

# **Tenth Annual Student Research Symposium**



**April 14, 2015  
3:30 - 5:00**

**Bertschi Center & Technology  
Commons**



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Tenth Annual Student Research Symposium

**Agenda**

3:30 Welcome

Greetings & Remarks

Thomas P. Foley, JD

President

3:45 Poster Session

Refreshments

Announcements of Door Prizes

4:30 Closing Remarks

Dr. Stephen Pugliese

Senior Vice President of Academic Affairs/Dean of Faculty

“Research is the process of going up alleys to see if they are blind.”  
- Marston Bates, *The Nature Of Natural History*

Research at Mount Aloysius College is a systematic outcomes-based integration of practices designed to develop critical reading, information literacy, research and writing skills. The Student Research Symposium is organized by the Student Research Committee, which facilitates research experiences for students in all academic disciplines. The committee accepts applications for grants to support research and grants for students to attend meetings where they are presenting. The committee encourages research both within a course and through independent learning.

**Committee Members for the 2014-2015 academic year:**

Ms. Brittany Anderson	Business Administration & Information
Dr. Matthew Arsenault	Social Science
Dr. J. Michael Engle	Science & Mathematics
Dr. Crystal Goldyn	Science & Mathematics
Ms. Helen Ritchey	Medical Imaging & Radiation Sciences
Dr. Mary Shuttlesworth	Psychology
Mr. Robert Stere	Library

The committee would like to thank everyone for participating in this years symposium. Congratulations to all participants and mentors for a job well done!

Students interested in becoming involved in research may contact any of the committee members or visit: <http://www.mtaloy.edu/learning-programs/research/>

Please Note:

All entries are listed by category and poster number.  
All abstracts are printed as submitted.

“Anyone could be seduced by research when the results poured in. The trick was to love it when the results weren’t forthcoming, and the reasons why were elusive.”

- Lisa Genova, *Still Alice*

## **Business/Information Technology**

### **B1**

#### **Title Full Employment**

Author(s) Andre Thorpe, Molay Sesay

Mentor *Christopher Mingyar*

Abstract This project examines various perspectives on the definition of “full employment.” We compare and contrast differing views that economists have on full employment. We also examine some of the best policies to achieve full employment, and how the United States can achieve a low unemployment rate. We explore the points of view and the different arguments on each side of this debate: specifically, we analyze the two strongest arguments about unemployment and full employment, and some of the policies needed to achieve the targeted goal. Lastly, we describe in great detail what the policies are for each side of the debate. We also offer our opinion on which policies we think will work best.

### **B2**

#### **Title Sugar Prices**

Author(s) Bryan Buzi, Tyghe Bowers, Lindsay Olschesky

Mentor *Christopher Mingyar*

Abstract Our topic is how sugar prices are regulated and how the government supports sugar farmers. No matter what the demand of sugar is the farmers are guaranteed 18.75 cents per pound of sugar by the government. We believe that this system should be upheld so that the farmers have a somewhat steady income. This system also helps the smaller sugar farmers compete with the large corporations that produce sugar. This helps the small farmers stay in business because they most likely have a higher operating cost than the larger corporations. We will display the reasons why the system should be upheld on the poster and in our paper.

### **B3**

#### **Title International Labor Rights**

Author(s) Claudia Le, Sarah Forbes, Patricia Ball

Mentor *Christopher Mingyar*

Abstract In recent years, imports of manufactured goods into the United States have increased; this has caused people to question the workplace conditions of workers producing those goods. Our group will present the negative and positive aspects of international labor rights. Through research, our group will explain if standards should be set for work rules in other countries, also who should set them, and how should they be enforced. We will also answer these questions: Are workers exploited in these jobs? Or, are they better off than they would be in alternative employment? Should U.S. consumers boycott these goods? Or, would the workers be helped if U.S. consumers bought more of these goods? Should standards be set for work rules in other countries? Or, should work rules be left to the political system in a particular country? If work rules are set, who should set them and how should they be enforced?

### **B4**

#### **Title The Living Wage**

Author(s) Crystal Cosgrove, Samantha Miscavage, Carlo Kazmierczyk

Mentor *Christopher Mingyar*

Abstract The Living Wage Living wage is the minimum necessary income set for people to meet the basic living requirements. The basic living requirements include housing, food, and clothing. Throughout our research we will answer the following six questions: 1. What does it mean to have a living wage? 2. How much should employers pay to ensure low wage workers and their families can live above the poverty level? 3. How is the living wage different from the minimum wage? 4. What impact could imposing the living wage have on the economy? 5. Who is helped and who is hurt by the living wage requirements? 6. How do we justify a living wage requirement?

**B5****Title** **Extending the Debate: Walmart: Competitive Wonder or Community Nightmare?**

Author(s) Dylan Baker, Aubrey Frederick, Ronald Gallaher

Mentor *Christopher Mingyar*

Abstract Walmart is a popular retail/supermarket chain; however, it is not all wonders. WalmartWatch.com reviews how Walmart responds to the environment, employees, consumers, and communities. This group is comprised of, but not limited to, Walmart union workers, community leaders, and advocates. WalmartWatch.com argues that changing Walmart is vital to the United States. Mitchell (2013) stated Walmart is one of the largest environmental polluters. WalmartWatch.com further claims that employees of Walmart who work full-time, live below the poverty level. Walmart supports communities through the grant program and disaster relief aid. Walmart created environmental initiatives by using smarter packaging, recycling, and reducing plastic bag use. By reviewing WalmartWatch.com and comparing the claims made against Walmart Corporation, we will be researching whether or not Walmart is a competitive wonder or a community nightmare.

**B6****Title** **Unemployment and Employment During a Recession and Recovery**

Author(s) Jonathan Haff, Matthew Batts, Jacob Yarnish

Mentor *Christopher Mingyar*

Abstract What happens to unemployment and employment during a recession and recovery? This project examines two recessions and the following recoveries of those recessions to see what has happened to employment, unemployment, and the unemployment rate during the recession and recovery periods. The two periods analyzed are the great depression (1929) and its recovery (1933). The other period examined is the housing crash in 2008 and its slow current recovery. Question addressed include: Does employment always increase in a recovery? By how much does it increase, if any? And does the unemployment rate always decrease in a recovery? By how much does it decrease if any?

**B7****Title** **Unemployment**

Author(s) Todd J. Wardwell, Dalton J. Garlock, Ian Brantner

Mentor *Christopher Mingyar*

Abstract Our group will be discussing the effects of high unemployment rates; and by doing so we plan to correlate the similarities and differences between the patterns of consumption in relation to typical unemployment rates. Overall, unemployment will change the lifestyles of those affected by making the individuals adapt to their adjusted income. Many home factors must change in order to maintain a stable living condition that includes food, clothing, housing, automotive, and also accommodates the gender basis of spending habits. Our objectives are to discuss and determine the most predominately affected areas in consumer spending while under the influence of unemployment, as well as the changes in lifestyle the individuals affected make depending on relationship status and social well-being.

**B8****Title** **Should U.S. immigration be limited?**

Author(s) Morgan Brosnihan, Abigayle Kulick, Lindsey Mercer

Mentor *Christopher Mingyar*

Abstract This project examines critical issues relating to immigration, and policies that address those issues.

**B9****Title Cotton Tariffs**

Author(s) Tre Brown, Ja'wan Hargraves, Jason Jones

Mentor *Christopher Mingyar*

Abstract This project examines the issues of tariffs and quotas and how they affect both the importing and exporting countries, particularly with respect to American imports of cotton from African countries.

**B10****Title Can the market reduce pollution?**

Author(s) Brandon Morris, Joseph Nazarak

Mentor *Christopher Mingyar*

Abstract This project examines the pros and cons of market-based incentives to reduce pollution.

**B11****Title The Future of Money and Banking**

Author(s) Deonna Capelli, Garrison Faircloth, Haley Foster

Mentor *Christopher Mingyar*

Abstract This project examines current trends in financial markets, technology, and society, and examines potential implications for the banking system in the future.

## **Education and ASL /English Interpretation**

### **E1**

#### **Title      Play-Based Curriculum in Preschool and Kindergarten Readiness**

Author(s) Amanda Dillen

Mentor     *Dr. Marilyn Roseman*

Abstract    This paper will examine the relationship between a play-based curriculum in preschool and kindergarten readiness and the influences of kindergarten readiness on preschool curriculum. Research regarding play-based curriculum and kindergarten readiness was analyzed. Evidence of play-based curriculum has been shown to be beneficial in children's learning. With academics driving curriculum, preschool programs are limiting the amount of play time in their curriculum. Children can learn academic skills and other skills that will enable them to be successful in school through play.

### **E2**

#### **Title      Welfare Reform and Academic Success**

Author(s) Brandi Dunegan

Mentor     *Dr. Roseman*

Abstract    This research paper examine welfare reform and more specifically the question "How does welfare reform affect the reading scores of students living in poverty?" Data has been conducted and compared by looking at articles, research studies, statistics, student's test scores and literature on the topic of welfare reform. By analyzing the impact that welfare reform has had on low income families, employment rates, and the academic success of children affected by the reform, it was shown that welfare reform has had a detrimental effect. Welfare reform has had a detrimental effect of the reading scores of students affected by welfare reform.

### **E3**

#### **Title      Success without Scripted Curriculums**

Author(s) David Eberhart

Mentor     *Marilyn Roseman*

Abstract    The purpose of this paper is to show that high poverty districts can be successful without using scripted curricula. School districts that are located in low social economic communities are strongly correlated with failing test scores. Those districts also receive minimal funding to improve their curricula. To remedy the situation, districts receive grants to improve the quality of their school and education, but they need to utilize a highly scripted program. The narrowed curriculum is causing negative results for teacher morale which correlates to negative test scores. The research conducted shows that high poverty districts can succeed without using the narrowed curriculum, but the students are being taught by highly qualified teachers.

### **E4**

#### **Title      Fostering Resiliency in Low-Income Students**

Author(s) Marissa Ayers

Mentor     *Dr. Marilyn Roseman*

Abstract    The purpose of this study is to support the claim that teachers with low-income or at-risk students in their classroom have a higher responsibility of fostering resiliency and providing academic success due to the many factors that low-income students bring into the classroom. This study examined the needs of at-risk students and their families, perceptions of low-income schools, barriers in low-income schools and the chronic turnover rate that is present in low-income schools in order to validate the high level of responsibility that falls on the shoulders of elementary teachers. The study found that although there are higher levels of responsibility, effective teachers are able to foster resiliency and provide a quality education to at-risk students.

**E5****Title      The Positive Effects of Animal Therapy**

Author(s) Marra Balmer

Mentor    *Dr. Sara Rutledge*

Abstract    Animals are often used as companions for individuals with varieties of exceptionalities. The benefits these animals provide are endless. One specific area of this animal companionship is animal therapy. Animal therapy has proven to be successful, especially with children with exceptionalities. Such therapy helps children in all areas of growth and development and can leave positive lifelong effects.

**E6****Title      Child Rearing and Bullying**

Author(s) Rhett Leech

Mentor    *Dr. Marilyn Roseman*

Abstract    The aim of this research paper is to explain the network of effects among parenting style and child involvement in bullying occurrences in school. Issues arising from bullying led to direct and long-term negative worries such as physically, mentally, and socially anxieties for all the children involved with bullying. Case studies of parental styles and how they influence bullying behaviors in children were analyzed. The basis of or the origins of various parenting styles was shown to be linked drugs, alcohol, violence, discipline issues, and other parent involvement, which was further related to bullying. It was shown that parenting styles played a significant role in the creation of bullies and victimization. Ultimately child rearing and child behavior influence one another.

**E7****Title      Grade Retention**

Author(s) Tiffani Finnegan

Mentor    *Dr. Marilyn Roseman*

Abstract    This research examines the effectiveness of grade retention focusing on students from kindergarten through third grade. The long-term outcomes of this research are based on longitudinal studies, educational policies, and developmental theories. When young learners are lacking in all developmental areas, teachers must retain students due to the No Child Left Behind policies and recently Common Core Standards. These critical components to education make differentiation not enough for developmentally delayed students. When grade retention is used for students who are not academically successful and are not reaching developmental milestones, then grade retention should be used to facilitate learning.

## Health Studies

### H1

#### **Title**      **Bloodless Surgery**

Author(s)    Alexandra Watt

Mentor      *Kathleen Hoyne*

Abstract    Bloodless surgery, which is surgery that does not use human blood or blood related products, is becoming more common as the result of religious groups that will not allow blood transfusions, the cost of transfusions, as well as a decrease in donations of human blood products. There are many ways to achieve bloodless surgery, however some methods or techniques are more successful than others. This research will compare and contrast three techniques: enhancing the production of hemoglobin, using minimally invasive procedures, and doing difficult procedures in stages. It will explore the different side effects, costs, and the mechanics of the procedure to determine which technique is the most beneficial and leads to the best outcomes for the patient.

### H2

#### **Title**      **Fetal Keepsake Imaging**

Author(s)    Allison Collins

Mentor      *Megan Beaver*

Abstract    Diagnostic medical sonography is the modality most commonly used when using imaging prenatally. This diagnostic test allows a direct look at the health and welfare of both the mother and the fetus. Advancements in ultrasound technology have made 3D and 4D imaging available. These images are able to show details of the fetus such as facial features and hair which have made them very popular with parents. Some entrepreneurs have capitalized on this popularity and have opened up fetal keepsake boutiques across the country. These businesses provide non-medical “entertainment scans” without a physician’s order. Throughout the last couple of decades, the idea of keepsake images has been a very controversial one due to the bioeffects of ultrasound. While some say that these scans are perfectly acceptable, the majority of those in the profession are against the idea of these ultrasound boutiques.

### H3

#### **Title**      **Impact of the Affordable Care Act within Ultrasound**

Author(s)    Alyssa Dodson

Mentor      *Sharon Miller*

Abstract    This research project shows how the Affordable Care Act can be beneficial to some Americans and creates disadvantages for other Americans. The Affordable Care Act is thoroughly explained in the research and shows how people benefit from it. Hospitals, physicians, and other health care providers are also impacted by the Affordable Care Act. The focus is directed towards pregnant women who have an advantage with the Affordable Care Act by being issued for necessary ultrasound examinations. The research was completed with peer-reviewed, scholarly journals that demonstrate the importance of fetal ultrasounds. With the Affordable Care Act, the government’s intention is to provide insurance to Americans who cannot afford a plan, which in turn benefits hospitals and physicians.

#### H4

**Title Nuclear Medicine and PET/CT: Changing the Way We See Cancer**

Author(s) Alyssa Gallagher

Mentor *Sharon Miller*

Abstract Nuclear medicine is a fairly new type of imaging compared to x-ray and ultrasound. Nuclear medicine can be used to diagnosis many types of diseases and pathologies. The most helpful means about nuclear medicine, is that it offers a unique way to study the biology of cancer. It not only helps with the study of cancer, but it also can act as a customized cancer therapy plan for each individual patient. Nuclear medicine along with positron emission tomography (PET) can provide important information on tissues of the body such as normal tissue or diseased tissue. This is one of the reasons nuclear medicine and PET scans are the modality of choice when diagnosing cancer as compared to other conventional anatomical imaging modalities like ultrasound (US), computed tomography (CT), and magnetic resonance imaging (MRI). With nuclear medicine already being the modality of choice, we can only imagine what will happen with new technological advancements in the future.

#### H5

**Title Soldiers Exposure to Radiation**

Author(s) Ashley McCabe, MaryKate Cassidy

Mentor *Dr. Paula Scaramozzino*

Abstract Throughout history men and women have sacrificed their lives for the freedom of the United States of America. Often, bombs and nuclear attacks have been within the war, radiation was emitted with the attacks from the bombs. The body is greatly affected by high radiation doses and may cause cancer, skin burns and other health problems. Radiation from the wars and testing sites of the military have causes high levels of radiation to be emitted, natural radiation produced in the Earth causes 85% of the exposure to radiation. Programs within the military have been put in place to ensure that military personnel and civilians are safe from high exposures to radiation. These programs include Naval Nuclear Propulsion Program, Navy's Radiation Health Protection Manual, and National Council on Radiation Protection and Measurement. Devices to measure the amount of radiation exposure were also worn by military personnel and civilian workers.

#### H6

**Title Airplane Radiation**

Author(s) Danielle Walsh, Adeline Jarvis, Lyn Dipko

Mentor *Dr. Paula Scaramozzino*

Abstract Ionizing and nonionizing radiation exposure occurs during airplane flights. During airplane flights, passengers and crew members are exposed to different levels of radiation. Frequent flyers have the same health risks from their radiation exposure as do the pilots and flight attendants. There are no current regulations for radiation protection, or monitoring for airplane flights for the public; therefore, the recommended annual maximum radiation dose of 1mSv can easily be exceeded. Airline crew members flying high-altitude routes for long periods of time receive greater exposures than the typical radiation workers in industries where radioactive sources or radiation producing machines are used. Due to these high exposure rates, analyses have been performed to link together radiation and certain diseases, such as cancer. Frequently associated cancers to radiation exposure include breast cancer and leukemia, which have been documented as increasingly diagnosed in crew members. Researchers have made available a computer program called CARI-6 that can be used to calculate personal radiation exposures on a flight-by flight basis, through the entry of flight plans for any and each trip.

## **H7**

### **Title      Digital Breast Tomosynthesis**

Author(s) Elizabeth Boyce

Mentor     *Sharon Miller*

Abstract   Digital Breast Tomosynthesis (DBT) is one of the newest imaging procedures in Mammography. The implementation of DBT was recently approved by the FDA in February of 2011. This new procedure has proven its diagnostic accuracy by detecting early stage breast cancer in all breast densities, but most importantly in dense breast tissue, an issue that radiologists have struggled with for years. In combination with Digital Mammography, DBT has proven it is going to be the next great advancement in the battle against breast cancer.

## **H8**

### **Title      Food Irradiation**

Author(s) Hailee James & Lauren Felix

Mentor     *Paula Scaramozzino*

Abstract   Food irradiation is a processing technique that exposes food to radiation. Food irradiation may be used in order to reduce the occurrence of foodborne disease by destroying pathogenic organisms. Food irradiation also has the purpose of destroying insects or microorganisms, therefore increasing the safety and shelf life of foods. Food can also have naturally occurring radiation because the world is naturally radioactive. Radiation treatments have been applied to sterilize food products, reduce microbial contamination of food, and increase the safety and shelf life of foods; this is especially true for seafood. There have been studies conducted to provide explanations on food irradiation. Irradiation has not been widely adopted throughout the world due to a negative public perception, concerns expressed by some consumer groups, and the unwillingness of many food producers.

## **H9**

### **Title      Exercise and Human Physiology**

Author(s) Haleigh Custer, Hannah Hoffman, Devon Weyant, Claudio Vietti

Mentor     *Dr. Whitlock*

Abstract   Human Heart Physiology This three week experiment was designed to test the effects of exercise and other environmental factors, such as temperature, on human heart rate. Vital signs were calculated for each participant before and after exposure to environmental factors and exercise. Each participant was asked to perform a variety of physical activities after which time their vital rates were taken and compared to resting rates. The other aspect of this experiment involved altering the temperature of the environment for each participant. Vital signs were taken at room temperature and then again after each alteration to the external environment. It was hypothesized that both rigorous physical activity and temperature changes would affect the heart rate of the test subjects. Some tests were performed multiple times to ensure accuracy. Data was collected and analyzed for each test and each participant using standard mathematical functions. For tests that were performed multiple times, the participants' average vital rates were calculated. The results of this experiment were primarily congruent with the initial hypothesis made by experimenters. Data revealed that strenuous exercise and temperature can have drastic effects on the heart rate of humans.

## **H10**

### **Title      **Food For Thought****

Author(s) Jarrod Thorwart, Greg Swartz

Mentor    *Mrs. Hickman*

Abstract   Radiation is a word that possesses a lot of power. Many people associate radiation with nuclear energy and the potential harm it can cause as was shown in Three-Mile Island, Chernobyl, and Fukushima. Radiation is misunderstood and feared for potential harm. What if everyone knew that they were being exposed to radiation every day and not showing any signs of it? Foods that humans consume contains some amounts of radiation. Popular foods such as bananas, milk, beef, and potatoes all contain natural amounts of radiation. Proteins, fruits, and vegetables are treated with radiation to kill off harmful bacteria and parasites. This makes these foods safer to consume, not more dangerous because of radiation exposure. Radiation occurs naturally in many forms, including the food that so many people enjoy. Do not give in to irrational fears that all radiation is deadly. People are exposed to microscopic amounts of radiation every day.

## **H11**

### **Title      **Sickle Cell Disease - Treatment and Risk****

Author(s) Jordan Kech

Mentor    *Kathy Hoyne*

Abstract   Sickle Cell Disease is a disorder where red blood cells form crescent (sickle) shapes, resulting in blocked blood flow within vessels causing pain and organ damage. There are limited treatments available for Sickle Cell Disease and the right treatment depends on the severity of the disease. In a trial by the National Center for Biotechnology Information, 25 patients received either Hydroxyurea , which enhances the synthesis of fetal hemoglobin, or placebo for 6 months. The number of hospitalization days for patients on this drug was significantly reduced compared with placebo group, concluding that Hydroxyurea is practicable treatment. Another study done by the National Heart, Lung, and Blood Institute (NHLBI) evaluated 30 patients with sickle cell disease. Stem cell transplant was used with results showing the procedure reversed disease in 26 of 30 patients. The conclusion was that stem cell transplant is another promising treatment.

## **H12**

### **Title      **Latest Advances in Bone Densitometry****

Author(s) Jordan Stahr

Mentor    *Mrs. Megan Beaver*

Abstract   Bone densitometry is a diagnostic test to evaluate osteoporosis. Most common way to test bone density is the dual energy x-ray absorptiometry or DXA. DXA is mostly performed to measure bone mineral density on the lower back and hips (radiology info). Bone densitometry is used for conditions that deal with bone calcium loss, or the weakening of bones; along with the assessment of fractures risks. Over the year's medical imaging as a whole has advanced so much. Bone densitometry has advanced not only in technology but in application as well. DXA scanners are now being used to assess body composition or soft tissue composition. Scans can also be performed using a program downloaded onto a computed tomography scanner. Quantitative ultrasound is also being used to provide body composition without any dose given to the patient.

### **H13**

#### **Title      **Radiation: Good or Bad for Diabetes****

Author(s) Kimberly Stoneberg, Gabriel Humphrey, & Kalib Uhl

Mentor     *Mrs. Hickman*

Abstract   When we think of radiation we know that it can cause harmful effects on the body. It is possible that we are unaware of all of the problems that radiation can cause to the body, and the positive effects of radiation. Many people use radiation to diagnose diseases, and even to cure them, such as in radiation therapy. Many patients that have went through such treatments have had many adverse effects on their body. What we will be focusing on is when high levels of radiation is administered to the abdomen. The organ of interest is the pancreas, and the effects that will occur in it on a positive and a negative aspect. Since the pancreas has an important role with producing insulin, any damage caused by radiation could have an adverse effect. Can high levels of radiation to the pancreas lead to an increased chance of Diabetes? Or further the effects of diabetes? Could radiation exposure prevent the disease from worsening?

### **H14**

#### **Title      **Contrast in Diagnostic Ultrasound****

Author(s) Kristin Foor

Mentor     *Megan Beaver*

Abstract   The use of contrast in diagnostic ultrasound is progressing. The Microbubble is the most popular use of contrast. Other contrast agents are used along-side the microbubble to enhance the quality of the image taken. Contrast agents help provide more meaningful diagnostic images for ultrasound. The use of contrast agents have helped diagnose patients faster and more effectively.

### **H15**

#### **Title      **Researching the Link Between Autism and Vaccines****

Author(s) Lucas Mearkle

Mentor     *Kathy Hoyne*

Abstract   Despite living in the most technologically advanced country on earth, many children in the United States still contract preventable communicable diseases. This phenomenon occurs because many parents are fearful that their children may develop autism after being exposed to chemicals in the measles/mumps/rubella vaccine that is currently in use. Parents may believe this because of a lone study published by Dr. Andrew Wakefield in 1998 that linked some disorders on the autism spectrum with additives in vaccines used in the United States. This research examines other studies that disprove Wakefield's original theory. These recent studies find no link between any autism disorders and vaccine additives. This research will also compare previous and more recent studies, and explain why newer research methods are more accurate than the methods used by Wakefield to support his original theory.

### **H16**

#### **Title      **Elastography with Breast Sonography****

Author(s) Lyndsey Hall

Mentor     *Sharon Miller*

Abstract   New techniques in the various modalities are introduced into the medical field every day due to the increase in the advancing technologies. The use of elastography with breast sonography is among one of those increasing new modalities. The technique of using elastography with breast sonography will greatly improve the patient's prognosis. Elastography will provide the stiffness of the lesion, in this instance a breast lesion. Elastography will help determine whether a breast lesion is benign or malignant. Elastography with breast sonography (SWE) is a common type of elastography. Elastography should work as an adjunct tool with two-dimensional (2D) and three-dimensional (3D) ultrasound, but never used alone. Elastography has the capability of reducing the number of biopsies that a patient may have. The medical community will be able to improve patient diagnosis and patient satisfaction when using elastography with breast sonography.

## **H17**

### **Title      Natural vs. Cesarean Birth: Effects on the Immune System**

Author(s) Marissa Reinard

Mentor    *Kathleen Hoyne*

Abstract   This research examines the various effects that cesarean deliveries can have on the natural immunity of babies born this way compared to the natural immunity of babies born via natural vaginal delivery. It also examines possible future health complications that can arise such as asthma, hay fever, and Type I Diabetes. Studies have been performed demonstrating a correlation between cesarean births and a greater risk of developing chronic immune disorders. Though most women have no choice in the matter, the data shows natural delivery is healthier for babies because when born vaginally, babies are exposed to normal microflora in the vaginal canal and this bacteria begins colonizing their intestines. Babies born via cesarean delivery are delivered using sterile methods and are not exposed to this essential bacteria.

## **H18**

### **Title      Pediatric Sonography Exam**

Author(s) Melissa Koch

Mentor    *Mrs. Megan Beaver*

Abstract   The American Registry for Diagnostic Medical Sonography, which is the credentialing board for all sonographers is instating a new credentialing examination. This exam will focus only on the pediatric population and medical conditions specific to them. The pediatric sonography exam will encompass neurosonology as well as many pediatric conditions, some most frequently detected by ultrasound are highlighted in this research. The field of ultrasound is looking forward to this new addition as a way to expand knowledge and expertise as well as to better assist this fragile population.

## **H19**

### **Title      Color Doppler Sonography**

Author(s) Michelle Ubbens

Mentor    *Sharon Miller*

Abstract   The purpose of this research was to explain the purpose of Color Doppler in the field of Diagnostic Medical Sonography. Color Doppler Sonography is a low invasive procedure that is used to examine vessels of the body such as arteries and veins. Color Doppler Sonography has come a long way within only a short period of time. Along with almost any other medical field, Color Doppler Sonography is constantly growing. It is also taking the place of other invasive procedures because sonography is safer and noninvasive. At times Color Sonography is even chosen over gray scan sonography because of its ability to identify blood flow. Color Doppler is a relatively new procedure that will only continue to grow.

## **H20**

### **Title      General Sonography**

Author(s) Morgan Lemin

Mentor    *Mrs. Miller*

Abstract   While doing this board I wanted to make sure that I covered all the major details when dealing with general sonography. I provided an introduction, stating what I was going to address throughout the board. Then, I defined general sonography. Along with defining general sonography, I also provided the advantages and disadvantages of the modality. The poster includes what a general procedure is like and some interesting facts that go along with this modality. I included the advantages of portable ultrasound machines and noninvasive sonography because they are two of the most significant advantages general sonography provides. All in all, I provided an over view of how general sonography benefits the medical field.

## **H21**

### **Title      PET/CT for Neurology**

Author(s)   Nicole Russell

Mentor      *Megan Beavor*

Abstract    The purpose of this research was to see how PET/CT scans are improving for Neurology. PET/CT is a scan that combines both PET and CT, this proposal was made in the early 1990's by Townsend, Nutt and co-workers. A PET scan can look at the body's metabolic activity and provides important information about the body's internal physiology. Whereas a CT scan can very accurately evaluate anatomy. By combining these two modalities it provides the doctors with better images for diagnoses. There are three different neurological diseases that were studied by using PET/CT. Within all of the neurological disease it was found that PET/CT played a major role in either diagnosing or providing information on which medical path for treatment to follow.

## **H22**

### **Title      Vascular Interventional Technology: Latest Technologies**

Author(s)   Rachel Harris

Mentor      *Megan Beaver*

Abstract    The purpose of this research was to discover the latest technologies of interventional technology. Interventional procedures are part of a newer technology that allows for better visualization of vessels, insertion of medicine, and even minimally invasive procedures. The technological advancements that have been made are promoting more use of the interventional suites in hospitals, which is making hospitals more marketable. Vascular interventional technology has played a remarkable role in early detection of cancer, curing cancer and other various diseases. The interventional teams in hospitals must be extremely focused and dedicated to their work. The main risk involved with interventional procedures is the use of contrast agents and patients' adverse reactions.

## **H23**

### **Title      Digital Radiography: Annotating and Collimating**

Author(s)   Samantha Shaffer, Mary Havice, Katie Dye, Nicole Schirf

Mentor      *Paula Scaramozzino*

Abstract    Medical imaging has evolved drastically over the past couple of years. A huge advantage in imaging was the change to digital equipment. Digital radiography has multiple advantages along with a few disadvantages. A big issue that needs solved with digital radiography is the ability to annotate images after processing. This allows technologists to make changes to images after they are taken such as cropping the image down to the necessary anatomy instead of collimation before the image is taken and adding on markers. Technologists should be using techniques as low as reasonably achievable, ALARA. On all images, a marker indicating the side of the patient is to be completely visible on the film without having part of it missing or "clipped". This is for the radiologist to know what anatomy he or she is looking at. Missing markers can lead to many legal issues if it is later annotated incorrectly as the incorrect side of anatomy.

## **H24**

### **Title CT Imaging Gently and Radiation Protection**

Author(s) Sara Myers

Mentor *Sharon Miller*

Abstract Radiation dose is one of the biggest and most important healthcare concerns in the field of medical imaging. Some medical imaging modalities such as Computed Tomography, Radiography, and Nuclear Medicine, involve exposing patients to radiation in order to obtain a high-quality, diagnostic image for the radiologist to read, and accurately diagnose the patient's condition. The medical imaging modality that exposes patients to the highest dose of radiation is Computed Tomography (C.T.). C.T. technologists today, are well-trained and aware of the radiation risks involved with this modality. Therefore, these technologists have extensive training with the C.T. machinery, examinations, as well as knowing the proper techniques to set per patient. The most important aspect of C.T. imaging is to lower patient dose and use adequate radiation protection for the imaging procedure being performed. Many hospitals across the United States have taken the Imaging Gently pledge, as well as follow the principle A.L.A.R.A (As Low As Reasonably Achievable), in order to lower patient dose.

## **H25**

### **Title 3D and 4D Ultrasound**

Author(s) Taylor Mansfield

Mentor *Sharon Miller*

Abstract The purpose of this research is to show the similarities and differences between three dimensional (3D) and four dimensional (4D) ultrasound, and their uses and purposes in the medical field. 3D and 4D ultrasound are used for many types of exams, but are very commonly used for gynecology or fetal care. 3D ultrasound allows the visualization of facial features and other small features that are not as pronounced on 2D ultrasound. 4D ultrasound allows the same visualization techniques that 3D allows, however, it can also show real-time images. This allows better visualization of the actual movements of the fetus, such as yawning and blinking.

## **H26**

### **Title Musculoskeletal Ultrasound**

Author(s) Taylor Weed

Mentor *Sharon Miller*

Abstract Within the last fifteen years, advances in musculoskeletal (MSK) ultrasound have allowed this new form of imaging to become more widely used and accepted. A sonographer registered in MSK ultrasound can image the muscles, tendons, ligaments, bursa, and other parts included in the musculoskeletal system. MSK ultrasound imaging helps to measure the thickness of the various muscles and tendons in the body. Different ways to sonographically image the musculoskeletal system include the use of Color Doppler ultrasound, contrast-enhanced ultrasound, sonoelastography, and fusion imaging. These different ways of imaging help in finding muscle degeneration, inflammation, arthritis, and other pathologies of the MSK system. Ultrasound physics is also important in musculoskeletal imaging. Artifacts may form on the image and obscure the visualization of the muscles and tendons. New technologies combined with a relatively low cost compared to other imaging modalities will make MSK ultrasound imaging more popular and commonly used.

## **H27**

### **Title      When Half-Lives Cost Real Lives**

Author(s) Thomas Hepburn, Sarah Cherico, Kiley McQuillen

Mentor     *Rebecca Hickman*

Abstract   What's the "Half-life" of Nuclear Denial? Since 1945, unsafe nuclear weapon testing, accidents at nuclear power plants, and negligent dumping of radioactive material has left a long trail of cancerous destruction across the globe; some of which still occur today. In the 1950s, health concern led to the creation of the Partial Test Ban Treaty in 1963. Since then we have learned a great deal in regards to radiation's effects on human cells. Cell damage may create cancer if it affects cell reproduction. Cells carrying hereditary information may even pass these cellular defects onto offspring, which could affect the entire human race. The gross negligence demonstrated by nuclear states in the past 70 years highlights the need for congress to ratify the Comprehensive Nuclear Test Ban Treaty (CTBT). This treaty helps reduce nuclear risk while promoting the transfer of beneficial technology and intelligence to less developed countries. Reducing the likelihood of nuclear weapons being used is the primary goal of the CTBT; it also helps prevent "the environmental release of radioactive material, provides access to nuclear technology for peaceful purposes, and provides scientific data relevant to predicting and managing the consequences of natural or human caused disasters worldwide" (Dreicer, 2014, p. 591). The CTBT promotes sharing information on how to best secure radioactive material. Recently, the widespread international participation of the CTBT is linked to counter-terrorism, nonproliferation, and improvement in nuclear safety. In 1996, the United States signed the CTBT, however 19 years later the bill has still not been ratified by congress. How many years must pass before we join the rest of the world in cleaning up our nuclear past?

## **H28**

### **Title      3D & 4D Computed Tomography**

Author(s) William Noel

Mentor     *Mrs. Megan Beaver*

Abstract   This research examines the modality of three-dimensional (3D) and four-dimensional (4D) computed tomography (CT). This can be demonstrated by the use of 3D and 4D CT as an image guidance tool for various medical procedures and pathology demonstrations. A contrast can be made between 3D and 4D CT, signifying the value of these modalities in the field of Radiology. A major topic of this modality is the great importance and magnitude it has shown in the area of Radiation Therapy. Four-dimensional scanning is highly effective when used with Radiation Therapy, for enhanced target evaluation. The capabilities of three-dimensional reconstructions have shown great improvements in the detection of parathyroid adenomas and the overall ease of use. This research determined that four-dimensional cone-beam CT outperformed 3D cone-beam CT, in respect to image enhancement for tumor localization. This discussion will also include the ongoing research involved with the modality of 3D and 4D CT.

## **H29**

### **Title      3D & 4D Ultrasound (non-fetal)**

Author(s) Katie Dell

Mentor     *Mrs. Megan Beaver*

Abstract   The medical community always seems to embrace 2D ultrasound imaging, however there are other forms of ultrasound that can be used in certain situations that can produce a better image. 3D & 4D ultrasound are more advanced methods of scanning. 3D imaging can capture a true, three-dimensional image, while 4D imaging is very similar. The main difference between 3D and 4D is that 4D ultrasound takes the 3D image and creates motion within it. Although 3D & 4D ultrasound are more commonly used in fetal imaging, there are other uses for it as well such as cardiac uses and other diagnostic imaging. 3D & 4D ultrasound imaging scans are not meant to necessarily replace 2D ultrasound imaging, but they have major potential to combine conventional 2D imaging and tools that are available to take a step toward an effective 3D integration.

### **H30**

**Title**      **Functional MRI**

**Author(s)**   Olivia Rupp

**Mentor**      Sharon Miller

**Abstract**    This research poster focuses on functional MRI. Functional MRI has been in use since the 1990s and continues to develop. Functional MRI is an imaging technique that measures brain activity. It works by detecting changes in blood oxygenation and blood flow. This form of imaging is extremely helpful in many cases. Functional MRI helps surgeons planning brain surgeries, and psychologists who are monitoring individuals with mental illnesses. There are several advantages with functional MRI when compared to other modalities. Functional MRI continues to improve and change as the medical imaging world also continues to grow.

## Psychology

### P1

**Title**        **The Perceived Efficacy of Mount Aloysius's Academic Preparation Program Enrollment on Freshman Students Academically and Socially**

Author(s)    Alexcia Acosta, Kylie Froehlich, Lakin Raybuck, Holly Chapman, Brittney Mock

Mentor        *Dr. Virginia Gonsman*

Abstract     MAAPP is an early orientation program offered at Mount Aloysius, which seeks to integrate students into the college life, with a focus on academic and social success. The purpose of this research is to identify MAAPP second-semester students' perception of the effectiveness of the program. The participants include all of the 2014-2015 students' responses who are currently enrolled in MAAPP. Students will complete a 24-item Google Forms survey based on their perceived effects socially and academically of MAAPP, which will be administered via Mount Aloysius college email.

### P2

**Title**        **Perceptions and Attitudes toward Homosexuality and Big Five Personality Traits**

Author(s)    Alison, Butler, Kendi Frank, Jennifer Yohn

Mentor        *Dr. Mary Shuttlesworth*

Abstract     Homosexual individuals may encounter stigma in our society. This study measures relationships between attitudes toward homosexuality and the Big Five Personality Traits of openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. We predict the traits of openness to experience, conscientiousness, extraversion, and agreeableness will correlate with more favorable attitudes toward homosexuality. High levels of neuroticism will correlate with less favorable attitudes toward homosexuality. Undergraduate students from Mount Aloysius College will respond to the Attitudes toward Lesbians and Gay Men Scale-Revised (Herek, 2014) and A Very Brief Measure of the Big-Five Personality Domains (Gosling et al., 2003). To analyze data, we will correlate total scores for each Big Five trait with total ATLG-R scores. Discussion will include future directions for studying personality traits and attitudes toward homosexuality.

### P3

**Title**        **The Effects of College Orientation on the College Experience and Academic Success Of Commuter Students**

Author(s)    Anjelique Gorba, Kelly Penrod, Emily Tinkey, Maggi Ferguson

Mentor        *Dr. Virginia Gonsman*

Abstract     The purpose of this study is to examine the relationship between college orientation programs and academic success of commuter students. A survey will be conducted with students of Mount Aloysius College as participants and data will be analyzed to determine the relationship between students' perceptions about college orientation, the extent to which they considered it engaging, interesting, and worthwhile and academic success. We expect those with a positive orientation experience to have greater academic success.

### P4

**Title**        **The Effects of College Remediation on Academic Success at the College Level**

Author(s)    Bethany Hanzir, Haleigh McCall, Adam Keller, Kelly Rhodes

Mentor        *Dr. Virginia Gonsman*

Abstract     Being prepared for college-level work is essential for meeting the academic demands of higher education. Many incoming freshmen arrive to college lacking needed preparation to help them successfully pursue their degree. A survey is being conducted that explores the effectiveness of college remediation courses and their influence on academic success of the students taking these courses at Mount Aloysius College. The survey is composed of questions that prompt students to reflect on how effective and beneficial their remedial courses were for their education, which could be used to improve remedial courses in the future.

**P5****Title      The Effect of Peer-Support Programs on Hiring Likelihood**

Author(s) Brittany Mazur and Laura Stahli

Mentor    *Dr. Mary Shuttlesworth*

Abstract   Individuals with mental health/substance use histories may encounter stigma in securing employment. Participation in peer-support programs represents one pathway to address this stigma. Our study examined if peer-support program participation impacts likelihood of hiring individuals with mental health or substance use histories. Undergraduate students read vignettes and rated likelihood of hiring the individual in each vignette. A Chi-square goodness of fit test indicates that for individuals with a mental health history, peer-support participation impacts hiring likelihood. The odds ratio suggests that likelihood of hiring increases 3.75 times with participation in peer-support. A Chi-square goodness of fit test indicates that for individuals with substance use history, peer-support participation impacts hiring likelihood. The odds ratio suggests that likelihood of hiring increases 7.88 times with participation in peer-support. Results appear to substantiate peer-support program participation in improving employment prospects for both individuals with mental health and substance use histories.

**P6****Title      The Big Five Personality Traits in Relation to Locus of Control**

Author(s) Brittany Mazur, Brandie Mott, Megan Ruddock, Laura Stahli, Ryan Sweet

Mentor    *Dr. Mary Shuttlesworth*

Abstract   Much research has been conducted to determine the main dimensions of personality. Two proposed theories include the Big Five personality traits (Costa & McCrae, 1992) and Locus of Control (Rotter, 1966). A substantial amount of research has focused on these theories separately. Little research, if any, focuses on the relationship between these theories. The purpose of our study is to determine the relationship between the Big Five personality traits and locus of control. We hypothesize that Big Five traits of openness to experience, conscientiousness, extraversion, and agreeableness will correlate positively with internal locus of control and that neuroticism will correlate positively with external locus of control. To test these hypotheses, undergraduate students will complete surveys measuring both constructs. We plan to correlate Big Five traits with locus of control to determine if the constructs are related. Implications of results will be discussed.

**P7****Title      College Orientation Programs Retention Effects on Non-traditional Students**

Author(s) Jennifer Yohn, Lori Bills, Nikki Long, Louis Good

Mentor    *Dr. Virginia Gonsman*

Abstract   Much research has been done on the effectiveness of college orientation programs and their ability to retain or prevent the attrition of students. However, very little research has been done in the impact of these programs on nontraditional students and their unique circumstances (e.g., social commitment, family responsibilities, technology familiarization). As a result, there is perceived need for a nontraditional student specific orientation or at least a need for separate sections focused for these students. Because of this, a survey is being conducted of the students to determine if the current orientation program at Mount Aloysius College addresses their needs and how changes to the program would be perceived.

**P8**

**Title      Locus of Control and Self-Esteem**

Author(s) Kelcie Heverly, Sarah Davinsizer, Jessica Wagner, Taylor Clark

Mentor     *Dr. Mary Shuttlesworth*

Abstract    This study measures the relationship between locus of control and self-esteem. We predict that students with high self-esteem will have an internal locus of control, and students with low self-esteem will have an external locus of control. The participants in the study will consist of undergraduate Mount Aloysius College students from various majors. Each participant will take a demographic survey, the Rosenberg's Self-Esteem Scale (Rosenberg, 1989), and Rotter's Locus of Control Scale (Rotter, 1966). We will analyze the data using correlations between self-esteem and locus of control. We will also use a t-test to determine if individuals with high versus low self-esteem differ in locus of control. The researchers will also review study limitations and possible future research directions.

## Sciences

### S1

**Title Identification of diatoms in a healthy Pennsylvania stream compared to three downstream site impacted by abandon mine drainage (AMD)**

Author(s) Chris Arena

Mentor *Dr. Merrilee Anderson & Dr. J. Michael Engle*

Abstract Life in a healthy stream can be severely impacted by changes in pH and other water quality parameters. This study reveals differences in diatom diversity and water quality characteristics in a central Pennsylvania stream. One healthy site was compared to three nearby sites affected by abandoned mine drainage during a July sampling in 2013. Permanent slides were made and microscopically assessed for diatom identification. The healthy stream contained eleven diatom genera while the site most impacted by mine drainage showed only one diatom, *Eunotia exigua*. Data were analyzed for Shannon diversity index and species richness. Water samples showed differences in pH, aluminum, sulfate, and iron. This work demonstrates the use of diatoms as bioindicators of stream health.

### S2

**Title Bacteria and AMD**

Author(s) Gabriel Sabo, Emily Hancharick

Mentor *Penny O'Connor*

Abstract For our experiment we are testing how acid mine drainage affects living organisms. We are using five different types of water to conduct this experiment. The five types of water that we used were pond water, acid mine drainage water, before the water was treated, after the water was treated, and well water. These waters were found in a various of places. The acid mine drainage was found in Portage, Pa right near a creek. The pond and well water were found in Indiana, Pa behind a house and inside of a house. We then wanted to see if the bacteria would grow in these waters. We chose three different types of bacteria to test. These three were picked to see if they would grow; *Enterobacter cloacae*, *Micrococcus luteus*, and *Photobacterium fisher*.

### S3

**Title The Effects of Limestone on Acid Mine Drainage**

Author(s) Genesis Brown Rebecca Romagnino

Mentor *Penny O'Connor*

Abstract Our research looks at the effectiveness of using limestone to treat acid mine drainage (AMD). AMD is very acidic, and the limestone should increase the pH of the AMD. Our research looks at AMD from three different sites. Each sample will be tested using solid limestone and powdered limestone. We will test the pH of the AMD water before placing the limestone in. Then, we will place the limestone in the water. The pH will be monitored over the course of the next few days. This will tell us if the limestone increases the pH, how long it takes, and the type of limestone that works best.

### S4

**Title Microbes in Acid Mine Drainage**

Author(s) Gina Hanik; Tim Kestermont

Mentor *Penny O'Connor*

Abstract Do all acid mine drainage sites support the same organisms? Our focus was with fresh-water organisms that might exist in acidic and high metal concentration water. We addressed this question by looking at four different local acid mine drainage sites. Samples from Portage, South Fork, Sidman, and Portage were collected and the organisms were cataloged and compared between sites.

## S5

### **Title Limestone Treatment and AMD**

Author(s) Jordan Marion and Rodney Mose

Mentor *Penny O'Connor*

Abstract Our group's focus is to answer the question, "How effective is passive limestone treatment going to be in neutralizing acid mine drainage?". To answer this question, we obtained water samples from the Puritan mine drainage site, near Portage, PA; we obtained samples from water before the limestone treatment and after the limestone treatment. To test the effectiveness of this treatment, we are going to place limestone in containers with both water from before and after the treatment. Every 24 hours for the course of a week, we will test pH levels of both water samples with the limestone rocks and at the end of the week, we observe pH to see how effective the limestone was in the AMD water and raising its pH.

## S6

### **Title Acid Mine Drainage and Its Effects on Microbial Diversity and Grass Growth**

Author(s) Justin Fleegle and Abigail Charlton

Mentor *Dr. Penny O'Connor*

Abstract "How does acid mine drainage (AMD) affect microbial biodiversity and grass growth?" We will use a selective media to culture microbes found in pond water. Using the same selective media, we will culture microbes found in AMD and compare our findings from the pond water to our findings from the AMD. The selective media used will be a solid, complex nutrient agar selective for microbial growth at a neutral pH. The streak-plate method will be used to inoculate the solid media. From this, identification of the microbes will be possible. We will also compare grass growth in the presence of AMD to grass growth in the presence of pond water. The grass will be grown under artificial light, and each sample will be given equal amounts of water each day. Growth will be measured by the height of the tallest blade and by the number of blades present each day.

## S7

### **Title Bacterial Growth in AMD**

Author(s) Justin Wigfield and Alexis Dona

Mentor *Dr. Penny O'Connor*

Abstract We are interested in learning what bacteria might cause diseases in humans from AMD water that would potentially leak into drinking water. We will look at two bacterium that are most common in water *Staphylococcus aureus*, which is the leading cause of skin and soft tissue infections, and *E. coli*, which could cause urinary tract infections and travelers' diarrhea in humans. We want to determine if the pH level of AMD will cause the bacteria to grow better. We will use a control of HCl and sodium bicarbonate to determine if the bacteria will grow in a more acid or basic environment. We believe, because of the environment created by AMD, that the bacteria will thrive more causing the bacteria to spread faster.

## S8

### **Title AMD Remediation**

Author(s) Kasie Brown

Mentor *Dr. Penny O'Connor*

Abstract The focus of this research study is to examine the effectiveness of specific chemicals for the purpose of remediation of abandon mine drainage (AMD). Information about chemicals known for treating AMD was gathered taking into consideration the amount of time they had to be used, in what concentration each is used and how each will positively affect pH of AMD impacted water. Each chemical was then experimentally tested looking for improvement of water quality to identify not only which chemicals change pH but which will do so in lowest concentrations making them the most effective. The main concern in the results will be how AMD can be treated in the most accurate way.

## S9

### **Title AMD Water Sample Effects on Pansy Seedlings**

Author(s) Kate Whitaker, Taylor Swatsworth, Sam Crilley

Mentor *Dr. Penny O'Connor*

Abstract Acid Mine Drainage samples of both the treated and untreated sections of the Puritan site were collected along with pond water from Miller's Greenhouse as the control. All collected samples were tested to find their pH and their dissolved oxygen content. The samples were then used to water three groups of five pansy seedlings to determine whether growth in AMD water was a possibility and to make comparisons between the remediated water. The plants were watered twice daily and measured weekly by highest measurable height and by a leaf count. Based on previous research, the untreated AMD water sample is suspected to be the most damaging to the pansy seedlings.

## S10

### **Title Passive Treatments of AMD**

Author(s) Kayla Blair, Haley Sasserman

Mentor *Dr. Penny O'Connor*

Abstract Treating acid mine drainage is a growing concern in protecting environmental waters. Acid mine drainage is acidic water runoff as a result of coal mines. Acid mine drainage has many treatment options. Passive treatments are preferred because they require little up keep, require less chemicals, and are cheaper. Currently, there are five basic types of passive treatment options that include using limestone, natural wetland materials, and combinations of both. This experiment examines which passive treatments with organic materials work the best to decrease the acidity of the acid mine drainage.

## S11

### **Title AMD & Moss**

Author(s) Kiera Bills & Kady Bills

Mentor *Dr. Penny O'Connor*

Abstract The purpose of this research is to determine the affects of acid mine drainage water on plant organisms. To do this we are taking moss and observing how acid mine drainage water physically changes the plant. The first phase of the project involved gathering two different species of moss and collecting a sample of acid mine drainage water from a local abandoned mine. Our research is going to involve comparing the physical changes between the two species of moss, each half being watered by the control (tap water) and watered by the acid mine drainage water.

## S12

### **Title Diversity of Micro-invertebrates**

Author(s) Kirsten Ohler Morgan Malovich

Mentor *Dr. Penny O'Connor*

Abstract Our research is being conducted to find if there is a difference in the diversity of micro invertebrates in AMD infected water versus non AMD infected water. We obtained AMD polluted water from the Puritan AMD sight and non polluted water from a pond on campus. Our plan is to identify different micro invertebrates in the samples in order to discover if there is a difference in the diversity of micro invertebrates in the affected water. Our hypothesis is that we will find a greater diversity of micro invertebrates in the non AMD water sample compared to the AMD polluted water sample.

**S13****Title Acid Mine Drainage in the Portage Puritan Mine Site: Passive Limestone (CaCO<sub>3</sub>) Treatment**

Author(s) Kristin James &amp; Bobbie Sue Kist

Mentor *Dr. Penny O'Connor*

Abstract We plan to investigate possible passive treatments of acid mine drainage (AMD). Through the use of limestone obtained through a local AMD site, Portage Puritan Mine site, we plan to test the acidity through pH of AMD water. During our procedure, the experimental container will be kept at a still position and a constant temperature. This container will have limestone and the AMD liquid. We will also make use of a control container, containing distilled water and limestone. pH will be recorded before and after passive treatment with limestone rock, specifically Aashto 1 & 4 (CaCO<sub>3</sub>). The experimental process will last a one-week period and allow us to examine the effects limestone has on pH over time. We hope that this experiment will give some insight into possible treatments of AMD damaged water with limestone.

**S14****Title Finding the Connections Between HLCS and DRYK in Down Syndrome Patients**

Author(s) Leah Stoehr

Mentor *Dr. Crystal Goldyn*

Abstract I first became interested in Trisomy 21 when my Godchild was born with Down Syndrome (DS). My initial interest was trying to find a gene that could be manipulated to helping malnourished DS patients absorb nutrients better. Through bioinformatic studies, I found Holocarboxylase synthetase (HLCS) played a key role in metabolic pathways. Furthermore, I noticed the literature never directly connected HLCS to DS patients, only that it could cause developmental delays. It also never clarifies if over abundance or gene mutation of HLCS causes these delays. The gene Dual-specificity tyrosine-regulated kinase (DRYK) has been linked to DS and is right next to HLCS on chromosome 21. Through mapping and sequence comparisons, I found a few regions of overlap and a small area of 100% match in the protein sequence of HLCS and DYRK. Connections between these genes may lead to discoveries in HLCS functional activity.

**S15****Title Cosmic Radiation**

Author(s) Lindsay Danella, Alexandra Roman, Kyler James

Mentor *Dr. Paula Scaramozzino*

Abstract Cosmic radiation or the galactic rays that come from space are not anything that can be controlled. Given that they are not controllable, they are understandable. With this knowledge of what occurs inside of the universe, this gives a better understanding of how it is affecting the planet. In the medical profession, radiation exposure is always trying to be contained. Medical radiation is necessary for diagnostic imaging, but it does not need to be in overabundance. Cosmic radiation can affect the overall global temperature, and pose a risk for inhabitants. The ability to study the scientific happenings of space is remarkable and able to aid in productivity of day to day life.

**S16****Title Colorimetric Determination of Iron**

Author(s) Madison McCreary and Arielle Confer

Mentor *Dr. J. Michael Engle*

Abstract This project focuses on creating a colorimetric assay to quantitate iron (Fe) in acid mine drainage (AMD) water. This assay will be introduced to high school science teachers at a workshop held this summer at MAC. The assay is based on Fe conjugating with 1, 10-phenanthroline which produces a red color with intensity dependent on the amount of Fe present. Amounts can be determined spectrophotometrically or using a printed color scale developed by the researchers. The lesson also includes a serial dilution component since Fe amounts in AMD are so high.

**S17****Title      The Effect of Acid Mine Drainage on Plants**

Author(s) Mercedes Wachter

Mentor *Penny O'Connor*

Abstract It is the intention of this scientist to perform an experiment that may answer how the growth and development of plants are affected when they are watered with water that contains acid mine drainage (AMD). In this experiment, the scientist purchased six sprouts of cabbage. The researcher also collected water containing AMD from an area near the Glen White Coal Mine. The scientist will separate the cabbage sprouts into two groups of three, and then plot them in an area where it is certain that both groups will receive a nearly equal amount of sunlight. These groups will be known as Plot A and Plot B. For the duration of the experiment, the scientist will water Plot A with regular drinking water, while Plot B will receive an equal amount of water containing AMD. At this time, there is too little data to form a conclusion.

**S18****Title      AMD's Effect on Plant Growth**

Author(s) Montana Mentz, Corrine Wollet

Mentor *Penny O'Connor*

Abstract We are investigating if there is any effect on mitosis in onion plants when they are watered with water acidic water from mine drainage compared to water from a healthy water source. In order to answer this question we are growing onion plants to observe. We will first measure the length of the plant from the roots to the tip and then compare the onions watered by pure water and AMD water. We will next obtain samples from each plant, prepare them in the lab, and then compare under a microscope the effects on mitosis. We are hoping to see that mitosis in the onions watered with AMD water will have been inhibited in some way compared to those grown with pure water.

**S19****Title      AMD Remediation**

Author(s) Morgan Brosnihan, Tristan Gelvin

Mentor *Penny O'Connor*

Abstract The purpose of our experiment is to determine the most effective natural remedy for acid mine drainage. Pine needles, limestone, and leaves will be the three natural remedies. Based on prior research they should all increase the pH closer to the baseline pH of healthy pond water. We will be testing AMD water from a local stream and obtaining all other materials locally as well. The experiment is set to last about 10 days, with measurements of pH taken every two days.

**S20****Title      AMD Passive Remediation**

Author(s) Paige White and Teresa Drenning

Mentor *Penny O'Connor*

Abstract Looking at sites in Central Pennsylvania, we will investigate the effects of the passive treatment of acid mine drainage. We obtained water samples from four different local AMD sites settling ponds. In order to test the effectiveness, we will test the pH, iron concentrations, and the alkalinity of each pond.

**S21****Title AMD Research**

Author(s) Seth Greenfield &amp; Meagan Lamar

Mentor *Penny O'Connor*

Abstract Abandoned Mine Drainage (AMD) is vastly known throughout Pennsylvania history and statistics. The state is/was a big coal mining state. A lot of the water is filtered through treatment plants and remediated through other means. One of the vast known ways to remediate AMD is through limestone treatment. Limestone is able to neutralize the acidity of the water to allow it to return to a neutral pH of 7. It is an approved method of treating AMD. Though, does limestone remediation have its limits? When is it not enough? Water that has a lower pH will not be remediated by limestone alone. Therefore, the priority prospect of the experiment is to find if acidity has an adverse effect on limestone remediation. The experiment utilizes water three different AMD sites from Portage, its surrounding areas and Cresson, Pennsylvania.

**S22****Title AMD Water Bacteria**

Author(s) Trevor Nichols and Shawn Macedonia

Mentor *Dr. J. Michael Engle*

Abstract Our research aims to isolate and sequence bacterial DNA collected from an abandoned mine drainage (AMD) discharge. We sampled substrate from the Puritan AMD site just outside of Portage, Pa. In the lab, we then amplified a portion of the 16S ribosomal gene which was then sub-cloned. Purified DNA samples were then sent to Penn State University for DNA sequencing. Sequences were then analyzed using BLAST on the Genbank database to determine genus and species of the organisms present in AMD samples.

**S23****Title Human Heart**

Author(s) Tyler Ickes, Lauren Walker, Brady Wright

Mentor *Dr. Whitlock*

Abstract This study was conducted to investigate the function of the cardiovascular system, and determine how various conditions affect the heart's function. The activities that occur during the cardiac cycle were observed by listening to the heart sounds of the subjects, and by examining the four and six-lead electrocardiograms (ECG) obtained from them. The effects of temperature on peripheral circulation and the mechanisms through which these conditions affected it were observed in changes of the pulse and ECG recordings of the subjects upon the application of each condition. The effect of exercise on peripheral circulation was determined by recording the pulse and ECG of the subjects while they exercised leg and hand muscles for a certain period of time. Our results showed that heart rate increased with heat and with exercise. As the subject would rest their heart rate returned to normal levels. When cold was applied the heart rate was lowered.