IDEAFEST PROGRAM

Thursday, May 1, 2025

12:30-3:30pm, Science Building

Student Research Symposium at Dordt University

IDEAFEST

Presentation Schedule

	SB 1603	SB 1604	SB 1641	SB 2602 – 2nd Floor	SB 1606
1:15pm				Through My Lens: Insights and Experiences from my Summer Internship at Driesen Eye Center **Tyler Wieringa**	Solar Integration at Dordt's Campus: A Demonstration and Feasibility Study **Noah Swenson, Hendrick Vande Voort, Nate Voogt, Brayton Juffer**
1:30pm	Within Thy Courts: Composing for Worship on the Organ **Victoria Ensink**	Soil Management: Perception Versus Reality **Ava Buwalda**	Quantum Computation Using Optics **Nathan Bakker**	Investigating the Effect of Chronic Sleep Restriction on Tau Pathology **Samantha Anema**	Interstates Mobile Communications Cart **Caden Peters, Grant Alsum, Dominick Ver Meer**
1:45pm	Research and Grants Administration: An Exploratory Experience **Olivia Dahl**	The Topography of Our Theology **Lucie Dolenc**	Greener Pastures- Informative poetry splicing short speech **Mercea Rediger**	Investigating Bird Diversity in Prairie Strips **Graham Ross**	Rotating Paint Cart **Luke Albright, Caleb Dietz, Mason Price, and Dylan Aukes**
2pm	Mind Gut Connection and Mental Health **Janie Van Donge**	Cultural Apologetics and the Problem of Beauty **Colton Burney**	John Brown: The Writings of a Radical **Justin Kroeze**	The Impact of Fatigue on the Static and Dynamic Balance of Athletes of Different Sports **Lauryn Killion**	Crown Ridge Trail Bridge **Austin Lammers, Wade Shields, Maggie Brown, Conner Asche**
2:15pm	Finding Middle Ground on Gun Control **Anneka Pollema**	Why Believe in God? The Existential Benefits of a Functional Belief in God **Truman Clark**	The Ku Klux Klan's Self-Image: A Study of the Indiana Klan **Kyle De Jong**	Shoulder Muscle Activation in Men's Volleyball Players **Brady Fergen**	Stewardly Community Development **Annalucia Mendoza, Andres Guzman, Juan Ospina**
2:30pm	Move Your Mountains **Zachary Phillips**	Extended Cognition: How Communities of Faith Hold Us When Our Faith Is Weak **Nicole Mahoney**	"El oscuro pasado de Chiquita Brands"/The dark past of Chiquita Brands **Hannah Curtis**	Correlation Between BDNF Variant and Mental Health Among College Students **Lucy Zylstra**	Senior Design: Labral Injury Prevention Football Brace **Dawson Lee, Kade McDaniel, Fulton Gunderson**
2:45pm	College Snapshots **Philip Shippy**	La Vida y Las Obras de Luis Jiménez **Hope Tebben**	Hot Hands & Cold Spells: Analyzing Streaks in Dordt Women's Hoops **Joel Akers**	MPTP-Induced Parkinson's Model in Zebrafish **Joshua Manwiller**	Characterizing Human RDM1: A Novel Anticancer Target **Paul Roscoe**
3pm	Spring Season with Dordt Defender Football **Nathan Warner**	Fatherlessness and Its Effects on Children **MaKenna DeLong**	Breaking the Algorithm: The Recursion Method for the EDCN **Cooper Burkel**	The Effect of Patient Factors on Home Exercise Adherence **Taylor Wright**	The Northern Cities Chain Shift **Natalie Christians**
3:15pm	Lighting Design and Technologies **Jakob Kamp**	From Cheerios to Cheerful Returns: Why General Mills is a Buy **Jeralyn Rediger, Nolan Karel, Caden Koole**	Break the Cycle: Teaching Math for Thinking **Tyson Kube**	Using EMG Activity to Compare Shod and Barefoot Running **Simon Rynders**	

IDEAFEST

Posters / Displays / Exhibits

On display in the Science Building Atrium from 12:30 – 3:30

Presenters will be available from 12:30-1:15pm

Refreshments will be served near the Natural Sciences Office

Acknowledgements

Student Presenters

Faculty Sponsors

Classroom Moderators

Campus Events Office

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Dordt Dining

Hulst Library

Maintenance Department

Marketing Department

Vaughn Donahue

Classroom Moderators

Jenni Breems

Tom Clark

Erik Hoekstra

Tony Jelsma

Michael Kearney

Donald Roth

Ben Saarloos

Amy Westra

Melanie Wynja

1:15 PM Presentation

SB 2602

Through My Lens: Insights and Experiences from my Summer Internship at Driesen Eye Center

Tyler Wieringa – Faculty Sponsor: Brittany De Ruyter

This summer internship at Driesen Eye Center provided invaluable insights into optometry, blending both clinical and business experiences. I developed skills in diagnostic testing, patient interaction, and practice management while observing a range of eye conditions, from common refractive errors to more unique pathologies. The experience solidified my passion for optometry, particularly in stewarding the gift of sight and improving patients' quality of life. The mentorship I received deepened my understanding of both the profession and the importance of ethical, patient-centered care. I feel more prepared for a future in optometry because of this internship.

SB 1606

Solar Integration at Dordt's Campus: A Demonstration and Feasibility Study

Noah Swenson, Hendrick Vande Voort, Nate Voogt, and Brayton Juffer – Faculty Sponsor: Ben Saarloos

To implement more solar energy on campus, practical and reliable systems must be demonstrated. This Senior Design project aims to establish a technical foundation for future PV integration at Dordt University. A variety of system alternatives will be explored before turning toward a comparison between a self-constructed Unistrut solution and an off-the-shelf pre-engineered solution. The findings from evaluations conducted on the available roof space, campus energy consumption, system viability due to loading, and return on investment will be explained. Altogether, this will support the team's belief that increased solar integration at Dordt is a responsible decision from many standpoints.

1:30 PM Presentations

SB 1603

Within Thy Courts: Composing for Worship on the Organ

Victoria Ensink – Faculty Sponsor: Carrie Groenewold

The struggle of playing organ for a conservative church lies in finding the right music for your congregation. It can be intimidating for beginning and intermediate organists to know find music that is both accessible to their ability and applicable to their church. This project is a collection of 6 psalm-based hymns for the organ that can be played by organists at any level. My goal is for this project to result in the publication of a book that can be used throughout my own church and in many others.

SB 1604

Soil Management: Perception Versus Reality

Ava Buwalda – Faculty Sponsor: Meghan Jones

Farmers have made significant progress over the last 100 years regarding soil conservation. However, agriculturists are still vilified as the same people who caused the Dust Bowl during the 1930s! There is a requirement on farmers to both advocate for ourselves and to reach further success in the area of soil conservation.

SB 1641

Quantum Computation Using Optics

Nathan Bakker – Faculty Sponsor: Jason Ho

The Deutsch-Jozsa algorithm is a quantum computing protocol known for its ability to solve a specific computational problem with exponential speedup over classical counterparts. This research explores the implementation of the Deutsch-Jozsa algorithm using optical interferometry, leveraging the quantum behavior of light to simulate the required

quantum operations. By encoding qubit states into the polarization and phase of light and utilizing interferometric setups to execute quantum gates, this experiment will demonstrate the feasibility of optical systems as a platform for quantum computation. Optical interferometry provides practical accessibility to quantum computing: offering noise resistance, room-temperature operation, and commercially available components.

SB 2602

Investigating the Effect of Chronic Sleep Restriction on Tau Pathology

Samantha Anema – Faculty Sponsor: Robbin Eppinga

Tau phosphorylation is a biomarker of Alzheimer's disease (AD). Sleep restriction has been associated with an increased risk of AD and changes in the hippocampus. In this project, I investigated the effects of chronic sleep restriction on tau pathology in the hippocampus of rTg4510 mice. Using western blots, I found an increase in tau phosphorylation in male mice. Immunofluorescence staining revealed a higher level of basal tau in female mice compared to male mice.

SB 1606

Interstates Mobile Communications Cart

Caden Peters, Grant Alsum, Dominick Ver Meer – Faculty Sponsor: Jason Wyenberg

Our senior design team has designed and tested a system for Interstates that enables their technicians to more easily communicate across a job site and with other offices. The mobile communications cart is battery powered and designed to handle the harsh conditions of extreme weather and a construction site with a battery life that will last for a full working day.

1:45 PM Presentations

SB 1603

Research and Grants Administration: An Exploratory Experience

Olivia Dahl – Faculty Sponsor: Angela Kroeze Visser

While most people are familiar with research, many people have likely never had first-hand experience with an individual in research and grants administration (besides maybe sharing a pew on Sunday or shopping in the same grocery store). From helping researchers develop ideas to managing grant funding and reporting, these individuals play a crucial role in the grants process. Having almost completed a whole year in the grants world through my internship, I-RAISE, I can say that I've only hit the tip of the iceberg, but I'd love to share what I've learned about this important field with others.

SB 1604

The Topography of Our Theology

Lucie Dolenc – Faculty Sponsor: Justin Bailey

How does topography affect one's theology? Believers around the world inhabit vastly different environments - geographically, topographically, and societally. This presentation will explore the relationship between the landscape and a Christian inhabitant's view of the Divine and theological understanding.

SB 1641

Greener Pastures-Informative Poetry Splicing Short Speech

Mercea Rediger – Faculty Sponsor: Bruce Kuiper

Blending three poems to tie together a theme of taking a long journey and trusting in God to bring us to greener pastures in the end.

SB 2602

Investigating Bird Diversity in Prairie Strips

Graham Ross – Faculty Sponsor: Robert De Haan

A response to land degradation in the Midwest is to establish strips of native prairie within agricultural fields. In this study, autonomous recording units (ARUs) were used to determine bird use of prairie strips and other NW Iowa habitats. 10 total ARUs were deployed in prairie strips, agricultural field terraces, riparian forest, and a grassland ecosystem. Each ARU recorded the first 10 minutes of each hour from April 2 to July 15. Recordings were analyzed post-collection using software which determines a bird's species by hearing its song. This data was used to determine which habitats birds preferred most.

SB 1606

Rotating Paint Cart

Luke Albright, Caleb Dietz, Mason Price, and Dylan Aukes – Faculty Sponsor: Ben Saarloos

The Rotating Paint Cart Senior Design Project's goal is to enhance the efficiency and safety of the boom-painting process at Elliott Equipment Company. Currently their painting setup relies on a simple cart with angle irons which presents challenges such as difficult access to certain boom surfaces, inefficiencies in the painting workflow, and potential safety concerns for workers. The goal of this project is to design and develop a working prototype that securely holds booms without contacting or restricting their exterior surfaces while allowing full rotation for painting coverage on all sides.

2:00 PM Presentations

SB 1603

Mind Gut Connection and Mental Health

Janie Van Donge – Faculty Sponsor: Mark Christians

The mind gut connection is a critical part to how our bodies work, but is a function that is often overlooked or never even heard of. The connection between the mind and the gut is in constant communication with each other all day, while you are awake and asleep. The foods that you consume and activities that do will have an impact on how you feel both physically and mentally overall.

SB 1604

Cultural Apologetics and the Problem of Beauty

Colton Burney – Faculty Sponsor: Justin Bailey

The presence of beauty in our world begs numerous questions that must be answered. Why is it here? What makes it beautiful? Who made it? What should it tell us? These are just a few examples that naturally arise from a long look at our world. The Problem of Beauty is an attempt at exploring answers to these questions and how both beauty and evil direct our gaze to the Christian Gospel of God's grace in Jesus.

SB 1641

John Brown: The Writings of a Radical

Justin Kroeze – Faculty Sponsor: Paul Fessler

John Brown was an abolitionist most famous for his raid on Harpers Ferry in Virginia where he tried to incite a slave rebellion in the south. During his life John Brown wrote many letters to his family, but most do not convey the radical and insane ideas that he was known for. Instead, these sources form a picture of man who was deeply religious and whose religious convictions shaped all areas of his life including his ideas about family and about race relations and slavery. His ideas and actions were still radical, but instead of coming from an imbalanced mind, they stemmed from his cohesive vision for life that was shaped by his interpretation of the Bible and the culture around him.

SB 2602

The Impact of Fatigue on the Static and Dynamic Balance of Athletes of Different Sports

Lauryn Killion – Faculty Sponsor: Tony Jelsma
There are more than 83,000 student athletes in the NAIA division alone, all of whom are required to possess some level of physical ability. A few studies have been conducted to compare the differences in static and dynamic balancing of athletes in different sports. It has been determined that some sports require more of one kind of balance than the other. What has yet to be tested is the impact fatigue has on an individual's balance. Fatigue is a typical issue that athletes tend to push through, but knowing how the body responds to this kind of stress could change the way it is handled by coaches and athletes.

SB 1606
Crown Ridge Trail Bridge
Austin Lammers, Wade Shields, Maggie Brown, and Conner Asche – Faculty Sponsor: Jeff Gladstone
The Crown Ridge Trail Bridge project aimed to create a connection in the Sioux Center trail system that is both aesthetically pleasing and safe for its users. Responding to the city's desire for a "wow-factor" attraction, the team developed two bridge options that mix functionality with beauty. These designs are able to promote the need for the connection and encourage grants for this type of project. A wide variety of trail users will be able to enjoy more of creation by having increased access to different communities within Sioux Center.

2:15 PM Presentations

SB 1603
Finding Middle Ground on Gun Control
Anneka Pollema – Faculty Sponsor: Leah Mouw
Every year, thousands of Americans die at the hands of gun violence and mass shootings, with 2020 recording the United States' deadliest year yet due to firearms. Legislators have been continually working against each other to either protect the Second Amendment or the lives of Americans. The conversation around gun control is not clear-cut and inevitably sparks controversy and tensions. The United States needs to demand proper legislation without ambiguity and vagueness to solve this issue. There is a pathway to peace on both sides and the protection of lives in America.

SB 1604
Why Believe in God? The Existential Benefits of a Functional Belief in God
Truman Clark – Faculty Sponsor: Justin Bailey
What do you hold onto when life batters you? What happens when your faith is stress-tested? A belief in God that goes deeper than only intellectual talk is needed to withstand the sorrows of life. This is a functional belief in God because God is your functional reality. You are functioning on a day-to-day basis like God really is real and not just a good idea we talk about on Sundays. Do you wish to deepen your faith? One way to begin is to functionally believe in God.

Posters / Displays / Exhibits On display in the Science Building Atrium from 12:30 – 3:30

SB 1641
The Ku Klux Klan's Self-Image: A Study of the Indiana Klan
Kyle De Jong – Faculty Sponsor: Paul Fessler

The subject of my essay focuses on the ways in which the KKK viewed itself, especially looking at its social activities to see the ideologies behind those events.

SB 2602

Shoulder Muscle Activation in Men's Volleyball Players

Brady Fergen – Faculty Sponsor – Tony Jelsma

This study examines muscle activation in male volleyball players during different arm swing motions to identify which shoulder muscles are most engaged. Using EMG and motion capture sensors, data will be collected from participants executing three distinct arm swings. Targeted muscles include the trapezius, deltoid, pectoralis major, and teres major. Results will be analyzed for activation patterns, with the goal of informing preventative exercises to reduce overuse injuries. Findings could contribute to injury prevention strategies and performance enhancement by strengthening key muscles and improving shoulder mobility, ultimately benefiting volleyball athletes through targeted training and rehabilitation techniques.

SB 1606

Stewardly Community Development

Annalucia Mendoza, Andres Guzman, and Juan Ospina – Faculty Sponsor: Justin Vander Werff

Several senior design projects in the past have been related to urban planning and land development. While these projects have typically made efforts to think biblically and normatively through the process, the results have often been constrained by common engineering and construction practices that are imposed by both city regulations and engineering firms. The Stewardly Community Development project provides aspiring engineers with an opportunity to step back, reflect on the reasoning behind current practices, and explore ways to implement meaningful and positive changes in the industry through a new community in Sioux Center. The team will present the design of an innovative structure that aligns with the goals of this subdivision.

2:30 PM Presentation

SB 1603

Move Your Mountains

Zachary Philips – Faculty Sponsor: Mark Volkers

This short film showcases footage of students and athletes I am creating to show off my writing, cinematic, and creative skills. I will be following people "in the action" of him/her performing their duty as either an athlete or a student with a narrative that is about the pursuit of faith and drive. I want this project to help show off my skills with the camera, in editing, and lastly in my writing.

SB 1604

Extended Cognition: How Communities of Faith Hold Us When Our Faith Is Weak

Nicole Mahoney – Faculty Sponsor: Justin Bailey

I will be writing on the importance of extended cognition and communities of faith in the faith formation of individual believers. Extended cognition refers to the way that humans use external sources to aid in memory such as writing down a to do list or asking your phone to give you a reminder for a meeting. In the context of a community of believers, extended cognition may refer to the way that the faith and stories of other believers bolsters our own faltering faith by acting as a reminder of the faithfulness of the Lord and the prevailing truth of His Word.

SB 1641

"El oscuro pasado de Chiquita Brands"/The dark past of Chiquita Brands

Hannah Curtis – Faculty Sponsor: Rikki Brons

This presentation highlights the early history and later controversies of the Chiquita Banana Company and their significance to our world. (In Spanish)

SB 2602

Correlation Between BDNF Variant and Mental Health Among College Students

Lucy Zylstra – Faculty Sponsor: Tony Jelsma

Perceived stress and the ability to cope in stressful situations vary across many groups of people, especially college students. Genetic predispositions can impact this ability to deal with current stressors or add susceptibility to other psychiatric disorders. The Val66Met single nucleotide polymorphism in the gene coding for Brain-Derived Neurotrophic Factor (BDNF) is an example of such a predisposition. This specific gene variant has been correlated with various neuropsychiatric disorders including stress, anxiety, and depression. The association of this gene variant in college-aged humans as well as the differences between men and women is insufficiently understood.

SB 1606

Senior Design: Labral Injury Prevention Football Brace

Dawson Lee, Kade McDaniel, and Fulton Gunderson – Faculty Sponsor: Tayler Hoekstra

Labral Injuries are amongst the most prevalent injury in football, especially at the college level. These injuries are also more avoidable due to them being an overuse injury rather than being an injury that occurs due to a large, one time, application of force. Because of this, our team has studied the injury and created a brace to help reduce injuries for Dordt Football players.

2:45 PM Presentation

SB 1603

College Snapshots

Philip Shippy – Faculty Sponsor: Mark Volkers

A short film in seven parts. Written, directed, shot, and edited by mostly one person, this movie tries to capture what it's like to be in college through short snippets in the life of two students, a nonstop workaholic and a professional procrastinator, as they work on a class video project together. Each part is themed after an aspect of college life, like syllabus days or relationship drama. We'll watch a few of these shorts before a time of Q&A.

SB 1604

La Vida y Las Obras de Luis Jiménez

Hope Tebben – Faculty Sponsor: Rikki Brons

The early life, family history, and historical context of Luis Jiménez greatly influenced his iconic artistic style. His famous fiberglass sculptures serve as symbols of Mexican-American heritage and are tributes to the history of the American Southwest. Three of his most famous (and infamous) sculptures demonstrate Jiménez's bold experimentation, love of the Southwest, and important role in the Chicano movement.

SB 1641

Hot Hands & Cold Spells: Analyzing Streaks in Dordt Women's Hoops

Joel Akers – Faculty Sponsor: Valorie Zonnefeld

In basketball, having a hot hand or cold spell can majorly affect the game. For my study I used statistics to analyze the Dordt Women's basketball team looking into how streaky the team and players were throughout the 2025 season. With the use of the Wald-Wolfowitz runs test and talking with a few players, I was able to see how the team and players were affected by their previous success or failures.

SB 2602

MPTP-Induced Parkinson's Model in Zebrafish

Joshua Manwiller – Faculty Sponsor: Tony Jelsma

By 2030, an estimated 8.7 million people will be diagnosed with Parkinson's disease (PD), characterized by the degradation of dopaminergic neurons in the substantia nigra. This study investigates whether the prodrug MPTP can induce PD-like symptoms in zebrafish larvae. After exposure, larvae will be mounted in agar and their tail movements recorded. Reduced movement frequency, longer intervals between movements, and decreased amplitude are expected. If these symptoms occur, it will support the use of zebrafish as a model organism for studying Parkinson's disease.

SB 1606

Characterizing Human RDM1: A Novel Anticancer Target

Paul Roscoe – Faculty Sponsor: Carl Fictorie

RDM1 is a novel protein involved in DNA repair and replication. RDM1 is overexpressed in BRCAness breast and ovarian cancers and presents as an attractive anticancer drug target. Characterizing this protein will allow for further drug development and design based on its newly found structure and function. In this research project, RDM1 was successfully characterized upon developing a purification protocol and studying its oligomerization and DNA-binding properties. This foundational knowledge of this understudied protein will allow for future chemotherapeutic drugs to be developed to more efficiently and successfully target BRCAness cancers.

3:00 PM Presentation

SB 1603

Nathan Warner – Faculty Sponsor: Mark Volkers

A documentary following the off-season training and practice activities of the Dordt Defender Football team as they prepare for next year's regular season in the fall.

SB 1604

Fatherlessness and Its Effects on Children

MaKenna DeLong – Faculty Sponsor: Tara Boer

Fatherless is a substantial problem in the U.S. It is estimated that about 25% of children are living without a father in the home. The effects of living without a present father are evident in a child’s wellbeing, behavior, and academic success. Policies greatly impact fatherlessness rates across the country. Christians and social workers alike have a responsibility to care for these children.

SB 1641

Breaking the Algorithm: The Recursion Method for the EDCN

Cooper Burkel – Faculty Sponsor: Nate Benjamin

The EDCN of a graph is a type of graph coloring where the colors of the vertices induce a color on the edge between them. In one of the foundational papers on the topic, the researchers suggested a recursion algorithm for finding the EDCN of any graph. This algorithm has stood for years as the premier way to find the EDCN, but it ultimately has some errors in it. In this presentation, I will explain why this recursion method is faulty, provide examples of it, and suggest what needs to be edited to make the algorithm correct.

SB 2602

Taylor Wright – Faculty Sponsor: Tony Jelsma

Nonadherence to home exercises is a challenge for physical therapists, with studies showing up to 50% of patients are noncompliant with their home exercises. In this study, I worked with Proactive Physical Therapy, monitoring patient adherence and collecting patient data. This data was collected through a variety of 'patient factor' questionnaires, surveying demographics, personality traits, and additional characteristics. The assessed traits were compared to the patient's self-reported home exercise adherence percentage. By analyzing this data, we can identify potential patient factors associated with better home exercise adherence. This understanding allows us to develop strategies to improve adherence, ultimately leading to better patient outcomes.

SB 1606

The Northern Cities Chain Shift

Natalie Christians – Faculty Sponsor: Leendert van Beek

If you read literature from the 1600s, you may notice that some of the spellings and words are different, but did you know that the pronunciation of the vowels was probably also different? There have been several changes in the pronunciation of letter sounds over the existence of the English language. One notable change was the Northern Cities Chain Shift (NCCS), which started in the 1930s. The NCCS took place in several major cities, affected the tongue placement of multiple vowel sounds, and resulted in a merger.

3:15 PM Presentation

SB 1603

Lighting Design and Technologies

Jakob Kamp – Faculty Sponsor: Laurel Koerner

As a capstone project I researched, designed, and programmed lights for the Dordt Theatre production of Radium Girls by D.W. Gregory. Throughout the process I had to work with others to ensure a cohesive vision, complete paperwork to track progress, and translate my design into the theatrical space. To aid my work, I consulted sources for lighting design practices, made use of software, and physically tested concepts for viability. In the end I was able to achieve a successful lighting design in the round by evenly lighting the actors and creating interesting environments through color, intensity, texture, and shape.

SB 1604

From Cheerios to Cheerful Returns: Why General Mills is a Buy

Jeralyn Rediger, Nolan Karel, and Caden Koole – Faculty Sponsor: Jesse Veenstra

Participating in the CFA Global Research Challenge, we analyzed General Mills, a key player in consumer staples. Applying real-world financial techniques, we used discounted cash flow and dividend discount models to assess its investment potential. We examined strategic investments in advertising, R&D, and market expansion, particularly in high-growth areas like pet food. Our findings indicate a strong financial outlook, highlighting the value of rigorous valuation and strategic insights. This experience deepened our financial analysis skills and provided insight into professional investment research, enhancing our understanding of how companies create long-term value.

IDEAFEST

SB 1641

Break the Cycle: Teaching Math for Thinking

Tyson Kube – Faculty Sponsor: Valorie Zonnefeld

The stereotypical math classroom is filled with behaviors such as slacking, stalling, faking, and mimicking. Students get by class without doing any actual thinking. This presentation dives into the research done by Peter Liljedahl on building thinking classrooms in mathematics. His research suggests a very unique teaching style where students are standing and active, and teachers doing no lecturing and more guiding. The structure of a Building Thinking Classroom is designed to promote thinking.

SB 2602

Using EMG Activity to Compare Shod and Barefoot Running

Simon Rynders – Faculty Sponsors: Tony Jelsma & Tayler Hoekstra

My research investigated the differences in electromyographic (EMG) activity between shod and barefoot running, specifically focusing on the influence of controlled foot striking patterns. The study aims to determine how footwear and foot-striking mechanisms affect muscle activation during running. By comparing EMG data collected from participants running with shoes and barefoot while controlling for specific foot strike patterns (e.g., rearfoot, midfoot, forefoot), this research seeks to provide insights into the biomechanical adaptations associated with different footwear conditions and running styles. The findings of this study will contribute to a better understanding of the potential benefits and drawbacks of shod versus barefoot running and may have implications for injury prevention and performance optimization in runners.

THANK YOU to all who are moderating today!

IDEAFEST

Posters/Exhibits on display

12:30 – 3:30 in Science Building Atrium

Presenters will be available to answer questions from 12:30 – 1:15pm

Poster Presentations:

Dordt Women's Soccer Recruitment showcase

Joana França – Faculty Sponsor: Mark Volkers

This project is a recruitment-focused website designed to showcase the Dordt Women's Soccer Program to new/promising recruits. The website serves as a digital platform where the new players can learn about the team's culture and achievements. Through videos and appealing design content people will be able to learn more about the program and even schedule a meeting with the head coach

Remember What's Important - Short Film

Logan Baccam, Spencer Ratzlaff, Zachary Phillips, Philip Shippy, Joana França Correia, and Jenna Kuperus – Faculty Sponsor: Mark Volkers

This will cover the accumulation of 4 years in the Digital Media program. This is a project completed last fall for the short film class. In this poster presentation, I will be showing off the film as well as presenting on the process of making something like this. This will also act as a promotional for the program and specifically the class.

The Effects of Long-COVID on Children and Adolescents in the US

Amanda Johnson & Molly Griess – Faculty Sponsor: Kate Vander Veen

Long COVID is characterized by prolonged symptoms of COVID-19 lasting for over 3 months after an initial diagnosis. Clinical manifestations vary, most commonly affecting the pulmonary and cardiac systems. A general finding is a decreased ability to carry out normal daily activities. Long COVID has recently been identified as a disease, and there is limited data on its long-term consequences. This presentation will expand on available research and discuss necessary interventions regarding children and adolescents who are diagnosed with Long COVID in the United States.

The Prevalence of Early Onset Parkinson's Disease and it's Specific Challenges

Emma Bleeker and Ella Dekkers – Faculty Sponsor: Kate Vander Veen

Parkinson's Disease is a progressive neurological disorder that affects movement, balance, and coordination. Early-Onset Parkinson's Disease (EOPD) is Parkinson's disease manifesting between the ages of 21 and 50. Patients with EOPD present with unique challenges. In this project we sought to understand the prevalence and the challenges that present specifically in people with Early Onset Parkinson's Disease in comparison to Parkinson's Disease in those above the age of 50.

Outcomes of Childhood Asthma Management

Hannah Lewis & Josie Zeutenhorst – Facutly Sponsor: Kate Vander Veen

Asthma is a chronic respiratory disease which causes inflammation and muscle tightening around the airways. Childhood asthma is the leading cause of emergency department visits, hospitalizations, and missed school days. Childhood asthma can cause daily symptoms that interfere with play, sports, school, and sleep. In this project, we analyzed the outcomes of proper asthma management in children compared to those with unmanaged asthma.

Healthcare Literacy in the United States

Jacob Schmoll & Samuel Susanto – Faculty Sponsor: Kate Vander Veen

Personal health literacy is defined as the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others. According to the

National Assessment of Adult Literacy Survey, 36% US adults had basic or below-basic health literacy. In this project, we researched the different determinants for healthcare literacy and what has and can be done to improve healthcare literacy in the United States.

Sex Trafficking in the United States

Jade Mathews & Addison Popken – Faculty Sponsor: Kate Vander Veen

Human trafficking is a global crime that affects individuals of all genders, ages, and backgrounds. It typically occurs in two forms: sex trafficking and labor trafficking. This presentation will focus on sex trafficking in the United States. Victims often face significant physical and mental health issues, making trafficking both a community and healthcare system concern. Notably, 87.8% of survivors had contact with a healthcare provider during their victimization. Our goal is to raise awareness about sex trafficking and highlight ways healthcare workers and the community can identify and support potential victims.

Vaccine Compliance

Joy Lee & Taylor Drent – Faculty Sponsor: Kate Vander Veen

Vaccine compliance in children is a critical public health issue that ensures the prevention of infectious diseases and the maintenance of herd immunity. Despite the proven effectiveness and safety of vaccines, many children remain under-immunized due to various factors. Almost 6.5 million children and adolescents died globally in 2021, the vast majority from preventable causes. With appropriate vaccine compliance there were approximately 154 million deaths averted in the past 50 years. Although this number continues to increase with education, it is imperative that we bring about awareness to this topic. In this presentation, we are promoting vaccine compliance and how it can be implemented in the local, state, federal, and international levels.

Metabolic Syndrome

Kristen Van Elderen & Ella Brands – Faculty Sponsor: Kate Vander Veen

Metabolic syndrome is a cluster of conditions that increase the risk of stroke, heart disease and type 2 diabetes. The syndrome typically includes obesity, hypertension, high blood sugar, and abnormal cholesterol levels. Recent studies indicate that metabolic syndrome is increasingly prevalent, affecting a significant portion of the global population, particularly in the U.S. It is estimated that nearly 37% of adults across the U.S are affected by this condition. This project will present potential lifestyle modifications as well as local, state, and national interventions to address the growing epidemic of metabolic syndrome and their success rates.

Community Acquired Pneumonia

Liberty Haas & JoJo Van Slageren – Faculty Sponsor: Kate Vander Veen

Pneumonia is an acute infection of lung tissue and is diverse in its pathology, with varied causes and prognoses. In the United States, pneumonia is among the top 10 most common causes of death. Evidence as recent as October 2024 displays an increase in pneumonia among all age groups in the United States, but is especially prevalent among children aged 2-4. In order to better serve our community, it is necessary to understand the disease process and ways in which we can mitigate this infection.

Substance Abuse in Adolescents and Older

Michael Thompson & Ethan Hooyer – Faculty Sponsor – Kate Vander Veen

Substance abuse disorder is a chronic medical condition characterized by a pattern of problematic substance use that impairs a person's health, social functioning, and well-being. The Substance Abuse and Mental Health services administration has reported that 20.7% of people aged 12 or older have used a tobacco/nicotine product in the past month. Our research covered the populations of adolescents and older adults who have abused nicotine/tobacco on a monthly basis. We present the data which demonstrates the epidemiological crisis of substance abuse disorder.

RSV in Preterm and Full-Term Infants

Mikayla Meyers & Alyssa Koelewyn – Faculty Sponsor: Kate Vander Veen

Respiratory Syncytial Virus (RSV) is a major cause of respiratory infections in infants, with preterm infants at higher risk for severe illness. This study examined the prevalence of RSV among preterm and full-term infants. We analyzed and compared the differences in infection rates, hospitalization rates, and disease severity among the two populations of infants. We assessed risk factors contributing to increased susceptibility in preterm infants and long-term effects. Our findings aim to inform prevention strategies, including vaccination and early intervention efforts, to reduce RSV-related morbidity in these vulnerable populations.

Drowsy Driving in Adolescents and Young Adults

Nia Hoekstra & Amanda Veldman – Faculty Sponsor: Kate Vander Veen

Although driving is a staple of American freedom, six million car accidents occur yearly in the US, with 38,000 resulting deaths. This creates a challenging landscape for healthcare to navigate due to various causes associated with motor vehicle accidents (MVA). 50-70% of high school and college students admit to having driven while drowsy. Tiredness behind the wheel can result in various causes of MVAs branching all three categories of distracted driving: Visual, manual, and cognitive. This study sought to educate the wider community concerning risk factors and consequences of drowsy driving.

The Silent Killer in Young Adults

Rebecca Dykstra & Emme Hunziker – Faculty Sponsor: Kate Vander Veen

Hypertension is growing among young adults ages 18-25 and has emerged as a serious issue in the United States often being called the silent killer. While the diagnosis among young adults is lower than middle aged and older populations, individuals with elevated blood pressure in youth are likely to have hypertension in later life. Hypertension can lead to serious life-threatening conditions such as stroke, heart failure, or even death. Our project's goal is to bring research and awareness about the condition rising among young adults, educate about the risks, and provide information on preventative measures.

Pediatric Obesity

Regan Kloppe & Hayden Stevens – Faculty Sponsor: Kate Vander Veen

Pediatric obesity is a rising condition in America and currently affects over 17% of adolescents aged 2–19 years. Lifestyle, poor dietary habits, and socioeconomic disparities cause obesity. Adolescent obesity is associated with an increased risk of developing metabolic disorders, cardiovascular diseases, and psychological distress, which can persist into adulthood. In this presentation we will discuss pediatric obesity's incidence, morbidity, and mortality while comparing interventions across the state, federal, and international levels.

Food Insecurity in College Students

Tessa Alsum & Leah Matzner – Faculty Sponsor: Kate Vander Veen

Food insecurity among college-aged students has become a prevalent problem that impacts academic performance, mental health, and wellbeing. Approximately 30-50% of college students in the United States experience food insecurity. Food insecurity among college students is greater than double the food insecurity rate of US households. There are a variety of interventions at the local, state, federal, and international levels including campus food banks, assistance programs like SNAP, grants for colleges and universities and awareness campaigns. Our aim of this presentation was to educate on food insecurity and provide interventions to the growing problem.

High School Sports Injuries

Gena Koetsier & Molly Mulder – Faculty Sponsor: Kate Vander Veen

For the first time, high school sports participation passed 8 million kids. With the increase in participation, there is also an increase in injuries sustained during practice and play. The aim of this project was to research high school sports injuries, looking at which sports cause the most injuries, types of injuries, risk factors, and interventions to prevent sports injuries.

Zr-based Metal-Organic Frameworks for Photocatalytic aza-Henry Reaction Under Ambient Conditions

Emma Phillips – Faculty Sponsor: Carl Fictorie

Photocatalysis, inspired by the biological process of photosynthesis, is the process of driving otherwise difficult reactions using light. One common method is the use of metal-organic frameworks (MOFs) as photocatalysts, which absorb visible light and transfer energy to reactants. The aza-Henry reaction is highly studied in the realm of photocatalysis. In this project, seven aza-Henry products were catalyzed using NU-1000 MOF, and the characterization and kinetics are documented. Alternative MOFs are also under inspection, and a carbazole diester linker was attempted, aiming to develop new MOFs with more efficient TADF, although there is as yet no success on that front.

High Energy Hadron-Hadron Scattering in the Regge Limit

Elias Obbink – Faculty Sponsor: Jason Ho

Regge theory describes high energy hadron-hadron scattering data in terms of exchanges of unstable particles. I performed a global fit of the experimental cross section data to theoretical formulas, extracting Regge trajectories and unifying the description of multiple scattering processes under factorization. Additionally, I conducted a careful uncertainty analysis to quantify the reliability of the fit and determine dominant sources of error. This resulted in a consistent Regge model for all major cross sections at high energies, providing an accurate framework for describing hadron-hadron interactions.

Artistic Representation of Mathematics

Lauren Van Weerdhuizen & Natalie Christians – Faculty Sponsor: Mike Janssen

We looked into the media's perception of mathematics using memes. Specifically, we looked at artistic representations that correlate with math classes at Dordt along with more general representations.

Investigating the effects of prenatal stress and IL-6 exposure on dorsal striatal microglia in mice

Samantha Anema – Faculty Sponsor: Robbin Eppinga

Autism spectrum disorder (ASD) is associated with several environmental factors during embryonic development such as prenatal stress (PS). Changes to a brain region known as the dorsal striatum have been linked to ASD, and deficits of ASD such as restrictive repetitive behavior are related to functions of this region. One potential change in the striatum connected to prenatal stress is microglial changes. This project used immunohistochemistry staining to observe microglial changes in the dorsal striatum of mice that experienced PS. It was found that PS led to an increase in lowly ramified microglia density, indicating an increase in microglia activity.

Conservation of the MET6 Gene in Methionine Biosynthesis of S. cerevisiae and S. pombe

Lukas Kooiman – Faculty Sponsor: Robbin Eppinga

Methionine biosynthesis is critical in growth processes of yeast. Sacchromyces cerevisiae and Schizosaccharomyces pombe are common yeasts which require similar methionine pathways despite differing methods of reproduction. Thus, the mutant strain of S. cerevisiae, pYes2.1S.c.MET6, was analyzed to determine whether the MET6 gene is conserved. Analysis of the MET6 mutant involved plating on a variety of agar plates as well as using gel electrophoresis to confirm the absence of the MET6 gene. Additionally, performing DNA transformation will indicate whether the Met26 gene from S. pombe is able to replace MET6 in S. cerevisiae and result in a functional methionine pathway.

Met14 Protein Gene Conservation Between S. Cerevisiae and S. pombe

Taylor Wright – Faculty Sponsor: Robbin Eppinga
The biosynthesis of methionine, an essential amino acid, is critical for cell survival. Its biosynthesis is well characterized in the yeast, Saccharomyces cerevisiae, but not in Schizosaccharomyces pombe. In this study, I assessed the functional conservation of the protein Met14 from S. cerevisiae to S. pombe. I identified and transformed an S.pombe homolog of the S.cerevisia Met14 gene into an S.cerevisia strain lacking the Met14 gene. If transformations are successful, and the S.pombe gene restores the ability of the S. cerevisiae mutant to synthesize methionine, the gene functionally has been conserved between the two species.

Complementation of MET3 in S. cerevisiae to Examine Gene Conservation in the Methionine Biosynthesis Pathway Across Yeast Species
Joshua Manwiller – Faculty Sponsor: Robbin Eppinga
The methionine biosynthesis pathway is essential for S. cerevisiae and may be conserved in closely related yeast species. To investigate this, a complementation experiment was performed. Selective media and yeast colony PCR confirmed the presence of the appropriate S. cerevisiae BY4742 ΔMET3::KANR mutations. The plasmids pYES2.1S.c.MET3 and pYES2.1S.p.Sau1 were isolated and verified using restriction mapping. These plasmids will be used to transform S. cerevisiae BY4742 ΔMET3::KANR. Successful complementation will provide evidence of MET3 gene conservation in the methionine biosynthesis pathway between S. cerevisiae and S. pombe.

Functional Conservation of MET8 in the Methionine Pathways of S. cerevisiae and S. pombe
Isabella Webb – Faculty Sponsor: Robbin Eppinga
Saccharomyces cerevisiae, a yeast species used in wine-making fermentation, utilizes the methionine pathway, and the related *Schizosaccharomyces pombe* may use a similar pathway. The methionine pathway is necessary for the yeast's survival, as it converts sulfate to the amino acid methionine. I sought to discover whether the *S. pombe homolog of MET8*, a gene in the methionine pathway of *S. cerevisiae*, can restore the ability of a metΔ8 strain of *S. cerevisiae* to synthesize methionine. I transformed the *S. cerevisiae* metΔ8 strain with an expression plasmid containing the *S. pombe homolog* of *MET8*, to determine whether complementation occurred.

Investigating Enzyme Conservation in Methionine Biosynthesis: Can S. pombe Rescue a S. cerevisiae MET17 Mutant?
Kyle Schubert – Faculty Sponsor: Robbin Eppinga
Methionine biosynthesis is a crucial metabolic pathway in yeast, playing an important role in sulfur metabolism. While Saccharomyces cerevisiae methionine pathways are well understood, it is unclear whether Schizosaccharomyces pombe utilizes the same enzymatic mechanisms. This study investigates enzyme conservation and gene rescue by testing whether S. pombe homologs can complement an S. cerevisiae MET17 mutant (BY4742 ΔMET17). MET17 encodes homocysteine synthase, a key enzyme in methionine biosynthesis and sulfur metabolism. If complementation is successful, indicated by restored growth in methionine-deficient conditions, this would demonstrate evolutionary conservation of sulfur metabolic enzymes.

Understanding the Conservation of Methionine Synthesis Pathways by Investigating the Role of MET16 in Schizosaccharomyces pombe
Payton Doenhoefer – Faculty Sponsor: Robbin Eppinga
Methionine synthesis is vital for yeast metabolism. This pathway in Saccharomyces cerevisiae has been researched in-depth but is unclear if Schizosaccharomyces pombe uses similar mechanisms. This study was done to see if S. pombe, MET16 works similar to S. cerevisiae in the sulfite reduction reaction. A complementation assay was done to determine

whether S. pombe homolog of S. cerevisiae MET16 has the same functions. Conclusions from the experiment helped show methionine pathways are conserved between yeast species.

Investigating Apparent 2-4-D Resistance in Water-hemp Populations

Adam Brown – Faculty Sponsor: Robert De Haan

Soybeans are grown on 9 million acres in Iowa and the vast majority of those acres are treated with 2-4-D. This heavy usage has already led to resistant water hemp populations in other parts of Iowa. In my research I hope to investigate why some water hemp plants are surviving 2-4-D treatment and determine if resistance has been acquired. To do this I will collect seeds from plants that survived an initial treatment, grow them to maturity, and then make my own 2-4-D application to determine if resistance is present in Northwest Iowa.

Diversity and Microbial Load of American Bison (Bison bison) vs domestic cattle (Bos tauros) feces

Levi Landman – Faculty Sponsor: Robert De Haan

When considering the ecology of the land that we live on, one specific difference between 200 years ago and now is the large mammals that roam around, specifically bovids. There are many things to consider in respect to these animals, this study will specifically observe the difference in the load and diversity of the microbes carried by either animal. Bison and cattle differ in several ways anatomically which can lead to different microbes thriving in different ways. For example, Bison tend to have larger and more complex rumen which is adapted for their more varied diet, while cattle have adapted with a grain and cultivated diet, making their rumens less complex and flexible. These conditions can certainly lead to unique microbial communities present, which this study aims to explore further.

Bench Press Width Effect on Muscle Activation of the Deltoid, Pecs and Tricep

Michael O'Neill, Garret Hoogendoorn, and Luke Swanson – Faculty Sponsor: Tayler Hoekstra

This study investigates how grip width during the barbell bench press affects muscle activation in the chest, triceps, and front deltoid. Using EMG and motion capture, muscle activation and arm angles were measured across three grip widths (75%, 100%, and 125% of biacromial breadth). Subjects performed controlled repetitions with half their one-rep max. Data analysis will determine the relative muscle activation changes at each grip width, clarifying optimal grip strategies for targeting specific muscle groups.

Impact of Soil Microbial Products on Plant Fitness In Native Prairie Plants

Aidan Kraft – Faculty Sponsor: Tony Jelsma

Soil microbes greatly impact plant fitness and biodiversity in ecosystems globally. Recently there has been much interest in soil microbes which can be purchased for the purpose of increasing soil health for garden use. My project will inquire on the efficacy of the products by growing populations of Butterfly Milkweed and Little Bluestem in different microbial environments, keeping other conditions the same for each population. To measure the impact, a biomass measurement, leaf area index, and a sequencing of microbial DNA to assess the contents of the products will be collected to quantify efficacy and identify relationships impacting plant fitness.

Quick Stats:

IDEAFEST

100+ student participants
29 faculty mentors
41 classroom presentations
31 posters/exhibits
9 classroom presentation moderators
Hundreds of audience members!

Thank you to all who participated in IdeaFest!