Program of Events

Discovery Day Symposium

April 13, 2016
Welcome to Discovery Day 2016

Welcome to Discovery Day in our year-long celebration of the Century of Science.

The Discovery Program highlights science at Benedictine College in important ways. First, it is a product of the great science program here because the college’s scientists are among its founders. One of its founders, Dr. Doug Brothers was this year honored by Ingram’s magazine as a Kansas City Icon of Education. Second, Discovery Day is a great example of what makes Benedictine College science unique: students and professors working together on creating and presenting original research in a community of faith and scholarship.

It is amazing to see what our students are capable of, when given the freedom, training, and encouragement to accomplish great things. Thank you so much to all who contributed so much time and effort to make the Discovery Program possible.

President Stephen D. Minnis

Discovery Day 2016 marks the twenty-first year of the Discovery Day Symposium. Since 1996, more than 2540 students have presented or co-authored a Discovery Project, involving virtually all the faculty and representing all academic departments. Discovery Day 2016 will present 90 projects, the result of the work of 244 students, 45 faculty/staff, and 21 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 they can draw on their knowledge and creativity to face the challenges that await the future.

On behalf of the faculty and administration of Benedictine College, I encourage you to participate fully in the activities of this day. 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 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 is student member Catherine Glenn; and faculty members Chris Childers (History), Patrick O’Malley (Engineering), Bryan Park (Art), Michael Stigman (English), and Terrence Malloy and Julia Bowen (Discovery Program Co-Directors).

Discovery Grants

The Discovery Program committee awarded over $19,600 in Discovery grants to students this year in support of 47 Discovery projects. The 2015–2016 Discovery grant recipients are the following:

Matthew Anderson  Natalie Gallatin  Emily Kennebeck
Samuel Anderson  Caitlin Gibson  Joshua Kice
Michael Baldwin  Jennifer Gilbert  Michael Klein
Christina Barth  Catherine Glenn  Catherine Kluempers
Elizabeth Benda  Diane Gorrell  Madeleine Kluempers
Brandon Betsch  Galen Gossman  Daniel Kopitke
Shannon Biwer  Kenneth Green  Thomas Kroh
Margaret Boone  Anna Greenlee  Scott Kuefler
Melissa Borsh  Lorenzo Gregory  Christopher Kujawa
Nicholas Brouillette  Andrew Greiner  Natalie Lager
JonElliott Brubaker  Ruth Gross  Nicholas Lahr
Allison Buell  Molly Hair  Meghan Lancaster
Adam Burke  Darren Handy  Mary Lawlor
Joshua Canaday  Lauren Hankes  Sang Hyeok Lee
Maggie Carpenter  Anne Hatfalvi  Jeffrey Leger
Julia Chahine  William Hawkins  Lucy Leighton
Rebecca Chouinard  Gabriel Heffernan  Kathryn Lenertz
Leacadia Christensen  Elizabeth Heil  Jessica Linton
Bienvenido Cortes  Julia Hemman  Nicholas Lober
Brian Curran  Jack Herbic  Joseph Locascio
Philip Davis  Rachel Hernandez  Jacob Martin
Kieran Dornay  Rosemary Herold  Rachel Masotti
Lauren Dorsett  Timothy Heron  Stuart Mast
Michael Duchesne  Rebecca Hess  Graham Matlock
Emily Dyer  Paul Heuser  Whitney Matous
Gerard Edwards  Katharine Hirl  Alexia McAndrews
Hunter Eisenmenger  Elise Huntley  Lorryn McGuire
Sierra Esau  Kristen Hylen  Daniel McMahon
John Finders  Paul Imgrund  Elizabeth Medina
Michaela Flax  Charles Iner  William Medina
Lee Fredrickson  Elizabeth Intfen
Andreas Fritz  James Keat  Thaddeus Messer
Last year marked the thirteenth 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 2015, these seniors were honored as Discovery Scholars:

- Michael Collins ........................................ Rancho Palos Verdes, CA
- Bridget Conry ........................................ Waunakee, WI
- Paula Egging ........................................ Inver Grove Heights, MN
- Rachel Foguth .......................................... Elburn, IL
- Abigail Hamel .......................................... Topeka, KS
- Erica Johnson .......................................... Springfield, MO
- Anne Koppes .......................................... Yorba Linda, CA
- Katelyn Manos .......................................... Howell, MI
- Colton Martin .......................................... Falls City, NE
- Erin McDonough ...................................... St. Charles, MO
- Kelley McVeigh ........................................ Riverside, CA
- Mary Miller .............................................. Juneau, WI
- Travis Morrison ........................................ Sacramento, CA
- Eric Newton ............................................ Springfield, MO
- Simon Pick .............................................. Remsen, IA
- Deanna Ramos .......................................... Duncanville, TX
- Elizabeth Yawarsky ................................... Carroll, IA
Wangari Maathai Discovery Award

When Wangari Maathai accepted the Nobel Peace Prize on December 10, 2004, she made her alma mater the only Catholic college in America with a Peace Prize winner among its alumni. She won the Nobel for her efforts to promote democracy, peace, and sustainable development and is the first Peace Prize winner to have an environmental focus. Maathai, from Kenya, came to the United States as part of the Kennedy Airlift in 1960 and earned a degree in biology from Mount St. Scholastica College, now Benedictine College, in 1964. On December 10, 2014, the college marked the 10th Anniversary of the Nobel ceremony by announcing the winners of two new Maathai Discovery Awards.

Maathai returned to Benedictine College in 2007 to give an address that drew thousands and made national news. She passed away in 2011 after battling cancer. Since then, the College has remembered her in several ways. Her classmates from the Mount Class of ’64 planted a tree in St. Scholastica Plaza on the college campus, and in 2015 her statue was erected next to that tree. Now, a donor has stepped up and given the funds for Mount St. Scholastica to endow two awards in her name. Sister Helen Mueting, OSB, announced the first recipients of the awards, which are tied to Benedictine’s Discovery Program, on December 10.

The winners of the Maathai Discovery Awards are Katharine Hirl and Jeremy Spalding. Both students are presenting the results of their research during today’s Discovery Symposium.

Hirl, a senior engineering and chemistry major, worked on a project called “Study of the Viability of Anaerobic Digestion at Benedictine College Phase 1: Construction of the Test Reactor and Procedure.” The objective of her project was to determine if Benedictine College may use anaerobic digestion as a viable renewable energy source.

Spalding, a senior mechanical engineering major, worked on a project called “Waste Oil Furnace.” The goal of his project was to be able to melt and cast various metals in the most environmentally friendly and sustainable way possible.

Each Maathai Discovery Award carries a $500 stipend for the student, and up to an additional $500 to complete their proposed Discovery Project. The award supports projects that focus on stewardship, sustainability, women’s equality, and/or environmental justice.
Keynote Address

Bernard Amadei, Ph.D.
Professor of Civil Engineering
University of Colorado – Boulder

“Engineering for Sustainable Human Development”

Welcoming remarks by Stephen D. Minnis
President of the College

1:00–2:20 PM
O’Malley–McAllister Auditorium

Dr. Bernard Amadei is the founder of Engineers Without Borders-USA and currently is a professor of civil engineering at the University of Colorado – Boulder. A native of Roubaix, France, he earned a Diploma Engineer in 1977 from the School of Applied Geology and Mining Engineering (Ecole Supérieure de Géologie Appliquée et de Prospection Minière) in Nancy, France. Following a year of service in the French Army, he began his graduate studies. He earned a Master of Science from the University of Toronto in 1979 and was awarded a doctorate (PhD) in civil engineering in 1982 from the University of California, Berkeley. He is a member of the National Academy of Engineering and a recipient of the Hoover Medal. In 2009, he was recognized with an Award of Excellence from Engineering News-Record. In 2012, Dr. Amadei was appointed as a Science Envoy by the U.S. Department of State.

In 2000, Amadei took a group of eight engineering students to Belize to build a water pump for the village of San Pablo. The pump was powered by a local waterfall and provided clean water to the village. The simple, sustainable and low-cost solution was the first Engineers Without Borders-USA (EWB-USA) project.

This model of engineering students partnering with developing communities resonated in the engineering and university communities and EWB-USA chapters began expanding across the United States. Since its incorporation in 2002, EWB-USA has grown from a handful of passionate individuals to an organization of more than 15,900 members. Through programs similar to the first program in Belize, EWB-USA members have impacted more than 2.5 million lives around the world.
Discovery Day Schedule

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

Continental Breakfast

7:30 AM — Napier Foyer (4th floor), Ferrell Academic Center

Morning Sessions

7:40–8:35  Poster/Exhibit Session #1
McAllister Board Room (4th floor)

1. Effects of TES-1 Loss on Migration in Embryonic Mouse Fibroblasts
   Jon Elliott Brubaker, Alexander Van Keulen, Mark Schramp, Biology

2. Sexual Selection Based on Feather Plumage and Ornamentation in Common Yellow-Throats (Geothlypis) and Dicksissels (Spiza americana)
   Natalie Cook, Jacob Cushing, Virginia Winder, Biology

3. Genetic Analysis of TES-1 and Actin Regulating Proteins During Epithelial Morphogenesis in C. elegans
   Bienvenido Cortes, Brennan Roche, Mark Schramp, Biology

4. Relationships Between Interpersonal Variables, Such as Age, Gender, Athletic Participation, and Collegiate Academics
   Erin Daly, Kallie Woodward, Emily Kippes, Rebecca Koehn, Lynne Connelly, Nursing

5. Knowledge Deficit in Patients With Diabetes
   Alexandra Faraj-Musleh, Rachel Snyder, Lynne Connelly, Nursing

6. Discover Magazine: Graphic Design
   Galen Gossman, Anna Greenlee, Clare Tapia, Art

7. An In-depth Analysis of WIFI Router Password Protection and Safety
   Paul Harrison, Alexander Rohm, Eric West, Mathematics and Computer Science

8. A Comparison of Major Vault Protein in Cells Affected by Barrett’s Esophagus and Normal Esophageal Epithelial Cells
   Kristen Hylen, Julia Hemman, Martha Carletti, Biology

9. Photography Darkroom: A Traditional Technique in Contemporary Art
   Kathryn Lenertz, Sang Hyeok Lee, Bryan Park, Art
10. Concrete Canoe Hull Design and Construction  
   *Joseph Locascio*, Patrick Michaels, Scott Newbolds, Engineering

11. Open Hardware Power Transmission  
   *Jacob Martin*, Paul Heuser, Daniel McMahon, Johanna Wieczorek, Charles Sprouse, Engineering

12. To Stretch or Not To Stretch?  
   *Lorryn McGuire*, Lee Fredrickson, Lanny Leroy, Health, Wellness, and Exercise Science

13. Patient Satisfaction Surveys at the Benedictine College Student Health Clinic  
   *Elizabeth Medina*, Julia Reinhardt, Sierra Esau, Maria Sergeant, Emily Prosser, Lynne Connelly, Nursing

   *Allison Mendenhall*, Gail Blaustein, Chemistry and Biochemistry

15. Nuclear Reactors: How They Work  
   *Derek Rodgers*, Eric Fox-Linton, Physics and Astronomy

   8:45–9:05 ∗ Room 109

16. Women’s Rights: Subjective Perceptions in a Modern Age  
   *Elise Huntley*, Karen Wood, Sociology and Criminology

   8:45–9:05 ∗ Room 124

17. Autonomous Drone Monitoring of Parking Lots for Empty Parking Spaces  
   *Matthew Anderson*, Patrick O’Malley, Engineering

   8:45–9:05 ∗ Room 125

18. The Kornilov Affair, Aleksandr Kerensky, and the Fall of Russian Democracy  
   *Brian Curran*, Richard Crane, History

   8:45–9:05 ∗ Room 208

19. The Art of Mt. St. Scholastica: Illuminated Manuscripts  
   *Michaela Flax*, Natalie Gallatin, Carlyn Olson, Lucy Leighton, Cathryn Treco, Catherine Glenn, Christa Kagin, Art

   8:45–9:05 ∗ Room 219
20. How Nursing Patient Education and Communication Can Learn From the Educational Model of Teaching Individuals With Intellectual Disability  
Krista Kosek, Matthew Ramsey, Education  
8:45–9:05 * Gangel Seminar Room

21. The Freedom of Chains: An Examination of Poetry in the Gulag Camps  
Laura Romaine, Susan Traffas, Honors Program  
8:45–9:05 * Room 323

22. Waste Oil Furnace  
Jeremy Spalding, Nicholas Lober, Kenneth Green, Bryan Park, Art  
9:15–9:35 * Room 109

23. Individual Income Taxes and Political Plans  
Lillian Hoover, Maria Mayhak, Kristen Whiteley, School of Business  
9:15–9:35 * Room 124

24. Testing Herwig: The Role of Officers in the Kiel Mutiny  
Thomas Kroh, Richard Crane, History  
9:15–9:35 * Room 125

25. Why They Vote: The Iowa Caucus  
Darren Handy, Joshua Canaday, Stanton Skerjanec, Benjamin Randolph, Joseph Shaneyfelt, Christiana Reasor, Kael Stoaks, John Settich, Political Science  
9:15–9:35 * Room 208

26. Recording and Composition for Female Quartet: “Japanese Lullaby”  
Mary Rumpza, Timothy Tharaldson, Music  
9:15–9:35 * Room 219

27. Understanding Communications Signals  
John Finders, Andreas Fritz, Matthew Vogrin, Matthew Richard, Physics and Astronomy  
9:15–9:35 * Gangel Seminar Room

28. Study of the Viability of Anaerobic Digestion at Benedictine College Phase 1: Construction of the Test Reactor and Procedure  
Katharine Hirl, Maggie Carpenter, Samantha Turner, Evan Sutherland, James Keat, Austen Miller, Ryan Spellman, Christopher Palm, Scott Blonigen, Engineering  
9:15–9:35 * Room 323
29. The Synthesis and Fluorescence of N-(p-substitutedbenzalamino) oxindoles
   Jacob Unnerstall, Melissa Borsh, Paul Steinbach, Chemistry and Biochemistry
   9:45–10:05 * Room 109

30. Benedictine’s First-Ever 24-Hour Theatre Festival: Seven Impossible Things Before Breakfast
   Rosemary Herold, Clare Nowak, Eamon Mulholland, Conner Novacek, Peter Barstad, Paul Modlin, Emily Kennebeck, Scott Cox, Theatre Arts and Dance
   9:45–10:05 * Room 124

31. Vertical Milling Machine in Pursuit of Precision
   Scott Kuefler, Kenneth Green, Steve Spencer, Engineering
   9:45–10:05 * Room 125

32. The Economic Effects of a Drop in Oil Prices
   Maria Mayhak, Lillian Hoover, David Harris, Economics
   9:45–10:05 * Room 208

33. Per la Tromba: A Brief History
   William Medina, Theodore Hanman, Music
   9:45–10:05 * Room 219

34. Parish Evangelization: An Art of Living in Community
   Mary Suprenant, Matthew Ramage, Theology
   9:45–10:05 * Gangel Seminar Room

35. New Kids on the Block: Experiences of First-Year Teachers
   Brooke Arconati, Callie Baumberger, Kathleen Gathright, Rose Sabin, Christina Adams, Education
   9:45–10:05 * Room 323

10:15–11:10  Poster/Exhibit Session #2
   McAllister Board Room (4th floor)

36. Assessment of Women’s Health Knowledge
   Mary Minnis, Natalie Roberts, Lynne Connelly, Nursing

   Joseph Naugle, Joshua Linton, Jacob Poston, Chris Glenski, School of Business

38. Steel Wool Photography
   Melissa Nigrin, Danielle Reynoldson, Dennis Dunleavy, Journalism and Mass Communications
   James Nistler, Mario Skertchly, Margaret Kempf, Hanna Torline, Sydney Wolf, Elizabeth Intfen, Paul Heuser, Michael Klein, Maggie Carpenter, Shannon Globensky, Joseph Locascio, Scott Newbolds, Engineering

40. The Effects of Perinatal Hospice on Mothers
   Melissa Ott, Theresa Ott, Therese McCance, Morgan Schumacher, Lynne Connelly, Nursing

41. Survey of Vertebrate Diversity in the Benedictine Bottoms
   Susan Pistek, Sarah Schmit, Miranda Toyne, Kieran Dornay, Ashley Tylksi, Anna Tust, Virginia Winder, Biology

42. Synthesis of an Iron-coordinated Macrocyclic Catalyst for Water Oxidation
   Michael Salemi, Kolbe Scheetz, Chemistry and Biochemistry

43. Concrete Canoe Mix Design
   Joshua Scheuler, Thaddeus Messer, Scott Newbolds, Engineering

44. Inner Beauty Manifested in Art
   Danielle Shanahan, Daniel Kopitke, Bryan Park, Art

45. Computer Controlled Drawing Machine
   Aidan Shaughnessy, Steve Spencer, Engineering

46. Progress Towards Construction of a Point-of-Care Bacterial Versus Viral Infection Diagnostic Test
   Nathaniel Stacy, Cody Sherlock, Larry Sutton, Chemistry and Biochemistry

47. Climbing Trees for Tardigrades
   Laura Tibbs, Bienvenido Cortes, Terrence Malloy, Biology

48. Liquid Fluidized Bed
   Samantha Turner, Maggie Carpenter, Elizabeth Intfen, Mary Lawlor, Nicholas Brouillette, Scott Blonigen, Engineering

49. Weddings and Witchcraft: A Collection of Italian Folklore
   Cecilia Wood, Julia Bowen, English

50. Macroinvertebrate Diversity and Abundance in a Mitigated Wetland on the Benedictine Bottoms
   Madison Zubradt, Tara Schofield, Whitney Matous, Rachel Masotti, Emily Dyer, Virginia Winder, Terrence Malloy, Biology
51. Potato Cannons: An Application of Mechanical Valves
   Adam Burke, Paul Wessel, Samuel Anderson, John Krishnan Myjak, William Hawkins, Steve Spencer, Engineering
   11:15–11:45 * Room 109

52. Babies & Careers
   Gabrielle Douglass, Elizabeth Clum, Julianne Smith, Emily Marker, William Raymond, Political Science
   11:15–11:45 * Room 124

53. The Effects of Kinesthetic Learning on Students With ADHD: A Comprehensive Study
   Danika Lang, Matthew Ramsey, Education
   11:15–11:45 * Room 125

54. Qué obviedad tan difícil: Una Telenovela
   Claire Schroettner, Mariana Sosa, Nicholas Lahr, Michael Duchesne, Hannah Vogt, Kristina Pikula, Lorenzo Gregory, Philip Davis, Julie Sellers, World and Classical Languages and Cultures
   11:15–11:45 * Room 208

55. John of St. Thomas and the Lumen Gloriae: A Translation and Analysis of John of St. Thomas on the Beatific Vision
   Thomas DePauw, Edward Macierowski, Philosophy
   11:15–11:45 * Room 219

56. Art and Mood: An Exploration
   Meghan Lancaster, Christa Kagin, Art
   11:15–11:45 * Gangel Seminar Room

57. “The Good Morrow,” an Original Choral Composition Based on Poetic Text by John Donne
   Hunter Eisenmenger, Margaret Boone, Erica Rohde, Molly Hair, Lauren Hankes, Rebecca Hess, Jessica Pavlik, Alexia McAndrews, Leacadia Christensen, Emily Kennebeck, Catherine Kluempers, Maria Starks, Madeleine Kopacz, Anthony Crifasi, Paul Murphy, Charles Iner, Timothy Heron, Joseph McCance, Michael O’Brien, Douglas Wahl, Justin Tran, Austin Lager, Timothy Tharaldson, Music
   11:30–11:50 * St. Benedict’s Church

11:30 AM–12:50 PM ♦ Lunch – Dining Hall
   ♫ Jazz Band Entertainment ♫
Keynote Address

“Engineering for Sustainable Human Development”

Bernard Amadei, Ph.D.

1:00–2:20 PM
O’Malley-McAllister Auditorium

Afternoon Sessions

58. The Next Big Question in Gender Equality
Peter Barstad, Velia Colunga, William Raymond, Political Science
2:35–2:55 * Room 109

59. Comparison of Dicer Levels of Normal Esophagus vs. Barrett’s
Anastasia Ratcliff, Laurencia Ouedraogo, Martha Carletti, Biology
2:35–2:55 * Room 124

60. Design and Development of Small UAVs
Graham Matlock, Andreas Fritz, Christopher Kujawa, Samuel Anderson, Anne Hatfalvi, Julia Chahine, Charles Sprouse, Engineering
2:35–2:55 * Room 125

61. Virtual or Physical, Which Community is More Fulfilling? Study on Social Media
Olivia Dowling, Clay Johnston, School of Business
2:35–2:55 * Room 208

62. Bringing Multicultural Education to the Secondary Classroom: Moving Beyond the Theoretical
Laura Romaine, Christina Adams, Education
2:35–2:55 * Room 219

63. A Historical Analysis of “The Feminine Mystique”
Elise Huntley, John Romano, History
2:35–2:55 * Gangel Seminar Room

64. Classroom to Community
Sydney Giefer, Angela Lorang, Scott Cox, Theatre Arts and Dance
2:35–2:55 * Room 323
65. The Pursuit of Beauty: Process, Aesthetic, and Concept  
Marie Orsinger, Shannon Biwer, Clare Tapia, Christa Kagin, Art  
2:35–2:55 * Band Room (JPII)

66. Forrest Gump, Ping Pong, and the Week That Changed the World  
Ashley Roberts, Caroline Cundiff, Katherine Greenwood, William Raymond, Political Science  
3:05–3:25 * Room 109

67. Natural Mathematics: Exploring Fibonacci and Phi in Nature  
Kelsey Gengler, Katelyn Dery, Leah Childers, Mathematics and Computer Science  
3:05–3:25 * Room 124

68. Incubation Behaviors of the Dark-eyed Junco (Junco hyemalis)  
Natalie Cook, Virginia Winder, Biology  
3:05–3:25 * Room 125

69. Primary Reaction Coordinate Proton Transfer in IMP-1 Carbapenemase Hydrolysis of β-Lactams  
Angela Poffenberger, Larry Sutton, Chemistry and Biochemistry  
3:05–3:25 * Room 208

70. Are You Engaged? Ways for Kinesthetic Students Actively to Learn  
Samantha Kelly, Mackenzie Caylor, Piper Wentz, Education  
3:05–3:25 * Room 219

71. Olga Nikolevna Romanova Ballet  
Elizabeth Benda, Allison Buell, Laurence Rossi, Rebecca Chouinard, Lauren Dorsett, Jeffrey Leger, Eamonn Mulholland, Caitlin Gibson, Marie Orsinger, Valerie Mulholland, Peter Volmert, Patrick Mulholland, Gabriel Heffernan, Stuart Mast, Diane Gorrell, Scott Cox, Theatre Arts and Dance  
3:05–3:25 * Gangel Seminar Room

72. Modeling Hawking Radiation of Black Holes  
Jack Herbic, Eric Fox-Linton, Physics and Astronomy  
3:05–3:25 * Room 323

73. Discovering Dada  
Claire Nacanaynay, Christine Flint, Margaret McCabe, Mayra Ortiz, Christa Kagin, Art  
3:05–3:25 * Band Room (JPII)
74. Catholic Literature in Secondary Schools: Literary and Theological Application  
Rachel Gleeson, Hannah Klamerus, Stephen Mirarchi  
3:35–3:55 * Room 109

75. Examining the Achievement Gap in Atchison  
Lucy Leighton, Christina Adams, Education  
3:35–3:55 * Room 124

76. Is Benedictine College Losing One of Its Core Values? The International Perspective on Community  
Cori Drouhard, Camrie Ventry, Eriko Mori, Mary Catherine Willacker, William Raymond, Political Science  
3:35–3:55 * Room 125

77. Development of Luminescent Solar Concentrators  
Nathaniel Strandquist, David Byrum, Georgiy Shcherbatyuk, Physics and Astronomy  
3:35–3:55 * Room 208

78. Oedipus Rex: Bringing Greek Tragedy to the Stage  
Abigail Niemann, Matthew Phillips, Paul Imgrund, Elizabeth Heil, Edward Mulholland, Derek Trautwein, World and Classical Languages and Cultures, and Theatre Arts and Dance  
3:35–3:55 * Room 219

79. Design and Manufacture of a Camera Ring Flash  
Michael Klein, Dennis Dunleavy, Myron Fanton, Steve Spencer, Journalism and Mass Communications, and Engineering  
3:35–3:55 * Gangel Seminar Room

80. The Increase of QK1 Protein Levels Between Esophagus Cells and Esophageal Adenocarcinoma  
Brandon Betsch, Jessica Linton, Jennifer Gilbert, Martha Carletti, Biology  
3:35–3:55 * Room 323

81. The Little Prince — Page to Stage  
Diane Gorrell; Clare Nowak, Director; Christina Barth, Composer; Danielle Shanahan, Puppet, Costume Designer, Little Prince; Rosemary Herold, Pilot; Natalie Gallatin, Puppeteer; Elena Teresa Moore, Grown-ups; Elizabeth Benda, Choreography; Peter Olson, Sound Designer; Madison Welte, Stage Manager; Scott Cox, Theatre Arts and Dance  
3:35–4:35 * Band Room (JPII)
82. **Ion Production in Titan’s Ionosphere Due to Energetic Protons**  
*Austin Windsor, Matthew Richard, Physics and Astronomy*  
4:05–4:25 * Room 109

83. **“Explorations in the Art of Storytelling”: Learning to Tell Stories Through Written and Visual Communication**  
*Micahela Kinyon, Laurence Rossi, Stephen Mirarchi, English*  
4:05–4:25 * Room 124

84. **Mechanized Turret Control**  
*Jacob Wildhaber, Andrew Greiner, Graham Matlock, Isaac Straus, Myron Fantan, Engineering*  
4:05–4:25 * Room 125

85. **Progress Towards a Coupled Enzyme Assay to Monitor Bile Salt Hydrolase Activity**  
*Rachel Hernandez, Larry Sutton, Chemistry and Biochemistry*  
4:05–4:25 * Room 208

86. **Awareness of the Impacts of Sensory Processing Disorder**  
*Clare Hildebrand, MariAnna Martin, Claire Reed, Katherine Hoffman, Jordan Closter, Matthew Ramsey, Education*  
4:05–4:25 * Room 219

87. **Design and Construction of a Snowboard**  
*Gerard Edwards, Joshua Kice, Michael Baldwin, Steve Spencer, Engineering*  
4:05–4:25 * Gangel Seminar Room

88. **Open Hardware Off-Road Go-Kart**  
*Thomas Olache, Graham Matlock, Nicholas Olache, Ruth Gross, Daniel McMahon, Cora Odoala, Paul Heuser, Johanna Wieczorek, Charles Sprouse, Engineering*  
4:05–4:25 * Room 323

89. **An Exploration of Music Composition**  
*Margaret Boone, Nicholas Lahr, Stephanie Nelson, Alexandria Schneider, Meghan Roush, Alexia McAndrews, Leacadia Christensen, Madeleine Kopacz, Miriam Walski, Katherine Schaefer, Timothy Heron, Timothy Tharaldson, Charles Iner, Hunter Eisenmenger, Paul Murphy, William Medina, Jessica Pavlik, Benjamin Bogner, Gabriel Heffernan, Jonathon Miron, Elena Teresa Moore, Michael O’Brien, Christopher Greco, Music*  
4:40–5:20 * O’Malley-McAllister Auditorium

90. **C3 P-0: A 12-Tone Study of John Williams’ Imperial March**  
*Alexandria Schneider, Paul Murphy, Christopher Greco, Music*  
4:40–5:20 * O’Malley-McAllister Auditorium
1. Effects of TES-1 Loss on Migration in Embryonic Mouse Fibroblasts  
*JonElliott Brubaker, Alexander Van Keulen, Mark Schramp, Biology*

Epithelial cells comprise one of the basic types of cell tissue. This tissue lines the cavities and surfaces of blood vessels and organs throughout the body of an organism. Epithelial cells participate in organ formation and body shape by a process called epithelial morphogenesis. Epithelial morphogenesis involves the migration, adhesion, and polarity of epithelial cells in an organism. This process is critical to organ development and the maintenance of homeostasis within cells. Specific proteins are involved in the migration, adhesion, and polarity of epithelial cells. In the modal organism, *Caenorhabditis elegans*, one of the specific proteins is TES-1. TES-1 is a focal adhesion protein that localizes to cell-matrix adhesions, to cell-cell contacts, and to actin stress fibers. TES-1 is very important in cellular development, and a correlation has been shown between the inhibition of the protein in humans and the development of tumors. The involvement of TES-1 in migration was studied in embryonic mouse fibroblasts. Scratch tests were run with cells containing TES-1 and in cells where *tes-1* was knocked out by RNAi. After 12 hours there was significant movement into the scratch, and after 24 hours the scratch was almost completely closed. Rhodamine-phalloidin and DAPI was used for staining. Western blots were done on these cells to determine if *tes-1* had been knocked down. Images from the scratch tests were analyzed to determine the location of ENA/VASP and PRKL-1, other proteins involved with migration, to see if there was a change in their movement with the absence of TES-1.

2. Sexual Selection Based on Feather Plumage and Ornamentation in Common Yellow-Throats (*Geothlypis*) and Dicksissels (*Spiza americana*)  
*Natalie Cook, Jacob Cushing, Virginia Winder, Biology*

Sexual selection is a component of natural selection in which members of one biological sex choose a mate based on physical, behavioral, or physiological characteristics. For many bird species, plumage and ornamentation of male birds play important roles in sexual selection and mate attraction. In this study we measured the size of ornamentation and plumage patches thought to be under sexual selection in male Common Yellow-throats (*Geothlypis*) and male Dicksissels (*Spiza americana*), two common migrant songbirds that breed throughout much of the Midwest. Birds were target netted in the field, banded, and measured for morphometric characteristics (e.g., bill length, wing length, and mass). We recorded video footage of the plumage of each captured male placed in front of a printed 1×1-cm grid. We generated still images from videos using iMovie and measured the size
of plumage patches using ImageJ software. We used linear models to relate the size of plumage patches to measurements of body size. We expect to observe larger plumage patches on larger bodied individuals. Alternatively, smaller bodied individuals may invest more energy in growing a larger plumage patch. With additional information on species-specific demography of annual survival and nest success, our study will provide insight into the mechanisms behind sexual selection and potential costs associated with maintaining plumage ornaments.

3. Genetic Analysis of TES-1 and Actin Regulating Proteins During Epithelial Morphogenesis in C. elegans

Bienvenido Cortes, Brennan Roche, Mark Schramp, Biology

A myriad of signals and proteins help cells differentiate, gaining specific structures in order to perform their functions. During epithelial cell morphogenesis, vital processes including cell migration, adhesion, and invasion necessitate the formation and dissolution of F-actin as well as cell-matrix and cell-cell adhesions. Using the model organism C. elegans, this project aims to elucidate the regulatory mechanism and function of F-actin in epithelial cell morphogenesis. Previous research focused on the C. elegans gene tes-1. Structurally, the C-terminus of TES-1 contains a PET domain and 3 tandem repeat LIM domains, which interact with other LIM-domain proteins, including many known to regulate the actin cytoskeleton. Physiologically, a null mutation in the tes-1 gene in ok1036 worms results in the protrusive vulva phenotype (pvl), which indicates poor cell adhesion. Our research demonstrates that, during morphogenesis, both vulval precursor cells found in L3 stage worms and vulval cells in the L4 and adult stages express the tes-1 gene; furthermore, TES-1 localizes to sites of epithelial cell-cell and cell-matrix adhesion. A LIM-domain consensus sequence identified 35 other LIM-domain containing proteins, 10 of which have been reported to be expressed in epithelial cells. Preliminary results indicate RNAi knockdown of two of these proteins, ALP-1 and PRKL-1, significantly enhanced the low-frequency pvl phenotype observed in ok1036 worms (p < 0.01). This indicates that they are important to cell adhesion. Further characterization of the phenotype, as well as knockdown of the remaining LIM domain proteins, will help develop a more complete understanding of epithelial morphogenesis.

4. Relationships Between Interpersonal Variables, Such as Age, Gender, Athletic Participation, and Collegiate Academics

Erin Daly, Kallie Woodward, Emily Kippes, Rebecca Koehn, Lynne Connelly, Nursing

The objective of this study was to determine if associations exist between interpersonal variables, such as age, gender, athletic participation, or collegiate field of study and one’s quality and quantity of sleep. Participants were all Benedictine College students who volunteered to participate in the study. The Institutional Review Board at Benedictine College approved the study. All study participants completed an online survey, which was created by the researchers and completion of the survey was considered implied consent. The survey
combined the Pittsburgh Sleep Quality Scale with various demographic questions related to the interpersonal variables being studied. The Pittsburgh Sleep Quality Scale is a well-tested scale with adequate reliability and validity. Descriptive and correlational statistics were used to analyze the data. This study adds to current research regarding sleep among college students, especially with regard to the students’ academic field of study and their participation in varsity athletics.

5. **Knowledge Deficit in Patients With Diabetes**  
   *Alexandra Faraj-Musleh, Rachel Snyder, Lynne Connelly, Nursing*

People with diabetes require education in order to manage their condition on a daily basis. The purpose of our preliminary study was to assess patients with diabetes about their understanding of the disease and how to care for their health. Research literature was searched, and an appropriate survey instrument was found that had adequate reliability and validity. This survey was reviewed by nursing faculty and the health care provider at the clinic. Minor wording changes were made to fit each population to be studied. The survey was distributed at the Atchison Community Health Clinic with the assistance of the nursing staff. We received 12 completed forms from patients at the clinic. The survey was also emailed to students and faculty with diabetes at Benedictine College via Benedictine College FYI. Completion of the survey was considered to be implied consent, and the study was reviewed by the college IRB. Data was entered into Excel ® and analyzed using descriptive and correlational statistics. In addition, the findings from the community clinic patients were compared to the findings from the college population. Our findings will be used to develop and then test a brief education intervention to be used at the community clinic in the next school year. Findings will be shared with clinic staff as well as at Discovery Day.

6. **Discover Magazine: Graphic Design**  
   *Galen Gossman, Anna Greenlee, Clare Tapia, Art*

“Graphic Design” is an umbrella term for a variety of occupations. A graphic designer has the responsibility of creating visual solutions that convey information to promote or enhance a service, product, philosophy, or entity. Graphic designers’ work is used for a wide range of products and activities, such as websites, advertising, books, magazines, posters, computer games, product packaging, exhibitions and displays, corporate communications, corporate identity through visual branding, and much more. A good designer has strong interpersonal and marketing skills in addition to a keen eye and an adept knowledge of electronic media. The creation of Discover Magazine was inspired by the questions I had about the field. The purpose is to answer my questions and gain knowledge about what aspiring graphic designers should do and know to develop a career in this field, as well as reveal the variety of creative positions that are available. Recently been called the coolest city in America, Kansas City is the center of attention in the Midwest. As a growing city of eclectic creative culture, there are many opportunities to pursue a career in graphic design. Discover Magazine takes the reader inside Kansas City and shows a glimpse of the up-and-coming jewel of the
Midwest. It also highlights the stories and efforts of some Benedictine students who are seeking to make a career for themselves as graphic designers.

7. **An In-depth Analysis of WIFI Router Password Protection and Safety**  
   *Paul Harrison, Alexander Rohm, Eric West, Mathematics and Computer Science*

WIFI routers are something many have but few know much about. During the semester, we researched the different ways WIFI routers are protected (some are secure, others not), and through our research, discovered how to improve the security of routers.

8. **A Comparison of Major Vault Protein in Cells Affected by Barrett’s Esophagus and Normal Esophageal Epithelial Cells**  
   *Kristen Hylen, Julia Hemman, Martha Carletti, Biology*

Repeated exposure to acid, as occurs in gastroesophageal reflux disease (GERD), can lead to a phenotypical change in the cells of the esophagus, a condition known as Barrett’s esophagus, which is considered a precursor to esophageal adenocarcinoma. Developing a better understanding of the factors that influence cellular transformation in Barrett’s esophagus can lead to better prevention techniques and better treatments for esophageal adenocarcinoma. Vault organelles act as a storage site for miRNA and can be opened and closed in response to cellular signals. This allows a change in the pool of functioning mRNA available to the cell. Numerous studies have indicated that miRNA, which are post-transcriptional regulators, have a role in the progression of cancer. While there are many pathways that can cause a cell to become cancerous, malfunction of vaults and the miRNA they contain could contribute to unregulated cell growth. The main structural protein in the vault organelle is called Major Vault Protein (MVP). This study sought to examine the levels of MVP in Barrett’s esophagus versus normal esophageal cells. This was done using techniques, such as Western Blot, which tests for presence of and relative amount of major vault protein in Barrett’s versus normal esophageal cells in vitro, and immunohistology, which examines the presence of MVP in vivo. Future studies will continue to look at the role of vault-stored miRNA in Barrett’s esophagus.

9. **Photography Darkroom: A Traditional Technique in Contemporary Art**  
   *Kathryn Lenertz, Sang Hyeok Lee, Bryan Park, Art*

As photography advances in the digital age, there also has been a passionate revival of the roots of the process. The science behind developing a truly successful print is a taxing process, but is one that works to help advance and develop an artist’s technique. Whereas digital cameras have automatic settings that allow the photographer to take a decent picture with little knowledge, film cameras force the photographer to have a deep understanding of lighting, timing, and depth of field. The purpose of this project was to create a fully functioning darkroom. Research was conducted to ensure proper setup, including lighting, plumbing, and ventilation conditions, as well as safe disposal of chemicals. This research was then applied to the construction of the room, which now serves both a
darkroom photography class and a printmaking class. Most important, this research has helped us develop a better understanding of how a photograph comes to exist. In film photography, every detail counts. By learning the foundations and chemistry behind the darkroom process, we have developed as photographers and artists.

10. Concrete Canoe Hull Design and Construction
   **Joseph Locascio, Patrick Michaels, Scott Newbolds, Engineering**
   Each year civil engineering students from Benedictine participate in the National Concrete Canoe Competition in which students are responsible for designing, analyzing, and constructing a four person concrete canoe. The main problem being investigated is how to design the canoe using a material that is not commonly considered for this purpose. This year, the team made tremendous strides in the design and construction of a new canoe. Innovative construction techniques, such as CNC milling of the canoe mold, were adopted. Additionally, a new design software program was used to model and analyze the hull design. Together these two changes allowed the team to build the best and strongest canoe to date.

11. Open Hardware Power Transmission
   **Jacob Martin, Paul Heuser, Daniel McMahon, Johanna Wieczorek, Charles Sprouse, Engineering**
   The goal of the “Open Hardware Off-Road Go-Kart – Power Transmission” project was to reignite and stoke the passion for engineering with which younger engineering students enter college. Due to the relative simplicity of the go-kart build, students of all backgrounds and experiences had the opportunity to contribute to the project, gaining a better appreciation for the joy found in bringing an idea to fruition. We assembled an interdisciplinary student team with backgrounds in mechanical engineering, electrical engineering, biology, nursing, and art. The students provided a unique and fresh design perspective not initially limited to previous design ideas. The power transmission subgroup worked on determining the right motor specifications and gear ratio to produce our desired top speed. Through consistent collaboration with the frame design subgroup, we were able seamlessly to integrate our solution with their design. Our aim was to provide the students of Benedictine College and beyond with the excitement necessary to start a challenging engineering project and the tools necessary to finish both this project and future ones as well. Visit our webpage for more information and pictures: www.bckart.webs.com.

12. To Stretch or Not To Stretch?
   **Lorryn McGuire, Lee Fredrickson, Lanny Leroy, Health, Wellness, and Exercise Science**
   Muscle soreness is a common sensation that every athlete has endured at one time or another. They constantly are told the same thing: if you are sore, go stretch. But, how beneficial is stretching for sore muscles? During our eight-week project, we asked our subjects to complete a daily resistance workout followed by
a specific type of stretching that was assigned to each subject. In addition, the
duration between exercise and stretching varied by week. Twice a week we tested
the point tenderness, tightness, and soreness of the muscles being stressed in the
resistance program. During this time, the subjects also were asked to fill out a
survey that asked questions about how effective stretching had been to them, how
sore they were immediately following their workout and at the time of testing, and
if their muscle soreness was affecting their day-to-day activity. At the end of eight
weeks, we compiled our findings and compared the values to conclude which type
of stretching aids in muscle soreness the best, the prime time in which stretching
should occur after activity, and if stretching is actually beneficial when dealing
with muscle soreness.

13. Patient Satisfaction Surveys at the Benedictine College Student Health
Clinic

Elizabeth Medina, Julia Reinhardt, Sierra Esau, Maria Sergeant, Emily
Prosser, Lynne Connelly, Nursing

The use of a satisfaction survey is essential for the healthcare environment in
order to improve the experience of the patient. At Benedictine College, the student
health clinic staff has expressed a desire to participate in receiving feedback
from students who use the clinic. Therefore, our study is both a research and
service project for the Student Health Center. This group project gathered data
and information from the students seen in the Benedictine Student Health Clinic.
The survey measurement tool is one that we used last year with the Atchison
Community Clinic and worked well to collect data. Slight wording changes were
made to apply to college students, and it was reviewed by nursing faculty. Because
the survey had an instruction sheet with consent information and it was voluntary
and anonymous, completing the survey was considered implied consent. Each
week, we collected the surveys and entered the data into Microsoft Excel for
analysis. When we collected a total of over 100 completed surveys, we analyzed
the data using descriptive and correlation statistics. In addition to presenting the
findings at Discovery Day, we will then present the findings to the clinic staff.

on Internal Hydrogen Bonding of Carbazolopyridinophane and
Diphenylaminopyridinophane

Allison Mendenhall, Gail Blaustein, Chemistry and Biochemistry

Carbazolopyridinophane (2,18-dithia[3](1,8)carbazolo[3](2,6)pyridinophane
(CP)) and diphenylaminopyridinophane (2,18-dithia[3](2,2’diphenylamino[3]
(2,6)pyridinophane (DP)) are heterocyclophanes consisting of fluorophore
(carbazole or diphenylamine) and fluorescence quencher (pyridine) subunits. Both
CP and DP possess an intramolecular hydrogen bond that quenches fluorescence
in nonpolar solvents. However, the presence of protic species has been shown to
disrupt the hydrogen bond and restore fluorescence to the fluorophore, suggesting
CP and DP may be useful as sensors to detect noxious species, such as ammonia
and hydrazine. In this study, the effect of water and ammonia on the internal
hydrogen bond of CP and DP was investigated in both gas phase and heptane solvent. It was hypothesized that the disruption of the internal hydrogen bond in these cyclophanes is the result of preferential hydrogen bonding with water or ammonia. In addition, the geometries of these cyclophane-analyte complexes were explored. Geometry and energy DFT calculations were performed with Gaussian 09, and the polarizable continuum model was used to simulate bulk solvent effects.

15. Nuclear Reactors: How They Work
Derek Rodgers, Eric Fox-Linton, Physics and Astronomy
8:45–9:05 * Room 109

The demand for energy is always increasing, and some of our resources are beginning to run low. Nuclear energy recently has seen growth and is projected to double by 2030 due mainly because it is significantly more efficient than fossil fuels and cheaper than solar energy. This project addresses the physics behind a nuclear reaction and how we can use it to produce electricity. A computer code is written using nuclear physics to find the critical mass of uranium and simulate a nuclear reactor. This project looks to continue to grow over the years to incorporate more complex breeder reactors. This presentation is geared towards a general audience, and no physics knowledge is needed to enjoy the talk.

16. Women’s Rights: Subjective Perceptions in a Modern Age
Elise Huntley, Karen Wood, Sociology and Criminology
8:45–9:05 * Room 124

Feminism is a very controversial topic within Catholic communities. Research indicates that many Catholic women are torn between being a “feminist” and also being true to their faith because feminism is equated with both radicalism and with being pro-abortion. Using a standard definition of feminism, that of “equality between the sexes,” this study explored attitudes about gender equality and abortion in a small Catholic college community (Benedictine College). As hypothesized, of the large (322) sample of Benedictine College community members (mostly students), many respondents demonstrated attitudes that favor equality between the sexes but were reluctant to call those views “feminist” because they perceived feminism as radical. The students also hesitated to use the word feminism because they believed that meant they would have to agree with abortion, which most of the participants did not support. Using both quantitative and qualitative analysis, this study provides a greater understanding of how feminism in general and also a group called “Feminists for Life” are perceived in one Catholic campus community.

17. Autonomous Drone Monitoring of Parking Lots for Empty Parking Spaces
Matthew Anderson, Patrick O’Malley, Engineering
8:45–9:05 * Room 125

Remotely controlled drones are a rapidly growing market and have an incredibly diverse range of potential applications. The most common application of drone
systems in both the hobbyist and commercial markets is aerial photography and mapping, but having a small, economical, airborne camera could be an incredibly useful tool for search and rescue teams, law enforcement, farmers, construction workers, and many other professions. This project uses a drone-based camera to collect photographic data, and the data is analyzed using a custom-built software package. Using GPS and telemetry data, the quadcopter is able autonomously to take off, complete a flight plan detailed by the operator, and land. Failsafe mechanisms land the drone safely if the battery is low or communication with the transmitter is lost. For this project, the drone is used to scan parking lots on campus and detect where there are empty parking stalls. This could be especially helpful for large events, sporting events, or other times when the campus may be expecting a large volume of visitor traffic. The quadcopter is programmed to fly over a designated parking area, return to the home base where the operator exchanges the memory card in the camera, then fly the route again and repeat the process, achieving pseudo-real time monitoring. A custom software package was written to analyze the images or video collected by the drone.

18. The Kornilov Affair, Aleksandr Kerensky, and the Fall of Russian Democracy
   Brian Curran, Richard Crane, History
   8:45–9:05 * Room 208

Much of the primary evidence suggests that the Kornilov Affair, a failed right-wing coup against the democratic Provisional Government, made the fall of Russia to a coup by the communist Bolshevik party inevitable. Yet a reinterpretation of the evidence suggests that the coup started as a joint attempt between General Kornilov and Prime Minister Aleksandr Kerensky to save Russia from falling into anarchy. This presentation re-examines the evidence around this failed coup to dispel the myth that the Soviet Union’s rise was inevitable.

19. The Art of Mt. St. Scholastica: Illuminated Manuscripts
   Michaela Flax, Natalie Gallatin, Carlyn Olson, Lucy Leighton, Cathryn Treco, Catherine Glenn, Christa Kagin, Art
   8:45–9:05 * Room 219

Before the existence of a mass print culture, manuscripts were a way for Christians to participate in prayer and liturgy. Illuminated manuscripts were pages decorated with various images and scripts to enhance the content of the text. Mt. St. Scholastica owns a collection of European illuminated manuscripts from as early as the thirteenth century, hanging throughout the Mount as a token of monastic prayer history. These works provide the Sisters, as well as their visitors, with a view into the history of monastic prayer, creating a connection to the past and revealing the universality of prayer. These fragile pages are in need of special care as they are now individual pieces but were once part of larger texts. We have studied what steps the Mount could take in order to keep these pages in good condition. Our work has examined the history, content, and scientific makeup of these illuminated manuscripts in order better to understand how to care for them. The
artistic value of these manuscripts is invaluable to monastic history, and our presentation will demonstrate their role in monastic life. In working with the Sisters on this project, we have continued to foster growth between students and the Sisters. We have worked to provide the Mount with a comprehensive understanding of the history and care of these pieces. More than a narrative, these manuscripts illuminate the history of monastic liturgy through the centuries. This project is the second year of a multi-year project of documenting the art at Mt. St. Scholastica.

20. How Nursing Patient Education and Communication Can Learn From the Educational Model of Teaching Individuals With Intellectual Disability

Krista Kosek, Matthew Ramsey, Education

8:45–9:05 * Gangel Seminar Room

The purpose of this study is to examine the needs of individuals with disabilities in the health care system, specifically how can nursing staff effectively communicate with those who have significant limitations in their ability to share symptoms, levels of pain, and other necessary medical information. With the understanding that pre-service instruction for nurses lacks in methods and training to communicate with this population, I turn to the field of special education for a deeper understanding of the characteristics, behaviors, and family factors associated with students identified as having intellectual disabilities. A review of the literature in both nursing and education will aid me in researching case study(s) based on family experience receiving medical treatment. Using Yin’s (2009) model, I will construct a series of case studies charting the experience of these families. The case studies will serve to inform answers to the following research question: “What can nursing learn from special education about the communication needs of individuals with intellectual disabilities during medical treatment?”

21. The Freedom of Chains: An Examination of Poetry in the Gulag Camps

Laura Romaine, Susan Traffas, Honors Program

8:45–9:05 * Room 323

Under Lenin and then his successor Stalin, the newly formed centralized Russian government and the desire for rapid industrialization turned the previously lax prison camps into a vast institution for forced labor and the suppression of human spirit. The gulag was designed to create a sense of isolation and extreme despair. Many left the gulag with silent, unheard voices. Still others were still afflicted by ideological blindness. Some were killed before they had a chance to share their story. However, art and poetry did survive. Despite all efforts by the government to strip them of their human identity, the gulag poets emerged clearly articulating those aspects of humanity that are impossible to enslave. I examined the work of poets who had had both the unique gift of being able to both encounter truth and the capacity to express it. Aleksandr Solzhenitsyn, Osip Mandelstam, Sergey Markov, Varlam Shalamov, Joseph Brodsky, Nikolai Klyuev, Boris Kornilov, Anna Akhmatova, and Marina Tsvetaeva discovered that particular flavor of freedom that grows from the pits of despair and desperation. Hope and spirit of survival unite their poetry.
22. Waste Oil Furnace

Jeremy Spalding, Nicholas Lober, Kenneth Green, Bryan Park, Art

9:15–9:35 * Room 109

The goal of the waste oil furnace is to be able to melt and cast various metals in the most environmentally friendly and sustainable way possible. The method chosen will be to burn waste vegetable oil from the Benedictine Cafeteria as the fuel for the furnace. This is not only a clean burning fuel but also a means to recycle a product that would otherwise simply be thrown away. There were many design questions that had to be answered along the way, such as the style of burner used, the size of the furnace, and many more. The style of burner used is arguably the most important part of the system because this is what generates the heat for casting. The design used is a fuel injected burner because it has easy construction and high energy output. The furnace will be able to hold a #20 crucible, which can hold up to 20 pounds of aluminum in one pour. The entire furnace is on a cart with wheels for easy transportation. Because the goal was to create a sustainable system, the majority of the parts are recycled or repurposed. The only brand new items were the fire extinguisher and the refractory materials for the furnace body. The system will also use recycled aluminum as the main source of material for casting, furthering the sustainability of the project. Overall, the project will be a great addition for the Art Department as a way to create metal castings.

23. Individual Income Taxes and Political Plans

Lillian Hoover, Maria Mayhak, Kristen Whiteley, School of Business

9:15–9:35 * Room 124

With over 100 million American households filing a federal income tax return each year, income taxes affect every working American. Our income tax system is designed to be progressive, with the wealthy paying a larger percentage of their income than the middle- or low-income earners. In 2014, individual income tax represented the largest percentage of federal revenue, accounting for 48.7% of total federal revenue according to the Internal Revenue Service. Through this presentation, individual income taxes are explored by comparing the tax plans proposed by current and former presidential candidates, including Bernie Sanders, Donald Trump, and Ted Cruz, as well as The Main Street Tax Plan presented by Jeffrey Anderson. Specifically considered is their effect on individual income taxes and how each changes the individual tax brackets and tax rates.

24. Testing Herwig: The Role of Officers in the Kiel Mutiny

Thomas Kroh, Richard Crane, History

9:15–9:35 * Room 125

Near the end of World War One, revolutions began to break out across Germany, including within the army and navy. The traditional historiography of the Kiel Mutiny asserts that the revolt began out of the fear of the common sailors about facing the British fleet in a suicidal glory-driven attack. Historian Holger Herwig asserts that social discontent among different ranks and types of officers were the driving force behind the revolution rather than this fear among the enlisted sailors.
This Discovery project seeks to test this theory. Through analysis of the writings of those who were there, as well as analysis of secondary sources specializing on the Kiel Mutiny, this project shows the Herwig’s analysis is incorrect. The Kiel Mutiny was neither driven by an officer vs. officer rivalry nor did officers join the mutiny in an attempt to resolve this social discontent at the top.

25. Why They Vote: The Iowa Caucus

Darren Handy, Joshua Canaday, Stanton Skerjanec, Benjamin Randolph, Joseph Shaneyfelt, Christiana Reasor, Kael Stoaks, John Settich, Political Science

9:15–9:35 * Room 208

The 2016 election season has proved to be a fascinating and curious cycle, one in which students of the Political Science Department were lucky enough to participate, and no state’s caucus provides a more thrilling example of democracy in action than the Iowa Caucuses. Thirty students, under the direction of the Political Science Department Chair Dr. John Settich and senior student Darren Handy, traveled to Iowa to survey the participants of the caucus. The students conducted research in over ten precincts, both Democrat and Republican. This Discovery project presents the findings of the conducted research, gathered through surveys, and provides insight into the preferences of voters in the 2016 presidential election.

26. Recording and Composition for Female Quartet: “Japanese Lullaby”

Mary Rumpza, Timothy Tharaldson, Music

9:15–9:35 * Room 219

This project consists of both a composition and recording. The poem that was set is “Japanese Lullaby” by Eugene Field, a famous children’s poet born in St. Louis, Missouri. The composition is for four female voices and was recorded with a quartet using a single microphone. The purpose of this project was to learn about both the composition process and recording process, especially when recording multiple voice parts at once.

27. Understanding Communications Signals

John Finders, Andreas Fritz, Matthew Vogrin, Matthew Richard, Physics and Astronomy

9:15–9:35 * Gangel Seminar Room

In our modern lives, electronic communications play an undeniably massive role in day-to-day activities. Due to the constant interaction and use of electronic communications devices, there may be some misconceptions as to what allows a communications signal to be effective. The objectives of this project are as follows: 1) to demonstrate what a communication signal is and how it works, 2) to demonstrate interactions between signals and the environment, and 3) to demonstrate the fact that an electronic signal is a physical entity, albeit an invisible, massless one. To fulfill the objectives for this project, we will show the interaction between signal generators and receivers by building a device that
effectively mimics a 49 MHz signal used by an R/C car. This device will demonstrate the problems of overlapping signals of similar frequencies interfering with each other. The second way this project seeks to fulfill its objectives is through the construction of a Faraday cage. The Faraday cage is a simple device that prevents the propagation of signals through the physical blocking of a signal. For this project, a cage large enough to drive the car into was built in order to provide an incredibly effective demonstration of the physical properties and limits of signals due to the environment. Finally, we will provide an effective and straightforward explanation of how modern communications work and why they are largely uninterrupted in the modern world. The basics of the signals working will be explained via the construction of a simple transverse wave generator and in-depth research into modern communications. With these three goals, the project seeks to provide a clear, straightforward explanation of what a communications signal is.

28. Study of the Viability of Anaerobic Digestion at Benedictine College Phase 1: Construction of the Test Reactor and Procedure

Katharine Hirl, Maggie Carpenter, Samantha Turner, Evan Sutherland, James Keat, Austen Miller, Ryan Spellman, Christopher Palm, Scott Blonigen, Engineering

9:15–9:35 * Room 323

The objective of this project was to determine if Benedictine College may use anaerobic digestion as viable renewable energy source. Anaerobic digestion takes organic waste and feeds it to anaerobic bacteria, which then produce biogas. This project focused on food waste produced by the college. Biogas is primarily composed of methane and carbon dioxide gas. The first phase of the project was to develop the necessary procedure and equipment to perform the study of the campus’s food waste the following year. A working anaerobic digester, bioreactor, was constructed as the main piece of equipment needed for the study. The bioreactor is a lab scale reactor that allows the yield of methane and concentration of biomass in the reactor to be measured. Along with the construction of the bioreactor, a procedure was developed for how to feed the reactor and obtain the desired raw data. The focus of the project this year, phase 1, was preparing the necessary equipment, procedure, and information to perform a significant study on the methane yield of the food waste produced by the Dining Hall using anaerobic digestion next year.

29. The Synthesis and Fluorescence of N-(p-substitutedbenzalamino) oxindoles

Jacob Unnerstall, Melissa Borsh, Paul Steinbach, Chemistry and Biochemistry

9:45–10:05 * Room 109

This research investigates the fluorescent properties of multiple derivatives of N-(p-substitutedbenzalamino)oxindole. Various chemical groups are substituted in the para-position of the aromatic ring of the benzalamino group. If these molecules fluoresce, the various chemical groups are expected to have a noticeable effect on the fluorescence properties of the oxindole molecule. This research required the organic syntheses of the desired molecules (derivatives) in order to conduct the
fluorescence studies. Analyses of the desired compounds were determined utilizing NMR, UV-Vis, and fluorescence spectroscopy techniques. Changes in the excitation or emission wavelengths of the fluorescence spectra may be correlated with the electron donating or withdrawing abilities of the groups substituted in the para-position of the benzalamino group.

30. Benedictine’s First-Ever 24-Hour Theatre Festival: Seven Impossible Things Before Breakfast  
Rosemary Herold, Clare Nowak, Eamon Mulholland, Conner Novacek, Peter Barstad, Paul Modlin, Emily Kennebeck, Scott Cox, Theatre Arts and Dance  
9:45–10:05 * Room 124

Twenty-Four-Hour Theatre is a relatively new theatrical phenomenon that has been flourishing across undergraduate theatre departments from Seattle to New York. It entails garnering student volunteers to playwright, direct, act in, and work crew for however many productions undertaken, and then writing, rehearsing, designing, and staging these plays all within the course of 24 hours, performing them all in a festival setting at the end of that time. This year I spearheaded the Benedictine Theatre department’s first-ever festival when I proposed the idea to the department head and worked with him to schedule a date, devised a festival schedule specifically suited to departmental capacities and the volunteers received, emceed the welcome ceremony, and oversaw the festival as it unfolded, complete with performances. The evening was well-attended, and many of the student volunteers from other majors wanted to know if I was “doing it again soon.” Many students want to be involved in theatre but can’t juggle the time commitment of a mainstage show’s rehearsals with their major; this was a perfect opportunity for such enthusiasts to commit for a weekend and still enjoy the full gamut of theatrical-experience that is being involved in a show. This also served as a wonderful way to introduce freshmen to the department in a retreat-like setting and gave theatre students a chance to explore the areas of playwrighting and directing.

31. Vertical Milling Machine in Pursuit of Precision  
Scott Kuefler, Kenneth Green, Steve Spencer, Engineering  
9:45–10:05 * Room 125

Precision vertical milling machines are created in batches on assembly line processes, using advanced manufacturing techniques, to reduce cost without compromising performance of the product. For $1,000–$2,000 it is possible to buy a precise hobby-sized vertical milling machine. However, these machines inevitably lack one of the following characteristics: rigidity, part size capacity, or portability. In this project, we researched and investigated the design features necessary to build a rigid, precise metal milling machine through custom machine part design, in-house fabrication and assembly, and testing. The fabrication of our custom milling machine was enabled by utilizing the manufacturing facilities available in the Benedictine Engineering Department. The manufacturing processes we used included aluminum casting, MIG welding, CNC machining of
intricate steel and casted aluminum components, lathing, 3D-printed timing-belt gears, and complex component assembly involving axis alignment, and bearing and shaft alignment. We learned an important lesson that many manufacturing processes (such as aluminum casting) require practice and technique to produce good results. Additionally, this project reinforced the engineering principle that, in general, the more precise and accurate a machine has to be either the more money is necessary or the more redesign to optimize the system is necessary to obtain the precision required. Attributed to the former, some of the key design points that required continual redesign to remain under budget during the project included a compact closed steel frame design, custom fabricated spindle head with #2 Morse Taper tool holders, and manual 3-axis milling table.

32. The Economic Effects of a Drop in Oil Prices
   Maria Mayhak, Lillian Hoover, David Harris, Economics
   9:45–10:05 * Room 208

In 2013, oil prices peaked at $91 per barrel. As of March 15, they had dropped to $41, a 55% drop in price. The economy is highly dependent on oil, giving this market the potential to affect the economic cycle of expansions and recessions based on supply and demand factors. The causes of the current oil prices primarily are thought to be an increase in the supply of oil from the US and the actions of the Organization of the Petroleum Exporting Countries (OPEC). These factors have resulted in substantial changes across the economy, including an increase in the amount of oil stored after extraction, a significant profit loss for oil companies, a decrease in employment among the oil industry, a shift in the market shares of oil producing companies, and new spending habits for individual consumers and businesses. Oil prices have further influenced the stock market, taxes, imports and exports, oil extraction processes, inflation, interest rates, employment, and the banking system. Through this presentation, the impact of oil prices on the U.S. economy is explored through the causes, effects, and predicted future of the oil market.

33. Per la Tromba: A Brief History
   William Medina, Theodore Hanman, Music
   9:45–10:05 * Room 219

This research focuses on the development of the trumpet from biblical times to the present. Using multiple sources and a trumpet player’s background, the researcher has compiled extensive information on materials, tools, and techniques used in trumpet construction as well as the purpose for the trumpets, whether they were used in religious ceremony, for concerts, or for any other reason. The trumpet, or shofar, is mentioned in the bible as being used in Jewish ceremonies, in bringing down the walls of Jericho, and in heralding the coming of the Lord. The bugle is a natural trumpet used for military purposes, such as waking the barracks and announcing certain situations. The keyed trumpet is characteristic of the baroque era. The valve trumpet is what we use now.
34. Parish Evangelization: An Art of Living in Community  
*Mary Suprenant, Matthew Ramage, Theology*  
9:45–10:05 *Gangel Seminar Room*

After exposure to statistics showing dramatic decrease in participation in sacraments and parish life, I wondered what could be done to encourage a parish community to take an active role in the New Evangelization. After research and the pastor’s approval, I implemented a series of Evangelization Hours at St. Benedict Parish that ended in opportunities for commitment to growth in prayer, hospitality, and a commitment to evangelization. I gathered data to measure the project’s effectiveness from the participants at the Evangelization Hours and am transitioning the effort from the small group to the whole parish through an evangelization effort in Atchison and opportunities for prayer. The end goal is to learn principles of effectiveness in building an evangelizing community at a parish. This project was also begun to encourage those who are searching for a strong Catholic community to build one wherever they are. This project has shown that the universal call to holiness is also a call to community and an invitation to evangelization.

35. New Kids on the Block: Experiences of First-Year Teachers  
*Brooke Arconati, Callie Baumberger, Kathleen Gathright, Rose Sabin, Christina Adams, Education*  
9:45–10:05 *Room 323*

Graduates of the Teacher Education Program of Benedictine College enter the workforce as licensed K–12 grade elementary, special, or secondary education teachers. Our research sought to answer the question, “What are the experiences of first-year teacher graduates of the Benedictine College Education Department?” By reputation and research, the first year of teaching poses unique challenges to recent graduates, resulting in an estimated 15% of teachers leaving the profession following the first year (Ingersoll, 2002). Our research examined the expectations and experiences of 2015 graduates of the Benedictine College Education Department. Data were gathered from surveys in both the first and second semester of the 2015–2016 school year, as well as follow-up interviews of four first-year teachers. This project explored their level of preparation and the most challenging and rewarding aspects of their first year of teaching. Specific challenges facing participants included work-life balance, classroom management, responding to student diversity, and interpersonal interactions. Positive rewards of teaching and implications for future teachers will be discussed.

10:15–11:10 *Poster/Exhibit Session #2*  
McAllister Board Room (4th floor)

36. Assessment of Women’s Health Knowledge  
*Mary Minnis, Natalie Roberts, Lynne Connelly, Nursing*  
Women’s health is a topic controversially defined varying from a woman’s menstruation cycle to the rights to contraceptives. The health of a woman can be
understood better by the different biomarkers identifying hormonal changes in
the body relating to fertility. With new research from the World Youth Alliance,
it is found that few women actually can define when the last time they ovulated
was even though it is a great identifier of one’s health. This project focuses on the
knowledge women have of their own health and cycles. The goal is to see if our
research lines up with that of the World Youth Alliance and also assess the need
for fertility education classes. Survey questions include demographics, study in
a healthcare field, time since last sexual education class, a variety of questions
relating to fertility identification, and confidence in knowledge of fertility and in
knowledge of own fertility. Analysis will note if there is a correlation between any
of these groups and address the need for this type of class. Additional analysis will
be done with correlational statistics and will be included in our presentation. The
results of our study will be provided to the clinic staff.


Joseph Naugle, Joshua Linton, Jacob Poston, Chris Glenski, School of Business

Our project was inspired by an article we found from Forbes that grades different
higher education institutions based on their financial fitness level. Naturally, as
Benedictine finance and accounting majors, we could not help but ask the follow-
ing question: What would Benedictine College’s grades look like? Luckily for
us, Forbes provided detailed descriptions of their formulas and how they scored
each grade. We began to do some initial research and analysis of Benedictine Col-
lege’s most recent audited financial statements. We quickly realized that running
a small private institution is extremely difficult from a financial perspective. Our
analysis showed that according to Forbes’ rubric, Benedictine’s financial fitness
is very poor. This was somewhat of a surprise to our team as we did not realize the
financial difficulty of running a small private college. We began to wonder what
the institution looked like when it was near closing its doors for good. To discover
what Benedictine’s financial status was then, we gathered financial information
in five-year increments starting in 1984. One of our goals with this project was to
discover how far Benedictine has come financially in the last 30 years. Our other
goal was to create more grateful Ravens at Benedictine. The majority of the stu-
dents, like those in our team, are oblivious to the financial difficulties of running
any small private college, even a successful one like Benedictine, on a day-to-day
basis. We hope to show the students the financial challenges our school faces and
how the students’ tuition and the generous donations of our benefactors make it
possible for us to get our education from this great school.

38. Steel Wool Photography

Melissa Nigrin, Danielle Reynoldson, Dennis Dunleavy, Journalism and Mass
Communications

Steel wool is no longer a product just for cleaning! When set on fire, it creates
a sparkling ball of fire. Once the steel wool has been set on fire, it can be spun
around and will create beautiful patterns. This process can be captured with a
camera and can create unique photos of the sparks. When a long exposure is used,
the entire path of the fire and patterns of the dancing fire can be seen. This project will show the process used to create the photos and how different settings will manipulate the photo in different ways.


James Nistler, Mario Skertchly, Margaret Kempf, Hanna Torline, Sydney Wolf, Elizabeth Intfen, Paul Heuser, Michael Klein, Maggie Carpenter, Shannon Globensky, Joseph Locascio, Scott Newbolds, Engineering

Benedictine College Engineering Missions continued on its second year of mission work following the success of last year’s inaugural trip to Guatemala. This year a group of 12 students traveled to Ghana with the goal of discovering and learning about the Ghanaian culture and how water controls their everyday life. To do this, the team designed and managed construction of a water tower and taught in a village of 5000 known as Lingbinsi. The design work was split into two categories: structural design and labor-material logistics. The structure consists of a concrete tower the students designed, and the logistics included the managing of labor and materials for the successful completion of the project. The work was distributed among the village while the team assisted them in pouring the concrete structure. In addition, the team taught at the local school and ministered to the community. During the week there, the group experienced the Ghanaian culture and developed beautiful relationships with the people of the village Lingbinsi that demonstrated how simply they lived and still lacked some basic human needs such as water. This lack controls where they devote their time and the general health of the population. From this experience, the missionaries hope to continue in their mission to build a better world by equipping communities to meet their most basic human needs, spiritually and physically, by sharing the love of Christ through our engineering education.

40. The Effects of Perinatal Hospice on Mothers

Melissa Ott, Theresa Ott, Therese McCance, Morgan Schumacher, Lynne Connelly, Nursing

An evidence-based practice research study was performed to determine the effects that perinatal hospice has on mothers whose unborn child has been affected by a fetal anomaly. The objectives of the study included identifying the most beneficial care provided to mothers by health care providers. Using keywords such as perinatal death, perinatal palliative care, effects on mothers of perinatal hospice, and perinatal hospice, databases were searched for research articles in ProQuest, EBSCHOST, and Medline. In addition, the ancestry method was used to search for additional articles. The abstracts for the articles were reviewed, and the number of appropriate research articles was narrowed down to 12 articles. These articles regarding perinatal hospice and perinatal death were then analyzed using criteria for each type of research study. The population included mothers who continued a pregnancy affected by a fetal anomaly. The research designs included qualitative descriptive, quantitative, and narrative analysis. Upon analysis, perinatal hospice allows mothers to prepare for and experience the birth and bonding that occurs before and after birth. In providing perinatal hospice, nursing implications were
also analyzed. Nursing implications included encouragement of mother and child interaction, listening and clarifying the mother’s thoughts and feelings, and preparing mementoes. Perinatal hospice is a compassionate and supportive option for mothers whose unborn child is diagnosed with a fetal anomaly.

41. Survey of Vertebrate Diversity in the Benedictine Bottoms

Susan Pistek, Sarah Schmit, Miranda Toyne, Kieran Dornay, Ashley Tytski, Anna Tust, Virginia Winder, Biology

The Benedictine Bottoms is a 2,112-acre mitigation site on the Missouri River floodplain. The U.S. Army Corps of Engineers initiated mitigation efforts to return croplands back to the habitats present prior to river channelization and restore native wildlife habitat and populations. Our field study focused on surveying the populations of vertebrates in the mitigated habitats. We installed a series of nine scent stations spaced at least 250 meters apart, which consisted of a 1-meter circle of sand with a fatty acid-based scent tablet in the middle. We deployed game cameras at a subset of our scent stations to collect photographs of visiting animals to verify identification. We baited scent stations for three consecutive nights once every month from October through March. Our hypothesis was that carnivorous mammals would be present at the highest frequencies; this hypothesis was based on the fact that carnivorous mammals are larger, scent-based animals that inhabit large home ranges, covering most of the area in their habitat. Our data thus far have shown that our hypothesis has not been supported, and the most frequent animals we have observed to explore the scent stations were rabbits and deer. The scent stations also have attracted a variety of birds as well as small rodents. Carnivorous mammals, such as raccoons and opossums, comprised the smallest proportion of animals observed at our stations. Our research can assist mitigation efforts by providing information on vertebrate population diversity and habitat use as an indicator of wildlife restoration at the Benedictine Bottoms.

42. Synthesis of an Iron-coordinated Macrocyclic Catalyst for Water Oxidation

Michael Salemi, Kolbe Scheetz, Chemistry and Biochemistry

With energy needs continuously rising and petroleum reserves depleting, the need to find alternative renewable energy sources has become a major focus. One attractive option is the oxidation of water into molecular hydrogen and oxygen. Combustion of hydrogen results in the formation of water, which is much more environmentally friendly than the combustion of the carbon-containing fuels currently used today. Although there are numerous examples of catalysts that will promote the oxidation of water, to date none have achieved a high turnover number (TON) with a turnover frequency (TOF). Additionally, many of these catalysts utilize expensive heavy metals that also limit their appeal for commercial applications. The goal of this project is to synthesize a working catalyst that utilizes the highly abundant metal, such as iron, nickel, or copper, instead of ruthenium, iridium, or palladium. This year’s focus for the endeavor was to synthesize the ligand to stabilize the metal and prevent decomposition of the catalyst. The ligand design
is based upon a non-innocent tetraamido macrocyclic (TAMLs) scaffold. The first generation of this macrocyclic ligand is synthesized from o-phenylenediamine and diethyloxylate. In a second step the insertion of an iron cation was completed in a modest yield. The complex is currently being studied for catalytic activity.

43. Concrete Canoe Mix Design

Joshua Scheuler, Thaddeus Messer, Scott Newbolds, Engineering

The American Society of Civil Engineers (ASCE) holds a collegiate concrete canoe competition every year in which colleges from around the country compete. Every year new rules are put in place, and, as a result, the design and overall construction of the canoe has to be changed. The BC team’s goal this year is to design a concrete mix that would be stronger than the previous year’s mix while still being light enough to use in the canoe. The mixture also had to be designed to meet the rules of the ASCE competition. One of the main ways to accomplish this is to find a more efficient ratio of aggregate bead sizes that is a sustainable product. The aggregate selected is made of recycled glass, which is then heated and made into varying sizes of expanded glass beads. In this project, a statistical test was run on different mixes that were made to find the ratio of different sized beads that produces the best possible mix based upon strength and the overall weight of the mix. The final mix design was stronger than that used in previous years while still maintaining a low weight suitable for use in the canoe.

44. Inner Beauty Manifested in Art

Danielle Shanahan, Daniel Kopitke, Bryan Park, Art

We, as the epitome of God’s creation, bring glory to our Creator reveling in His craftsmanship. However, many people still neglect to appreciate the value and beauty of each human person, frequently valuing inanimate creations over the life of another being. For this reason, the world allows the abortion of the unborn, the trafficking of the helpless, and the destitution of the poor. Our goal was to explore the beauty of the human person in art and the beauty of art in the human person. Through the process of sculpting, painting, and applying special effects makeup, we created a physical manifestation of the internal beauty of each subject. This process combined both theatre and art through the interactive and performance quality of the human person with the manipulative aesthetic aspect of the mediums. Our greatest challenge was discovering the best way to combine the stillness of art with the ever-changing and moving human form. These discoveries were first found in the interviews then brought to life through sculptures and captured in photography. For this project, we focused on those around us who we encounter the most – those within the Benedictine Community. We delved into the rich variety of people on campus, including students, faculty, and staff, to capture the spectrum of beauty that exists inherent in this community.

45. Computer Controlled Drawing Machine

Aidan Shaughnessy, Steve Spencer, Engineering

As automated machinery are becoming larger and larger parts of manufacturing processes, it is increasingly important for engineers to understand these systems.
To understand better how these automated CNC machines work, a project was conducted to design and build a simplified version. Three-dimensional design software was used to model how the machine would look and fit together. A variety of manufacturing processes were used to build the machine, including mills, lathes, and 3-D printers. The presentation includes problems encountered, how it was built, how it works, and a demonstration. The purpose of this project was to understand better automated technology so that more complex future projects can be built.

46. Progress Towards Construction of a Point-of-Care Bacterial Versus Viral Infection Diagnostic Test

Nathaniel Stacy, Cody Sherlock, Larry Sutton, Chemistry and Biochemistry

Globally, one of the most critical public health problems is antibiotic resistance which is driven in part by the selective pressure exerted by inappropriate use of antibiotics in clinically ambiguous patient presentations. It has been reported that a Bacterial Infection Score derived from the flow cytometric analysis of proteins expressed in bacterial and viral infections may be useful in curbing inappropriate use of antibiotics. However, flow cytometers are expensive and not routinely available in most primary care settings. With the goal of developing a simple, point-of-care test, a hybridization assay using peptide-nucleic acids (PNA) targeting the messenger RNAs (mRNA) for the corresponding proteins used in the flow cytometric assays was designed. This assay utilizes an E104D TEM-1 beta-lactamase mutant (TEM1) and a beta-lactamase inhibitor protein (BLIP) as a biochemical switch to detect mRNA binding. The genes for both TEM1 and BLIP were synthesized and inserted into the pET-28b plasmid vector ensuring conservation of the correct reading frame. The recombinant DNA was then transformed into BL21(DE3) electro-competent E.coli cells. Transformants were selected on kanamycin-containing agar plates, grown in Luria Broth, and protein expression was induced with IPTG. However, neither protein was expressed over three attempts. Sequencing and restriction digests demonstrated the presence of the DNA insert as well as correct sequence and reading frames. These results suggest these proteins are either poorly expressed in this strain or are forming toxic inclusion bodies. Work continues on finding an alternate host for protein expression.

47. Climbing Trees for Tardigrades

Laura Tibbs, Bienvenido Cortes, Terrence Malloy, Biology

Tardigrades, commonly known as water bears, are microscopic animals that live in moss and lichen, but they are best known for their ability to survive extreme conditions, including temperatures near absolute zero and even the vacuum of space. Though tardigrades are common worldwide, their distribution is poorly understood. Last year, a preliminary survey of tardigrades on the Benedictine College campus collected 10 samples within 2 meters of ground level and found 55 individuals representing four genera. Of the individuals collected, 7% were carnivores. Recent studies suggest that tardigrade diversity increases with height
in trees. The purpose of this study was to survey tardigrade diversity in trees on the Benedictine Bottoms. We employed double rope climbing technique (DRT) to ascend trees and collect three vertically stratified samples of moss and lichen: one below 3 meters, one between 3 and 6 meters, and one above 6 meters. For each sample, one gram of substrate was soaked in 20ml of water for at least four hours. Three 1ml subsamples were then taken and examined for tardigrades under a 20X dissection microscope. Tardigrades were extracted from these subsamples and identified to species level. Preliminary results from nine samples taken from three trees have found 361 individuals representing only two genera. Of these individuals, 96% were carnivores. These results indicate that tardigrades in trees on the Benedictine Bottoms have lower diversity but higher overall abundance as well as a higher relative proportion of carnivores compared with tardigrades found in ground samples from the Benedictine College campus.

48. Liquid Fluidized Bed

*Samantha Turner, Maggie Carpenter, Elizabeth Intfen, Mary Lawlor, Nicholas Brouillette, Scott Blonigen, Engineering*

Fluidization is a process that induces a fluid-like behavior on small particles. This process is accomplished in an apparatus known as a fluidized bed; a column containing small particles through which a liquid or a gas can be pumped. Fluidized beds are commonly used in a variety of chemical engineering processes, including heat transfer and separation techniques. The Benedictine College Engineering Department currently is in need of a lab scale liquid fluidized bed in order to be equipped to hold upper division chemical engineering lab courses on campus. In this project, a liquid fluidized bed was constructed by modifying a pre-existing column to accommodate given specifications in order to meet the requirements necessary to perform required lab experiments. Several aspects were added to a pre-existing column, including pressure ports and a manometer, so that the pressure drop across the total height of the column could be measured. Also, unnecessary parts on the column were removed in order to make the final design as simple as possible and so that it could be mounted on a stand. With the construction of this bed, the Benedictine College Engineering Department will be able to hold a wider variety of chemical engineering courses requiring experiments involving fluidization on campus and thus can move closer to becoming fully accredited.

49. Weddings and Witchcraft: A Collection of Italian Folklore

*Cecilia Wood, Julia Bowen, English*

This poster project presents ten pieces of Italian folklore and explores how a culture is passed down orally through stories. I collected stories orally from Art Historian Francesco Vignaroli while I was studying abroad in Florence. This poster also briefly reviews some “methodologies” for collecting folklore, a discipline known as Folkloristics. In this project I employed what could be called the “Brothers Grimm” methodology, laid out by Marthe Robert, for the purpose of gathering the stories into a single collection for English speakers. The stories vary in tone and focus, but because they involve various locations in both Florence and
areas of Umbria, they give readers an interesting introduction to the culture and heritage of Central Italy.

50. Macroinvertebrate Diversity and Abundance in a Mitigated Wetland on the Benedictine Bottoms

Madison Zubradt, Tara Schofield, Whitney Matous, Rachel Masotti, Emily Dyer, Virginia Winder, Terrence Malloy, Biology

Macroinvertebrates play an essential role in wetland ecosystems. They aid in decomposition, nutrient cycling, and they are a food source for many types of wildlife. Each year from October through January, mitigated wetlands at the Benedictine Bottoms are flooded to provide habitat and food for the migratory waterfowl, which are hunted at this time. The objectives of this study were to assess the abundance and diversity of macroinvertebrates that were present in the soil prior to the flooding of the mitigated wetlands. During this experiment, five 15 cm$^2 \times$ 10 cm deep soil samples were taken from the Benedictine Bottoms where the mitigated wetlands usually are flooded. These soil samples were deposited in plastic tubs with approximately 10 gallons of dechlorinated water in each container. A screen-covered lid was placed over the tubs to allow proper air flow so the invertebrates could hatch out of the soil and into the water. Over the course of several months, six samples were taken from the tubs in order to determine which macroinvertebrates had hatched. The preliminary analysis of the results showed there were 712 total macroinvertebrates found in the samples. Sixteen orders and 34 families of macroinvertebrates were also identified. The results from this experiment will aid researchers in determining when it is the ideal time to flood Benedictine Bottoms. In doing so, this maximizes the food supply for the migratory waterfowl.

51. Potato Cannons: An Application of Mechanical Valves

Adam Burke, Paul Wessel, Samuel Anderson, John Krishnan Myjak, William Hawkins, Steve Spencer, Engineering

11:15–11:45 * Room 109

Potato cannons, as their name implies, are mechanisms that are capable of launching potatoes a considerable distance. They usually implement either the use of combustion chambers or compressed air to give the potato a large impulse and accelerate it quickly out the barrel. While using combustion methods can be quite successful, dangers arise with the inconsistency of the combustions, pressures exceeding the allowables for the chamber, thermal degradation and defects in the body of the potato cannon. These can result in catastrophic failures of the breach. The greatest difficulty in making a successful compressed air potato cannon lies in opening a valve fast enough so the compressed air easily can drive the potato out the barrel. In previous projects, Benedictine College students have built two hand-held potato cannons that use solenoid valves that were designed to carry water and thus do not allow for optimum air flow nor do they open quickly. For this project, two more potato cannons were built using custom designed, fast opening mechanical valves. For one, a ball valve was modified to support a torsion spring capable of opening it quickly. For the other, a slider valve was designed that used
the air pressure as the opening force. In order for these mechanical valves to be effective, trigger mechanisms also had to be designed. Some of the parts for the cannons required detailed CAD drawings and the use of CNC milling.

52. Babies and Careers

*Gabrielle Douglass, Elizabeth Clum, Julianne Smith, Emily Marker, William Raymond, Political Science*

11:15–11:45 * Room 124

Many women have been told they cannot have it all while others have been told they can. It is time to let women speak for themselves. The primary research question was whether or not women truly can balance motherhood and a career. The team hypothesized that working mothers with supportive spouses and working mothers with more resources would balance the conflicting demands of motherhood and work better. Anne Marie Slaughter, a mother, Princeton Professor, and President and CEO of New America makes it clear, “You can’t have it all. At least not at the same time.” If one cannot have motherhood and a career, what is the point in trying? After reading her most recent book, *Unfinished Business*, and analyzing a host of other literature, while interviewing working mothers in a variety of fields (educational, medical, and retail), the team confirmed both hypotheses and developed several recommendations on how better to balance motherhood and work. Important trends from the interviews included the need for a spouse’s support for motherhood, the satisfaction a mother finds in choosing the right childcare, and a supportive workplace. Come hear some fascinating findings and recommendations on why mothers can have it all by attaining the balance required to achieve a healthy lifestyle.

53. The Effects of Kinesthetic Learning on Students With ADHD: A Comprehensive Study

*Danika Lang, Matthew Ramsey, Education*

11:15–11:45 * Room 125

Is there a positive correlation between a curriculum of kinesthetic learning strategies and improved academic performance for students with ADHD? Students who have difficulty paying attention during class, who are easily distracted, and who often seem to be in constant motion are frequently diagnosed with ADHD and put on a structured regimen of medication in order to correct their behavior. What so many parents and teachers fail to see oftentimes is that a student’s difficulty to learn may not always be caused by exceptionality but by a failure to cater to this student’s specific learning style. Whether or not a student is diagnosed with ADHD, it is possible that the student can still benefit from kinesthetic learning activities being more regularly integrated into the curriculum because children are inherently inclined towards movement. In Jean Piaget’s *Theory of Cognitive Development*, at the earliest stage, the sensorimotor stage, “an infant explores the world through direct sensory and motor contact” (Piaget). In devising a curriculum entirely based on the kinesthetic learning style, I tested whether students with ADHD would improve academically over time if given the opportunity to learn in a less conventional environment with alternative teaching strategies. I
administered a pre-assessment in order to determine their level of academic readiness and then conducted weekly progress reviews to see how the curriculum was affecting their learning process. At the conclusion of this study, a post-assessment determined whether or not my hypothesis was correct.

54. **Qué obviedad tan difícil: Una Telenovela**

*Claire Schroettner, Mariana Sosa, Nicholas Lahr, Michael Duchesne, Hannah Vogt, Kristina Pikula, Lorenzo Gregory, Philip Davis, Julie Sellers, World and Classical Languages and Cultures*

11:15–11:45  *Room 208*

Telenovelas are an integral part of Latino culture. They have historically been used to make statements about society, complain about politics, and entertain millions of viewers of all backgrounds and ages worldwide. While the genre has some similarities to American soap operas, the implications and audience of telenovelas is much greater. Our telenovela is a shortened version that contains all the key elements of a telenovela: drama, suspense, secrets, hate, and true love. *Qué Obviedad Tan Difícil* is the story of a humble young woman who joins the staff of the famous Hotel Reyes with the sole intention of supporting her young nephew. What was supposed to be a simple job has some unforeseen challenges, not the least of whom is her attractive new boss. Along the way, she makes friends and enemies and discovers some unsettling information. Will this be too much for her to handle? Who will end up scathed by scandalous and dangerous events? Sit back, relax, and enter the drama at our Discovery Day presentation!

55. **John of St. Thomas and the Lumen Gloriae: A Translation and Analysis of John of St. Thomas on the Beatific Vision**

*Thomas DePauw, Edward Macierowski, Philosophy*

11:15–11:45  *Room 219*

John of St. Thomas, also known as John Poinsot, was a Spanish Dominican philosopher and theologian of the 17th century grounded firmly in the Thomistic Commentator tradition. A brilliant and versatile thinker, he wrote copiously on almost every topic in Thomistic thought and dealt with them at an unprecedented level of precision. His multi-volume *Cursus Theologicus* surveys the whole *Summa Theologiae* of St. Thomas while probing sophisticated and difficult questions implicitly raised in the text. One of the important questions dealt with in great detail by John of St. Thomas has to do with what causative role the light of glory has with respect to the Beatific Vision. However, few of John of St. Thomas’ works have been translated, and his intellectual work is largely unknown except to Thomists who specialize in studying the Commentator tradition. In order to bring to light John of St. Thomas’ theological treatment of the *lumen gloriae* and his work as a thinker in general, this project shall undertake both the translation of *Disputatio 14* from John of St. Thomas’ *Cursus Theologicus* and the presentation of his treatment of the lumen gloriae in relation to the Beatific Vision. The presentation will explore the content and arguments of *Disputatio 14*, evaluating the structure and effectiveness of John of St. Thomas’ treatment of the *lumen gloriae*. 
56. Art and Mood: An Exploration

_Meghan Lancaster, Christa Kagin, Art_

**11:15–11:45 *Gangel Seminar Room***

This Discovery project explored the question of how creating visual artwork can impact the mood of a person who doesn’t frequently “do art.” Ten Benedictine College students were recruited to meet for an hour twice a week for three weeks. A pre-art measure was administered to assess how often participants typically created art; after the group meetings, a follow-up measure was administered to see if they intended to do art more or less in the future. Each meeting, the participants began and ended with a mood-check measure. During each session, the participants were given one or more media to create with, and instruction was given for how and what to create. The objective was to expose the participants to various media, methods of creating, and purposes of creating art without the pressure of “doing it correctly” as they would for a class. As an artist, I am aware that the process of creating art can have drastic impacts on my mood. Due to this personal experience and my passion for helping others, I am pursuing a future career in art therapy. The fundamental concept behind this field is that creating art is therapeutic. This presentation will discuss the analysis of the mood checks, before/after measures, and the art created to see how free creation impacted each participant’s mood. I will also discuss various aspects of my experience being in the role of an art therapist.

57. “The Good Morrow,” an Original Choral Composition Based on Poetic Text by John Donne

_Hunter Eisenmenger, Margaret Boone, Erica Rohde, Molly Hair, Lauren Hankes, Rebecca Hess, Jessica Pavlik, Alexia McAndrews, Leacadia Christensen, Emily Kennebeck, Catherine Kluempers, Maria Starrs, Madeleine Kopacz, Anthony Crifasi, Paul Murphy, Charles Iner, Timothy Heron, Joseph McCance, Michael O’Brien, Douglas Wahl, Justin Tran, Austin Lager, Timothy Tharaldson, Music_

**11:30–11:50 *St. Benedict’s Church***

This project was undertaken to explore the vast world of choral composition and its processes. Through the progressive studying of famed composers and musicians, it becomes clear that musical composition is no easy task. However, under the guidance and inspiration of gifted instructors, it is a task worth pursuing. This composition presented is the work of several months of writing, composing, editing, and practicing the art of choral composition. It is the work of many combined years of music lessons in theory, history, and conducting, as well as individual instruction that taught what it means to write good choral music. The latest technology in music editing software aided in the process of bringing beautiful text to life through singing. Most importantly, this composition was written in an attempt to accomplish music’s intention: to touch the hearts of many people.
58. The Next Big Question in Gender Equality

Peter Barstad, Velia Colunga, William Raymond, Political Science
2:35–2:55 * Room 109

Has the time come to send American mothers, sisters, and daughters into the hellish fury of war? In light of the recent decision to open all combat arms positions to women in the U.S. Military, the question arises again regarding whether or not women should have to register for the Selective Service once they turn 18 as men currently do. In *Rostker v. Goldberg* (1981), the Supreme Court ruled that women would be exempt from registering for Selective Service on the basis that they could not serve in combat arms positions within the military. On December 3, 2015, Defense Secretary Ashton B. Carter announced that women would be able to serve in all combat roles. Because women can now serve in all combat arms roles, should they also have to register for the Selective Service? In this Discovery project, the team examined this complex, controversial, and emotional issue from economic, ideological, legal, military, political, and sociocultural perspectives. Each perspective offers different insights into answering the research question. Come to the presentation to hear our answers and recommendations.

59. Comparison of Dicer Levels of Normal Esophagus vs. Barrett’s

Anastasia Ratcliff, Laurencia Ouedraogo, Martha Carletti, Biology
2:35–2:55 * Room 124

The junction between the esophagus and the stomach is known as the gastroesophageal junction; here, the squamous cells of the esophageal lining bud up to the columnar mucosa of the intestinal tract. Metaplasia of the squamous esophageal cells into columnar cells can develop into Barrett’s esophagus, a precursor to esophageal adenocarcinoma or esophageal cancer. Carcinoma, cancer of epithelial tissue of skin or the lining of internal organs, is caused by the uncontrolled division of abnormal cells. MicroRNA precursor, pre-miRNA, is modified by the enzyme Dicer to the ~22nt mature miRNA. Levels of Dicer have been demonstrated to be changed in cancer; this affects the total mature microRNA level of the cell. In this study, we seek to examine Dicer levels in Barrett’s vs. normal esophagus using a Western blot and immunohistochemistry. For the Western blot, cells will be grown in vitro and protein will be isolated and analyzed. For immunohistochemistry, esophageal sections from patients will be treated with the Dicer antibody so Dicer localization can be visualized. Differing Dicer levels between normal and Barrett’s esophagus could indicate the need for further examination into Dicer and to microRNA in the development of esophageal adenocarcinoma.

60. Design and Development of Small UAVs

Graham Matlock, Andreas Fritz, Christopher Kujawa, Samuel Anderson, Anne Hatfalvi, Julia Chahine, Charles Sprouse, Engineering
2:35–2:55 * Room 125

Following up on a visit to the Society of Automotive Engineer’s 2015 Aero Design competition, the college’s design team has been experimenting with new
aircraft designs, recruiting new members, and learning more about aircraft design, analysis, and construction. Each of these activities prepare the team to contend at the 2017 competition. The competition aircraft has undergone a radical redesign in the form of a “powered parachute.” This design features a large lifting surface that can be tightly packed into the competition-required transport tube, leaving more space for a powerful propulsion system. The combined effect of the larger lifting surface and more powerful propulsion system is the ability to carry more weight. Based on preliminary calculations for our prototype, the use of this aircraft design would increase the team’s competition score by approximately 15% or more. Another aircraft, an 8′-wingspan high-wing cargoplane, has been designed and constructed by three senior engineering students and the Aero Design team. This construction provided experience with aircraft construction, knowledge of different design elements, and familiarity with the constraints that apply in the construction of an aircraft. In addition to the complete aircraft, two partially completed models were made to demonstrate the building process and the internal structure of large aircraft designs.

61. Virtual or Physical: Which Community is More Fulfilling? Study on Social Media
   
   Olivia Dowling, Clay Johnston, School of Business
   
   2:35–2:55 * Room 208

   What does community mean in the modern world? The progression of technology through the Industrial Revolution has brought a multitude of resources to connect with others locally and globally. Has the ability to connect brought us closer into community with others, or has it given us a place to talk but not necessarily be fulfilled? Social media communities are the most common forum for people to discuss common and uncommon interests. Are these communities more fulfilling than being face-to-face with someone of the same interest. Is the experience of meeting people from across the globe more rewarding than a physical group? The objective of this project was to discover if the fulfillment of a human is more satisfied by a social media community or a face-to-face community. Primary and secondary research was conducted. Primary research was conducted in the form of a survey and will be presented alongside accumulated secondary research.

62. Bringing Multicultural Education to the Secondary Classroom: Moving Beyond the Theoretical
   
   Laura Romaine, Christina Adams, Education
   
   2:35–2:55 * Room 219

   Through technology, travel, and the benefits of easily accessible information, we live in an increasingly accessible world. Incorporating cross-cultural understanding and keeping students informed about global perspectives is widely accepted as being good pedagogical practice. However, most often multicultural education remains superficially theoretical and removed from practical pedagogical strategies, even in culturally diverse schools. Thus, this study seeks to address how the aspirations of multicultural education can be realized in the classroom. After
briefly discussing various understandings of multiculturalism in K–12 grade education and its benefits, this project seeks to explore tangible ways to incorporate the learning styles and content of different cultures in the secondary classroom, through both subject matter and pedagogy. A series of interviews with individuals who attended secondary school in different countries combined with research from books of various subject matter from different cultures provide practical strategies and a survey of possible topics of discussion that will enrich the American classroom experience according to the true spirit of multiculturalism.

63. A Historical Analysis of *The Feminine Mystique*
   *Elise Huntley, John Romano, History*

   **2:35–2:55 * Gangel Seminar Room**

   In 1963, Betty Friedan published *The Feminine Mystique*. In this book, Friedan responded to the problem she saw for women in the United States. She believed women were unhappy and dissatisfied because they believed the road to happiness was to become the domestic housewife and they never looked for anything else in their lives. When her book came out, the response to Friedan’s writings were both supportive and critical. Many who read the book identified with its message. But others did not agree, and they believed that her logic was flawed. They thought she was making false assumptions about women being unhappy in their roles as wives and mothers. The society was putting an increasing emphasis on the happy housewife, and Friedan challenged that idealistic notion. Fifty years later, *The Feminine Mystique* is still seen as a controversial book. In today’s society, there are those who hear the title and immediately respond negatively. Some critics have tarred her by association with more radical feminist critiques of society. Others in modern times believe the book was a turning point in the fight for women’s rights in America. They see it as a powerful book that encouraged Americans to reevaluate the role of women in society. The goal of this research is to gain a better understanding of *The Feminine Mystique* by looking at Friedan’s writings, studying the time and context in which the book was published, and looking at the opinions and reactions to this powerful book over half a century later.

64. Classroom to Community
   *Sydney Giefer, Angela Lorang, Scott Cox, Theatre Arts and Dance*

   **2:35–2:55 * Room 323**

   Can what you are learning in the classroom be used to change your community right now? If so, how? There seems to be an unnecessary division between the students at Benedictine College and the larger Atchison community. With a surplus of educated, able students, it appears there should be no deficiency of volunteerism and after-school programs in Atchison. Yet, the deficiency is an ugly reality. In order personally to address this problem, we asked whether a liberal arts education could serve Atchison’s needs and considered ways in which we could use skills learned in the classroom to benefit the community. Initially discussing the community at large and looking at the model of the prison Shakespeare program, it was determined that serving the youth was the most viable avenue
for our specific skill set. This approach offered practical experience in honing the theatrical craft while simultaneously putting our education at the service of others. In this vein, we reached out to the local middle school and crafted a 20-week theatre education program that touches on various aspects of our art form ranging from speech and movement, to monologues and auditions, and even language and history. We will demonstrate manners in which the students of Benedictine can approach the community and provide personal witness and anecdotes to a successful program founded in the liberal arts.

65. The Pursuit of Beauty: Process, Aesthetic, and Concept

*Marie Orsinger, Shannon Biwer, Clare Tapia, Christa Kagin, Art*

2:35–2:55 • Band Room (JPII)

Is there beauty and validity in the process of creating? As a group of artists with various levels of training, we explored the experience of painting. Taking inspiration from Helen Frankenthaler, who created art for the process and the intention of making something beautiful, we utilized her techniques of painting, specifically her famous staining technique on large pieces of raw canvas. Within a sequence of three paintings, we explored process, aesthetic, and concept, allowing each to be independently represented. Through comparison and discussion, we investigated the validity and beauty of each of the three paintings produced by each participant, answering questions such as the following: Does one of the canvases hold more validity and beauty than the others? Does there need to be something more than experience? Is the end product integral to the beauty and validity of the work? Or is there something beautiful that happens along the way while creating? Is there beauty inherent in that experience? Our objective of making connections and also distinctions between process, aesthetic, and concept were expanded through readings concerning process, aesthetic approaches, philosophies of art, and historical influence.

66. Forrest Gump, Ping Pong, and the Week That Changed the World

*Ashley Roberts, Caroline Cundiff, Katherine Greenwood, William Raymond, Political Science*

3:05–3:25 • Room 109

Forrest Gump, the famous fictional ping pong player and war hero in the Vietnam War, had a firm understanding that “life is like a box of chocolates, you never know what you’re going to get.” Perhaps this statement is best illustrated by the fact that ping pong, along with a host of real-life characters, changed the world. While the reason for the revival of ping pong is unknown to a majority of people, its revitalization is credited with establishing the new relationship between the United States and the People’s Republic of China that historic week in February 1972. So how did ping pong change the world? This project examined how the game of ping pong significantly influenced American-Chinese relations while still advancing as an international sport. The Discovery team conducted a comprehensive literature review and examined six of the most influential men involved “in the week that changed the world”: Glenn Cowan, Zhou Enlai, Henry
Kissinger, Ivor Montagu, Richard Nixon, and Mao Zedong. Each of these men contributed, in their own unique way, to the establishment of relations between the United States and China. Due to China’s adoption of ping pong as its most renowned sport, huge advancements were made in its foreign policy. Through this project, the team sought to analyze how ping pong changed the world and led to what many call President Nixon’s biggest accomplishment.

67. Natural Mathematics: Exploring Fibonacci and Phi in Nature

*Kelsey Gengler, Katelyn Dery, Leah Childers, Mathematics and Computer Science*

3:05–3:25 *Room 124*

Natural Mathematics explores the ways in which the Fibonacci Sequence and golden ratio are found in nature. Many living things, specifically the sunflower, exhibit a growth pattern that follows the Fibonacci Sequence, consisting of the numbers 1, 1, 2, 3, 5, 8, and so on. This presentation also will explore the golden ratio in the context of the golden rectangle, which leads to close observations of the nautilus shell. By examining the limit of the Fibonacci Sequence, it is apparent that golden ratio and Fibonacci Sequence are closely related. This relationship helps explain the presence of these two mathematical relationships in living organisms and provides a small glimpse at the mathematics behind the beauty of the natural world.

68. Incubation Behaviors of the Dark-eyed Junco (*Junco hyemalis*)

*Natalie Cook, Virginia Winder, Biology*

3:05–3:25 *Room 125*

Incubation behavior can be an important driver of nest success. Incubating females in a uniparental care system must balance the time and energy expenditure between nest attendance and self-maintenance activities such as feeding. We monitored a breeding population of White-winged juncos (*Junco hyemalis aiakensi*), a subspecies of the Dark-eyed junco (*Junco hyemalis*), in the Black Hills of South Dakota. We monitored incubation behaviors with Thermocron iButtons, a small device that records the temperature of its immediate environment, such as the temperature of incubating eggs, at predefined intervals. The aim of our study was to analyze incubation behaviors of the Dark-eyed junco as potential predictors of nest success and investment by the female. We hypothesized that incubation behavior would directly impact nest success. We expected to observe two incubation behavior phenotypes that are not necessarily mutually exclusive. First, nest success could be achieved by an incubating female taking short but frequent recesses. Second, nest success would be achieved by an incubating female taking long but infrequent recesses. We monitored 20 nests and used temperature profiles from iButtons to determine timing and duration of recesses. We modeled nest survival as a function of incubation behavior and found that high rates of nest survival were associated with shorter and more frequent recesses. This study is the first successfully to monitor incubation behaviors of the Dark-eyed junco using iButtons.
Production of carbapenemases is the most important mechanism of antibiotic resistance employed by carbapenem-resistant Enterobacteriaceae (CRE). The design of new carbapenemase inhibitors requires a thorough understanding of these enzymes’ catalytic mechanisms. A novel monocyclic β-lactam (Spectrobactam) was used to probe the mechanism of hydrolysis catalyzed by IMP-1 and compared to that of IMP-1-catalyzed hydrolysis of the cephalosporin (Chromacef). \( K_m \) values and turnover numbers were similar for both substrates. Under first-order conditions, Chromacef pH-rate profiles revealed two titratable protons with pKa’s of 4.4 ± 0.1 and 9.1 ± 0.1; while that for Spectrobactam revealed 3 titratable protonic sites with pKa’s of 4.4 ± 0.1, 6.0 ± 0.2, and 8.6 ± 0.1. There was no significant kinetic solvent isotope effect (KSIE) for Chromacef, though Spectrobactam yielded a KSIE of 3.0 ± 0.9. The latter’s proton inventory was concave downward and fit well to a model of a transition state single proton transfer, \( \phi_t \) of 0.15 ± 0.07, the isotope effect of which is masked by a non-unity reactant state fractionation factor, \( \phi_R = 0.5 ± 0.1 \). Under saturating conditions the Chromacef pH-rate profile is consistent with a titratable proton with pKa = 5.46 ± 0.05 and possibly a second, pKa = 9.7 ± 0.1 and the KSIE was normal at 2.1 ± 0.5 with a linear proton inventory. The C221D mutant IMP-1 has been cloned and expressed to further probe this reaction mechanism. These and subsequent results will be discussed in terms of reaction mechanisms and participation of active-site residues.

70. Are You Engaged? Ways for Kinesthetic Students Actively to Learn
   **Samantha Kelly, Mackenzie Caylor, Piper Wentz, Education**
   3:05–3:25 * Room 219

Today’s students learn through a multitude of ways. Students themselves can be classified through a variety of characteristics that relate to styles of learning. Kinesthetic learners are those who prefer to learn by doing and moving around. Teachers have a difficult time meeting the needs of their kinesthetic learners because of the challenge to incorporate movement. This project is an in-depth exploration about meeting the needs of kinesthetic learners. The first part of this project included finding strategies that are applicable to the traditional lecture-style classroom. The next part was interviewing people and learners who had firsthand knowledge about meeting the needs of kinesthetic learners. Then we were challenged to apply our new learning to our student teaching experience.
71. Olga Nikolevna Romanova Ballet

Elizabeth Benda, Allison Buell, Laurence Rossi, Rebecca Chouinard, Lauren Dorsett, Jeffrey Leger, Eamon Mulholland, Caitlin Gibson, Marie Orsinger, Valerie Mulholland, Peter Volmert, Patrick Mulholland, Gabriel Heffernan, Stuart Mast, Diane Gorrell, Scott Cox, Theatre Arts and Dance

3:05–3:25 * Gangel Seminar Room

I directed, choreographed, designed, and performed an hour-long dance performance grappling with the tragic story of the last Romanov family of Russia as seen through the life of the eldest daughter of Nicholas II, Olga Romanov. As a reflection of the fall of a large nation into Communism by the shedding of innocent blood, this performance suggests how the family is crucial to the life of society as is reflected in the tenderness between the Romanov family members amid terror and destruction. The question I sought to answer was how to portray the intimacy of the Romanov family in contrast to the evil of communism around them through dance, choreography, staging, and costuming. This dance performance was divided into six parts; each part illustrated the short life of Olga Romanov through a balletic style as well as Martha Graham’s contemporary style and creative choreography. The costumes of the performance were also a very important part of the project. I studied the fashion of the late 19th century and the early 20th century in Russia and researched through the photography of the Romanov family in order to build and purchase dance costumes that would place the audience in that era of Russia.

72. Modeling Hawking Radiation of Black Holes

Jack Herbic, Eric Fox-Linton, Physics and Astronomy

3:05–3:25 * Room 323

Water waves traveling upstream are used to model radiation emitted from the event horizon of a black hole. Analog models like this are the only way to study Hawking Radiation from black holes at the moment because there is no way actually to measure this radiation in the foreseeable future. This experiment takes advantage of the lensing property of water waves by using two photodiodes to measure the wavelength of shallow water waves.

73. Discovering Dada

Claire Nacanaynay, Christine Flint, Margaret McCabe, Mayra Ortiz, Christa Kagin, Art

3:05–3:25 * Band Room (JPII)

Dada often is referred to as the “anti-art art movement” and is much despised by almost anyone asked. However, the merit of Dada must be seen as it has helped to shape the modern identity of art. We, therefore, decided to look at it through the mindsets of the time (1916–1923), as well as through a modern perspective at the impact and influence of Dada today, by creating present-day conscious Dada pieces. A major focus in Dada was the temporary as many plays and even art pieces took place only once before being willingly destroyed. In Dada, art
was meant to affect and engage the viewer in the moment, unlike traditional art, which is meant to last, and so Dada did not believe in longevity as an important aspect. Our journey through Dada has allowed us to question meaning in art and its creation as well as its purpose. Hans Richter, a founder of Dada, had concluded that all anti-art movements, now and in the future, are man’s “unflagging search for a true picture of himself.” This searching for the truth is not only for the artists but for the viewers, and, as Dada works challenged the viewers to look for meaning and truth, so do modern works of art search for the truths of humanity. Dada also has enabled us to make connections between the past and present so that we may look upon Dada for its true worth and not solely our opinion of it.

74. Catholic Literature in Secondary Schools: Literary and Theological Application
Rachel Gleeson, Hannah Klamerus, Stephen Mirarchi, English

As public and private schools alike scramble to meet the requirements of Common Core, many questions have been raised about these national standards. Catholic schools in particular have been faced with the dilemma of how to remain competitive while providing orthodox moral formation. However, the two goals need not be at odds. Catholic literature can satisfy national and local standards while serving as an important asset for the education of the whole student: body, mind, and soul. To demonstrate this, we approach the issue from the separate disciplines of Literature and Theology. With works by such authors as J.R.R. Tolkien, G.K. Chesterton, C.S. Lewis, and Flannery O'Connor, we have explored how Catholic literature can be used in the secondary classroom. Applying our conclusion, we have created original unit plans for teaching Catholic literature in high school English and Theology courses. Through the presentation of our research and application of these works we hope to show how Catholic literature can be used to enhance the Catholic identity of high schools while satisfying state and diocesan standards.

75. Examining the Achievement Gap in Atchison
Lucy Leighton, Christina Adams, Education

The purpose of this study is to examine the effects of the achievement gap in Atchison schools. The achievement gap, which can be racial or socioeconomic, means that minority or low-income students perform worse academically and attend college at lower rates than their white or high-income peers. Closing the achievement gap is a major goal of education today and one that affects students across the country. In this project, students in Atchison schools have been surveyed regarding their grades, perceptions of school, and expectations of college. The effects of the achievement gap in Atchison based on the collected data were analyzed and compared to national and Kansas statistics.
76. Is Benedictine College Losing One of Its Core Values? The International Perspective on Community

Cori Drouhard, Camrie Ventry, Eriko Mori, Mary Catherine Willacker, William Raymond, Political Science

3:35–3:55 * Room 125

There are currently 51 international students attending Benedictine College from six different countries. As one of its core values, Benedictine College encourages community by facilitating student interaction. Yet when international students are seen around campus, they are usually seen with only other international students. So how well is Benedictine College integrating international students into its community? Are international students involved in sports better integrated? Do American students have a good awareness of their international classmates and a general understanding of world geography? Our diverse research team pursued the answers to these questions through interviews with faculty and staff, American and International student surveys, and personal research in order to help make Benedictine College a more welcoming place for all international students. The team also examined how the U.S. Army Command and General Staff College at Fort Leavenworth, Kansas, welcomes and integrates its 120 international students from 96 different countries. The main research question was the following: How well does Benedictine College welcome and integrate its international students? The key hypotheses were as follows: 1) Benedictine College does not do a good job welcoming international students; 2) international students are not integrated into the campus community very well; and 3) international students involved in sports are better integrated. After our research, only the third hypothesis was confirmed. The research allowed us to make several recommendations to help better welcome and integrate international students into the Benedictine College community.

77. Development of Luminescent Solar Concentrators

Nathaniel Strandquist, David Byrum, Georgiy Shcherbatyuk, Physics and Astronomy

3:35–3:55 * Room 208

In recent years, the use of solar energy has increased but has been limited by the fact that nonrenewable energy sources are still cheaper and require no modifications to existing infrastructure. One method of decreasing the cost of solar energy is to concentrate incoming sunlight onto panels either through lenses and mirrors or through special devices called luminescent solar concentrators (LSCs). LSCs are especially promising as they will operate in diffuse or indirect sunlight and can be integrated into existing building designs while lenses and mirrors require expensive installation on rotating turrets to track with the sun. Our presentation will address the basic design of LSCs and their advantages over other types of solar concentrators, the steps for constructing a functioning prototype, and future plans for improving our existing design.
I wished to discover how to put on a Greek tragedy in the original style and wanted to learn why the tragic plays from Ancient Greece are still relevant to us today. Essentially, I wanted to ascertain what it would take to replicate a performance similar to one the Greeks themselves would have put on and to investigate the nature of the drama. I selected the play *Oedipus Rex* by Sophocles as the play that we would perform because Aristotle himself said that it was the most perfect play. I decided to use a translation by Robert Grene, which I adapted slightly to fit with the cast. After the play was cast, Dr. Mulholland and I found the place on campus that best mimics an outdoor theatre, which turned out to be Memorial Hall Lawn. As for the performance, we learned that the Greeks put more emphasis on the spoken word in plays than on scenery or blocking, so within the performance we reflected this by implementing a bare stage and masks on the actors. By studying the script and the history of the play, I helped the actors present the script in an authentic, traditional way. Overall, all of the actors and participants had some share in the analysis of the deep meaning behind this play, and we all saw within the themes of the play the reason why it has endured for so long: it is the story of soul that cannot run from fate.
80. The Increase of QK1 Protein Levels Between Barrett’s Esophagus Cells and Esophageal Adenocarcinoma
Brandon Betsch, Jessica Linton, Jennifer Gilbert, Martha Carletti, Biology
3:35–3:55 * Room 323

Barrett’s esophagus (BE), a condition characterized by the changing of the esophageal lining to tissue similar to the intestinal lining, has been shown to be a prominent risk factor for the development of esophageal adenocarcinoma. Many features within the cell can facilitate transcription and translation, which ultimately lead to changes in phenotype observed in Barrett’s esophagus. MicroRNA, which bind and cleave messenger RNA, can mediate changes in protein expression. Circular RNA, circRNA, have the ability to efficiently bind to complementary microRNA. The binding of microRNA to circRNA prevents the microRNA from regulating mRNA. The Quaking protein (QK1) is a regulator of circRNA and has been demonstrated to be changed in cancer. Western blot analysis and immunohistochemistry will be performed in order to measure the relative abundance of the QK1 protein in normal esophageal cells, BE cells, and esophageal cancer cells. A difference in QK1 protein levels would presumably indicate that a difference in circRNA levels are involved in BE. We saw an increase in QK1 levels between Barrett’s esophagus and esophageal adenocarcinoma cells. A Western blot will be performed at a later time to further investigate the results. Additionally, the ability to distinguish between BE cells and esophageal cells using the measure of QK1 protein could prove to be an effective diagnostic tool in premalignant esophageal screenings. The implications of this research will help to uncover the role of QK1 and if there is a link between the levels of QK1 and the development of BE and esophageal adenocarcinoma.

81. The Little Prince — Page to Stage
Diane Gorrell; Clare Nowak, Director; Christina Barth, Composer; Danielle Shanahan, Puppet, Costume Designer, Little Prince; Rosemary Herold, Pilot; Natalie Gallatin, Puppeteer; Elena Teresa Moore, Grown-ups; Elizabeth Benda, Choreography; Peter Olson, Sound Designer; Madison Welte, Stage Manager; Scott Cox, Theatre Arts and Dance
3:35–4:35 * Band Room (JPII)

The goal of this project was to create a fully-realized production of Antoine de St. Exupery’s book, The Little Prince. This process began with a concept for the show: We would build a production for a small group of actors that could be transported to different locations and thus brought to many different groups of people. With the concept in mind, a script adaption of the book was wrought, and several drafts were produced and worked over. With a working script in hand, the director began her process with an action analysis of the script. She established the most essential locations and major actions, then created a scenic concept and ground plan that would translate well between scenes and benefit all necessary action. This set, the director could create action to drive and aid the plot. The show was cast and rehearsal began. Simultaneously, students began working to compose music and create choreography and movement to express the characters
and further the story. In composing for this project, the composer explored how to write music that matched a specific theme. For this student, all past compositions had been written spontaneously. These compositions had to be planned out carefully to evoke particular images and emotions. As part of the vision to bring this story to life, some of the characters were chosen to be portrayed with puppets. The designs are inspired from St. Exupery’s watercolor paintings which accompany the book and intended to be visual representations of the storybook come to life.

82. Ion Production in Titan’s Ionosphere Due to Energetic Protons

*Austin Windsor, Matthew Richard, Physics and Astronomy*

4:05–4:25 * Room 109

The *Cassini Spacecraft*, launched in 1997, is currently orbiting Saturn and collecting data on the planet and its moons. Of particular interest is Saturn’s moon Titan, whose N₂ and CH₄ dominated atmosphere is thought to resemble that of an early Earth. As *Cassini* passes Titan, it gathers information about the composition of its upper atmosphere and ionosphere. Using a built Monte Carlo computer code and the information received from *Cassini*, the ionization due to charged particles entering Titan’s atmosphere was studied. This computer code simulates the motion of hundreds of thousands of charged particles entering the atmosphere of Titan and predicts, based on particle energies and collision cross sections, whether or not the charged particle collided with a neutral species in the atmosphere to produce an ion. The results being presented are for a proton entering the atmosphere of Titan and interacting with the abundant Nitrogen molecules. Altitude ranges of peak ionization as a function of location in Titan’s ionosphere will be shown. It is foreseen that this computer code will eventually be applied to exoplanets to study the ion productions in their atmospheres as well.

83. “Explorations in the Art of Storytelling”: Learning to Tell Stories Through Written and Visual Communication

*Michaela Kinyon, Laurence Rossi, Stephen Mirarchi, English*

4:05–4:25 * Room 124

Within this project, we have sought to discover how people represent a fallen world, God, and how they reconcile those forces, both through fiction and photography. One aspect of this project involved researching writing and various genres of storytelling, as well as reading stories of conversion, discovery, and redemption, such as C.S. Lewis’s *The Screwtape Letters*, Mary Eberstadt’s *The Loser Letters*, G.K. Chesterton’s *Orthodoxy*, and Maureen Johnson’s *13 Little Blue Envelopes*. From this, a travelogue-style novella was written in order to understand storytelling as well as issues and questions which plague the spiritual lives of young people. The second aspect of this project involved frequent practice of photography skills and the use of Photoshop to supplement it. Photographs were selected based on quality, locations that coincided with the novella, and portrayal of the character’s state of mind and spirituality. These two mediums were combined to create a cohesive, complete representation of one fictional young woman’s physical and spiritual journey.
This year we have been working on the turret module of our automated Nerf blaster project. Our end goal is to produce a turret that we can remotely control or allow to operate autonomously to fulfill our foam flinging desires. This year’s turret module will allow us to mount any lightweight instrument, such as a satellite dish or Nerf blaster and control, as well as track, its movement with a degree of relative precision. This is done using servos and rotary encoders connected to an Arduino Uno. In order to allow the turret to be remotely controlled, we are also experimenting with an Arduino Wi-Fi shield attachment. This attachment will allow the Arduino to connect over the internet to a computer so that code can be input remotely. Our presentation will go into detail about the mechanical, electrical, and coding aspects of the project. For example, we will discuss how and why we have chosen to use encoders in the project as well as the problems and solutions of using them with the Arduino Uno. We also will discuss plans for the future, such as autonomous target tracking using input from a webcam and the possibility of upscaling the design for larger applications.

One third of a billion pounds of antibiotics are administered to animals annually as growth promoters generating a huge selective pressure for bacteria to evolve resistance. Bacterial production of bile salt hydrolase (BSH) in the intestine of animals aids bacteria in their competition for animal feed by deconjugating bile salts, disrupting the chyme emulsion necessary for efficient host digestion. BSH is a promising, non-lethal target for inhibition to increase feed conversion in food animals. Unfortunately, there are no convenient assays to use for BSH inhibitor screening. The objective of this project was to make an enzyme-coupled assay of BSH activity. Hypothetically, the glycine liberated from BSH-catalyzed hydrolysis of glycocholate is oxidized by glycine oxidase (GO) generating $\text{H}_2\text{O}_2$, which forms a colored product in the presence of horseradish peroxidase (HRP) and o-dianisidine (oDA). While BSH and HRP are commercially available, GO is not. A 45,006.89MW, FAD-containing protein, the gene for GO was synthesized and inserted into the pET-28b(+) vector. The recombinant DNA was transformed via electroporation into B21(DE3) E. coli, expression induced with IPTG, and the GO gene product purified by Ni-NTA affinity chromatography. GO was isolated at a concentration of $3.48 \times 10^{-2}$mM and produced a single band on SDS-PAGE. GO activity was monitored spectrophotometrically at 460 nm in 50 mM pH 7.0 Na$_2$PO$_4$ buffer containing 5.0U/mL HRP and 1.0X10$^{-3}$M oDA. A commercially available glycine oxidizing enzyme was also tested in the same system and compared to GO. These results and their interpretation will be discussed.
86. Awareness of the Impacts of Sensory Processing Disorder

Clare Hildebrand, MariAnna Martin, Claire Reed, Katherine Hoffman, Jordan Closter, Matthew Ramsey, Education

4:05–4:25 * Room 219

A case study was done on Sensory Processing Disorders where parents, teachers, medical professionals, and individuals with the disorder were interviewed. This topic was chosen because of the lack of research and the needs of the students with this disorder. As said by one of the interviewees, “sensory processing or sensory processing disorder is one’s ability or inability to process the sensory input coming at them appropriately, so that they can regulate their body.” The main issue with treating Sensory Processing Disorder (SPD) is that it is not in the Diagnostic and Statistical Manual (DSM), which is used by psychiatrists, pediatricians, psychologists, social workers, and other professionals. If SPD were in the DSM, it would allow more funding for research and treatment financing. Another issue with SPD not being in the DSM is there is no insurance for treatments, making any or adequate treatment for the child very difficult to implement because of the financial strain on the parents or caretakers. Therapy is found to be largely successful for children with SPD. The coping mechanisms and skills they learn in therapy are necessary for them to regulate themselves and be integrated into their environment. This research found that SPD is more common in a classroom than many teachers realize, and accommodations for these individuals is vital despite the lack of formal diagnosis. We hope that by educating the public on this disorder there will be an increased demand for research and support for these individuals and their families.

87. Design and Construction of a Snowboard

Gerard Edwards, Joshua Kice, Michael Baldwin, Steve Spencer, Engineering

4:05–4:25 * Gangel Seminar Room

Snowboards, it seems, possess a relatively simple and intuitive design. Three students at Benedictine College took on the challenge of researching innovative ways to create a self-built professional-grade snowboard staying within a firm budget. There are many obstacles to overcome in the design and construction of such an object. Various types of materials were considered. It is essential to manipulate the overall shape of the board in order to acquire the performance desired. Further, the most vital component of construction is the press that brings all the materials together. The team truly is a multidisciplinary team bringing together various majors such as math, engineering, and art. Both the top and bottom graphic are originally designed along with the dimensions and overall shape. The project utilized original and somewhat unconventional methods in the construction of the snowboard. The presentation will cover the methods and difficulties of construction and also will include a video of the board in action.
88. Open Hardware Off-Road Go-Kart
Thomas Olache, Graham Matlock, Nicholas Olache, Ruth Gross, Daniel McMahon, Cora Odoala, Paul Heuser, JohannaWieczorek, Charles Sprouse, Engineering

4:05–4:25 * Room 323

The goal of the “Open Hardware Off-Road Go-Kart – Frame Design” project was to reignite and stoke the passion for engineering with which younger engineering students enter college. Due to the relative simplicity of the go-kart build, students of all backgrounds and experiences had the opportunity to contribute to the project, gaining a better appreciation for the joy found in bringing an idea to fruition. We assembled an interdisciplinary team with backgrounds in mechanical engineering, electrical engineering, biology, nursing, and art. After sketching out some preliminary go-kart designs, the Frame Design subgroup focused on completing the stress analysis and other calculations to ensure the final structure could sustain worst-case scenarios, such as a front impact or a rollover. After several iterations, the final design was selected. The team constantly communicated with the Power Transmission subgroup to provide a frame geometry compatible with the drivetrain components. Visit our web page for more information and pictures: www.bckart.webs.com.

89. An Exploration of Music Composition
Margaret Boone, Nicholas Lahr, Stephanie Nelson, Alexandria Schneider, Meghan Roush, Alexia McAndrews, Leacadia Christensen, Madeleine Kopacz, Miriam Walski, Katherine Schaefer, Timothy Heron, Timothy Tharaldson, Charles Iner, Hunter Eisenmenger, Paul Murphy, William Medina, Jessica Pavlik, Benjamin Bogner, Gabriel Heffernan, Jonathon Miron, Elena Teresa Moore, Michael O’Brien, Christopher Greco, Music

4:40–5:20 * O’Malley-McAllister Auditorium

My Discovery project consists of three original compositions: *Ma Petite Chou Chou* for piano and flute, *Il Ballerino* for clarinet and piano, and *Child of a Day* for mixed choir. The first composition titled *Ma Petite Chou Chou* for piano and flute contains enriched harmonic language and harmonies. As a result of my studies in music composition, MU 290 and MU 291, I explored different ways to develop rich harmonies through the use of intervals a second and fourth apart. In the work I also studied the use of canon, inspired by the works of J.S. Bach, specifically his *Brandenburg Concerto no. 2*. The second composition, *Il Ballerino*, for clarinet and piano provides a contrast to *Ma Petite Chou Chou*. While working on this piece, I investigated this use of form in more detail and learned how to create a piece with different contrasting sections, as well as how to unify sections. The third composition, *Child of a Day*, for mixed choir is a tribute in reaction to the violence that has been happening around the world this year, specifically in France. The text is from a poem by Walter Savage Landor. The research for this project came largely from within my composition lessons through analysis of scores by Aaron Copland, L.V. Beethoven, Igor Stravinsky, J.S. Bach, Arvo Pärt, and Ēriks Ešenvalds. Two main text sources include *Music Notation: A Manual of Modern Practice* by Gardner Read and *Musical Composition* by Reginald Smith Brindle.
In 1921, composer and music theorist Arnold Schoenberg was credited with the creation of his 12-tone method of composition. This method was a response to centuries of the Western major-minor system of tonality. Today, the method largely has been assimilated, and for others, left in the past. This project, a result of studies in MU300 Music Theory and MU398 Honors Twentieth Century Music, seeks to present a brief history of the 12-tone method achieved through research of Arnold Schoenberg and his works *Six Little Piano Pieces Op. 19* (1913) and *Piano Suite Op. 25* (1921). In addition, the presentation will include the performance of an original 12-tone composition, *C3 P-0* for piano. *C3 P-0* pulls from the melody of *The Imperial March* from John Williams’ score for *Star Wars*. This approach creates a modern twist on Schoenberg’s 12-tone method of compositional practice.
**Discovery Day 2016 Schedule Overview** (Presentation number in parentheses)

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

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<td>7:40–8:35</td>
<td>Poster/Exhibit Session #1 — Ferrell Academic Center (McAllister Board Room) (1–14)</td>
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| 8:45–9:05 | FLC 109  
Rodgers  
Nuclear Reactors  
Fox-Linton (15)  
  FLC 124  
Huntley  
Women's Rights  
Wood (16)  
  FLC 125  
Anderson  
Autonomous Drone Monitoring … Parking Lots  
O'Malley (17)  
  FLC 208  
Curran  
The Kornilov Affair; … Russian Democracy  
Crane (18)  
  FLC 219  
Flax  
The Art of Mt. St. Scholastica  
Kagin (19)  
  Gangel Seminar Room  
Kosek  
Nursing Patient Education … Individuals With Disability  
Ramsey (20)  
  FLC 323  
Romaine  
The Freedom of Chains: Poetry in Gulag Camps  
Traffás (21) |
| 9:15–9:35 | O'Malley-McAllister Auditorium (9:00–10:00 a.m.)  
Benda — Olga Nikolovna Ballet  
Cox (71) |
| 9:45–10:05 | Poster/Exhibit Session #2 — Ferrell Academic Center (McAllister Board Room) (36–50) |
| 10:15–11:10 |  
  FLC 109  
Burke  
Potato Cannons  
Spencer (51)  
  FLC 124  
Douglass  
Babies & Careers  
Raymond (52)  
  FLC 125  
Lang  
Kinesthetic Learning on Students With ADHD  
Ramsey (53)  
  FLC 208  
Schroettner  
Què obviada tan difícil: Una Telenovela  
Sellers (54)  
  FLC 219  
DePauw  
John of St. Thomas  
Macierowski (55)  
  Gangel Seminar Room  
Lancaster  
Art and Mood: An Exploration  
Kagin (56)  
  FLC 323  
St. Benedict's Church  
Eisenmenger  
The Good Morrow, an Original Choral Composition Based on Poetic Text by John Donne  
Tharaldson (57) |
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**O’Malley-McAllister Auditorium**

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“The main element at school is to learn to be magnanimous … having a great heart, having greatness of mind; it means having great ideals, the wish to do great things to respond to what God asks of us.”

– Pope Francis