

# NPRESS

North Park Research Experience  
for Summer Students

## PRESENTATIONS

FRIDAY, JULY 28

9:00 am Presentations

1:00 pm Banquet

Helwig Boardroom, Third Floor  
Nancy and G. Timothy Johnson Center  
for Science and Community Life



**NORTH PARK**  
**UNIVERSITY**  
CHICAGO

# NPRESS

## North Park Research Experience for Summer Students

**ABOUT NPRESS** The NPRESS (North Park Research Experience for Summer Students) program provides opportunities for North Park students to conduct research with a North Park faculty mentor for eight weeks over the summer. It was the brainchild of a core group of faculty, and funded by a small group of donors, allowing students to dive into a topic in a way that the constraints of an academic year do not always allow. Students received a \$3,500 stipend and were given the opportunity to live on campus, making it possible for them to focus solely on research.

### NPRESS FACULTY DIRECTORS:

Dr. R. Boaz Johnson  
Dr. “K” Professor Aaron Kaestner

#### ▶ 1. EMMA WILSON

**MAJOR:** English Literature and Secondary Education

**FACULTY MENTOR:** Dr. Kristy Odelius

**RESEARCH TITLE:** *Understanding Education through the Resurgence of Storytelling.*

**ABSTRACT:** The art of storytelling has experienced a resurgence in recent years which has led to a large community of people dedicated to sharing their own stories and listening to the heart and stories of others. For this project, we explored this resurgence in Chicago and what makes storytelling so unifying and gives it the ability to include and empower marginalized people. The purpose of this research was to find ways in which aspects of storytelling could transfer into the world of education and academic discourse as an avenue to address some of the injustices that are exceedingly prevalent throughout the educational system. While storytelling cannot solve all of these issues, it has the potential to resist some of the exclusivity of the current system of education to become a framework of inclusivity for students and educators.

#### ▶ 2. RANSOM CLARK

**MAJOR:** Philosophy

**FACULTY MENTOR:** Dr. Karl Clifton-Soderstrom

**RESEARCH TITLE:** *Ethics for the New War*

**ABSTRACT:** The justification of war and actions therein has been discussed and argued by philosophers and politicians alike for millennia, and has risen again to the forefront in recent years. Ethics remain constant, but war changes how they are applied. As guerilla warfare has become the normal means in conflicts of recent decades, re-examination of applied ethics is called for. This essay investigates how Classical Just War Theory and Rule Utilitarianism apply in contemporary war and are implemented by the General Petraeus’s Doctrine of winning “hearts and minds” in counterinsurgency campaigns.

#### ▶ 3. RACHEL JOHNSON

**MAJOR:** History and Global Studies

**FACULTY MENTOR:** Dr. Sumie Song

**RESEARCH TITLE:** *A Theology of Lament in Tolkien’s Legendarium.*

**ABSTRACT:** Accounted among the mightiest beings in J.R.R. Tolkien’s legendarium is the female Vala, Nienna, who is associated with grief and mourning – the communal lamenter of Middle-earth. In seeking to understand the importance and influence of Nienna, a Christian theology of lament in Tolkien’s legendarium is not only exposed but is made evident. This paper explores parallel qualities of lament found in Tolkien and in Lamentations in the Bible and examines the significance of the tradition of lament in Tolkien and Lamentations as a way of interacting with the world and the divine.

▶ **4. RYAN SILINS**

**MAJOR:** Psychology and Philosophy

**FACULTY MENTOR:** Ilsup Ahn

**RESEARCH TITLE:** *A Socio-Ethical Investigation of Sex Trafficking in Chicago.*

**ABSTRACT:** Chicago is a hub for sex trafficking in the United States. It is an issue that is continuously overlooked because of the simple belief that it happens in other countries, but not anywhere near where we live, work, and study. The hard truth is that it is a prevalent and significant issue that Chicago and the United States as a whole must face. Through my research, my intent is to make Chicago and the U.S. aware of the issue and what is being done to fight it. In addition, I present viable interventions and preventative measures aimed at protecting victims and enforcing justice upon those who attempt to take away the rights of citizens of our country. We pride ourselves on being the land of the free, and yet, slavery still exists.

▶ **5. PALOMA ST. JEAN**

**MAJOR:** Molecular Biology/ Biotechnology

**FACULTY MENTORS:** Dr. Barrington Price and Dr. Peter K. B. St. Jean

**RESEARCH TITLE:** *Pathways to Success of Disadvantaged Students at North Park University: Christian Campus and Promoting a Climate of Diversity.*

**ABSTRACT:** The purpose of this study was to investigate how a climate of diversity relates to the academic and non-academic success of disadvantaged students at North Park University, and how Christian doctrines and practices on campus relate to a climate of diversity. Data was collected via an online survey sent to about 2000 NPU students out of which 65 completed the survey. Non-academic success and academic success of these participants were analyzed using bivariate correlations, frequency tables, and regression analysis on SPSS software. Academic success indicators were only available for 47 students. Preliminary results show that a climate of diversity on campus exists in various positive and negative aspects for different students. Trends are currently being further analyzed. The implications for this research will be to improve pathways to aspects of academic and non-academic success of students, especially those in various disadvantaged categories.

▶ **6. DAWSON VOSBURG**

**MAJOR:** Conflict Transformation and Sociology

**FACULTY MENTOR:** Dr. Robert Hostetter

**RESEARCH TITLE:** *Break Every Chain: The Church and resistance to mass incarceration.*

**ABSTRACT:** Mass incarceration, the huge-scale imprisonment in the United States disproportionately implemented against people of color, can be best characterized as the racialized state discipline of social bodies. This suggests that solutions to the problem of mass incarceration that focus merely on individual human rights or the altering of state policies do not resolve the deepest issues of mass incarceration. Through sociological, peacemaking, and theological methodology, we can uncover the ways in which the church embodies a social being that is capable of resisting the isolating and exploitative forces of mass incarceration.

▶ **7. JOMARIE PERLAS**

**MAJOR:** Business and Economics, with concentration in Marketing.

**FACULTY MENTOR:** Mr. Mark Gavoort

**RESEARCH TITLE:** *Surveying Industry Executives: Perceptions on Inventory, Cash and Financial Performance.*

**ABSTRACT:** The common lore surrounding inventory management is this: *more inventory equates to less cash.* But is this displayed on the field? In continuing a two-year study on inventory, cash and financial performance, the research now being conducted focuses on an instrumentation of surveying intended to observe the perceptions of business professionals in the field of Operations, Supply Chain, General Management and Finance. The survey is an attempt to expound on what is known and what is actually being applied; if optimal and viable growth being generated for organizations is truly due to belief of the relationship between Inventory Management and cash position. Conclusions drawn from the survey should lead to practical applications meant to better the field of inventory management.

▶ 8. **DAMIR BEKIC****MAJOR:** Physics and Engineering**FACULTY MENTOR:** Dr. Stephen Ray**RESEARCH TITLE:** *Wind Tunnels vs CFD on Topographic Wind Accelerations.*

**ABSTRACT:** Every area analysis has to put wind into consideration. Studying meteorological data allows engineers to make reasonable predictions as to how a structure, topographic or man-made, will affect the acceleration of the wind. In order to study these accelerations in detail, professionals use wind tunnels or computational fluid dynamics to observe the wind. This enables them to observe specific locations and decide if there are any areas in need of improvement within cities. If areas that are under consideration for construction, they can also be examined and the results may impact the final design of the project. Safety is one of the main concerns when studying wind accelerations. Poorly designed buildings that accelerate wind speeds too much may result in harm to civilians, so they must be carefully examined before being built. Both computational and physical models must match the standards set by the American Society of Civil Engineers to be considered. This research project examines both methods of observation, comparing their results, and determining which would be ideal.

▶ 9. **HAYDEE RAMIREZ****MAJOR:** Biology**FACULTY MENTOR:** Dr. Yoojin Choi**RESEARCH TITLE:** *Silencing of gene SSD1 by use of RNA interference (RNAi) in the unicellular alga Chlamydomonas reinhardtii.*

**ABSTRACT:** This research project is on the silencing of gene SSD1 by use of an RNAi construct in the unicellular alga *Chlamydomonas reinhardtii*. The function of SSD1 in *Chlamydomonas* is currently unknown, but the gene sequence is predicted to produce a sterol-sensing 5-transmembrane protein (UniProt, 2007). We became interested in SSD1 because it is a homolog of a mammalian gene, Ptch1, which plays an important role in embryonic and post-embryonic development and its malfunction is associated with certain human cancers. A literature search of similar silencing projects in *Chlamydomonas reinhardtii* suggested that we make use of plasmid pChlamiRNA2 as the delivery vehicle of our microRNA. We designed a 96-nucleotide construct with appropriate restriction enzyme recognition sites for pChlamiRNA2 in addition to a negative-control construct of equal size (produced by the company

GenScript). We are very close to inserting our microRNA DNA sequence into the pChlamiRNA2 plasmid. The next major step is to introduce the recombinant pChlamiRNA2 plasmid into *Chlamydomonas* and transform them, knocking down gene expression of SSD1 through the glass beads transformation (Kindle 1990). After observing the physical appearance of the transformed cells, we plan to use a motility assay to determine any effects of loss of function of SSD1 in *Chlamydomonas reinhardtii*.

▶ 10. **WILSON RAY****MAJOR:** Exercise Science**FACULTY MENTOR:** Dr. Bryan Cobb**RESEARCH TITLE:** *Validity and Reliability of Various Devices for Velocity Based Weight Training.*

**ABSTRACT:** Velocity based training (VBT) refers to tracking the speed of a lift to determine the ideal load for strength training. Understanding the importance of bar speed during workouts and utilizing VBT is helpful for athletes training for competition that involves explosive qualities and power. The purpose of this study was to examine which wireless devices provide the user with useful data for VBT. In this study, three wireless devices were used on nine subjects who completed three sets of three exercises. Velocity data from these devices were compared to measurements gathered using a motion capture system. Results show variations in accuracy between devices that coaches need to be aware of when looking to use these devices in a VBT program. This study will lead into further research done to examine the benefits of using VBT for athletes over time.

▶ 11. **PETER VOSS****MAJOR:** Biochemistry**FACULTY MENTOR:** Dr. Sunshine Silver**RESEARCH TITLE:** *Isolation and Characterization of Dandelion (Taraxacum officinale) Peroxidase.*

**ABSTRACT:** Peroxidase is an enzyme found ubiquitously throughout nature, important for its role in controlling hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) levels within the cell by performing oxidation reduction reactions using H<sub>2</sub>O<sub>2</sub> as a primary substrate. For our research, we examined the peroxidase found in *Taraxacum officinale*, colloquially known as the common dandelion. Surprisingly, dandelion peroxidase had not yet been characterized, despite the prevalence of this plant across western civilization. Peroxidase was isolated and extracted from

three separate parts of the plant: the stem, root, and leaves. Using pyrogallol, o-phenylenediamine (OPD), or guaiacol as a secondary substrate, the enzyme's activity was observed and characterized. The rate at which these reactions proceeded was determined via spectrophotometry due to the visible color change associated with the reaction.

► **12. LISA DANIELS**

**MAJOR:** Biomedical Sciences

**FACULTY MENTOR:** Dr. Drew Rholl

**RESEARCH TITLE:** *Body Wars: A Card Game for Teaching Host-Pathogen Interactions.*

**ABSTRACT:** Host-pathogen interactions are notoriously difficult to teach and intimidating to learn. Body Wars is an interactive card game which aims to simplify these concepts, and teaches them in a fun, memorable manner. This study's purpose is to test the utility of Body Wars as a teaching tool, and also make it more accessible and attractive to play. Most of the card development was done using desktop publishing software, whilst testing was done by playing the game with small groups of undergraduate and high school students. Because the game is brand new, much of this project's work focused on game development and beta-testing for ease of use. As such, large data sets of knowledge outcomes were not obtained. Nevertheless, data collected from multiple iterations of pre and post surveys showed that the game is attractive, fun, and has great potential as a learning tool. With a more streamlined game in place, future work will be able to focus on tracking students' learning with larger groups, to verify the game's utility.



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