Student Research and Creative Scholarship Colloquium

Sponsored by the Honors Program

Time and Place

Wednesday, April 26 [10 a.m. – 3:30 p.m.]

President's Conference Room, A-102

Thursday, April 27 [9:30 a.m. – 2:30 p.m.]

Science Building, Room S-247

Wednesday, April 26 in President's Conference Room, A-102

SESSION ONE: 10 a.m. – 12 p.m.

https://cccedu.zoom.us/j/82805663580?pwd=WU9DUVVhOW85YWFydkc2OTU0T1VlQT09

Meeting ID: 828 0566 3580
Passcode: 098836

10:00 a.m. – 10:20 a.m. The Center of Excellence for Engineering and Computer Science "Empowerment Through Community of Practice (CoP) Increases Self-Efficacy and Belonging of Undergraduate Students"

Community of Practice (CoP) is a group of people who are working together towards a shared passion or concern. Our research aims to investigate the impact of CoP on undergraduate students' sense of belonging and self-efficacy. External barriers could potentially hinder students from partaking in Cop, preventing them from fully committing to academics and participating in extracurricular and/or co-curricular activities. We hypothesize that engagement in activities, such as participation in organizations, promotes CoP which consequently increases belonging and self-efficacy. Our preliminary results of two hundred (200) participants show that engagement in activities through CoP empowers self-efficacy and increases belonging. In the future, we will increase the survey size and conduct more case interviews through the appreciative inquiry (AI) method to validate our survey outcome further.

Presenters: Andrew Steppan, Melvin Cabera, Guadalupe Pina-Castillo, Shlesha Patel, Vivian Nguyen
Faculty Sponsor: Doris J. Espiritu, Ph. D

10:30 a.m. – 10:50 a.m. The Center of Excellence for Engineering and Computer Science "Factors Affecting Reverse Transfer Students' Degree Completion"

Between 2018-2020, 1.9 million students dropped out of college, and approximately 250K that started at 4-year institutions reverse transfer (started at 4-year and transfer to community college). In Illinois, only 16% of reverse-transfer students earn an associate's degree and only 24% attain a bachelor's degree. This research is designed to understand why there is a very low success rate in bachelor attainment among reverse transfer students. We will administer surveys and case study interviews for reverse transfer students at Wright College to understand the barriers that could potentially prevent them from completing a degree. We are currently strengthening our research protocols and will start collecting data for Fall 2023 reverse transfer students. Our future results will help community college design interventions to support this population.

Presenters: Casey Tan & Perla Bran
Faculty Sponsor: Doris J. Espiritu, Ph. D.

11:00 a.m. - 11:20 a.m. English 102-Composition II
"In Defense of AI: An Analysis of Gertner's *The Idea Factory* and the Current Race to Actualize the Next Technological Revolution"

Our English 102 section has been reading and analyzing Jon Gertner's scientific history on technology in the 1900s titled *The Idea Factory*. This presentation will elucidate several key connections between the work done at Bell Labs in the 1940s, specifically in relation to the research and innovation of the transistor, and the current tech environment and its development of Artificial Intelligence. Just as the 1947 invention of the transistor revolutionized practically every technological industry, from twentieth century telecommunications to computing, AI has a similar capacity to quickly revolutionize the modern tech landscape. This revolution will extend into our everyday lives and forever change how we view and interact with our ourselves and our environment. If our tech scientists and companies can emulate the public-private partnership of Bell Labs that created vast leaps in technological innovation with its research and development in the twentieth century, we can guide our society to a better future determined not by profit margins, but by the increased capacity for productivity and creativeness among our thinkers. This presentation will discuss the key factors that allowed Bell Labs to successfully foster innovation and relate the story of its success to modern research into AI. It will also highlight the potential consequences of the development AI in such a hyper-competitive environment and will aim to answer the question "should we be scared of AI?".

Presenter: Andrew Steppan
Faculty Sponsor: Professor Vincent Bruckert

11:30 a.m. – 11:50 a.m. Chemistry 295 – Independent Research
"Mentor Match: A Research-Based Application for Mentoring Experiences"

This research explores the development of a research-based application for finding an effective mentor-mentee match. Mentoring is a process defined as a mutually beneficial and collaborative relationship between two individuals, and it is essential to professional success. Successful mentoring occurs when the relationship evolves organically in various formal and informal forms. However, there is no blueprint for a mentoring relationship, so finding the ideal one is challenging. We hypothesize that personality type, demographics, career, and interests contribute to ideal mentoring relationships and that there is a percentage of matching between these four dimensions. Using a tier-based approach, we designed an experimental algorithm and application to test which dimensions carry more weight and what matching percentage is needed. We expect the research-based mentor-mentee application to be an effective approach to mentoring, with the wide use of a well-tested algorithm.

Presenters: Alondra Gonzales, Ahmed Sozzer, Dominika Panek
Faculty Sponsor: Dr. Doris J. Espiritu

BREAK 12:00 p.m. – 2:00 p.m.

Wednesday, April 26 in President's Conference Room, A-102

Session Two: 2:00 p.m. – 3:30 p.m.

https://cccedu.zoom.us/j/87559145873?pwd=ekt6VlBrOGZLeDAxMGVIcG5zMGlUZz09

Meeting ID: 875 5914 5873
Passcode: 945454

2:00 p.m. – 3:00 p.m. English 102 Honors-Composition II
"Slavic Literature in the late 20th Century: Becoming Postmodern"

In this session, students will present their examinations of the topics of identity, existence, space, reality and borders in the works of postmodern Slavic authors such as Olga Tokarczuk's *House of Day, House of Night*, Milan Kundera's *Ignorance*, Vladimir Makanin's *Escape Hatch*, and Milorad Pavić's *The Inner Side of the Wind.*

Presenters: Thomas Cahill, Connor O'Reilly, Annays Perez, Sergio Romero, Taylor Singh, Malak Suleiman
Faculty Sponsor: Professor Natasha Todorovich

3:00 p.m. – 3:15 p.m. Anthropology 201
"Human Being and Becoming: Understanding the Social Evolution of Hominins"

To foster an informed understanding of the origins of modern humans and their unique social behavioral attributes from an evolutionary perspective, I conducted in-person observations of primate behavior (Gorillas and Orangutans), and I referenced paleoanthropological/archaeological studies of hominin behavior and ethnographical research. In tandem with my research, I used my knowledge of the mechanisms of evolution (natural selection, gene flow, genetic drift, mutation), historic climate and environmental/habitat-related data per geologic research, and developmental trends across hominin evolution related to both morphology and an increasing proclivity for material culture amongst hominins to develop a nuanced understanding of the evolutionary connections between primates, and the evolutionary trends of social behavior in hominins in particular.

Presenter: Molly Officer
Faculty Sponsor: Dr. Jo Zalea Matias

3:15 p.m. – 3:30 p.m. English 102-Composition II
"Red-Light and Speeding Tickets in Chicago"

The motorist in the City of Chicago knows firsthand a red light or speeding camera is on every traffic light intersection. From Downtown Chicago to the Loop, From Berwyn to Belmont Cragin, rest assured when a driver speeds or blows a red light, a camera will catch them! While

the city argues its intent to install the cameras is for traffic safety and to benefit city drivers, residents quickly realized the hoops they must jump to prove their innocence when wrongly ticketed, including the financial burdens these tickets cause if not paid on time. Drivers in the city have brought to the court's attention the corruption associated with red-light and speeding cameras hoping to improve the program setup. Another key concern of motorists is the high prices associated with the tickets given through speeding and red-light programs, bringing into question if the program is for the good of drivers or to profit from motorists. The city shows a clear profit while financially inconveniencing drivers and because of this there is little trust in traffic enforcement programs. Laws related to traffic safety vary from state to state showing inconsistencies with how fines are appointed, and as a result, motorists constantly contest tickets. Some alternatives were offered to cities for other ways of reprimanding drivers focusing on safety and fairness, not profit and dishonesty. Chicago is a city that can benefit from having traffic cameras established for driver safety without placing drivers in debt.

Presenter: Roxana Rodriguez
Faculty Sponsor: Professor Jerome Cusson

Thursday, April 27 in S-247

Session Three: 9:30 a.m. – 12:00 p.m.

https://cccedu.zoom.us/j/84729408131?pwd=OFpUY2s4cERvdFlWYjgyVGNTVTNHdz09

Meeting ID: 847 2940 8131
Passcode: 028200

9:30 a.m. -10:50 a.m. Literature 115 Honors-Great Books Seminar
"Tricksters and Fools in British Literature"

In this session, students from Literature 118 HON9 will discuss some of the memorable tricksters and fools of British Literature. These characters include both the good and the evil, the contemptuous and the hilarious. We will meet the clever, foul-mouth Miller, the feminist prototype Wife of Bath and the immoral, blatantly sinful Pardoner (Geoffrey Chaucer's *The Canterbury Tales*) and encounter several of Shakespeare's tricksters and fools from *A Midsummer Night's Dream* and *Othello*, as well as look at other works. Students will examine some of the specific themes and questions of these works, including those topics they will more fully address in their 2500-3000-word final research papers. They will also include highlights from their PowerPoints on specific works and themes of the course.

Presenters: Literature 115 students
Faculty Sponsor: Professor Michael Petersen

11:00 a.m. – 11:20 a.m. English 102-English Composition II
"Graduation Retention Crisis in Chicago"

The purpose of this project is to present an argument that Chicago Public Schools is a failing school system which does not prepare students for college and/or life beyond. There are many issues relating to why it is a failing system, but through my research I have found that the three main reasons are: inappropriate distribution of funding, lack of professional development for educators, and the absence of college preparatory programs. Because of these obstacles, students of Chicago are graduating high school with proficiency levels at 3rd grade. Through my research I present the gaps in achievement and possible solutions to counter the educational crisis in Chicago.

Presenter: Eveliz Roman
Faculty Sponsor: Professor Jerome Cusson

11:30 a.m. – 11:50 a.m. English 102 Honors-Composition II
"Slavic Literature in the late 20th Century: Becoming Postmodern"

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Presenters: Liam Smith, Henry Chau
Faculty Sponsor: Professor Natasha Todorovich

BREAK 12:00 p.m. – 1:00 p.m.

Thursday, April 27 in S-247

Session Four: 1:00 p.m. – 3:00 p.m.

https://cccedu.zoom.us/j/84624527397?pwd=ZlF5cHVlV29MMVBzZkdIMkFvUHJRZz09

Meeting ID: 846 2452 7397
Passcode: 372091

1:00 p.m. – 1:20 p.m. Engineering 225 – Introduction to Thermodynamics
"Internal Combustion Automobile Systems"

This presentation offers an analysis of the potential of the Rankine cycle as an additional power generation process, which uses the waste heat of a car engine. Based on this fundamental cycle,

various designs can be identified to recover engine waste heat. These configurations differ in the utilization of the heat source and the number of system components. Our project focuses on the design and simulation of a system to recover waste energy from exhaust gases expelled from a 2.5 L, four stroke automobile engine, to reclaim at least 15 hp of power through the use of two turbines. Similar studies find that water as a working fluid is the ideal, though not possible due to real world technical limitations. Toluene and ethanol are generally found to be suitable substitutes that adhere better to real world working conditions. Simplifying assumptions are made to reasonably limit the scope of the project, including, but not limited to air-standard analysis, constant flow of all working fluids, and perfectly insulated systems.

Presenters: Casimir Leja and Natalie Tran
Sponsor: Dr. Ruzica Todorovic

1:30 p.m. – 1:50 a.m. Engineering 225 - Introduction to Thermodynamics
"Residential CHP Efficiency"

Both electricity and heat transfer are needed for processes within manufacturing settings. Combined heat and power (CHP) systems are designed to provide both from a single fuel source such as natural gas. Micro-CHP (combined heat and power) units capable of producing up to 1.8 kW of electric power are now commercially available for use in the home. Such units contribute to domestic space or water heating needs while providing electricity as a by-product. By hybridizing a micro-CHP unit with a gas furnace, all domestic heating needs can be met while generating a substantial portion of the annual electric power requirement. We evaluated this hybrid form for application to a typical single-family dwelling in Chicago, Illinois that has natural gas service, and considered on-site battery storage of excess electricity generated. We used existing data to create a simulation of the CHP system we designed and compared the efficiency of our simulated system to the efficiency of separate heat and power.

Presenters: Allen Ali, Nick O'Reilly, Shlesha Patel
Sponsor: Dr. Ruzica Todorovic

2:00 p.m. – 2:20 p.m. The Center of Excellence for Engineering and Computer Science
"Engagement Through Service: Strengthening Students' Identity Through Volunteering"

Service through volunteering has been shown to be correlated with growth in social behavior and academic aptitude. These activities have the potential to promote an individual's growth and belonging to the profession. Although found beneficial, there are limited studies that address the impact of STEM volunteering on STEM identity (the ability to see oneself as a STEM professional) and STEM efficacy (the belief in one's ability to succeed in STEM). The current research is focused on STEM volunteering as opposed to service learning (service tied to a course curriculum). Our hypothesis is students who are engaged in STEM-related services increase their STEM identity and STEM efficacy and the impact is dependent on the length and recurrence of the service provided. To test these hypotheses, we piloted standalone short-

term (days), medium-term (2 weeks), and long-term or continuous (months) STEM-related service projects.

Presenters: Selvin Tobar, Yessenia Nicacio-Rosales, Anna Le,
Adam Moine, Abdelouahab Eskaw
Faculty Sponsor: Dr. Doris J. Espiritu

2:30 p.m. – 2:50 p.m. Engineering 225 – Introduction to Thermodynamics
"Vapor-Compression Refrigeration Systems in High-Performance Aircraft"

As technology evolves, the increasing usage of avionics and electronic equipment is greatly adding to the thermal load of high-performance aircraft. Several cooling systems have been implemented to manage these thermal loads, but they are reaching their capacities. Vapor-compression refrigeration systems (VCRS) have been proposed as an alternative solution for this problem, but their effectiveness and adaptability under variable conditions is still unknown. The objective of this project is to develop a simulation with which to evaluate the performance of a VCRS subjected to broadly variable thermal inputs and changing ambient conditions.

Presenters: Bryce Lusterio Aguirre and Samuel Durns
Sponsor: Dr. Ruzica Todorovic

Wright faculty sponsors: Professors Doris Espiritu, Michael Petersen, Vincent Bruckert, Ruzica Todorovic, Jerome Cusson, Jo Zalea Matias and Natasha Todorovich.

Honors Program Coordinator: Professor Natasha Todorovich

Thank you to our student presenters and to our faculty sponsors!