Brandon Boesch .....	Hastings, NE
Erich Braun .....	Cincinnati, OH
Michael Brubaker .....	Burnsville, MN
Lindsay Bunker .....	Overland Park, KS
Megan Domnanish .....	Topeka, KS
Brittany Feldhake .....	Chippewa Falls, WI
Gregory Fiudo .....	Chesterfield, MO
LeighAnna Flagg .....	Kimberling City, MO
Victoria Gerkin .....	Omaha, NE
Jacob Guthier .....	Platte City, MO
Danielle Hanson .....	Box Elder, SD
Clifford Heyer .....	Sioux Falls, SD
Elizabeth Jones .....	Louisville, NE
Anna Marie King .....	Olathe, KS
Drew Maly .....	Wichita, KS
Clarissa Merz .....	Bakersfield, CA
Elizabeth (Bieker) Meyer .....	Falls City, NE
Tyler Meyer .....	Colwich, KS
Matthew Minnis .....	Atchison, KS
Francis Petruccelli .....	Rockville, MD
Elizabeth Poquette .....	Arnold, MD
Nicholas Porretta .....	Gavlin Hills, CA
Lisa Prowant .....	Shawnee, KS
Billie Jean Quade .....	Beulah, WY
Gina Sanders .....	Salina, KS
Jacob Schesser .....	Horton, KS
Ellen Schneider .....	Cincinnati, OH
Nathan Stone .....	Forest City, MO
Heather Stump .....	Mulvane, KS
Sarah Thomas .....	Howard, KS
Sean York .....	Centennial, CO

## *Keynote Address*

### **Stanislav Ioudenitch**

Van Cliburn Gold Medalist

Welcoming remarks by Dr. Kimberly Shankman  
Dean of the College

Introduction by Dr. Larry Sutton  
Associate Professor, Chemistry & Biochemistry

1:00–2:20 PM

O'Malley–McAllister Auditorium



Stanislav Ioudenitch is widely regarded for his strong individuality and musical conviction. His artistry won him the Gold Medal at the 11th Van Cliburn International Piano Competition, where he also took home the Steven De Groote Memorial Award for Best Performance of Chamber Music.

Born in 1971 in Tashkent, Uzbekistan, Ioudenitch has netted prizes at the Busoni, Kapell, Maria Callas, New Orleans competitions, among others. A former student of Dmitri Bashkirov, he also studied with Leon Fleisher, Murray Perahia, Karl Ulrich Schnabel, William Grant Naboré and Rosalyn Tureck at the International Piano Foundation in Como, Italy (the current International Piano Academy Lake Como). He subsequently became the youngest teacher ever invited to give master classes at the Academy.

He has performed at Carnegie Hall in New York City, the Kennedy Center in Washington, D.C., the Gasteig in Munich, the Conservatorio Verdi in Milan, the International Performing Arts Center in Moscow, the Forbidden City Concert Hall in Beijing, the Théâtre du Châtelet in Paris, Jordan Hall at the New England Conservatory, the Orange County Performing Arts Center in California and the Aspen Music Festival in Colorado.

He was the youngest teacher ever invited to give master classes at the International Piano Academy at Lake Como in Italy. Since then, he has led master classes at the Cliburn-TCU Piano Institute in Fort Worth, Stanford University, Cornell University, the National University in Seoul and Miami's International Institute for Young Musicians. Currently, he is teaching at the International Center for Music at Park University in the Kansas City area.

The presentation will feature the talents of not only Stanislav, but also his wife, Tatiana, another award-winning pianist, and their daughter, Maria, an accomplished violinist.

# Discovery Day Schedule

All presentations will take place in the Ferrell Academic Center unless otherwise indicated.

☕ Continental breakfast — Laughlin Rotunda ☕

## Morning Sessions

- 1. Vertical Representations in Fantasy Based on the Exquisite Corpse**  
*Abigail LeGrand, Alexander Vu, Naomi Popp, Mariana Hladik, Kimberley Hiatt, Morgan Gillihan, Peter Mellein, Stephen Workman, Art*  
8:00–8:30 • Laughlin Rotunda
- 2. An Argument for Human Freedom**  
*Joseph Rioux, Jamie Spiering, Philosophy*  
8:45–9:40 • Gangel Seminar Room
- 3. Characterizing Active Galactic Nuclei in the Hard X-Ray Spectrum**  
*Allison Ashburn, Scott Baird, Physics and Astronomy*  
8:45–9:05 • Room 308
- 4. Mentorship Program With Atchison High School**  
*Kathleen York, Christine Daly, Jane Bennett, Pete Helgesen, Education, Admission*  
8:45–9:05 • Room 219
- 5. Crime Prevention Through Environmental Design, Lighting, and Smartphone Technology: A Partial Replication and Extension of the Edmonton Project**  
*Katherine Gorman, Casey Barnett, Kevin Bryant, Sociology and Criminology*  
8:45–9:05 • Room 208
- 6. Parchment Illumination Through the Ages**  
*Patricia Clinesmith, Shannon Parks, John Romano, History*  
8:45–9:05 • Room 108
- 7. Axis Mundi: The Cosmic Archetype**  
*Joshua Bruegger, Deborah Peters, OSB, English*  
8:45–9:05 • Room 124
- 8. The Library: Cornerstone of Freedom and the Community**  
*Rebecca Howard, Fiona Holly, Steven Gromatzky, Library*  
9:20–9:40 • Room 308

- 9. A Bilingual Education Model: Developing American Sign Language and English for Children With Special Needs**  
*Valerie Gonzales, Christine Steele, Amy Peredo, Matthew Ramsey*, Education  
 9:20–9:40 • Room 219
- 10. An Empirical Attitudinal and Ideological Preference Analysis of Supporters of Republican Presidential Candidates During the 2012 Iowa Caucuses**  
*Chase Brunick, Peter Gifford, Dominic Ishmael, Samantha McIntosh, Mary Harrity, Ryan Page, Erin McDonough, Anthony Hock, John Settich*, Political Science  
 9:20–9:40 • Room 208
- 11. Medieval Bookbinding**  
*Shannon Parks, Patricia Clinesmith, John Romano*, History  
 9:20–9:40 • Room 108
- 12. Opium War “Games”: An Analysis of the Opium Wars Using Game Theory**  
*Julio Gonzales, Eric Parks, James Peterson*, Mathematics and Computer Science  
 9:20–9:40 • Room 124
- 13. *The Riddle 2012*: Taking an Original Musical From Amateur to Professional**  
*Robert Healey, William Wright, Theresa Higson, Gregory Frederick, Bridgette Mantia, Andrew Loew, Sarah Makkawy, Matthew Straub, Christopher O’Brien, Michael Megargle, John Thomas, Lisa Willis, Therese Mauro, Kathleen Doetsch, Corey Boyer, Theresa Kelly, Adam Buhman-Wiggs*, Psychology  
 9:55–10:15 • Gangel Seminar Room
- 14. Rapid Bioassessment of the Marias des Cygnes Watershed: A Multi-Year Approach**  
*Gabrielle Mullins, Amy Vogrin, Terrence Malloy*, Biology  
 9:55–10:15 • Room 308
- 15. The Effects of Sex in the Media on Teenagers**  
*Katelyn Schaefer, Karen Wood*, Sociology and Criminology  
 9:55–10:15 • Room 219
- 16. A Simple Solution**  
*Paul Rodriguez, Joyanna Deniger, David Sullivan, Paulina Barrera, Kristen Rosser, Jan Hansen*, School of Business  
 9:55–10:15 • Room 208



- 17. Gifted, Struggling, and Underserved: The Twice-Exceptional Student in the Classroom**  
*Lucia Gugliotta-Kremer, Matthew Ramsey*, Education  
 9:55–10:15 • Room 108
- 18. American and German Films From World War II**  
*Ann Heschmeyer, Everett Dague*, History  
 9:55–10:15 • Room 124



**10:20–11:10 – Poster/Exhibit Session**  
**McAllister Boardroom (4th floor)**

- 19. Just Keep Swimming**  
*Joseph Alongi, Mary Flynn*, HPER
- 20. An Exploration Into Multi-Touch Computing, Object Recognition, and Collaboration**  
*Jono Casino, John Hanson, Matej Voboril, Benjamin Kelly, Daisuke Mori, James Vanderhyde*, Mathematics and Computer Science
- 21. Ashley's Treatment: An Examination From a Moral, Ethical, and Disability Rights Perspective**  
*Paula Egging, Matthew Ramsey*, Education
- 22. Developing a Narrative Video**  
*Ann Heschmeyer, Patricia Clinesmith, Dennis Dunleavy*, Journalism and Mass Communications
- 23. Exploring Immune System Function in Pupae of Tobacco Hornworms in the Laboratory**  
*Anna Hicks, Constance Hallberg*, Biology
- 24. Exploration of the Effects of Environmental Degradation on the Tensile Strength of Fishing Line**  
*Brian Hoytal, Steve Spencer*, Engineering
- 25. The Influence of Gill Net Color on Catch Rates in Blackwater Habitat of the Amazon River**  
*Jenica Jarchow, Terrence Malloy, Daniel Bowen*, Biology
- 26. Gauss-Powered Accelerator**  
*Benjamin Lafser, Myron Fanton*, Engineering

27. **Community Growth Through Rational Planning: A Case Study of Atchison, Kansas**  
*Samuel Litz, Kevin Miller, Daniel Porter, John Settich, Political Science*
28. **Role of Microclimatological Factors in Pod Growth and Capsaicin Production in *Capsicum Annum* (Jalapeños)**  
*Patrick McGuire, Christopher Ekiss, Lauren Linton, Keegan Park, Lindsay Collar, Meghan Ortiz, Ana Taylor, Paul Steinbach, Martin Simon, Biology, Chemistry and Biochemistry*
29. **Utilizing the Diverse Flora and Fauna of the Amazon Basin**  
*Patrick McGuire, Daniel Bowen, Terrence Malloy, Biology*
30. **Bird Diversity Within the Tamshiyacu-Tahuayo Reserve**  
*Keegan Park, Daniel Bowen, Terrence Malloy, Biology*
31. **Synthesis and Spectral Properties of N-(Benzalamino)oxindoles**  
*Anna Pavlovich, Kristen Oswald, Joshua Piper, Paul Steinbach, Chemistry and Biochemistry*
32. **The Prevalence of MRSA in the College Setting**  
*Matthew Pesely, Paul Wagle, Karl Fischer, Larry Sutton, Chemistry and Biochemistry*
33. **Metal Concentrations in Bovine Eyes**  
*Lauren Rogers, Stefan Ranieri, Maria Skorey, Karina Estee, Aaron Kranz, Grace Gawatz, Paul Steinbach, Chemistry and Biochemistry*
34. **Communicable Diseases and Their Effect on Class Attendance**  
*Vincent Scavuzzo, Lynne Connelly, Nursing*
35. **The Effects of Flooding on Bird Populations in the Missouri River Valley**  
*Zachary Stark, Daniel Bowen, Biology*
36. **Dressing for Success Does Not Improve Performance**  
*Elizabeth Szalewski, Laura Lynn Schneller, Giovanni Misceo, Psychology*
37. **Raven Rock Batting Cages**  
*Christopher Tasler, Andrew Green, Benjamin Myers, Evan Peters, Joseph Locascio, Matthew Nordhus, Nathan Finken, Peter Hegarty, Ryan Bax, Stephen Noffke, Zachary Rohm, Steve Spencer, Patrick O'Malley, Engineering*

38. **Patterns of Biodiversity and Abundance of Terrestrial Macroinvertebrates on Two Mitigation Sites in Northeast Kansas**  
*Elizabeth Tharman, Lisa Prowant, Mary O'Brien, Amy Vogrin, Danielle Rush, Martin Simon, Biology*
39. **Insect Biodiversity Near the Tahuayo River in the Amazon Rainforest Basin**  
*Elizabeth Tharman, Terrence Malloy, Daniel Bowen, Biology*
40. **Population Dynamics and Biodiversity Patterns of Small Mammals on the Benedictine Bottoms Fish and Wildlife Mitigation Site**  
*Lisa Willis, Martin Simon, Biology*



41. **The Euro: An Analysis of the Foundations of the Greek Sovereign Debt Crisis**  
*Hillary Chilcote-Crawford, Richard Coronado, Economics*  
 11:15–11:35 • Gangel Seminar Room
42. **Salt Effect on Substrate Binding for  $\beta$ -Lactamase-Catalyzed Hydrolysis of Chromaceft**  
*Jonathan Severson, Larry Sutton, Chemistry and Biochemistry*  
 11:15–11:35 • Room 308
43. **Factors in Linguistic Stability and Variation: From Icelandic to the World**  
*Ean Henninger, Sarah Young, English*  
 11:15–11:35 • Room 219
44. **Supreme Court Case *PLIVA, Inc. v. Mensing*: The Plight of the American Consumer**  
*Samantha McIntosh, John Settich, Political Science*  
 11:15–11:35 • Room 108
45. **Why Two Atchison Sewers are Better Than One: A Policy Implementation Study**  
*Chase Brunick, Mary Harrity, Alexander Orel, Rachel Golden, Baris Ersoy, John Settich, Political Science*  
 11:15–11:45 • Room 124

•• 11:30 AM–12:50 PM – Lunch – Cafeteria ••

Jazz Band Entertainment

Keynote Address  
**Stanislav Ioudenitch**  
Van Cliburn Gold Medalist  
1:00–2:20 PM  
O’Malley-McAllister Auditorium

**Afternoon Sessions**

- 46. What Is Conceivable Is Possible? An Argument Against David Hume**  
*Anne Muenks, Anthony Crifasi*, Philosophy  
2:35–3:30 • Gangel Seminar Room
- 47. How BC Speaks: A Dialectology of Benedictine College Students**  
*Hillary Chilcote-Crawford, Amelia Christ, Sarah Sinnott*, Modern Foreign  
and Classical Languages  
2:35–2:55 • Room 308
- 48. Discovering the Power of Electricity: Rail Guns**  
*Justin Brandl, Eric Fox-Linton*, Physics and Astronomy  
2:35–2:55 • Room 219
- 49. Plated Mail, A Further Investigation of Chainmail**  
*Zachary Stark, George Nicholas*, English  
2:35–2:55 • Room 208
- 50. Para-Substituent Effect on the Rate-Determining Steps of  
VIM-2  $\beta$ -Lactamase-Catalyzed Hydrolysis of Styryl-Derivatized  
Cephalosporins**  
*Katherine Corbella, Tricia Walz, Larry Sutton*, Chemistry and  
Biochemistry  
2:35–2:55 • Room 108
- 51. A Naturalist Inquiry Into the Relationship Between Individuals With  
Disabilities and the Sacraments**  
*Rebecca Duckworth, Elizabeth Stackpole, Olivia Ritter, Leah Miller,  
Kathleen Shaneyfelt, Grace Ruedi, Rachel Toner, Matthew Ramsey*, Education  
3:10–3:30 • Room 308

- 52. T-Shirt/Potato Pneumatic Gun**  
*Andrew Green, Jeffery Leger, Steve Spencer*, Engineering  
 3:10–4:05 • Outside Westerman Hall, bottom floor
- 53. Stress Levels of College Students at Benedictine College as Indicated by Cortisol Levels**  
*Gabrielle Mullins, Stacie Cook, Lynne Connelly, Constance Hallberg, Adam Buhman-Wiggs*, Nursing, Biology, Psychology  
 3:10–3:30 • Room 208
- 54. Atchison: Ad Astra Per Aspera**  
*Rachel Malinauskas, John Bowen, Presidential Scholars (Allison Ashburn, Lauren Bickford, Jenna Bruegger, Gabrielle Callanan, Erin Daugherty, Rebecca Maples, David Maxwell, Ian O'Hagan, Emily Thayer, Lillian Vey, Lisa Willis), Susan Traffas*  
 3:10–3:30 • Room 124
- 55. Amphibian Occurrence and Activity on Army Corps Mitigated Properties in Northeastern Kansas**  
*Michael Godin, Daniel Drimmel, Alexander Prentice, Martin Simon*, Biology  
 3:45–4:05 • Gangel Seminar Room
- 56. The Gifted Complex: A Naturalistic Inquiry Into the Social/Emotional Pressures of the Gifted Student**  
*Brooke Larson, Mary Pistek, Kelley Cofield, Amy Ross, Matthew Ramsey*, Education  
 3:45–4:05 • Room 308
- 57. EcoWater: A Benedictine Hydration Project**  
*Rebecca Howard, Matthew Falke, Ryley Donaldson, Anna Kern, John Bohovic, Brigita Rodacy, Dakota Miller, Angela Humburg*, HPER  
 3:45–4:05 • Room 208
- 58. Pigeon Pedal**  
*Christopher Tasler, Graham Carson, Nathan Finken, Darren Wellbrock, Steve Spencer*, Engineering  
 3:45–4:05 • Room 108
- 59. Making a 2D RPG Game Designer**  
*James Harris, Francine Wolfe, James Vanderhyde*, Mathematics and Computer Science  
 3:45–4:05 • Room 124

**60. Three Songs for Soprano**

*Christine Baehr, Christopher Greco, Music*

4:15–5:00 • O'Malley-McAllister Auditorium

**61. “Angelica” and “Onward”**

*Christopher O'Brien, Christopher Greco, Music*

4:15–5:00 • O'Malley-McAllister Auditorium

**62. Requiem for the Holy Innocents**

*Katherine Bittner, Christine Baehr, Paul Burghart, Timothy Warnke, Katrina Keat, Virginia Brungardt, Simon Pick, Nicholas Gawarecki, Michael Bechina, Erin Martin, Joseph Heron, Christopher Greco, Music*

4:15–5:00 • O'Malley-McAllister Auditorium



*Presentation Abstracts*

**1. Vertical Representations in Fantasy Based on the Exquisite Corpse**

*Abigail LeGrand, Alexander Vu, Naomi Popp, Mariana Hladik, Kimberley Hiatt, Morgan Gillihan, Peter Mellein, Stephen Workman, Art*

**8:00–8:30 • Laughlin Rotunda**

After exploring many iterations of poster design, we fell into the exquisite corpse technique using long, vertical strips of paper and other materials. This exquisite corpse requires the first artist to complete a third of the drawing, cover it up leaving only a small portion exposed, followed by the second and third artists adding to the drawing without the benefit of seeing the portions already drawn. Some of the posters were treated with encaustic (a wax/resin mixture) to make them more translucent and add to the surrealistic feel. There will be a drawing to give away some of the posters.

**2. An Argument for Human Freedom**

*Joseph Rioux, Jamie Spiering, Philosophy*

**8:45–9:40 • Gangel Seminar Room**

The idea of free will, while essential for understanding man's unique place in the world, is not universally accepted. Some, namely, determinists, say that we cannot be free because they believe that all events, including human choices, are necessitated by prior forces. Others attempt to save human freedom by denying determinism and claiming there is fundamental randomness within nature. This randomness allows these “indifference theorists” to deny that choices are necessary and claim instead they are ultimately random and so free. This account, however, also falls short of a true account of freedom. In my philosophy thesis entitled *Masters of Our Actions: the Rational Autonomy of the Human Person*, I

attempted to explain what freedom must be and how humans can possess it. In order to do this, I have taken as a foundation the idea proposed by Aristotle that human beings are “masters” of their actions, and have researched the account of freedom, based on Aristotle’s ideas, proposed by St. Thomas Aquinas in works including the *Summa Theologiae* and *De Veritate*. This account safeguards freedom against determinism and “indifference theory” by showing how a master of actions must possess autonomy and rationality, and how these qualities are found in the human person through a unique interaction between the intellect and will. In this thesis, I defend Aquinas’s account of freedom as a true explanation of how humans cause their actions and refute attempts to reduce Aquinas’s account to determinism and “indifference theory.”

### **3. Characterizing Active Galactic Nuclei in the Hard X-Ray Spectrum**

*Allison Ashburn, Scott Baird, Physics and Astronomy*

**8:45–9:05 • Room 308**

Active galactic nuclei (AGN) are supermassive black holes accreting matter at the centers of galaxies. A new way to select AGN is through their very hard X-ray emission. AGN are broken up into three main subgroups—Seyfert 1, Seyfert 2, and Blazars—depending upon the viewing angle of the accretion disk. We present the X-ray spectral analysis of newly detected sources from the Swift Gamma-ray burst satellite using the Swift XRT and BAT spectra of 66 previously uncategorized sources in the BAT 58-month catalog. An X-ray color-color diagram is shown, using the 0.5-2 keV, 2-10 keV, and 14-195 keV bands, to compare these sources with the brightest BAT sources from the Swift 9-month catalog. The newly detected AGN are not heavily obscured, with average column densities of  $2.5 \times 10^{21} \text{ cm}^{-2}$ . Their average luminosities are  $3.5 \times 10^{45} \text{ ergs s}^{-1}$ , which is above that of the previously detected AGN, and they are also more distant. These results are significant because as AGN are observed at higher redshifts, the evolution of AGN and of galaxies can be further studied.

### **4. Mentorship Program With Atchison High School**

*Kathleen York, Christine Daly, Jane Bennett, Pete Helgesen, Education, Admission*

**8:45–9:05 • Room 219**

The objective of this Discovery Day project is to help inform first-generation college students at Atchison High School about opportunities available to them after high school and the importance of a college education in society today. This was done through short seminars at the high school as well as through a mentoring program where Atchison High School sophomores were paired with Benedictine College students. The high school students met with their mentors at least once a semester when they came on campus to see what the college life is really like. They attended a women’s and a men’s basketball game and came for a Raven Day second semester. The main point of this program is to show the high school students that college is a real possibility after high school graduation. We intended to help them discover that it is possible to attend college, despite

family circumstances. We are trying to help the Atchison High School students see what life after high school could look like for them in a college environment. As the leaders of this program, we learned that the students who participated in our mentorship program truly were interested in furthering their education and have very real concerns (mostly financial) that are shared by many about actually taking the steps to get there. We were impressed by the amount of curiosity and interest these students showed in attending college. We also learned that there are many difficulties to overcome when planning this sort of a program. We ran into many roadblocks but were able to learn how to overcome these through developing relationships with Atchison High School, the admission office, and students at BC.

## **5. Crime Prevention Through Environmental Design, Lighting, and Smartphone Technology: A Partial Replication and Extension of the Edmonton Project**

*Katherine Gorman, Casey Barnett, Kevin Bryant, Sociology and Criminology*

**8:45–9:05 • Room 208**

This project examines the relationship between crime and the quality of lighting in apartment parking lots in the city of Shawnee, Kansas. By measuring the artificial lighting of those parking lots (using iPhone applications) and crime in those complexes, we partially replicate the Edmonton Project, which revealed that poor lighting can attract potential offenders. Our findings indicate that apartment complexes in Shawnee with lighting below Edmonton Project standards displayed higher levels of crime than those complexes that met or exceeded Edmonton Project standards.

## **6. Parchment Illumination Through the Ages**

*Patricia Clinesmith, Shannon Parks, John Romano, History*

**8:45–9:05 • Room 108**

Medieval scribes often decorated their hand-written texts (manuscripts) with painted designs and gold leaf. The art of illumination gets its name from the light that gold brings to the page; however, the name has expanded to include decorations in general, encompassing art from intricate capital letters to full-page drawings. This technique remained popular in Western Europe for nearly 1,000 years, beginning in the 6th century and lasting until just before the beginning of the 16th century. However, while all decorated texts can be called illuminated manuscripts, the techniques and purposes of the designs varied greatly in different periods and countries. We investigated the extent of the changes between the early, high, and late Middle Ages, and the reasons why different techniques rose to popularity. We used our findings to create our own manuscript with a page for each of these major phases in the history of the art. For these pages, we used the texts, designs, materials, and methods the scribes would have actually used in the period. We cut quill pens, mixed ink using a medieval recipe, and transcribed texts on parchment, a page prepared from animal skin. Following the medieval



practice, we followed a three-step system for illumination, first transcribing the text, then drawing the designs, and finally applying the gold leaf. We will display our final work as we present the history of illumination, and the challenges the scribes may have faced as they devoted their lives to the worship of God and the preservation of knowledge.

## **7. *Axis Mundi: The Cosmic Archetype***

*Joshua Bruegger, Deborah Peters, OSB, English*

**8:45–9:05 • Room 124**

Throughout mythology and religion, there have been numerous common symbols and themes that—despite taking on countless shapes and forms—represent different elements within the collective unconscious. In this presentation, I will be telling of *Axis Mundi*, or the World Axis, a powerful archetype that represents the link between Heaven, Hell, and all else in between. This lecture reveals how this universal concept, found even today within the cultures of the East and West, still acts as a sign of humanity’s connection with the Divine.

## **8. *The Library: Cornerstone of Freedom and the Community***

*Rebecca Howard, Fiona Holly, Steven Gromatzky, Library*

**9:20–9:40 • Room 308**

This project seeks to explore the intersection of freedom and the nature of a library’s unique position in the larger community. Looking at a cross-section of libraries and their communities across America, we examined the basic foundation upon which they rest, as well as the concept of what it means to be free. Our research has encompassed our experiences working in the library field and visiting a number of libraries around the country. Our project draws on these first-hand experiences of both public and academic libraries, in addition to specialized libraries, immersing ourselves in library journals and further research to understand more properly the web of ideas that make up a library’s unique contribution to a free society.

## **9. *A Bilingual Education Model: Developing American Sign Language and English for Children With Special Needs***

*Valerie Gonzales, Christine Steele, Amy Peredo, Matthew Ramsey, Education*

**9:20–9:40 • Room 219**

Our original intention was to prove how sign language can be used as a bridge to speech for children with developmental disabilities. The research we initially found supported the method known as Simultaneous Communication (SimCom), which is signing and talking at the same time. However, in our naturalistic research, we found this was not the best method to develop authentic language in children. English and American Sign Language are two different languages. SimCom is not recommended because the child needs an authentic language base on which to build a second language. Simultaneous Communication is not a full language model of either language. It is a method not backed by long-term

research and is discouraged in bilingual classroom settings. We found that a bilingual “sandwiching” method seeks to preserve both languages and allows students to see them used in natural, meaningful settings within a bilingual classroom. There is a critical need for instructional environments that emphasize ASL use in contexts that allow students to see symbols being used repeatedly, interactively, and generatively during meaningful ongoing activities. This project analyzed the methodologies used by an exceptional ASL Academy to teach children with disabilities to communicate. We interviewed teachers, administrators, parents, and social workers considering this unique environment. We will show our findings from our research as well as offer practical suggestions that institutions can implement from this school in order to support authentic language development in children.

## **10. An Empirical Attitudinal and Ideological Preference Analysis of Supporters of Republican Presidential Candidates During the 2012 Iowa Caucuses**

*Chase Brunick, Peter Gifford, Dominic Ishmael, Samantha McIntosh, Mary Harrity, Ryan Page, Erin McDonough, Anthony Hock, John Settich, Political Science*

**9:20–9:40 • Room 208**

A group of Benedictine students went to Des Moines, Iowa, January 2–4 to participate in and collect data from the 2012 Iowa Republican Caucus. The objective of the project was to obtain an understanding of the driving factors of voting behavior of Iowa voters through exit polling at various sites around the Des Moines metropolitan area. The survey the voters were asked to fill out helped identify demographics, pertinent issues, and the attitudes the voters had towards the various candidates. The data we collected helped us verify questions we had going into the Caucus. One question we specifically included was whether Iowans voted based on their individual core beliefs or if they voted on who they believed would win the nomination. This question has been persistently asked throughout the 2012 Republican Primary, and our data provides some insight into explaining what has transpired during and since the Iowa Caucus, which was the first contest of the 2012 primary.

## **11. Medieval Bookbinding**

*Shannon Parks, Patricia Clinesmith, John Romano, History*

**9:20–9:40 • Room 108**

The art of bookbinding is the joining together of multiple pieces of paper or parchment within a protective covering. Bookbinding began long before the Middle Ages. It originated in India around 100 B.C.E. and spread westward. Plant-based materials were used for the pages, which were placed between two boards and bound together with twine. Around 200 B.C.E. parchment was developed and would become the material used for book pages during the Middle Ages. The malleable animal skin was favored over papyrus because it was more easily accessible and more durable. When the codex was developed, the books could contain

more pages. It was developed in the late 400s C.E. and was a compilation of the folding of multiple sheets of parchment into a quire and binding the quires together. These quires were a compilation of usually pages put in order and bound together. This format quickly replaced the scroll. The codex enabled the Bible to be put in one volume for the first time. The bindings, not to mention the pages, became more elaborate over time. In this project, we bound parchment together into a thin book using old techniques to sew the book together and cover it with wooden boards bound in leather.

## **12. Opium War “Games”: An Analysis of the Opium Wars Using Game Theory**

*Julio Gonzales, Eric Parks, James Peterson, Mathematics and Computer Science*

**9:20–9:40 • Room 124**

Have you ever been in a competition? Chances are you could have used Game Theory to model the event as a “game” with you and your opponents as players. Using Game Theory you can make optimal decisions among various outcomes in certain scenarios. Game Theory was created early in the twentieth century by John Von Neumann and Oskar Morgenstern as a way to look at economics. Since then it has been studied by many other mathematicians, including John Nash, and has been applied to many other fields including political science. We will be giving a brief introduction to basic Game Theory that will include explanations of and examples of zero-sum games, unrepeated nonzero-sum games, Nash equilibria, pure maximin strategies, Pareto optimal strategies, and mixed Nash equilibrium strategies. We will use Game Theory to model the events leading up to the First Chinese Opium War and to come to a conclusion about the players’ preferences in each “game.” The conflict of the Opium Wars arose when the Chinese tried to force the British opium trade out of China. The British were forced to respond militarily in order to maintain their profitable trading arrangements in China.

## **13. *The Riddle 2012*: Taking an Original Musical From Amateur to Professional**

*Robert Healey, William Wright, Theresa Higson, Gregory Frederick, Bridgette Mantia, Andrew Loew, Sarah Makkawy, Matthew Straub, Christopher O’Brien, Michael Megargle, John Thomas, Lisa Willis, Therese Mauro, Kathleen Doetsch, Corey Boyer, Theresa Kelly, Adam Buhman-Wiggs, Psychology*

**9:55–10:15 • Gangel Seminar Room**

This project examines the ongoing creative process of the original musical *The Riddle* by student Robert Healey. As a sequel project to last year’s Discovery Project titled “*The Riddle*: The Creation of an Original Musical,” this project focuses on the revision work of this last year, as the musical was finalized for production on the professional stage. In response to feedback from the 2011 audiences, difficulties met within the first rehearsal/performance process, a radically different performance space, and a new level of technology, this project

involved the addition of new arias and song pieces, editing of the musical score, revisions of lines and lyrics, rearranging of blocking, etc., culminating in a student-led production with six performances in late February 2012. *The Riddle 2012* is a detailed analysis of human motives, reactions, and emotions that took place both while revising the script and score and while working with a new cast. The goal was to shape the amateur show into a professional production capable of bringing the audience to a deeper consciousness of human emotion in the context of objective moral truth.

#### **14. Rapid Bioassessment of the Marias des Cygnes Watershed: A Multi-Year Approach**

*Gabrielle Mullins, Amy Vogrin, Terrence Malloy, Biology*

**9:55–10:15 • Room 308**

Maintaining aquatic resources involves many phases, the first of which is assessment. Rapid bioassessment uses multiple techniques to assess quickly the health of aquatic and periaquatic ecosystems. This research applied the principles of rapid bioassessment to multiple sites in the Marias des Cygnes watershed over a three-year span in order to identify baseline ecosystem parameters and to monitor for intervention-related eco-health changes. By employing a variety of methods, we were able not only to monitor the Marias des Cygnes watershed, but also to identify potential indicators of ecosystem status. We ultimately found that certain water quality parameters are more intensely correlated with overall habitat score as well as invertebrate and fish richness. Our findings have implications in aquatic resource management in areas of agriculture, urban development, and general wildlife management.

#### **15. The Effects of Sex in the Media on Teenagers**

*Katelyn Schaefer, Karen Wood, Sociology and Criminology*

**9:55–10:15 • Room 219**

Every day when people turn on the television, there is a reference to sex. Children and teenagers in today's society live in a world where nothing is kept secret. Parents tend to have very different outlooks on their children being exposed to provocative media. This study will measure the effects of promiscuity in the media on teenagers. The research will do this by studying students at a public high school in St. Louis, Missouri. The independent variable is the students' self-reported exposure to sex in the media; the dependent variable is their personal values and attitudes about sex. There are also three control variables: parental influence, age, and gender. This research will provide knowledge of the effects of sexual media on teenagers and promote further study of this topic.

## 16. A Simple Solution

*Paul Rodriguez, Joyanna Deniger, David Sullivan, Paulina Barrera, Kristen Rosser, Jan Hansen, School of Business*

9:55–10:15 • Room 208

This legacy Discovery project explores how necessities of life are being taken—taken for granted by some, and taken away from others. In particular, it examines communities in Honduras that we reached out to this past spring, communities that lack clean water. The truth is that over 3.5 million people die every year due to water-related diseases. Some obtain bottled water at the expense of other necessities. Our team bought and implemented filtration systems to select communities, providing millions of gallons of clean water. The filtration systems not only save lives, but improve and enrich lives beyond simple survival. Families are now able to focus more on each other, their children and their education, and their small businesses. Society benefits by increased commerce within the community. In summary, our research and evidence display how basic necessities of life are being taken for granted in first world countries, and we propose a “Simple Solution” in order to change this tendency so that all people across the world become aware of these vital facts.

## 17. Gifted, Struggling, and Underserved: The Twice-Exceptional Student in the Classroom

*Lucia Gugliotta-Kremer, Matthew Ramsey, Education*

9:55–10:15 • Room 108

Twice-exceptional students, or gifted students with disabilities that affect their academic performance, are often misidentified and underserved in our classrooms. In this project, I looked at the factors contributing to this situation, researched the academic and social/emotional impact of this state of affairs on these students, and examined programs which were successful in identifying them and meeting their needs. Through reading literature in the field of education and interviews, I found these students have enormous potential, but they also have a unique set of needs that must be met in order for that potential to be fulfilled. When their individual needs are not met, they do not succeed. Ultimately, I looked for ways in which teachers and school districts can better identify and serve this population.

## 18. American and German Films From World War II

*Ann Heschmeyer, Everett Dague, History*

9:55–10:15 • Room 124

Frank Smith in Bremen, Ohio, and Franz Schmidt in Bremen, Germany, go to the movies in 1944. What will they see? What have they seen? This project compares and contrasts certain American and German films from shortly before and during World War II. From examining these films, we can understand how films can reflect and influence people’s perceptions of themselves and their values. Also, a clearer picture forms of how these films were used. Within the context of World War II, it is appropriate to consider the role of propaganda in the films, where it

existed and how it functioned. The highlighted comparison and contrast will be *Gone With the Wind* and *Kolberg*. Josef Goebbels considered *Kolberg* the Nazi answer to *Gone With the Wind*. Along with these films, I watched *Prelude to War* (1942), *Der Marsch Zum Fuhrer* (1940), *Die Holle Von Verdun* (1931), and *Bismark* (1940).



**10:20–11:10 – Poster/Exhibit Session**  
**McAllister Boardroom (4th floor)**

**19. Just Keep Swimming**

*Joseph Alongi, Mary Flynn, HPER*

This Discovery Day project investigated the Benedictine College community's use of the campus swimming pool. The purpose of this study is to create awareness that the swimming pool is a valuable alternative option for students, staff, and families to engage in physical activity. This Discovery project will show daily, weekly, and semester pool usage statistics during open swim since fall 2010. All swimmers using the pool since that time will be included in the study. Participants were required to sign in before using the pool. Logs date back to October 14, 2010, providing data to examine the total number of swimmers per semester, total swimmers per day of week, and average swimmers per day. Data sheets were created based on these logs to keep participants anonymous. Additionally, we included the number of swimming classes each semester and the number of BC sports teams and clubs, etc. that have used the pool for training.

**20. An Exploration Into Multi-Touch Computing, Object Recognition, and Collaboration**

*Jono Casino, John Hanson, Matej Voboril, Benjamin Kelly, Daisuke Mori, James Vanderhyde, Mathematics and Computer Science*

This project explores the advantages of multi-touch computing and its ability to enhance productivity in the areas of education, business, engineering, healthcare, and many other fields. For the past several years, computing has been 'personal' (as in the term PC). Because of the large size of the computer we built, we don't call it a "PC" as it really is a collaborative computer or a community computer. We explore different input methods of information and data into the computer. This includes RFID, voice, and object recognition. These also will allow a computer to interact more with the real world. This opens up new possibilities especially in the realm of accessibility. People who have never seen a computer or are frustrated using them will now have easier access to the potential a computer can provide.

**21. Ashley's Treatment: An Examination From a Moral, Ethical, and Disability Rights Perspective**

*Paula Egging, Matthew Ramsey, Education*

In 2004, a young woman with profound intellectual and physical disabilities underwent a series of medical procedures aimed at limiting her physical growth

and removing organs and tissue related to reproduction. These surgeries and related hormone treatments were elected by her parents in an attempt to limit her physical development towards making her physical care more manageable. This situation represented an extreme case for the medical ethics community and spurred a debate that crossed moral, philosophical, and ethical boundaries. In addition, those concerned with disability rights took notice as the case is in opposition to the four outcomes associated with the Individuals with Disabilities Educational Improvement Act, or IDEA, of 2004. We are taught that it is necessary to ensure (1) equal opportunity, (2) full participation, (3) economic self-sufficiency and (4) independent living for individuals with disabilities. This case, now known as Ashley's Treatment, violates these outcomes. After learning of this case, the researcher became concerned regarding the ethical and moral implications of this type of action and seeks to gain an understanding of Ashley's Treatment from a moral, ethical, and disability rights perspective. In order to build a conceptual understanding of this case across these three perspectives, a review of relevant literature will be discussed toward the goal of answering the question: Was Ashley's Treatment ethical, moral, and in line with disability rights/policy? This poster seeks to share the conceptual framework and lessons learned and to spur discussion among the audience.

## **22. Developing a Narrative Video**

*Ann Heschmeyer, Patricia Clinesmith, Dennis Dunleavy, Journalism and Mass Communications*

This project explores how a short narrative video is developed. We researched professional screenplay formatting/style and storyboarding before creating our script and storyboard. The comic-book-like storyboard is the blueprint the director uses to plan how the video "looks" before shooting begins. The storyboard illustrations even can be set in their own video, a story reel, with recorded dialogue, to imagine the video more accurately. Through this project, we learned more about the steps between story concept and video, and created our own blueprint for such a production. Our storyboard creates scenes for a short video, set on campus, about a student grappling with philosophical ideas. Our display will include storyboard samples and a short story reel.

## **23. Exploring Immune System Function in Pupae of Tobacco Hornworms in the Laboratory**

*Anna Hicks, Constance Hallberg, Biology*

The immune systems of insects have been shown to have both cellular and protein (humoral) components in the hemolymph. These components have been explored in some insects, such as the tobacco hornworm (*Manduca sexta*), the organism studied in this project. Using the relationship between the humoral component (measured as activity of the antibacterial enzyme, lysozyme) and the hemocyte (blood cell) morphology, we can determine what the innate immune system of *M. sexta* looks like. The goal of this project is to examine hemocyte morphology of laboratory-reared, immunologically naive *M. sexta* through late larval/early pupal

development. To do this, we had to learn how to rear *M. sexta* in the lab in such a way that when they reach the proper stage, we could obtain blood samples and analyze them using a phase contrast microscope and lysozyme assay. The whole process is contingent upon the successful rearing of the hornworm in the lab and the immunological naivety of the hornworms when they reach a size their blood can be sampled.

## **24. Exploration of the Effects of Environmental Degradation on the Tensile Strength of Fishing Line**

*Brian Hoytal, Steve Spencer, Engineering*

To explore the effects of environmental degradation, I placed samples of fishing line into three different environments. The environments were outside, underwater, and in an oven. The samples were left in these environments for two months and tested against a control sample. The tensile strength was found using a universal tester and an apparatus constructed for that purpose. The apparatus I constructed did not operate correctly, so no results or conclusions were drawn.

## **25. The Influence of Gill Net Color on Catch Rates in Blackwater Habitat of the Amazon River**

*Jenica Jarchow, Terrence Malloy, Daniel Bowen, Biology*

Every year floodwaters rise in the upper basin of the Amazon and inundate the surrounding forests between the months of November and April. This water is known as “blackwater” because tannins leach out of the flooded leaf litter and give the water a dark, tea-stained appearance. Local fishermen in these flooded habitats prefer to use green gill nets instead of clear monofilament nets because they believe the fish can see the clear monofilament net in the water and this impacts their catch rates. In March 2012, I traveled to the Tahuayo watershed in the Loreto District of Peru and tested this conventional wisdom. Three twelve-hour gill net sets, which employed one monofilament net and one green thread net, were set in blackwater habitat at dusk and then checked at dawn. Fish species were identified, and total length for each individual was recorded. Overall, the green net caught a total of 55 fishes of 20 different species, and the monofilament net caught 41 fishes of 11 different species.

## **26. Gauss-Powered Accelerator**

*Benjamin Lafser, Myron Fanton, Engineering*

This project is centered around using capacitors and inductors to create a magnetic field strong enough to propel an iron object through space. It was begun several years ago after I watched a program about how electric rail technology was being used in elevators due to the increase in safety and the lack of needing a cable. I thought about how a similar device could be used in a projectile system, for example, in a nail gun. After doing some research on the subject, I found that Carl Gauss had developed a system of coils designed to generate an inward magnetic field. I built a coil-based nail gun that can demonstrate the advantages of this



new technology over the conventional forms of compression or combustion. Coils would be much easier to use as they would dissipate charged energy more effectively. The majority of the work behind the project involved developing a way to charge a capacitor bank to its limit and cause the coils to release their energy in sequence. This project involved many hours of research, development, trial and error. It has given me a greater understanding of circuitry, magnetic fields, and the development process in general.

## **27. Community Growth Through Rational Planning: A Case Study of Atchison, Kansas**

*Samuel Litz, Kevin Miller, Daniel Porter, John Settich, Political Science*

This project seeks to study economic and community development in Atchison, Kansas, by approaching it from a public policy standpoint. It analyzes multiple models of economic development in order to find which, if any, are applicable and effective in the city of Atchison, as compared to the status quo. Research places emphasis on two sources of a solution. These have been categorized public and private. Experts suggest that what Atchison needs most is a strategy to attract young, growing families and keep them in Atchison. The questions this project will answer are the following: What actions must be taken to achieve this end, and by whom? The expectation is that cooperation between public and private sectors, meaning the government and business, will be required to reach a solution.

## **28. Role of Microclimatological Factors in Pod Growth and Capsaicin Production in *Capsicum Annum* (Jalapeños)**

*Patrick McGuire, Christopher Ekiss, Lauren Linton, Keegan Park, Lindsay Collar, Meghan Ortiz, Ana Taylor, Paul Steinbach, Martin Simon, Biology, Chemistry and Biochemistry*

The variation in pungency of those peppers found in the species *Capsicum annum* is remarkable and currently unexplained. The chemical compound in peppers responsible for their characteristic pungency is capsaicin. The goal of the Benedictine Pepper Project over the years has been to identify factors that might influence capsaicin production and, subsequently, cause these variations in pungency. The purpose of this year's study was to determine whether the following microclimatological factors have any effect on capsaicin production in Jalapeños: temperature, humidity, evapotranspiration, solar radiation, rainfall, and wind. The first half of the study, carried out this past summer, involved the collection of weather and pepper data by means of a Vantage Pro2 weather station and daily monitoring of plant growth. The second phase, begun at the start of the fall 2011 semester, focused on quantifying capsaicin concentrations of individual peppers. The capsaicin from dried peppers was extracted and eluted, with the final sample analyzed in a spectrometer. The capsaicin concentrations were then correlated with the weather data using the non-parametric Spearman's Rank-Order Correlation. The results indicate a strong relationship between capsaicin production and select microclimatological factors. For instance, an immature pod exposed to high

levels of solar radiation might result in an unusually pungent, mature pepper. Therefore, peppers from the same plant can exhibit a range of capsaicin concentrations if immature pods are exposed to significantly different weather patterns during development.

## **29. Utilizing the Diverse Flora and Fauna of the Amazon Basin**

*Patrick McGuire, Daniel Bowen, Terrence Malloy, Biology*

Over spring break, I had the opportunity to experience survival camp in the Amazon Basin with four other Benedictine students. Because our party would be living off the land, only the bare necessities were packed in preparation: DEET, Cipro, and toilet paper. The campsite, accessible by canoe, was two miles off the Tahuayo River within Peru's Regional Comunal de Tamshiyacu-Tahuayo (RCTT). The RCTT is believed to have been largely unaffected by glacial activity, making it one of the most biologically diverse regions in the world. Surprisingly, the richness of the surrounding environment did not make the survival experience any easier. If one is not intimately familiar with the rainforest, food and shelter are almost impossible to come by as the untrained eye is overwhelmed by the density of the vegetation. However, with much assistance from the guides, our party was able to locate a variety of useful taxa: water vines, jungle butter, grubs, palms, and fishes. My presentation will detail the location and utilization of the aforementioned taxa and document the reactions of my fellow campers to this foreign ecosystem.

## **30. Bird Diversity Within the Tamshiyacu-Tahuayo Reserve**

*Keegan Park, Daniel Bowen, Terrence Malloy, Biology*

The objective of my research was to study tropical bird species and characterize them according to which layer of the rainforest they inhabit. This indicated which rainforest layer maintained the highest species diversity. The study was conducted within the Tamshiyacu-Tahuayo Reserve, which is a three-hour boat ride from Iquitos, Peru. It is located in the heart of the Amazon, far from major human populations. The Tamshiyacu-Tahuayo Reserve is one of the few places in the world where numerous species of birds can be seen with great frequency. Birds were identified and categorized each day from March 5 to March 10, 2012, with most observations taken in the morning. Once a bird species was identified, it was categorized according to which rainforest layer it inhabits. There are four, not always distinct, layers to any rainforest. However, for my research I categorized birds according three layers since the Varzea floodplain forest floor was underwater. My results show that the highest bird diversity (55 species) was in the top layer—the canopy. The second highest bird diversity (15 species) was in the understory, and the emergent layer exhibits the lowest bird diversity (11 species). I concluded that the highest bird diversity was in the canopy because the majority of the resources are there. The emergent layer exhibited the lowest bird diversity because only predatory and scavenger birds inhabit this layer.

### **31. Synthesis and Spectral Properties of N-(Benzalamino)oxindoles**

*Anna Pavlovich, Kristen Oswald, Joshua Piper, Paul Steinbach, Chemistry and Biochemistry*

Twenty years ago, the syntheses of N-(benzalamino)oxindoles were conducted with the intention of correlating Hammett constants with the NMR shift of the iminyl proton. Sixteen different functional groups were substituted at the para position of the benzalamino entity, and purified samples were sent out for NMR analysis. Now this synthesis is being carried out again, and the derivatives are being analyzed for FTIR, NMR, UV, fluorescence, and possibly phosphorescence spectral properties.

### **32. The Prevalence of MRSA in the College Setting**

*Matthew Pesely, Paul Wagle, Karl Fischer, Larry Sutton, Chemistry and Biochemistry*

MRSA (Methicillin-resistant *Staphylococcus aureus*) is the number one cause of soft tissue infections in the world. MRSA, like other bacteria, are able to colonize in human hosts, in which most people do not realize they are there. However, one in four people have colonized MRSA in their noses. There have been studies on the percentage of people with colonized MRSA in hospitals, nursing homes, and athletic facilities, but very few studies, if any, on a college campus. In a dormitory setting, residents share drinks, food, cups, and other items, creating ideal conditions for the spread of bacteria. The purpose of this project is to study how many people have MRSA. Basically, the study is performed by collecting bacteria samples from the inside of the nose with a sterile swab, rubbing the swab on tryptic soy agar plates, and then further onto methicillin-resistant medium to isolate the MRSA. In studying MRSA, this research determines the percentage of MRSA on a college campus.

### **33. Metal Concentrations in Bovine Eyes**

*Lauren Rogers, Stefan Ranieri, Maria Skorey, Karina Estee, Aaron Kranz, Grace Gawatz, Paul Steinbach, Chemistry and Biochemistry*

The accumulation of certain metals in eye tissue has been linked to ocular diseases, such as age-related macular degeneration, cataracts, and disruption of the ocular pathway. However, little research has been done to establish a “normal” quantity of various metals in eye tissue without harmful effects. By dissecting and analyzing bovine eyes, we determined the quantity of several metals that are normally present in the eye. Five different eye tissues from bovine eyes were dissected and evaluated for five different metals. By establishing normal metal concentration levels, this information may be useful for comparison with metal concentrations in eyes which are diseased.

### **34. Communicable Diseases and Their Effect on Class Attendance**

*Vincent Scavuzzo, Lynne Connelly, Nursing*

The purpose of this project was to examine the effect of communicable diseases on class attendance. The data attained for the study were derived through two different approaches. Both approaches were used to find correlations between communicable diseases and class attendance from self-reports. The larger study was a campus-wide survey using Survey Monkey that included 33 questions. Results were that 313 students responded to the survey request with a total of 258 completed surveys. On average, students missed 2.78 days per semester with an average of 1.47 missed because of communicable diseases. The survey focused on having students report certain attributes that may have made them more prone to becoming sick in the fall 2011 semester. The data collected was used to identify trends that made students more or less likely to become sick in the fall 2011 semester. The second smaller study was conducted with both junior and senior nursing classes. The study consisted of 42 students and will be used as a pilot study for future research. In this study, students were given personal hand sanitizers and were asked to wash their hands twice a day. An alcohol hand sanitizer was also placed in the classroom and facility lounge. The purpose of this study is to see if a basic intervention will have an effect on the number of illnesses.

### **35. The Effects of Flooding on Bird Populations in the Missouri River Valley**

*Zachary Stark, Daniel Bowen, Biology*

When birds migrate, they often use distinctive natural formations as landmarks. These landmarks necessarily must be fairly constant and unambiguous from year to year. Perhaps as a result of these fairly stringent requirements, there are only four major flyways used by migratory birds in North America. The Missouri River is one of these flyways. Migrating is an extremely energy-intensive activity for birds, and so the habitat immediately adjacent to migratory paths is extremely important. These areas not only serve as temporary resting places but also are often used as feeding grounds for migrants. This summer there was a flood in the Missouri River basin near Atchison, and as a result, some of the habitat surrounding the Missouri River was altered. The goal of this project is to identify the effect, if any, this flood has had on the bird populations of not only on neotropical migrants but also on year-round residents. This project surveyed the diversity and relative abundance of bird species on the Benedictine Bottoms and two local oxbow lakes. Because there are only a few major flyways used by migratory birds, alterations to the surrounding habitat affect a large number of birds. By better understanding the effect natural habitat change has on birds, we will be better able to anticipate the effect man-made changes on habitat will have.

### **36. Dressing for Success Does Not Improve Performance**

*Elizabeth Szalewski, Laura Lynn Schneller, Giovanni Misceo, Psychology*

The effects of formal and informal clothing on a free recall memory test were experimentally investigated. It was hypothesized that dressing formally for a free recall memory test would improve test recall performance. Forty college students were randomized into one of two groups. One group dressed formally for the test. The other dressed informally. Results indicated that dressing either up or down does not moderate the success of words recalled. Consequently, our direct manipulation of type of dress failed to corroborate field studies showing an association favoring the “dressing for success” belief.

### **37. Raven Rock Batting Cages**

*Christopher Tasler, Andrew Green, Benjamin Myers, Evan Peters, Joseph Locascio, Matthew Nordhus, Nathan Finken, Peter Hegarty, Ryan Bax, Stephen Noffke, Zachary Rohm, Steve Spencer, Patrick O'Malley, Engineering*

The problem that the engineering department is undertaking is the repair of the batting cages at Raven Rock. Raven Rock is composed of a miniature putt-putt golf course and practice batting cages that are run by current Benedictine students. Currently, two of the six batting cages are nonfunctional, and the remaining four are unreliable. The cages are Raven Rock's main source of revenue, and their impairment is leading to a loss of business and reputation. This semester the engineering department will provide a detailed evaluation of the current state of the entire system. A diagnosis of parts needed and a report presenting our recommendations for repair and maintenance of the batting cages will be given to Raven Rock. Time permitting, repair of the batting cages will commence this semester.

### **38. Patterns of Biodiversity and Abundance of Terrestrial**

#### **Macroinvertebrates on Two Mitigation Sites in Northeast Kansas**

*Elizabeth Tharman, Lisa Prowant, Mary O'Brien, Amy Vogrin, Danielle Rush, Martin Simon, Biology*

The U.S. Army Corps of Engineers initiated a mitigation project on the Benedictine Bottoms, located on the Rushville bend of the Missouri River in 1993. The Benedictine College department of biology has been monitoring the progress of the mitigation efforts since 1994, using several biotypes as indicators, such as terrestrial macroinvertebrate abundance of ecosystem functionality. The Benedictine department of biology is currently using aquatic and terrestrial invertebrate abundance data to determine whether they are correlated with frog occurrence and activity. The purpose of this current project is to determine whether invertebrate populations are influenced by microhabitat and water quality and to use these data as covariates in an ongoing project monitoring amphibian population abundance and activity along the Missouri River; however, due to the excessive flooding in 2011, the sampling of aquatic invertebrates was severely curtailed. Two mitigation properties were sampled: Benedictine Bottoms and Dalbey Bottoms. Two trapping techniques were used to collect the terrestrial invertebrates: sticky traps

and sweep nets with a total of 558 traps set, collected, and identified. Over 58,000 invertebrates were collected between May and July 2011. Preliminary analysis revealed significant differences in abundance of terrestrial invertebrates among properties and habitat types. For example, a significant difference exists between terrestrial macroinvertebrate abundance in tributary versus pond habitats.

### **39. Insect Biodiversity Near the Tahuayo River in the Amazon Rainforest Basin**

*Elizabeth Tharman, Terrence Malloy, Daniel Bowen, Biology*

The Amazon Rainforest is prized as one of the greatest biologically diverse ecosystems of the world and is home to more than seventy percent of the known species of insects. The purpose of this study was to evaluate the biodiversity of insects collected at three different sites near the Tahuayo River based on the level of vegetation in the area and the location of the site relative to water. To acquire the data sample, a white sheet was hung at the site after nightfall, and an L.E.D flashlight was positioned using a tripod to elicit a phototactic response from insects. After an acclimation period, all insects found on the sheet within the following hour were identified or collected for later identification and release. As expected, as the level of vegetation increased among test sites, the number of insect orders and families also increased. Of the three habitat types ranging from the least amount of vegetation to medium vegetative growth to the most vegetation, the number of insect orders increased from six to seven to eight and the number of families increased from ten to thirteen to nineteen.

### **40. Population Dynamics and Biodiversity Patterns of Small Mammals on the Benedictine Bottoms Fish and Wildlife Mitigation Site**

*Lisa Willis, Martin Simon, Biology*

The Benedictine Bottoms Fish and Wildlife Mitigation site was created in 1993 in response to habitat loss resulting from the Missouri River Bank Stabilization and Navigation Project. Since 1995, Benedictine undergraduates have used live trapping techniques to generate data concerning the presence and activity, as well as the population size and dynamics, of small mammals. The purpose of this research is to study patterns of population fluctuation, biodiversity, and habitat use of small mammals on the Benedictine Bottoms. This research has been two fold. The first phase was the further analysis of previous data collected from trapping conducted on the Bottoms by Benedictine students since 1995. The current phase focuses on the population dynamics of small mammals as determined by live trapping conducted in the summer of 2011 and then compares current data to previous years to gain a better understanding of the restoration progress. Over the course of two months, we conducted a total of 436 trap nights using peanut butter bait, caught a total of 132 individuals, and had a trapping success of 35.3%. We also conducted 61 trap nights using alternative bait. Eight species were trapped, and a total of 12 species were observed on the study site. The four most commonly trapped species were found to differ significantly by habitat preference. The most

frequently trapped species was the white footed mouse, which accounted for 43% of individuals trapped, followed by the deer mouse, which accounted for 28% of individuals trapped.



#### **41. The Euro: An Analysis of the Foundations of the Greek Sovereign Debt Crisis**

*Hillary Chilcote-Crawford, Richard Coronado, Economics*

**11:15–11:35 • Gangel Seminar Room**

Beginning with a brief history of the European Monetary Union, this presentation will discuss key issues that laid the foundation for the current euro crisis as well as possible solutions. The way the nations of the Eurozone handle the Greek sovereign debt crisis will have major implications for the future of the euro. However, there are many obstacles inherent in the Eurosystem that make a solution more difficult to find. Problems include the single mandate of the European Central Bank, interest rate conversion that enabled fiscal irresponsibility, and lack of a Eurozone-wide governing authority to enforce fiscal responsibility. This presentation details the development of the sovereign debt crisis and what is being done to solve it, as well as possible solutions from contemporary economists.

#### **42. Salt Effect on Substrate Binding for $\beta$ -Lactamase-Catalyzed Hydrolysis of Chromaceft**

*Jonathan Severson, Larry Sutton, Chemistry and Biochemistry*

**11:15–11:35 • Room 308**

Bacterial production of  $\beta$ -lactamases is the most prevalent mechanism of antibiotic resistance worldwide. Using a commercially available  $\beta$ -lactamase from *Enterobacter cloacae*, the  $\beta$ -lactamase hydrolysis of Chromacef, a new chromogenic cephalosporin, was studied using pH 7.0, 0.10 M sodium phosphate and pH 7.0, 150 mM sodium chloride, 0.10 M sodium phosphate buffers. The  $K_m$  of the lower ionic strength buffer was  $300 \pm 100 \mu\text{M}$  and that of the higher ionic strength was  $178 \pm 1 \mu\text{M}$ . These observations are consistent with a salting-in effect of substrate-enzyme binding, i.e. a decrease in the equilibrium dissociation constant for the non-chemical step. This hypothesis was further tested by monitoring reactions under pseudofirst order conditions; Chromacef  $< 18 \mu\text{M}$ . First order rate constants at low and high ionic strengths were rate constants predicted by  $V/K = k_1 k_3 / (k_2 + k_3)$  wherein  $k_1$  increases with increasing ionic strength.

#### **43. Factors in Linguistic Stability and Variation: From Icelandic to the World**

*Ean Henninger, Sarah Young, English*

**11:15–11:35 • Room 219**

Why do languages change over time? Why do they display differing rates of change? This presentation will strive to answer these questions as it explores

the sociolinguistic factors involved in stability and variation within the Icelandic language. Special attention will be given to Icelandic as a language that has remained relatively conservative in the centuries since its origin while also demonstrating changes in its North American dialects. By investigating the reasons for this stability, the presentation will touch upon factors that impact the processes of variation and stabilization in all languages, the relationship between social contact and language, and matters of language planning and policy.

#### **44. Supreme Court Case PLIVA, Inc. v. Mensing: The Plight of the American Consumer**

*Samantha McIntosh, John Settich, Political Science*

**11:15–11:35 • Room 108**

This project analyzes the decision of the recent Supreme Court case PLIVA, Inc. v. Mensing, which concluded that federal drug regulations applicable to generic drug manufacturers directly conflict with, and thus preempt, the state tort-law claims based on certain drug manufacturers' alleged failure to provide adequate warning labels for the generic drug, metoclopramide. This project also examines the possible long-term ramifications of the decision of the recent Supreme Court case PLIVA, Inc. v. Mensing, as it affects the American consumer.

#### **45. Why Two Atchison Sewers are Better Than One: A Policy Implementation Study**

*Chase Brunick, Mary Harrity, Alexander Orel, Rachel Golden, Baris Ersoy, John Settich, Political Science*

**11:15–11:45 • Room 124**

This presentation explains how an Environmental Protection Agency Mandate from Washington, D.C., affects all of us in Atchison, Kansas, and how local governments implementing policies can improve their effectiveness by improving their communication with the general public. Our project concerns the storm water and how cities and counties across the U.S. are becoming responsible for how storm water is managed because of its increasing contribution to environmental problems. Part one of our project explains how a mandate at the federal level of government is actualized at the most local government level. In part two of our project, we created a public education program that serves two purposes: First, educating the general public about government programs improves the informational asymmetry that exists between the government and its people; and second, research has shown that increasing public awareness increases the success of government projects. After presenting the informational portion of the project, we will answer questions because we believe people will want to know more about Atchison water quality and concerns.



#### **46. What Is Conceivable Is Possible? An Argument Against David Hume**

*Anne Muenks, Anthony Crifasi, Philosophy*

**2:35–3:30 • Gangel Seminar Room**

The purpose of this thesis ultimately is to argue against the viability of David Hume’s system of philosophy. An essential proposition within this system is ‘everything which is conceivable is possible.’ This proposition allows Hume ultimately to conclude that all arguments based on cause and effect come from custom, not reason. This is the core of his philosophy. As such, this thesis investigates this proposition and argues that, under Hume’s premises, conceivability is incapable of being an indicator of possibility.

#### **47. How BC Speaks: A Dialectology of Benedictine College Students**

*Hillary Chilcote-Crawford, Amelia Christ, Sarah Sinnott, Modern Foreign and Classical Languages*

**2:35–2:55 • Room 308**

Benedictine students come from all over the U.S., bringing their unique interests, talents, and ways of speaking. These ways of speaking—accents and speech patterns—vary from region to region. Sometimes the words people choose and the ways they speak can be predicted by the region they call home. This study charts whether or not student speech reflects that expected of them as well as which accents and speech patterns are most prevalent. Through surveys and sociolinguistic interviews, we outlined various speech patterns of BC students and compared them to the available demographic information about students here. Questions we will answer include: How do BC students from different areas speak? Does it match our predictions? Which is more widely used: “soda” or “pop”? Does your homework “need doing”? Are you writing with a “pin” or a “pen”? These questions and more will be addressed in “How BC Speaks: A Dialectology of Benedictine College Students.”

#### **48. Discovering the Power of Electricity: Rail Guns**

*Justin Brandl, Eric Fox-Linton, Physics and Astronomy*

**2:35–2:55 • Room 219**

A rail gun is a weapon consisting of a pair of parallel rails that are conductive and that use the magnetic field created by an electric current sent through the rails to launch a projectile at a very high velocity. Currently, the most powerful rail gun on earth belongs to the United States Navy, moving a projectile to approximately 2.4 kilometers per second, or 5,400 mph. The goal of this project was to take a deeper look into the power electricity holds and to gain a better grasp on the magnetic fields the current creates in a rail gun to move a projectile. By building a small rail gun, I was able to see over the past seven months what it takes in research, general engineering, and testing to build such a device.

## 49. Plated Mail, A Further Investigation of Chainmail

*Zachary Stark, George Nicholas, English*

2:35–2:55 • Room 208

Two years ago when the armor project began, I explored the process of constructing a chainmail shirt. The following year I did a more in-depth analysis of the history of chainmail and its various forms. During this process I learned that chainmail was first used by the Celts as early as 400 BC. It was later adopted and modified by the Roman Empire, was used extensively up through the Middle Ages, and spread as far as Japan and India. It underwent many changes and modifications in this time. In this, the third year of the armor project, I decided to explore the construction of one of these lesser-known modifications—plated mail. This mail is constructed by interspersing metal plates within the chainmail weave. This armor provides better protection than regular chainmail, while sacrificing some of the flexibility. Comparisons between plated mail and regular chainmail also will be made.

## 50. Para-Substituent Effect on the Rate-Determining Steps of VIM-2 $\beta$ -Lactamase-Catalyzed Hydrolysis of Styryl-Derivatized Cephalosporins

*Katherine Corbella, Tricia Walz, Larry Sutton, Chemistry and Biochemistry*

2:35–2:55 • Room 108

Metallo- $\beta$ -lactamases, which cause bacteria to resist penicillins and cephalosporins, are a growing clinical threat evolving under the considerable selective pressure of antibiotic use. VIM-2 is a metallo- $\beta$ -lactamase that is produced by *Pseudomonas aeruginosa* globally. The VIM-2 mechanism was explored by studying the kinetics of VIM-2-catalyzed hydrolysis of styryl-derivatized cephalosporins substituted in the para position of the benzene ring with nitro, cyano, hydrogen, and methyl groups. The Michaelis constants for all substrates were well below 25  $\mu$ M; therefore, all reactions were conducted under saturating conditions. The para-nitro-substituted substrate demonstrated a biphasic reaction profile with an exponential “burst” followed by a linear initial rate. This phenomenon was lost when substrates with less electron-withdrawing substituents were studied. These results are consistent with the contribution of two chemical, rate-determining steps in the case of the strongly electron-withdrawing nitro group, one leading to the formation of a azanide intermediate and the other with its protonation and product release. Substrates with less potent electron-withdrawing groups form less stable azanide intermediates that rapidly break down, leaving its formation as sole contributor to rate determination.

## 51. A Naturalist Inquiry Into the Relationship Between Individuals With Disabilities and the Sacraments

*Rebecca Duckworth, Elizabeth Stackpole, Olivia Ritter, Leah Miller, Kathleen Shaneyfelt, Grace Ruedi, Rachel Toner, Matthew Ramsey, Education*

**3:10–3:30 • Room 308**

Some people have the opinion that individuals with disabilities should not be allowed to receive the sacraments of the Catholic Church. Research has shown that most Catholic parishes along with their communities provide religious education and the necessary resources to educate all of their members. Parents and ministry programs are responsible for teaching all children, including those with disabilities, about the sacraments as well as making it available for them to receive the sacraments regularly. The encyclical *Quam Singulari* is the papal encyclical known as the “Decree of the Sacred Congregation of the Discipline of the Sacrament on First Communion,” which states that an individual may receive communion at the age of reason. For further support, Jean Vanier contributed extensive research as well as the National Conference of Catholic Bishops towards individuals with disabilities receiving the holy sacraments. Their main objective is to bring Jesus, through the sacraments, to all members of the Church, respecting and honoring everyone as God’s children.

## 52. T-Shirt/Potato Pneumatic Gun

*Andrew Green, Jeffery Leger, Steve Spencer, Engineering*

**3:10–4:05 • Outside Westerman Hall, bottom floor**

The engineering club designed and fabricated two shirt/potato guns. At the time the project started, there were no shirt guns for sporting events. The club decided to build two guns that would be capable of launching T-shirts or other projectiles, such as candy or potatoes. The question was how to design and build a device capable of launching the desired projectiles. The design questions that needed to be addressed included: What is the correct relationship between barrel size and projectiles (T-shirts and potatoes)? What is the relationship among barrel size, tank size, and launch pressure? How can we structurally support the device to accommodate launch loads and user handling? How can we trigger the device safely? The final design consisted of pneumatically powered devices with interchangeable barrels and tanks and an electric safety and trigger device. A wooden support structure ensured support for launch loads and user handling; this structure also housed the electronics and power supply. The guns will be used by the engineering club during their activities and will be made available at various sporting events.

### **53. Stress Levels of College Students at Benedictine College as Indicated By Cortisol Levels**

*Gabrielle Mullins, Stacie Cook, Lynne Connelly, Constance Hallberg, Adam Buhman-Wiggs, Nursing, Biology, Psychology*

**3:10–3:30 • Room 208**

Stress is a difficult concept to define concretely. Different people have different concepts of what is stressful. However, all humans experience stress, whether it is physical, emotional, psychological, or social. Cortisol is a chemical the body creates in the kidneys and circulates in times of increased stress. For this reason, one can measure how stressed a person is by measuring how high his or her cortisol level is. This investigation involved several disciplines spanning nursing, biology, and psychology. Our study measured the stress levels of 45 voluntary undergraduate college students. We sampled urinary cortisol levels and administered a brief psychological stress scale (PSS) questionnaire as well as basic demographic information was collected. Furthermore, the study explored factors contributing to increased student stress by investigating the relationships between cortisol, PSS, and factors such as academic major, course load, academic standing, extracurricular involvement, and basic demographic parameters. We found that the baseline level of stress at Benedictine College was greater than the average stress levels of young adults. We also found that the levels of stress as indicated by both the PSS tool and cortisol levels did not vary significantly between science and non-science majors. We also gathered valuable information about the major contributors to student stress.

### **54. Atchison: *Ad Astra Per Aspera***

*Rachel Malinauskas, John Bowen, Presidential Scholars (Allison Ashburn, Lauren Bickford, Jenna Bruegger, Gabrielle Callanan, Erin Daugherty, Rebecca Maples, David Maxwell, Ian O'Hagan, Emily Thayer, Lillian Vey, Lisa Willis), Susan Traffas*

**3:10–3:30 • Room 124**

It is easy to take the land we live in for granted. The breathtaking view from the bluff might hold one's attention at first, but most of the unique characteristics of Atchison remain ignored. Those who live here, even for four years, should not ignore these characteristics, as their impact can be felt in the Kansas state motto: *Ad Astra Per Aspera*, coined by a prominent Atchisonian. Although the city of Atchison has also been known as "the city that refused to die," the geography of this area can enlighten those who study it, demonstrating both the handicaps and the glory produced by our surroundings. This year, the presidential scholars present a geographical study of Atchison County. The allure of geographical study lies in its exploration of a number of different subjects. This study combines the biology of the physical world as well as the activities and societies of the people, past and present, who have inhabited it. This study examines how the land affects how people live even as the people control and change the land. The presidential

scholars are uniquely formed to face this challenge, as its members work towards a number of individual majors. They have combined their expertise to form a comprehensive picture of Atchison.

### **55. Amphibian Occurrence and Activity on Army Corps Mitigated Properties in Northeastern Kansas**

*Michael Godin, Daniel Drimmel, Alexander Prentice, Martin Simon, Biology*

**3:45–4:05 • Gangel Seminar Room**

The third season (2011) of the five-year USACE-funded Missouri River Wetland Assessment Project in Northeastern Kansas involved chorus sampling (following North American Amphibian Monitoring Protocol), tadpole surveys, and recruitment sampling. The season ran from mid-April to the end of June. We sampled 34 sites on three USACE mitigation properties. Habitats on these properties included ephemeral pools, tributaries, roadside ditches, and ponds. Covariates, such as water quality tests (pH, %O<sub>2</sub>, etc.), bank slope, and adjacent vegetation, were measured at the sampling sites. We used D-nets to catch neo-metamorphs. Eleven species were heard calling in this region. At least five of these species had successful breeding seasons based on the presence of tadpoles. Six of the 11 species were heard on all three properties. A number of factors were important in determining species occurrence and calling activity. For example, habitats differed significantly in terms of species occurrence and calling activity. Also, such factors as bank slope and a number of water quality parameters explained differences in species.

### **56. The Gifted Complex: A Naturalistic Inquiry Into the Social/Emotional Pressures of the Gifted Student**

*Brooke Larson, Mary Pistek, Kelley Cofield, Amy Ross, Matthew Ramsey, Education*

**3:45–4:05 • Room 308**

While the education of students with disabilities is considered a “hot topic,” services to the gifted students are often overlooked. Gifted students by definition are “students, children, or youth who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services or activities not ordinarily provided by the school in order to fully develop those capabilities” (*The History*, 2008). Despite the wide range of exceptional abilities a gifted child may excel in, any student who excels in a manner requiring specialized services in school are served within special education. Studies have found there are many positive aspects of being part of a gifted program, such as academic growth, building relationships with other gifted students and internal gratitude. However, while there are many advantages of entering a child into a gifted education program, educators, parents, and even students must be aware of the of the many difficulties, such as isolationism, perfectionism, and poor social relationships, that often coincide with participation in a gifted program. Our team is specifically concerned with these

difficulties. Using the qualitative research methodology known as Naturalistic Inquiry, the team identified and interviewed a minimum of 20 individuals who received services under the IDEA category Gifted and Talented during their K–12 education. A case study was drafted with the findings from these interviews.

### **57. EcoWater: A Benedictine Hydration Project**

*Rebecca Howard, Matthew Falke, Ryley Donaldson, Anna Kern, John Bohovic, Brigita Rodacy, Dakota Miller, Angela Humburg, HPER*

**3:45–4:05 • Room 208**

Our project explored the benefits of implementing a hydration station on the Benedictine College campus in order to offer a sanitary filtering system for refilling water bottles at the college. First, we did in-depth research on the benefits of such a system, including sanitation, costs, and health. We also did research on other campuses that have also installed this kind of system and spoke to companies that offered the product to compare prices and quality. Second, we tried to raise awareness on campus about the hydration station to gauge whether or not the students and faculty would be interested in such a product. We put up informational posters, we were interviewed by *The Circuit*, and we conducted a petition on campus. Our petition was to gauge the public interest, and in a few weeks we received almost two hundred student and faculty signatures expressing interest in having a hydration station on campus. Additionally, we assessed and investigated the ways a hydration station would reflect and enhance Benedictine College’s Core Values. We found this product would especially reflect those values of community and hospitality because the Benedictine College community and its guests deserve to have clean, safe, and affordable water.

### **58. Pigeon Pedal**

*Christopher Tasler, Graham Carson, Nathan Finken, Darren Wellbrock, Steve Spencer, Engineering*

**3:45–4:05 • Room 108**

The problem we (Vinsane Size) undertook was to design and develop a universal trigger to clay pigeon throwers. The problem is that economic throwers can’t be operated by the target shooter. Current systems require a second person to operate the thrower and this can be a substantial inconvenience. There is no after-market device that can be attached to a thrower that enables the shooter to trigger the thrower. Vinsane Size designed and fabricated this attachment, namely Pigeon Pedal. This is a foot-activated trigger system that can be attached to any thrower using a pull rope. Pigeon Pedal can be operated solely by the shooter while maintaining good control of the firearm. As part of the design effort a CAD model was generated. The team also performed engineering and economic analyses. Vinsane Size has successfully fabricated and tested Pigeon Pedal.

## 59. Making a 2D RPG Game Designer

*James Harris, Francine Wolfe, James Vanderhyde, Mathematics and Computer Science*

**3:45–4:05 • Room 124**

RPG Designer is an open source and cross platform 2D RPG game creation tool-kit that allows easy creation and distribution of 2D role playing games. Currently the software world lacks a program of this type on operating systems other than Microsoft Windows. This project attempts to create such a program that will be cross platform, which means it will work on every computer despite the operating system used. In order to develop this software properly, we need to research several different aspects of computer programs. These include software development types, version control, licensing, and written documentation. Users first should be able to create a map. To do this easily, they will use their mouse and add small pictures called tiles to a grid. They should also be able to create an actor, which is a character who appears in the game. These actors will need items, so the users should be able to create items and assign them to an image. The actors will also have special skills, which help them to defeat enemies to complete the game. This software will include an event system, which allows the users to define events that occur to make a story. There should be well-written documentation to help them use the program correctly. Upon completion RPG Designer would make an easy and fun way for people easily to create and distribute their own 2D RPG games to their friends.

## 60. Three Songs for Soprano

*Christine Baehr, Christopher Greco, Music*

**4:15–5:00 • O'Malley-McAllister Auditorium**

In this project, three poems by T. E. Hulme (1883–1917), “The Man in the Crow’s Nest,” “Autumn,” and “A City Sunset” are set to music. Hulme’s poems “Autumn” and “A City Sunset” began the Imagist movement, which favored precision of imagery and clear, sharp language. The language in Hulme’s poetry reflects this, making it ideal to be applied to a musical setting. The compositions will employ several techniques introduced in MU 300 Music Theory and Aural Skills. Quartal and secundal harmony will be used for the poems “Autumn” and “The Man in the Crow’s Nest,” and “A City Sunset” will be composed in the phrygian mode. Many prominent 20th century composers, such as Claude Debussy, Igor Stravinsky, and Paul Hindemith, frequently used these harmonies. The phrygian mode was also an important tool to the 20th century composers John Adams and Samuel Barber, and their use of the phrygian mode was an important component part for some of their most famous compositions.

## 61. “Angelica” and “Onward”

*Christopher O’Brien, Christopher Greco, Music*

4:15–5:00 • O’Malley-McAllister Auditorium

“Angelica” is for piano and clarinet in the key of B flat. The piano accompanies the clarinet through a distinct melody with a romantic theme. “Angelica” has an A section, a B section, then a decorated B section, and finally returning to the original A section. The piano in this piece accompanies the clarinet, although at times the piano is providing a subtle counter-melody. This work was influenced by listening and studying 20th century composers Aaron Copland and Bela Bartok. I was also experimenting with using a simple musical mode and letting it develop into a complete melody. I experimented with simple harmonies in the piano accompaniment and allowed the clarinet to maintain its position as the principal melody. “Onward” is for flute and piano and is written in D major. The flute serves as the fast paced melody while the piano serves as the flute’s accompaniment. In “Onward,” I experimented with using more complex harmonies including 7th and 11th chords and deviated from my usual and simple harmonic habits. I used unusual accidentals in this piece instead of keeping the piece diatonic at all times. I worked to make this a swift and fast paced melody for the flute while the piano functioned primarily as the flute’s accompaniment.

## 62. Requiem for the Holy Innocents

*Katherine Bittner, Christine Baehr, Paul Burghart, Timothy Warnke, Katrina Keat, Virginia Brungardt, Simon Pick, Nicholas Gawarecki, Michael Bechina, Erin Martin, Joseph Heron, Christopher Greco, Music*

4:15–5:00 • O’Malley-McAllister Auditorium

My Discovery project presents four selections from a larger composition for chamber choir and tubular bells. This project combines several different aspects of 20th century techniques and is an extension of the materials covered in MU 300 Music Theory and Aural Skills. Throughout the work, percussion is added to a choral setting to provide a unique timbre and an eerily solemn context. The *Introit* is composed primarily of quartal and quintal harmonies with occasional instances of extended tertian harmonies and draws from compositional techniques used by a number of composers, in particular Arvo Pärt’s work for organ and bells, *Tintinnabulum*. The *Dies irae* is a section modeled after the 20th century movement known as Minimalism. Minimalism is a style of music that emphasizes harmonic stasis and repetition. Another characteristic of 20th century music is a resurgence of interest in the church modes. Consistent with this, the *Agnus Dei*, while still drawing from aspects of Minimalism and Tintinnabuli, is composed on the phrygian mode. Lastly, the *In paradisum* is the most tonal of the works because of the hopeful nature of the text, yet the opening soprano solo shifts constantly between major and minor tonalities in mode-mixture, and the chorus lingers heavily on extended tertian and quartal sonorities. My project was inspired by my pro-life convictions, and this work is dedicated to the senseless slaughter of innocent blood wherever it may occur, but especially in the sanctuary of the womb.



## Discovery Day 2012 Schedule Overview

(Presentation number in parentheses)

All presentations will take place in the Ferrell Academic Center unless otherwise indicated.

Time	<b>☞ Continental breakfast — Laughlin Rotunda ☞</b>				
	LeGrand, <i>Vertical Representations in Fantasy Based on the Exquisite Corpse</i> , Workman (1)				
	Room 308	Room 219	Room 208	Room 108	Room 124
8:00–8:30					
8:45–9:05	Ashburn <i>Characterizing Active Galactic Nuclei</i> Baird (3)	York <i>Mentorship Program With Atchison High</i> Bennett (4)	Gorman <i>Crime Prevention ... Edmonton Project</i> Bryant (5)	Clinesmith <i>Parchment Illumination</i> Romano (6)	Bruegger <i>Axis Mundi: The Cosmic Archetype</i> Peters, OSB (7)
9:20–9:40	Rioux <i>An Argument for Human Freedom</i> Spiering (2)	Gonzales, Valerie <i>A Bilingual Education Model: Children With Special Needs</i> Ramsey (9)	Brunick <i>An Empirical Attitudinal and Ideological Preference ... Iowa Caucasuses</i> Settich (10)	Parks <i>Medieval Bookbinding</i> Romano (11)	Gonzales, Julio <i>Opium War “Games”</i> Peterson (12)
9:55–10:15	Healey <i>The Riddle 2012</i> Buhman-Wiggs (13)	Schaefer <i>The Effects of Sex in the Media on Teenagers</i> Wood (15)	Rodriguez <i>A Simple Solution</i> Hansen (16)	Gugliotta-Kremer <i>Gifted, Struggling, and Underserved: The Twice-Exceptional Student</i> Ramsey (17)	Heschmeyer <i>American and German Films From World War II</i> Dague (18)
10:20–11:10	<b>Poster/Exhibit Session (19–40) — McAllister Boardroom (4th floor)</b>				
11:15–11:35	Chilcote-Crawford <i>The Euro: An Analysis ... of the Greek Sovereign Debt Crisis</i> Coronado (41)	Severson <i>Salt Effect on Substrate Binding ... of Chromacef</i> Sutton (42)	Heminger <i>Factors in Linguistic Stability: Icelandic to the World</i> Young (43)	(Open)	McIntosh <i>Supreme Court Case PLLIA, Inc. v. Meising</i> Settich (44)
11:30–12:50	<b>11:30 A.M.–12:50 P.M. • Lunch — Cafeteria</b> Jazz Band Entertainment				
					Brunick <i>Why Two Atchison Sewers are Better Than One</i> Settich (45) 11:15–11:45

• Keynote Address: <b>Stanislav Ioudenitch</b> • O'Malley-McAllister Auditorium							
Time	Gangel Seminar Room	Room 308	Room 219	Room 208	Room 108	Room 124	
1:00– 2:20							
2:35– 2:55	Muenks <i>What Is Conceivable Is Possible? An Argument Against David Hume</i> Crifasi (46)	Chilcote-Crawford <i>How BC Speaks</i> Simmott (47)	Brandl <i>Discovering the Power of Electricity: Rail Guns</i> Fox-Linton (48)	Stark <i>Plated Mail, A Further Investigation of Chainmail</i> Nicholas (49)	Corbella <i>Para-Substituent Effect on the Rate-Determining Steps of VIM-2 β-Lactamase-... Sutton (50)</i>	(Open)	
3:10– 3:30		Duckworth <i>A Naturalist Inquiry Into the Relationship Between Individuals With Disabilities and the Sacraments</i> Ramsey (51)	Green <i>T-Shirt/Potato Pneumatic Gun</i> Spencer (52)	Mullins <i>Stress Levels ... As Indicated by Cortisol Levels</i> Connelly (53)	(Open)	Malinauskas <i>Atchison: Ad Astra Per Aspera</i> Traffas (54)	
3:45– 4:05	Godin <i>Amphibian Occurrence ... in Northeastern Kansas</i> Simon (55)	Larson <i>The Gifted Complex: ... Pressures of the Gifted Student</i> Ramsey (56)	<b>(Outside Westerman Hall, bottom floor)</b>	Howard <i>EcoWater: A Benedictine Hydration Project</i> Humburg (57)	Tasler <i>Pigeon Pedal</i> Spencer (58)	Harris <i>Making a 2D RPG Game Designer</i> Vanderhyde (59)	
4:15– 5:00	Baehr <i>Three Songs for Soprano</i> Greco (60)	Benedictine College Composers — O'Malley-McAllister Auditorium				Bittner <i>Requiem for the Holy Innocents</i> Greco (62)	
		O'Brien <i>Angelica and Onward</i> Greco (61)					

Index of Presenters by Session (**Lead Presenters**)

Alongi, Joseph	<b>19</b>
Ashburn, Allison	<b>3, 54</b>
Baehr, Christine	<b>60, 62</b>
Baird, Scott	3
Barnett, Casey	5
Barrera, Paulina	16
Bax, Ryan	37
Bechina, Michael	62
Bennett, Jane	4
Bickford, Lauren	54
Bittner, Katherine	<b>62</b>
Bohovic, John	57
Bowen, Daniel	25, 29, 30, 35, 39
Bowen, John	54
Boyer, Corey	13
Brandl, Justin	<b>48</b>
Bruegger, Jenna	54
Bruegger, Joshua	7
Brungardt, Virginia	62
Brunick, Chase	<b>10, 45</b>
Bryant, Kevin	5
Buhman-Wiggs, Adam	13, 53
Burghart, Paul	62
Callanan, Gabrielle	54
Carson, Graham	58
Casino, Jono	<b>20</b>
Chilcote-Crawford, Hillary	<b>41, 47</b>
Christ, Amelia	47
Clinesmith, Patricia	<b>6, 11, 22</b>
Cofield, Kelley	56
Collar, Lindsay	28
Connelly, Lynne	34, 53
Cook, Stacie	53
Corbella, Katherine	<b>50</b>
Coronado, Richard	41
Crifasi, Anthony	46
Dague, Everett	18
Daly, Christine	4
Daugherty, Erin	54
Deniger, Joyanna	16
Doetsch, Kathleen	13
Donaldson, Ryley	57
Drimmel, Daniel	55
Duckworth, Rebecca	<b>51</b>

Dunleavy, Dennis	22
Egging, Paula	<b>21</b>
Ekiss, Christopher	28
Ersoy, Baris	45
Estee, Karina	33
Falke, Matthew	57
Fanton, Myron	26
Finken, Nathan	37, 58
Fischer, Karl	32
Flynn, Mary	19
Fox-Linton, Eric	48
Frederick, Gregory	13
Gawarecki, Nicholas	62
Gawatz, Grace	33
Gifford, Peter	10
Gillihan, Morgan	1
Godin, Michael	<b>55</b>
Golden, Rachel	45
Gonzales, Julio	<b>12</b>
Gonzales, Valerie	<b>9</b>
Gorman, Katherine	<b>5</b>
Greco, Christopher	60, 61, 62
Green, Andrew	37, <b>52</b>
Gromatzky, Steven	8
Gugliotta-Kremer, Lucia	<b>17</b>
Hallberg, Constance	23, 53
Hansen, Jan	16
Hanson, John	20
Harris, James	<b>59</b>
Harrity, Mary	10, 45
Healey, Robert	<b>13</b>
Hegarty, Peter	37
Helgesen, Pete	4
Henninger, Ean	<b>43</b>
Heron, Joseph	62
Heschmeyer, Ann	<b>18, 22</b>
Hiatt, Kimberley	1
Hicks, Anna	<b>23</b>
Higson, Theresa	13
Hladik, Mariana	1
Hock, Anthony	10
Holly, Fiona	8
Howard, Rebecca	<b>8, 57</b>
Hoytal, Brian	<b>24</b>
Humburg, Angela	57

Ishmael, Dominic	10
Jarchow, Jenica	<b>25</b>
Keat, Katrina	62
Kelly, Benjamin	20
Kelly, Theresa	13
Kern, Anna	57
Kranz, Aaron	33
Lafser, Benjamin	<b>26</b>
Larson, Brooke	<b>56</b>
Leger, Jeffery	52
LeGrand, Abigail	<b>1</b>
Linton, Lauren	28
Litz, Samuel	<b>27</b>
Locascio, Joseph	37
Loew, Andrew	13
Makkawy, Sarah	13
Malinauskas, Rachel	<b>54</b>
Malloy, Terrence	14, 25, 29, 30, 39
Mantia, Bridgette	13
Maples, Rebecca	54
Martin, Erin	62
Mauro, Therese	13
Maxwell, David	54
McDonough, Erin	10
McGuire, Patrick	<b>28, 29</b>
McIntosh, Samantha	10, <b>44</b>
Megargle, Michael	13
Mellein, Peter	1
Miller, Dakota	57
Miller, Kevin	27
Miller, Leah	51
Misceo, Giovanni	36
Mori, Daisuke	20
Muenks, Anne	<b>46</b>
Mullins, Gabrielle	<b>14, 53</b>
Myers, Benjamin	37
Nicholas, George	49
Noffke, Stephen	37
Nordhus, Matthew	37
O'Brien, Christopher	13, <b>61</b>
O'Brien, Mary	38
O'Hagan, Ian	54
O'Malley, Patrick	37
Orel, Alexander	45
Ortiz, Meghan	28

Oswald, Kristen	31
Page, Ryan	10
Park, Keegan	28, <b>30</b>
Parks, Eric	12
Parks, Shannon	<b>6, 11</b>
Pavlovich, Anna	<b>31</b>
Peredo, Amy	9
Pesely, Matthew	<b>32</b>
Peters, Evan	37
Peters, OSB, Deborah	7
Peterson, James	12
Pick, Simon	62
Piper, Joshua	31
Pistek, Mary	56
Popp, Naomi	1
Porter, Daniel	27
Prentice, Alexander	55
Prowant, Lisa	38
Ramsey, Matthew	9, 17, 21, 51, 56
Ranieri, Stefan	33
Rioux, Joseph	<b>2</b>
Ritter, Olivia	51
Rodacy, Brigita	57
Rodriguez, Paul	<b>16</b>
Rogers, Lauren	<b>33</b>
Rohm, Zachary	37
Romano, John	6, 11
Ross, Amy	56
Rosser, Kristen	16
Ruedi, Grace	51
Rush, Danielle	38
Scavuzzo, Vincent	<b>34</b>
Schaefer, Katelyn	<b>15</b>
Schneller, Laura Lynn	36
Settich, John	10, 27, 44, 45
Severson, Jonathan	<b>42</b>
Shaneyfelt, Kathleen	51
Simon, Martin	28, 38, 40, 55
Sinnott, Sarah	47
Skorey, Maria	33
Spencer, Steve	24, 37, 52, 58
Spiering, Jamie	2
Stackpole, Elizabeth	51
Stark, Zachary	<b>35, 49</b>
Steele, Christine	9

Steinbach, Paul	28, 31, 33
Straub, Matthew	13
Sullivan, David	16
Sutton, Larry	32, 42, 50
Szalewski, Elizabeth	<b>36</b>
Tasler, Christopher	<b>37, 58</b>
Taylor, Ana	28
Tharman, Elizabeth	<b>38, 39</b>
Thayer, Emily	54
Thomas, John	13
Toner, Rachel	51
Traffas, Susan	54
Vanderhyde, James	20, 59
Vey, Lillian	54
Voboril, Matej	20
Vogrin, Amy	14, 38
Vu, Alexander	1
Wagle, Paul	32
Walz, Tricia	50
Warnke, Timothy	62
Wellbrock, Darren	58
Willis, Lisa	13, <b>40</b> , 54
Wolfe, Francine	59
Wood, Karen	15
Workman, Stephen	1
Wright, William	13
York, Kathleen	<b>4</b>
Young, Sarah	43



## Notes





“BE NOT AFRAID”

Blessed John Paul II -Mt 28:1-10