24TH ANNUAL CELEBRATION OF STUDENT RESEARCH, SCHOLARSHIP, & CREATIVE WORK

JANUARY 26, 2024 | WABASH COLLEGE

Congratulations!

The Celebration Event Planning Committee is excited to announce the winners of two prestigious awards associated with today's event.

Celebration Research, Scholarship, and Creativity Awards

These $150 prizes are awarded to the students who most effectively articulated gains in professional development and personal growth as a result of their research, scholarship, or creative work. This year's winners are listed below, in alphabetical order.

Andrew Sinkovics & Phenix Carney: Léanme: Spanish Children's Literature

Jackson Hoover: Food for Thought: Finding New Solutions for Food Insecurity and Promoting Impactful Internship Experiences

Nhan Huynh: Drug-Resistant Melanoma is Mediated by DNA Damage

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Robert Wedgeworth '59 Library Research, Scholarship, and Creativity Awards

These $750 prizes are awarded to recognize effective use of library resources in the preparation of Celebration work. This year's winners are listed below, in alphabetical order.

Carson Wirtz: : The Strange Thing in Your Neighborhood is Political

Christan Zimmerman & Luke Davis: Photoredox Catalysis with Organic Photocatalysts

Christan Zimmerman, Zephaniah Johnson, & Jackson Bohrer: Impact of Awe Induction on Creativity

Welcome and Introduction

Welcome to the 24th

Oral Presentation & Performances Schedule

Detchon 109		
1:15	Caleb Peare	The Timeless Echo of Guernica V. Daniel Rogers & Matthew Greenhalgh (Spanish)
1:40	Owen Bennett	Reconstructing Henry S. Lane: Redefining Political Legacy Amidst Reconstruction Ambiguity Noe Pliego Campos (History)
2:05	Gavinn Alstott	The Rise of Fundamentalists in Politics Robert Royalty (History)
2:30	Chase Breaux	The Impact of Partisan Cues on Black Voter Support of Racial Equity Policy Shamira Gelbman (Political Science)

Oral Presentation & Performances Schedule

Detchon 112

1:15	Jackson Grabill	Institutional Design Matters: Issues with the Constitutional Framework of the Supreme Court Nicholas Snow (Philosophy, Politics, & Economics)
1:40	Joseph Barnett	In Defense of Dollar Stores: A Closer Look into the Relationship between Dollar Stores and Consumers Nicholas Snow (Philosophy, Politics, & Economics)
2:05	Jackson Leeper	Water Borne Disease Dynamics on a Random Network with a River Chad Westphal (Mathematics & Computer Science)
2:30	Derek Miller	Decolonial Thought of Critical Race Theory Jorge Montiel (Philosophy)
2:55	Matthew Jessup	Trading on AI Insights: Evaluating Forex Predictions from Central Bank Statements Eric Dunaway (Economics)

Detchon 209

1:15	Cody Bevelhimer	Beyond Sound: The Immersive Impact of Video Game Music Mollie Ables (Music) & Michael Abbott (Theater)
1:40	Io Maeda	Paul Hindemith: A Suppressed German Composer by the Nazi Regime Mollie Ables & Diane Norton (Music)
2:05	Evan Bone	Aimé Césaire's Influence on Modern Hip-Hop Agata Szczeszak-Brewer (English)
2:30	Jacob Weber & Noah Kent	How Jason Aldean uses Race as a Rhetorical Function: An Analysis of Jennifer Abbott (Rhetoric)
2:55	Carson Wirtz	: The Strange Thing in Your Neighborhood is Political James Cherry (Theater)
3:20	Jacob Weber, Cole Bergman, Christan Zimmerman, & Benjamin Mijangos Sampsell	From Theoretical to Tangible: The Political Turn in Environmental Policy Deliberation Chris Anderson (Democracy & Public Discourse)

Oral Presentation & Performances Schedule

Detchon 211

1:15	Zachary Geleott & John Mills	Wabash Always Fights: The Unintended Side Effects of our Mantra Michele Pittard (Education Studies)
1:40	Zev Wolverton	Rediscovering Chapel Sing Michele Pittard (Education Studies)
2:05	Preston Reynolds & Logan Weilbaker	A More Perfect Writing Center Zachery Koppelmann (Writing Center)
2:30	Matthew Lepper	Effects of Rhizobial Diversity on Soybean Health Bradley Carlson (Biology)
2:55	Jackson Hoover	Food for Thought: Finding New Solutions for Food Insecurity and Promoting Impactful Internship Experiences Eric Wetzel & Jill Rogers (Global Health Initiative)

Korb Classroom

1:15	Jacob Riddle	The World through My Lens Matt Weedman (Art)

Poster Presentations & Exhibitions Session #1 Schedule

Detchon International Hall		
	Matthew Jessup	Evaluating Racial Bias in AI Language Models Joyce Burnette (Economics)
	Reece Bauer	Wage Discrepancies: Examining the Wage Gap Between United States Born Citizens and Immigrants Joyce Burnette (Economics)
	Connor Craig	Mitigating Black Maternal Mortality Health Disparities Elan Pavlinich (English)
	Seth Acero	Layers of Desire: Exploring Aggression, Objectification, and Male Receptiveness in Pornography Elan Pavlinich (English)
	Augusto Kern Ghidini	

1:15–2:15

Poster Presentations & Exhibitions Session #1 Schedule

Detchon International Hall		
1:15–2:15	Christan Zimmerman, Zephaniah Johnson, & Jackson Bohrer	Impact of Awe Induction on Creativity Neil Schmitzer-Torbert (Psychology)
	Joshua Manfred & Corbin Strimel	Kandinsky was Right: Few do "Express Bright Yellow in the Bass Notes, or Dark Lake in the Treble" Karen Gunther (Psychology)
	Luis Rivera	

Oral Presentations & Performances (Alphabetical by Presenter)

Presenter: Augustin Sanchez & Evan Baldwin
Sponsor: Dennis Krause (Physics)
Title: Untangling Entanglement: Investigating the Creation and Destruction of One of Nature's Most Confusing Phenomena

Of all the strange phenomena in quantum physics, none can quite compare to the imagination and ire that entanglement causes. A quantum phenomenon with no robust classical counterpart, entanglement is fundamental to our understanding of the quantum world but is at the same time poorly understood by undergraduates because it is mostly neglected in

Oral Presentations & Performances

Presenters: Io Maeda
Sponsors: Mollie Ables & Diane Norton (Music)
Title: Paul Hindemith: A Suppressed German Composer by the Nazi Regime

This paper examines German composer Paul Hindemith's career in the Third Reich from 1933 to 1938, when he emigrated

Oral Presentations & Performances

Presenters: Jackson Leeper
Sponsors: Chad Westphal (Mathematics & Computer Science)
Title: Water Borne Disease Dynamics on a Random Network with a River

A wide range of waterborne diseases spread through a population through both human-to-human interaction and water-to-human interaction. In this presentation, we propose a compartment model to simulate the transmission of a waterborne pathogen through a river with two water sources. We create different systems like an ODE simulation and a Markov Chain Monte-

Oral Presentations & Performances

Presenters: Jacob Weber & Noah Kent
Sponsors: Jennifer Abbott (Rhetoric)
Title: How Jason Aldean uses Race as a Rhetorical Function: An Analysis of

This rhetorical criticism offers an analysis of by Jason Aldean through both the song's lyrics and music video. The analysis delves into the racially connotated themes and stereotypes within the song and video, exposing how they contribute to a white supremacist representation of white rural America. By examining coded language targeting people of color, the critique reveals how Aldean's work perpetuates harmful stereotypes and justifies control over racialized bodies. Aldean also creates a rhetorical border by emphasizing the contrast between rural tranquility and urban violence, which is accomplished through his lyrical choices. The deliberate choice of imagery, including law enforcement proceedings and racially charged scenes, is scrutinized for reinforcing biased perspectives and neglecting the struggles faced by Black bodies. Overall, the song and music video are critiqued for relying on racially charged elements that hinder progress toward a more egalitarian society.

Presenters: James Szalkie
Sponsors: James Brown (Physics)
Title: Imaging Sound Waves in Translucent Materials

The field of geophysics often relies on the invisible in order to research the intricate composition of our earth, or even extraterrestrial bodies. This includes mainly sound waves, derived from seismic activity, in order to deduce what exists beneath our feet. However, light has proven to be a much more reliable source of imaging, as it has a smaller scale to its behavior and can be manipulated in ways much different from sound. Using light waves to image sound waves, we can hope to better understand the relationship between sound and different materials in real time, and create new systems to catalogue these movements. Future applications can include better b(move)4(me)3(n)10(ts)-5(.)-226(Futu)9(r)-3(e)4( )-227(a)4(pplic)4(a)4(t

Oral Presentations & Performances

Presenters: Matthew Jessup
Sponsors: Eric Dunaway (Economics)
Title: Trading on AI Insights: Evaluating Forex Predictions from Central Bank Statements

My research objective is to explore AI's capability, specifically OpenAI's GPT4, to make accurate forex market trade predictions based on monetary policy statements from the G10 Central Banks. This group represents the world's most traded foreign currency exchange markets.

Using a backtesting methodology, I deployed GPT4 to interpret the nuances within each policy statement and predict currency pair movements, such as the EUR/USD forex pair, when comparing the US Federal Reserve with the European Central Bank. GPT4's role as a currency trader involved classifying the policy stance of each bank and making a trade recommendation. These recommendations were tested against historical price data to gauge profitability.

The backtest yielded a remarkable 65-70% success rate in profitable trade predictions, suggesting the potential for AI to significantly impact financial trading markets. This study underscores AI's transformative potential within the currency trading and broader investment sphere.

Despite successful backtesting, it's important to recognize that past performance may not predict future results.

Presenters: Matthew Lepper
Sponsors: Bradley Carlson (Biology)
Title: Effects of Rhizobial Diversity on Soybean Health

Soybeans utilize rhizobial bacteria in their soil to fix atmospheric nitrogen, converting it into a form of nitrogen that is crucial for plant growth and development. The rhizobial bacteria live in nodules that form on the roots of the soybeans, with higher nodule counts being linked to greater overall production of soybeans, which is desirable for the current agricultural market (Nakei et al, 2022). In the experimental gardens at the Smithsonian Environmental Research Center, we are introducing different combinations of bacteria cultures into the soil of both GMO and Heirloom soybean varieties. This will demonstrate whether or not different levels of rhizobial bacteria diversity in the soil of soybeans will affect overall growth and productivity of both GMO and Heirloom varieties.

We found a handful of statistically significant results regarding different metrics taken over the experiment. Our phenology data was graphed as the mean number of days it took to reach a reproductive stage, and we found significant differences in presence/absence of rhizobia in Heirloom varieties, a significant type difference (GMO v Heirloom), and significant diversity difference within the Heirloom varieties. We also found statistically significant data within our relative chlorophyll content metric (SPAD). Within SPAD, we found a significant presence/absence difference between both GMO and Heirloom varieties, but no overall diversity effect. For non-photochemical quenching (NPQt), we found significant differences in presence/absence for both types, and a significant difference in diversity by type. For overall plant height, we found a significant presence/absence effect between both types. Finally, for insect damage percentages we found significant diversity effects for the Heirloom varieties.

Oral Presentations & Performances

Presenters: Owen Bennett
Sponsors: Noe Pliego Campos (History)
Title: Reconstructing Henry S. Lane: Redefining Political Legacy Amidst Reconstruction Ambiguity

Oral Presentations & Performances

Presenters: Zachary Geleott & John Mills
Sponsors: Michele Pittard (Education Studies)
Title: : The Unintended Side Effects of our Mantra

Competitiveness and achievement are often considered catalysts for success, yet what transpires when the burden becomes overwhelming? In the podcast, we take a deeper look into the minds of Wabash men as we question our school's mantra - something that has, at times, been misconstrued. While America has adopted a nuanced approach to mental health, there appears to be a tendency for men to be overlooked and shrouded in the shadows. As the prospective leaders of America, it is imperative for us to shed light on the very tangible and inevitable mental health challenges that men may encounter. At Wabash, we aim to proactively address these issues and pave the way forward. We are a school rooted in tradition, but is it time for us to rethink and alter something as big as our mantra?

Presenters: Zev Wolverton
Sponsors: Michele Pittard (Education Studies)

Poster Presentations & Exhibitions (Alphabetical by Presenter)

Presenters: Alex Amore & Eric Green
Sponsors: Joe Scanlon (Chemistry)
Title: Molecular Rotors Encapsulated in a Palladium Chloride Coordinated Hexagonal Macrocyclic Framework

Molecular machines are a relatively new concept in Chemistry. They have applications in many areas of chemistry. Molecular

Poster Presentations & Exhibitions

Presenters: Arman Luthra
Sponsors: Nicholas Snow (Philosophy, Politics, and Economics)
Title: Exploring the Dynamics of Transnational Financial flows through Computational Linguistics: Forecasting Remittance Patterns among the Indian Diaspora in Canada

The presentation will explore the potential of integrating natural language processing (NLP) techniques with time series modeling to improve predictions of transnational financial flows, taking remittance inflows to India as a case study. My research employs a mixed methods approach combining quantitative SARIMA time series modeling with qualitative

Poster Presentations & Exhibitions

Presenters: Jerry Little, William Boswell, & Jordan Carter
Sponsors: Walter Novak (Chemistry) & Erika Sorensen-Kamakian (Biology)
Title: Taking Out the Trash: Developing a Protein Degradation Assay for LOCKR

Degrons are protein sequences that signal protein degradation, and are important to shape the gene expression landscape in living organisms. The Latching Orthogonal Cage/Key pRoteins system uses degrons (degron-LOCKR) to regulate protein degradation. Degron-LOCKR has a Switch with a degron in an "off" state that can be "unlocked" by a protein Key. When the degron is "unlocked" by the Key, it evokes degradation of the Switch and any attached proteins. We seek to optimize LOCKR to control protein degradation in C. elegans. We initially designed a fluorescence-based assay where the Switch was fused to red fluorescent protein (RFP-Switch). In the presence of Key, we predicted that red fluorescence would decrease over time. We failed to detect protein degradation in this experiment. We hypothesized that this result could be from either 1) failure to obtain full-length RFP-Switch or 2) technical issues with the assay. To overcome the first problem, we transformed the RFP-Switch into a new cell line. To test the s

Poster

Presenters: Taylor Lorsung
Sponsors: Patrick Burton (Biology)
Title: Lonafarnib and Dizocilpine Inhibits Annelid Aeolosoma Regeneration

Aeolosoma, a remarkable freshwater annelid, exhibits exceptional regenerative capabilities, successfully restoring missing structures within 120 hours post-bisection. This study investigates the impact of two chemicals, Lonafarnib and Dizocilpine, on the regenerative processes in Aeolosoma. Lonafarnib targets H-Ras, K-Ras-4B, and N–Ras, while Dizocilpine targets N-methyl-D-aspartate (NMDA). Both chemicals are implicated in inhibiting cell proliferation, a crucial aspect of Aeolosoma's regenerative ability (Chen et al., 2019).

Presenters: Thomas Oppman, Precious Ainabor, Nathanael Mertz, Cole Shifferly, & Andrew Sinkovics
Sponsors: Walter Novak (Chemistry) & Erika Sorensen-Kamakian (Biology)
Title: De'feeting' Barriers to Binding: An Analysis of Toeholds in LOCKR

Latching Orthogonal Cage Key Proteins (LOCKR) uses protein switches with bioactive peptides that can modulate gene expression, alter signaling pathways, control protein-protein interactions, or degrade proteins in cells. One component of this system is the Latch, which contains the bioactive peptide that is integrated into the Cage. In this state, the bioactive sequence is locked in the "off" state. Upon the addition of a Key protein, the Key unlocks the Latch from the Cage thus turning "on" its bioactive peptide for biological function. Because the Key-Cage interaction determines biological function, understanding what strengthens or weakens this interaction is critical. One factor that influences this interaction is the length of the toehold, which shortens the Latch relative to the Cage. Our research goal is to generate Latches with different toeholds and to identify which toehold variants bind Key best. To do this, we used molecular biology to create different Latch toeholds, expressed these proteins, and tagged them with a fluorescent molecule. We hypothesize that small toeholds will always be "off", while larger toeholds will always be "on." Our preliminary experiments show differences in Key binding based on Latch toehold length; further research will reveal the optimal toehold length for LOCKR.

Presenters: Troy Brown & Samer Halabi
Sponsors: Anne Bost (Biology)
Title: Broad Spectrum Antimicrobial Properties of a Wabash Field Isolate

Multidrug resistant bacteria are an ongoing public health threat. Wabash is doing our part to combat this problem by

Poster Presentations & Exhibitions

Presenters: William Keeling & Mason Naaman
Sponsors: Erika Sorensen-Kamakian (Biology) & Walter Novak (Chemistry)
Title: Appetite for Destruction: Purification of the 26S Proteasome in

Gene inactivation helps scientists better understand the role of that gene in normal development and the development of disease. The 'Latching Orthogonal Cage–Key pRoteins' (LOCKR) technology provides a novel way to inactivate genes by destroying a gene's protein product. LOCKR uses designed Switches that signal for protein destruction using a molecular machine called the proteasome when attached to a protein of interest. To date, Switches have successfully induced protein destruction in yeast and cell culture, but are currently untested in an animal model. Thus, we seek to optimize the LOCKR Switch for use in the worm . To this end, we first set out to isolate the proteasome using two techniques: 1) affinity purification of following CRISPR-Cas9 modification and 2) ion-exchange and hydrophobic interaction chromatography. For affinity purification, we designed gRNAs to add a C-terminal 3xFLAG tag by CRISPR-Cas9 modification to three distinct components in the proteasome (rpn-1, rpn-1, and pbs-4). We also report our initial experiments to isolate the 26S proteasome from using chromatography. We anticipate that isolated proteasome will be useful to optimize LOCKR Switches and in future experiments that explore gene inactivation in .