**Antibacterial Effects of Metals Found in Russian Propolis Ethanol Extracts**

Daniel Centeno ‘16

Ashwin Ambi ’17

Faculty Mentor: Dr. Christian Traba Chemistry/Biochemistry

In this study, the antibacterial activity of Russian propolis ethanol extracts (RPEE) and Russian propolis metal-free ethanol extracts (RPMFEE) was evaluated. The activity of this antibacterial was tested on two biofilm-forming bacteria: penicillin resistant *Staphylococcus aureus* and *Escherichia coli*. The results of this study indicate that Russian propolis ethanol extracts free of metals have almost identical antibacterial activity against both bacterial species. Complete biofilm inactivation was observed when biofilms were exposed for 40 hours. These findings indicate that the heavy metals present in propolis have antibacterial activity but do not have an essential role in the mechanism of action of propolis. Additionally, metal free samples caused significant damage to the cell membrane structures of both species, resulting in bacteriolysis. These findings suggest that the mechanism of action of Russian propolis ethanol extracts results from the organic compounds found in the antibacterial.

**Eliminating *Bacillus cereus*, *Staphylococcus aureus*, and *Escherichia coli* using Honey, Ginger, Pepper and Tetracycline.**

Sandra Arora ’16 Nussar Chisti ’17 Faculty Mentor: Dr. Jill Callahan Biology

Antibiotics have been used for years to inhibit the growth of bacteria. They are prescribed to treat and prevent bacterial infections. However, the incidence of antibiotic resistance has been increasing in the past few years, potentially making them ineffective in the near future. As a result, people are now opting for ancient medicines and remedies as a therapeutic alternative. This project was conducted to determine if home remedies are viable choice against antibiotics. The bacterial species tested included Gram positive *Bacillus cereus* and *Staphylococcus aureus,* and Gram negative *Escherichia coli*. For all species examined, a home remedy that included honey, ginger, and black pepper which was tested for inhibition of growth relative to a tetracycline control, using the Kirby Bauer Disk Diffusion method. Further, ten- fold serial dilutions of the home remedy were performed to determine the minimal inhibitory concentration (MIC). Our study indicates the home-remedy was effective in inhibiting *Staphylococcus aureus* and *Escherichia coli*, while ineffective against *Bacillus cereus*.

**A New Method for Measuring Dissolved Oxygen in Catalytic Water Oxidation**

Kristian Gutierrez ‘16

Genesis Renderos ‘17

Tawanda Aquino ‘17

Christian Resurreccion ‘18

Faculty mentor: Dr. Yosra Badiei

Chemistry and Biochemistry

Carbon dioxide (CO2) is a greenhouse gas emitted through daily human activities that mainly rely on burning carbon fuel. Utilizing hydrogen gas as a green fuel in fuel cells is a promising solution to help reduce the high levels of CO2 emission in the Earth’s carbon cycle. One effective and inexpensive means of sustainable hydrogen production is the solar-driven water splitting reaction catalyzed by transition-metal complexes. Water oxidation to molecular oxygen is a critical step in this process but requires a significant amount of energy. This reaction, which also occurs in natural photosynthesis with the help of the sun and an oxygen-evolving catalyst (OEC), converts solar energy to glucose, the solar fuel of the plant. Inspired by nature, the search of synthetic artificial catalysts that can meet these energy requirements is vital. We have successfully developed a new method for catalyst screening of metal complexes that contain ruthenium ions ligated to nitrogen based ligands. A new negatively charged framework based on amide organic ligands coupled with a Ru central metal ion is shown to drive water oxidation. For the first time, the facile use of an optical probe to directly measure dissolved oxygen (ppm) in chemically-driven water oxidation with the aid of a catalyst will be shown and the kinetics of the oxygen evolution activity in water will be discussed. This project will contribute significantly to the expanded utilization of renewable energy sources and energy sustainability.

**Applications in Polymer Chemistry**

Jonathan Kral ‘16

Curtis McCormick ‘17

Faculty mentor: Dr. Jessica Epstein

Chemistry and Biochemistry

Polymers impact our lives and society in numerous ways including clothing, food packaging, automobiles, medical devices, research and toys. Nature provides numerous examples of polymers: DNA is a polymer of nucleic acids, proteins are polymers of amino acids and a carbohydrate is a polymer of sugars. Although nature provides many types of polymers, they are not easy to make and mold for other uses. The field of polymer science began when scientists attempted to chemically modify natural polymers. While the first polymers were made from plant sources, today’s polymers and plastics are usually derived from petroleum feedstock. We are exploring several aspects of polymers synthesis and exploring emerging areas such as recycling, plasticizers (to change tensile strength), and bio-based polymers.

**Transgenerational Effects of BISPHENOL A and BISPHENOL S on Aspects of Reproductive System Functioning in *Caenorhabditis elegans***

Sophia Touri ‘18

Summen Mushtaq ‘17

Suyapa Penalva-Lopez ‘18

Alexandra Marques ‘17

Merna Sawaged ‘19

Faculty mentors: Dr. Agapito, Dr. Callahan, and Dr. Twersky

Biology

Bisphenol A is a compound used in the production of polycarbonate plastics and epoxy resins. Various studies have suggested that Bisphenol A (BPA) may enhance PCOS, infertility, or cardiovascular diseases. Another bisphenol molecule called Bisphenol S has become a common plasticizing agent in replacing BPA. In this study, the effects of BPA and BPS under acute (2 hr.) and chronic (24 hr.) exposures were analyzed by determining the reproductive rate in three generations, by observing the differences in egg laying rate and whether there are any delays in the timing of laying, and investigate any egg hatching differences using *C. elegans* as a model system. The preliminary data demonstrated no differences in the reproductive rate among the control and the treated groups. However the timing of egg-laying were altered in treated groups in comparison to the control groups. In addition, the treated groups showed differences in the egg-hatching rate in compare to the control group. Our preliminary data demonstrated evidence that both BPA and BPS may be hazardous chemical compounds that can cause long-term negative effects on the reproductive system of *C. elegans* and may have similar effects on humans.

Sponsored by the following Grants:

ICFNJ Grant

TriBeta National Honor Society

Recently Presented at:

ICFNJ’s Undergraduate Research Symposium at the Liberty Science Center - March 7, 2016

William Paterson’s Annual Undergraduate Research Symposium - April 9, 2016

Bergen Community College’s Annual C2 Summit - April 15, 2016

**Truths, Lies, and Expertise: How Expectations Affect Truth-Lie Judgements**

Marcella DeVenuta ‘17

Alyssa Lindenbaum ‘15

Faculty mentor: Dr. Maryellen Hamilton

Psychology

The current study examined the effect of base rate manipulations and perceived expertise on truth-lie judgments. Participants made judgments on whether a person in a video was telling the truth. Expectations were manipulated by providing base rate information on the level of honesty. In addition, half of the people in the videos were labeled as experts. It was hypothesized that people who watched the videos in terms of an expert speaking in the high-truth expectancy condition would lead to the greatest number of truthful judgments. Truth judgments were highest when participants expected truthful testimony; however, non-experts were perceived as more truthful than experts.

**Can the Relationship between a Color and an Emotion Effect Word Recall?**

Alyssa Lindenbaum ‘15

Marcella DeVenuta ‘17

Faculty mentor: Dr. Maryellen Hamilton

Psychology

Kuhbander and Pekrun (2013) found negative words were remembered best when presented in red while positive words were remembered best in green. It was suggested that this was due to the relationship between those colors and emotion (red-negative; green-positive). We directly tested this by using positive words associated with the color red. We predicted these positive words should be remembered best in red. A significant effect was found, implications of these findings will be discussed.

**Healthy Baby Awareness Day**

 Students of Bi 325, Topics in Anatomy and Physiology

Faculty mentor: Dr. Laura Twersky

Posters on student research projects on development that were presented at the Healthy Baby Awareness Day April 21, 2016 in the Roy Irving Theater will be displayed. Research topics included effects of cigarette smoking on the fetus, prematurity, osteogenesis imperfecta, Hutchinson-Gilford Progeria syndrome, and effects on cosmetics on pregnancy. This event was also a fundraiser for SmileTrain, the cleft palate surgery charity.

Co- sponsored by the Office of Campus Ministry SAVE (Students Against Violating the Earth), The Biology Department, The Sustainability Council, The Mendel Society, The Chemistry Club, and the Physics Club.

**Earth Day Festival/Nature Photography Contest**

S.A.V.E. (Students Against Violating the Earth)

Mentors: Dr. Laura Twersky and Dr. Frances Raleigh, co-advisors-S.A.V.E.

Photos entered in the nature photography contest, and exhibited at the Earth Day Festival held on April 21, 2016 in in the Roy Irving Theater, will be displayed

**Effects of Sucralose, Saccharin, Aspartame and Rebaudioside (in *Stevia*) on**

**Development in *Xenopus laevis* (Clawed Frog)**

Robert Graffin ‘16

Faculty mentor: Dr. Laura Twersky

Biology

Artificial sweeteners are a relatively recent addition to the human diet. These substances, developed to fight rising obesity by providing a low Calorie sugar substitute, have become very popular among consumers. The result has been increased consumption of chemicals whose effects on the human body are yet to be fully understood. The purpose of these experiments is to determine the effects of these food additives, specifically Aspartame, sucralose, saccharin and *Stevia* (rebaudioside) on development of frog embryos. Groups of five *Xenopus laevis* embryos were exposed to solutions with 10µg/ml concentrations of these artificial sweeteners with one group of five embryos per concentration of each artificial sweetener being tested and one control. The rate of subsequent development was measured and photos were taken of embryos to observe any morphological changes throughout development. Results indicate that there is very little difference between each group and the rate at which they develop. However, it appears that individuals exposed to aspartame are prone to morphological defects. In several trials individuals in the Aspartame group presented with tail bud defects in which the tail appeared underdeveloped and curved.

Supported by a grant from the Tri-Beta Research Foundation Program

**Project FeederWatch: A Tale of Two Seasons**

Abdul-Mummin Sanni-Adam ’17

Liborio Adorno ‘17, Lauren Chukrallah ‘17, Dolly Basaldua ’17 Catalina Melendez ’17

Vasilios Orologas ‘18

Adewale Busayo ‘19

Faculty Mentors: Dr. Frances Raleigh and Dr. Katherine Wydner

Biology

The second season of Project FeederWatch at Saint Peter’s University was recently concluded. Following a protocol developed by Cornell University, FeederWatch is a winter survey of birds that provides information about changes in bird distribution and abundance across North America. A FeederWatch area was monitored between Gannon Hall, Pope Hall, and the Yanitelli Recreation Center on two consecutive days, Thursday and Friday, for 20 weeks between November 2015 and April 2016. A tube feeder was filled with birdseed and one to two suet blocks were provided as continuously as possible. Data was recorded on species of birds, highest number of each species, and physical factors such as weather conditions and snow cover. Although our observations are most informative in their contribution to the North American database, we have analyzed our local data and made comparisons between the seasons 2014-2015 and 2015-2016. In both seasons, the most abundant species reported was the house sparrow (*Passer domesticus*). A total of 6 species were reported this season as compared to 11 species during 2014-2015. A leucistic (white-backed) female house sparrow identified during 2014-2015 regularly continues to visit the FeederWatch area. Comparisons are made between our urban data and the cumulative data reported for the state of New Jersey.

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**Color as Context Cue for The Mere Exposure Effect**

Elise Soares ‘16

Faculty Mentor: Dr. Maryellen Hamilton

Psychology major/ Art History minor

 The mere exposure effect refers to the phenomenon where people form a preference to an object just because it is familiar to them (Zajonc, 1968). The more a person is exposed to an object; they usually end up liking or preferring it over an unfamiliar object. Many studies have shown how robust the mere exposure effect can be. Recently however some researchers have attempted to erase this effect by manipulating the context items are shown in (De Zilva, Mitchell, & Newell 2013). These researchers manipulated context by pairing novel words with either shapes or faces and then either presenting the pairs intact, rearranged, or with novel cues at test. They found that the mere exposure effect becomes disrupted when the pairs are rearranged or are presented with a novel cue. De Zilva, Mitchell, & Newell believed that the cues (novel words) served as the context for the exposed targets (either faces or shapes) and therefore because the mere exposure effect was greatest for their intact pairs, they suggest that context is very important for the mere exposure effect to occur. This hypothesis is further supported by their finding that the mere exposure effect resurfaces when the target is presented without any cue.

 The purpose of the current experiment was to expand these findings to see if color could serve as a cue and therefore hinder the mere exposure effect.

**Students as Change Agents in Social Entrepreneurship Studies**

Yeimy Fuentes '16

Selena Guzman '17

Maria Camila Santacruz '17

Faculty Mentor: Dr. Mary Kate Naatus

Business

As college students grapple with the rising costs of tuition and the tough competition for jobs after they graduate, it becomes incumbent upon higher education institutions to provide as many opportunities for growth and skill development in line with the mission of the institution. The growing popularity of social entrepreneurship initiatives on campuses is one meaningful path to seek to engage students to be creative and innovative, build relevant skills and make a meaningful impact on the local community. This paper explores several prominent university-led social entrepreneurship initiatives around the country and describes the development of a new entrepreneurial institute at Saint Peter's University, a Jesuit institution in a very diverse, multi-cultural urban area. With a student population that mirrors the diversity of the surrounding community and with the help of Title V funding, teams of faculty and student research teams have been studying the local economy and the small businesses and entrepreneurs that make up the backbone of different neighborhoods in our city. Research findings over time identified salient common challenges these diverse businesses face, and students identified ways that the university and its faculty and students can help to address some of these challenges through service and experiential learning programs and collaborative class projects with community partners. This paper describes the launch of several innovative programs with a social entrepreneurship focus, and the outcomes to date. In addition, students have proposed the creation of a “Social Innovation Challenge” that seeks nominations from students and from the community for businesses and entrepreneurs that are having a positive impact and providing tangible examples to students about business decision-making and impact.

**The effects of Bisphenol A and Bisphenol S, individually and in combination, on the development of *Xenopus laevis* (South African clawed frog) larvae**

Lisa Thottumari ‘17

Lauren Chukrallah ‘17

Nick Antonucci ‘17

Faculty Advisor: Dr. Laura Twersky

Biology

Frog populations have been declining as they develop malformations, such as limb malformations and hermaphroditic malformations. Factors like pesticides, UV radiation, or infestations have been shown to have an effect, but, bisphenol S (BPS), a plasticizer, could be a major factor as well. BPS has been used as a replacement for bisphenol A (BPA), a proven endocrine disruptor, in many plastics. This study compares the effects of BPS and BPA individually and in combination on the development of the African clawed frog, (*Xenopus laevis*)*.* Eight groups of *Xenopus* tailbuds starting at stages 26-27 were compared; four were treated with two concentrations of BPA and BPS (5μg/mL and 10μg/mL) and three groups with three concentrations of combinations (3μg/mL BPA:6μg/mL BPS, 6μg/mL BPA:3μg/mL BPS, and 5μg/mL BPA: 5μg/mL BPS), with a control. Mortality, length, heartbeat, and Nieuwkoop and Faber stages of the tadpoles were measured. Data was compared and quantified. Tadpoles exposed to the 5μg/mL BPA:5μg/mL BPS solution and to 5μg/mL BPA exhibited head malformations, and the BPS groups exhibited a marked decrease in development, being ten stages behind the control group prior to dying. These implications affect humans; BPS has been found in urine and its effects are not understood.

**Gold Nanoparticle Generation with the Assistance of Atmospheric Pressure NonThermal Microplasmas**

Edwin Rivas: ‘17

Faculty Mentor: Dr. Wei-Dong Zhu

Physics

Gold nanoparticles (AuNPs) were generated using atmospheric pressure, non-thermal plasma to formulate an aqueous electrolyte solution containing hydrogen tetrachloroaurate [HAuCl4] and trisodium citrate [Na3C6H5O7]. The atmospheric pressure, non-thermal plasma chemistry facilitated a rapid synthesis of the gold nanoparticles. For the first set of solution testing, the concentrations of the gold and citrate were changed. Of this, fifteen trials were conducted. Five trials then proceeded to look at other parameters such as current, voltage, plasma discharge mode, and distance. Optical properties of the gold nanoparticles were characterized by ultraviolet-near infrared [UV-NIR] spectroscopy. The results were then categorized by the respective concentrations and the maximum wavelength peak and absorbance. The various trials allowed us to determine that 34 mM of Na3C6H5O7and 9.712 mM of HAuCl4 were the optimal concentrations for the generation of AuNPs. With a steady plasma discharge, a 1 mm distance from the electrode to the surface of the solution, and an exposure time of 3 minutes, the synthesized gold nanoparticles produced a 613.4 nm maxi-peak wavelength and a 0.940 absorbance. We hope to integrate ultrasonic cavitation into the experiment to observe if it can help facilitate the formation of the AuNPs, such as size and uniformity contro

**Investigating the in vitro antibacterial activity of *Salvadora persica* (Miswak) and *Nigella sativa* (Black seed) to prevent cariogenic biofilm against *Streptococcus mutans***

Aya Osman ‘17

Marie Jean Pierre ‘16

Faculty Mentor: Dr. Jill Callahan

Biology

Oral diseases such as dental caries caused by *Streptococcus mutans* are among the most common infectious diseases in the world. With the rise of oral diseases and an increase of antibiotic resistance there is a need for alternative prevention and treatment options that are safe and effective. While several agents for oral hygiene and infection treatments are available, these substances can alter oral microbiota and have undesirable side effects such as vomiting, and tooth staining. In this research we will investigate the effects of two naturally occurring antibacterial agents *(Salvadora persica Nigella sativa)* and their potency to inhibit the growth of oral pathogens and reduce the development of biofilms and dental plaque. A standard crystal violet assay will be used to assess biofilm inhibition. The results will demonstrate whether natural accessible products are effective alternatives in the fight against biofilm forming pathogen *S. mutans.*

**Are Conservative Attitudes More “Intuitive” than Liberal Attitudes?**

Jessica Carino ‘17

Faculty Mentor: Dr. Daniel Wisneski

Psychology

Do liberals and conservatives differ in terms of how they evaluate social and political issues? To answer this, this study tested the hypothesis that intuition thinking leads people to report more conservative attitude positions, whereas deliberative thinking leads people to report more liberal attitude positions. We experimentally induced either intuitive or deliberative thinking in eighty-two participants and measured their support or opposition to ten different political issues (e.g., legalized abortion, nationalized healthcare, capital punishment, restrictions on stem-cell research). Participants assigned to the “intuitive” condition were instructed to report their attitudes based on their “initial gut instinct” and were given only 9 seconds to respond. Participants assigned to the “reflective” condition were asked to report their attitudes based on “careful analysis and deliberation” and were given all the time they needed. Consistent with our hypothesis, intuitive processing lead to more conservative attitude stances whereas deliberative processing lead to more liberal stances. That said, future research is needed to further “unpack” this finding. Specifically, it is unclear in the current study exactly whether are driven by intuition leading to more conservative positions, deliberation leading to more liberal positions, or both.

**The effects of creatine monohydrate on renal function in Wistar rats**

Laura Kelly ‘16

Faculty Advisor: Dr. Laura Twersky

Biology

Creatine is a supplement taken to aid athletes and fitness aficionados alike with their workout. Previous studies have been done to prove the effects creatine has on a workout as well as studies on rats to investigate the benefits of creatine on different aspects of health, mainly the nervous system; however, there is minimal data available about the risks. Wistar rats are excellent subjects for human related studies due to the mammalian traits shared between them. Protein over- consumption affects the kidneys and bone via calcium loss; this is a concern with creatine since it is a protein. The rats in the control group did not consume creatine while the rats in the experimental group consumed 1g. kg-1. per day for four weeks. Their urine was collected tested for calcium and protein weekly. Increased concentrations were found and were indicative of renal damage. In order to ensure that creatine use was not being overestimated prior to experimentation, a research survey was conducted on thirty six members of the Saint Peter’s University Biology Department of varying ages yielding results that 22.2% of participants use/ have used creatine and 62.5% of those participants used the supplement for 2 months or more.

Special thanks to the TriBeta Research Foundation for funds for this project.

**Self-Organization Patterns in a Noble Gas Mixture in Cathode Boundary Layer Discharge**

Nnamdi Ike ’17

Faculty Mentor: Dr. Wei-Dong Zhu

Physics and Math

Self - Organization is a phenomenon observable in all aspects of life. It is essentially spontaneous order, in a previously disordered system. Its structure is derived from the smaller, local interactions within an underlying chaotic environment. Self-organization has been observed in several pure noble gases in Cathode Boundary Layer Discharge (CBLD), with the first observation in high purity xenon gas by Prof. Karl Schoenbach *et al.* in Old Dominion University, Virginia. Saint Peter’s University produced the first experimental demonstration of self-organization in Krypton (Zhu, 2013), and have confirmed the novel organization state known as a “ring structure” (Zhu and Niraula, 2014) both in pure krypton and pure xenon. In continuation of this study, noble gas mixtures consisting of both xenon and krypton were considered. Nearly equal and high ratios of Kr/Xe gas exhibited a lower empirical probability of self-organization, except for the “ring structure”, regardless of pressure. A consequence observable in this experiment in these mixtures was the reversible process of the distinctively changing CBLD’s emission spectra.

**Herbal Teas and Anti-angiogenic Properties**

Alexandra Llaguno ‘17

Faculty Mentors: Dr. Laura Twersky and Dr. Jill Callahan

Biology

Angiogenesisis the formation of new blood vessels in the body from pre-existing vessels. Anti-angiogenesis interferes with the growth of blood vessels. The utilization of dietary factors as anti-angiogenic agents may be effective as treatments for cancer, other abnormal angiogenic related diseases, and malignant, ocular, or inflammatory disorders. A few studies have been performed that involved the effects of dietary factors individually, or in combination with other factors, on angiogenesis. Herbal teas are consumed by many for their medicinal properties. Green tea has been known for its anti-angiogenic properties. The Angiogenesis Foundation’s research determined that Chinese jasmine and Japanese sencha were the most potent, and a blend of the two was even more potent than either alone. This experiment will test if herbal teas, specifically chamomile and mint, have any anti-angiogenic properties by using *in vivo*.Chick Office of Community Service and Service Learning. Chorioallantoic Membrane Assay. Green tea will be also tested. Results will be quantified by estimating the amount of new blood vessels formed, if any. This study will include combinations of the herbal teas to see whether or not they demonstrate synergistic interactions of the dietary compounds on angiogenesis.

**Eliminating *Bacillus cereus*, *Staphylococcus aureus*, and *Escherichia coli* using Honey, Ginger, Pepper and Tetracycline**

Sandra Arora ‘16

Nussar Chisti ‘17

Faculty Mentor: Dr. Jill Callahan

Biology

Antibiotics have been used for years to inhibit the growth of bacteria. They are prescribed to treat and prevent bacterial infections. However, the incidence of antibiotic resistance has been increasing in the past few years, potentially making them ineffective in the near future. As a result, people are now opting for ancient medicines and remedies as a therapeutic alternative. This project was conducted to determine if home remedies are viable choice against antibiotics. The bacterial species tested included Gram positive *Bacillus cereus* and *Staphylococcus aureus,* and Gram negative *Escherichia coli*. For all species examined, a home remedy that included honey, ginger, and black pepper which was tested for inhibition of growth relative to a tetracycline control, using the Kirby Bauer Disk Diffusion method. Further, ten- fold serial dilutions of the home remedy were performed to determine the minimal inhibitory concentration (MIC). Our study indicates the home-remedy was effective in inhibiting *Staphylococcus aureus* and *Escherichia coli*, while ineffective against *Bacillus cereus*.

**Sponsored by the Rho Nu chapter of TriBeta (the National Biological Honor Society), the Biology Department, and the Office of the Academic Dean at Saint Peter’s University.**

**Infection of *Escherichia coli* with phage ΦX174 and isolated marine phages**

Venkata Ponakala ‘16

Richard Jakubowski ‘16

Faculty mentor: Dr. Jill Callahan

Biology

 Bacteriophages were discovered before antibiotics, but they were not given the same importance as antibiotics. However, the improper usage of antibiotics has created microorganisms that are resistant to existing antibiotics. A possible alternative treatment that is currently being explored by medical professionals is phage therapy. Phages are viruses that are highly-specific in which bacteria that they infect. They are among the most common and diverse of all entities, of which less than 1% have been discovered. This study aims to determine the concentration at which the coliphage ΦX174 is as effective at inhibiting *Escherichia coli* growth as amoxicillin. The secondary aim of the study was to determine if a sample of water collected from the Hudson River contained phages, and if it did, the concentration at which they were as effective as traditional antibiotics. Plaque assays of the coliphage ΦX174 and the river water were performed. Preliminary findings revealed that the coliphage ΦX174 is as effective as amoxicillin and that the river water contained phages that were as effective as the coliphage ΦX174.

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**ACADEMIC SYMPOSIUM**

**2016**

*A Celebration of*

*Student Accomplishments*

Wednesday, April 27th, 2016

McIntyre Lounge

12:00 -1:00 p.m.

We congratulate all of the

participants on their presentations

and we wish them luck on

the completion of their research.



Sponsored by the Rho Nu chapter of TriBeta (the National Biological Honor Society), the Biology Department, and the Office of the Academic Dean at Saint Peter’s University.