Celebration of Undergraduate Scholarship
April 24, 2012
VALPARAISO UNIVERSITY
CELEBRATION OF UNDERGRADUATE SCHOLARSHIP
Harre Union Ballrooms
April 24, 2012

8:00 a.m. – 6:00 p.m. Posters on Display
8:00 a.m. – 10:00 a.m. Poster Presentation Judging
8:00 a.m. – 12:40 p.m. Oral Presentation Judging
10:00 a.m. – 6:00 p.m. Open Viewing for Campus Community
12:00 p.m. – 1:30 p.m. Lunch for Student Presenters
2:30 p.m. – 3:00 p.m. Awards Presentation
6:00 p.m. Students Take Down Posters

Deans’ Choice Presentations
Harre Union Ballroom C
3:00 p.m. – 5:15 p.m.

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<tr>
<th>Time</th>
<th>Name</th>
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<tr>
<td>3:00 p.m.</td>
<td><strong>Mark Schwehn</strong>, Provost</td>
<td>Welcome</td>
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<tr>
<td>3:10 p.m.</td>
<td><strong>Cynthia Rutz</strong>, Director of the Celebration of Undergraduate Scholarship</td>
<td>Deans’ Choice Presentations Program</td>
</tr>
<tr>
<td>3:15 p.m.</td>
<td><strong>Megan Muta</strong> (Christ College)</td>
<td>The Common Call to Care: An Interfaith Analysis on Adoption and the Differing Legal Status of Orphans and Abandoned Children in Judaism, Islam, and Christianity</td>
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<tr>
<td>3:30 p.m.</td>
<td><strong>Emily Bernhard, Lauren Paczkowski, Nathan Matejczyk, Nina Tu, Michelle De Young</strong> (College of Nursing)</td>
<td>Supporting Underserved Pregnant Women through Smoking Cessation</td>
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<tr>
<td>3:45 p.m.</td>
<td><strong>Travis Elless, Tony Lyza, Sarah Mustered</strong> (College of Arts &amp; Sciences)</td>
<td>Wintertime Climate Variability in the Lake Michigan Region: Sensitivity of Snowfall to Temperature and Northern Hemisphere Teleconnection Patterns</td>
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<tr>
<td>4:00 p.m.</td>
<td><strong>Diana Stutzman</strong> (College of Arts &amp; Sciences)</td>
<td>Evaluating the Role of Cellular Swelling in Glutamine’s Induction of Heat Shock Proteins</td>
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<td>4:15 p.m.</td>
<td><strong>Heather Herakovich, Marcy De Vries</strong> (College of Arts &amp; Sciences)</td>
<td>Does Branch Structure of an Invasive Shrub (<em>Elaeagnus umbellata</em>) Alter Bird Perching Behavior?</td>
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<tr>
<td>4:30 p.m.</td>
<td><strong>Amber Will</strong> (College of Arts &amp; Sciences)</td>
<td>Beating Down the Lowly: The Criminalization of the Homeless and Alternative Solutions</td>
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<td>4:45 p.m.</td>
<td><strong>Krista Schaefer</strong> (College of Arts &amp; Sciences)</td>
<td>Modeling of Early SIV/HIV Infection</td>
</tr>
<tr>
<td>5:00 p.m.</td>
<td><strong>Matthew LaRue</strong> (College of Engineering)</td>
<td>Effect of Stray Charge on Quantum-Dot Cellular Automata: A Full-Basis Calculation</td>
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STEM Faculty Publication Reception
Harre Union Ballroom B
5:30 – 6:30 p.m.
Overview of the
Celebration of Undergraduate Scholarship

The Celebration of Undergraduate Scholarship (CUS) is a conference that allows undergraduate students to showcase their creative and/or scholarly work and research in a professional format. The Celebration began in 1998 as an idea from an interdisciplinary group of faculty who had attended national meetings on the role of undergraduate research in the college experience.

One of the many joys of completing a research project or creative endeavor is to share the results with others. In a typical year, the Valpo CUS brings together over 150 students and 45 faculty sponsors to share their research experiences with the campus and local community. Students who have worked on class projects, senior projects and theses, or independent scholarship are encouraged to participate. At the conference, all students present their work in a poster or oral presentation format. In addition to poster and oral presentations, the Deans of Valparaiso University’s five undergraduate colleges select students to represent their colleges at the Deans’ Choice Presentations, and these students give oral presentations in an afternoon program.

Students and faculty should read the Poster Presentations Guidelines or Oral Presentation Guidelines on the Undergraduate Research website (http://valpo.edu/research/) for guidance on the development of their presentations. Faculty sponsors also provide guidance and support for their students, both in developing the original research and in transmitting that research to a poster or oral format.
**Beauvoir for the Masses: Exploring Applications of Her Philosophy in French Social Revolutions of the 1960’s**

Reillie Acks

*Departmental Affiliation: Foreign Languages & Literatures*  
*College of Arts and Sciences*

My project examines the feminism and existentialism of Simone de Beauvoir as they intersect with the ideas of the French social movements of the 1960’s, using the movement of May ’68 as a primary example. Beauvoir's ideas were politically in tune with the leftist philosophy of the students and workers who organized widespread demonstrations throughout the spring of 1968 and brought the French economy to a standstill in May of that year. But I argue that her existentialist philosophy, foregrounding the necessity of each individual to create a self and to reject accepted social paradigms, reflects the demands made by the students who wished to re-make the university and society. And, importantly, her conception of feminism – which grew from her existentialist ideas – explores the way in which the struggles of a singular person can represent those of an entire group, thus mirroring arguments of the Mouvement du 22 mars, with their emblematic phrase expressing their sense of oppression, "Nous sommes tous des juifs allemands" ("We are all German Jews."). The importance of the May ’68 movement and its intersection with Beauvoir’s ideas relative to feminism and philosophy point toward a greater understanding of the complexity of French identity.

*Information about the Author:*  
Reillie Acks is a French, mathematics, and economics major who is also currently studying in Christ College. She has always been interested in feminist theory, an interest which began to materialize her sophomore year in a Christ College class that allowed her to do a group research project on strip clubs. She then had the opportunity to work on this project which was initially a research paper for a French history class she took last fall.

*Faculty Sponsor:*  
Dr. Randa Duvick

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**Fit Kids Rock: The Campaign against Childhood Obesity in a Valparaiso Elementary School**

Samuel Borden, Nathalie Martinez, Lauren Rubio, Ryan Brule

*Departmental Affiliation: Communication College of Arts and Sciences*

The Bateman Team’s topic was childhood obesity, a well-known, yet hidden issue. Before beginning the campaign, it was necessary to research the target audiences and the most effective ways to reach them. The Bateman Team chose to address elementary school third graders (about 70 students) and their faculty. Research showed that the best ways to communicate with the 8-9 year olds was through interactive activities and guidance. As a team, we coordinated with the school’s administration to implement the plan for a set time during the school day. The third graders were separated into two sections (35 students each) to attend our event. The elementary students proceeded to seven stations which engaged their knowledge on obesity, making healthy choices, and learning about the importance of exercise. Based on our evaluation of the children’s reactions to the stations, their enthusiasm, and overall engagement, we concluded that they did enjoy the events and left with a better understanding of childhood obesity. The Bateman Team assessed that 90 percent of the students will make healthier choices and implement the knowledge provided to them.

*Information about the Authors:*  
Samuel Borden is a public relations, communications major. He is currently a member of the Public Relations Society of America where he is the co-chair of the SPARK Agency, standards chair, and the webmaster. Nathalie Martinez is a communications major with a public relations concentration. Currently, she is a public relations director of PRSSA. Ryan Brule is pursuing a bachelor degree in health sciences and systems. Ryan has been involved with the PRSSA chapter at Valparaiso University in campaigns such as "The Bateman Campaign," "Downtown Connection," and has attended several professional conferences. Lauren Rubio is a senior communication major with a concentration in public relations. She is a member of PRSSA and part of the Bateman Campaign's "Team Recess." She currently interns at Porter County Family Counseling Center and will graduate in May, 2012.

*Faculty Sponsor:*  
Dr. Bonita Neff

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PR Social and Digital Professional Challenges: A Relationship between Organizations and Their Publics

Samuel Borden, Erika Wagner, Lauren Rubio, Elizabeth Freeman, Matt Butcher, Tom Haeussler

Departmental Affiliation: Communication College of Arts and Sciences

Public Relations is extensively integrated into social and digital communication platforms. PR is focused on dialogic communication grounded in the philosophy of caring (Coombs, 2007). The most effective approach to understanding the PR role through social media is to examine how these platforms are used in developing relationships between an organization and its publics. Experienced professionals suggest it is the relationship between an organization's goals and the needs of its publics that allows the most effective communication process. Therefore, students conducted in-depth interviews of members of a student organization to establish the goals of the organization. Then the publics were interviewed to see if the needs of the external audience matched the goals of the organization. From this data, the students developed content for the various social media platforms. The test of this experiment will be when these platforms are established for execution and the impact results in increased membership. This reflected the relationship between Valpo student organizations and increased membership, including potential membership.

Information about the Author:
Samuel Borden is a public relations communication major. Erika Wagner is a communication public relations concentration major. Liz Freeman is a sports communication public relations major. Lauren Rubio is a senior communication public relations concentration major. Matt Butcher is a public relations communication major with a minor in philanthropy, leadership, and service. Tom Haeussler is a public relations communication major.

Faculty Sponsor: Dr. Bonita Neff
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Bach and Opera: Is It Possible?

Hilary Clark

Departmental Affiliation: Music College of Arts and Sciences

Devoted to the art and science of technique, Johann Sebastian Bach (1685-1750) is a celebrated master of the musical genres of the time, except for opera. Based on his musical upbringing and his independent attitude, there exists a possibility that Bach had the propensity to be an operatic composer. An exploration into this perspective leads us to wonder: Why did Bach never become an opera composer? Are there operatic features present in non-operatic works? What factors might have affected his inclination toward operatic composition? An investigation into professional development and influences from his early days in Arnstadt to his mature years in Leipzig, reveals a number of opportunities for Bach to assimilate operatic expressive devices. Such occasions include examples from the monumental St. Matthew Passion (BWV 244), the secular cantata BWV 211, "Schweigt stille, plaudert nicht" (recognized as the Coffee Cantata), and the drama per musica BWV 201, "Der Streit zwischen Phoebus und Pan," with three texts written by Christian Friedrich Henrici (1700-1764), who is known as 'Picander.' Despite having been contracted for work in other genres, these pieces, produced during the greatly prolific time in Leipzig, exemplify Bach's mastery of operatic writing.

Information about the Author:
Hilary Clark is a senior student in music and elementary education. She began considering Bach as an operatic composer in a seminar taken in 2010; this paper extends research from that course. As a VU Chorale member, Hilary has performed in the St. Thomaskirche in Leipzig, where Bach spent much of his life. This spring, she will return with the Chorale to celebrate the church's 800th anniversary. She hopes to continue to study Bach, post-graduation.

Faculty Sponsor: Dr. Linda Ferguson
Student Contact: hilary.clark@valpo.edu

Queer Neo-Mexicanism: Negotiating Mexican and Gay Identities in the Art of Nahum B. Zenil and Julio Galán

Nicholas Derda

Departmental Affiliation: Foreign Languages and Literatures College of Arts and Sciences

The Mexican artists Nahum B. Zenil and Julio Galán have become the poster children for being gay and Mexican in contemporary art criticism. Critics have drawn comparisons between Zenil and Galán because of their thematic treatment of gay sexuality and
Mexican nationalism. These comparisons, however, have often assumed that Zenil and Galán are representing a monolithic gay sexuality that is unaffected by their social class, their relationships to nationalism and Catholicism, and their views on the role of art in social activism. This paper aims to analyze specifically how Zenil and Galán represent two distinct gay identities, all the while employing the similar themes of suffering, the vulnerability of the gay male body, and the use of nationalist and Catholic symbols. Through a close reading of visual texts and the methodological lens of queer theory and art history, the paper will show that both artists represent homosexuality as a social construction that is influenced by the other identity categories the artists inhabit.

Information about the Author:
Nicholas Derda is a senior Spanish major. He is interested in visual representations of masculinity, sexuality, and HIV/AIDS, especially in a Latin American context. Next year, he will be interning as the legal clinic coordinator at the Bread for the City social service agency in Washington, D.C.

Faculty Sponsor: Dr. Stacy Hoult-Saros

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Religious Individualization, American Catholicism, and Vatican II: Issues of Influence and Interpretation

Laura Ehlen

Departmental Affiliation: Theology
Christ College

It cannot be denied that, throughout the history of the Christian tradition, religious doctrine has changed over time, yet a debate exists over the degree to which these changes are the effects of historically specific socio-cultural forces, and the degree to which they are the effects of solely theological forces, such as divine revelation or ecumenical councils. While many Christian thinkers want to consider doctrine as existing in isolation from history and culture and thus only altered by divine revelation, Christian history reveals a number of incidents, from the reign of Constantine to the Reformation to the Enlightenment, where culture influenced religion, and society in turn interpreted new doctrines through a specific lens. We see the former stance strongly in John Henry Cardinal Newman’s understanding of changes in Catholicism; he argues that what seem like changes in Catholic doctrine over time are actually just the development of ideas already embedded in a doctrine’s original formulation. For many thinkers, what is at stake in this question is, of course, the purity and theological truth of doctrine. This paper argues that socio-cultural forces do affect religious doctrine by exploring the case of Vatican II and, more specifically, by closely analyzing the “Declaration on Religious Freedom” from Vatican II and the changes it wrought in Catholic doctrine regarding religious freedom. Through the use of primary theological texts from the published documents of Vatican II, secondary sources on the interpretation and effects of these documents, and Robert Bellah’s treatise on American religion and individualization, this paper first examines how the American culture of individualism and religious freedom influenced the Second Vatican Council as it sought to incorporate secular and cultural changes into its doctrines; then, it points to how Vatican II produced documents on religious freedom which American Catholics interpreted through the lens of American culture and implemented as such. This paper concludes the case of Vatican II’s “Declaration on Religious Freedom,” by offering one illustration of the mutability of religion in the face of cultural change. In this, it argues against thinkers like Cardinal Newman who want to think of Catholic doctrine as impervious to the effects of a wider cultural world. Throughout, the paper considers the consequences of doctrinal mutability for religious individualization within the Catholic Church and then, in its conclusions, suggests implications for the Christian religion as a whole.

Information about the Author:
Laura Ehlen is a graduating senior with a double major in theology and English and minors in humanities and classical languages and literatures. She is a member of Christ College, in which she serves as both a TA and a debate coach in the Freshman Program. She has edited the Shaker publication for the SALT staff for three semesters now, works at the Writing Center, and is the Vice President of Sigma Tau Delta. She wrote this paper for the course Interpretation of the Self, Culture, and Society in Christ College, and is presenting it at this year’s National Conference on Undergraduate Research. Her hobbies include running, exercising, cooking, and reading.

Faculty Sponsor: Dr. David Western

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The Question of Philanthropy: Social Reform in Hawthorne’s *The Blithedale Romance*

Ashley Gilbert

*Departmental Affiliation:* English
*College of Arts and Sciences*

Nathaniel Hawthorne presents three types of philanthropy in his novel *The Blithedale Romance*: the socialist community, feminism, and social reform. He does this so he can strike down each in turn and tell why they fail. Social problems do not have easy solutions, but Hawthorne advocates for the “circle of community.” This is the idea that those in need should be taken care of by their extended family or by those in the church. These people have a moral or religious obligation to those around them, and, through this Christian brotherhood, problems can be solved. The larger-scale reforms do not improve the situation, but actually lead to tragedy and sadness. This end is seen in *The Blithedale Romance* as the Blithedale experiment falls apart, Zenobia commits suicide, and Hollingsworth’s dream is crushed. This negative light is shed on large-scale philanthropy by Hawthorne to encourage individual philanthropy or more personal forms of aid. This is still important today because many people decide to participate in philanthropy and need to make an informed decision about which type of philanthropy to support. If everyone helped the people around them, the larger-scale projects, which he claims fail, would be unnecessary.

*Information about the Author:*
Ashley Gilbert is from Angola, Indiana. She is an English and criminology double major with a Spanish minor who plans to go on to law school after graduation in May. She has been interested in philanthropy since she served on the board of a nonprofit organization in high school and realized that learning about how and why people participate in philanthropy is important.

*Faculty Sponsor:* Dr. Sara Danger

*Student Contact:* ashley.gilbert@valpo.edu

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The Solar Thermal Decoupled Electrolysis of Water Process: An Investigation of the Electrochemistry in a Base

Jessica Guertin

*Departmental Affiliation:* Mechanical Engineering and Chemistry
*College of Engineering and Arts and Sciences*

The solar research team at Valparaiso University is developing solar thermal chemical processes that will transform solar energy into economically viable and reusable energy forms. One subgroup is working on the Solar Thermal Decoupled Electrolysis of Water Process. In this multi-step process, the electrolysis of water to generate hydrogen occurs at room temperature outside of the solar reactor, and it is facilitated by the oxidation of magnetite (Fe3O4) to hematite (Fe2O3). The hematite is then pumped to the solar reactor where it is reduced back to magnetite at high temperatures with the liberation of oxygen. This cycle is then repeated. The electrolysis in the presence of magnetite has been previously demonstrated in an acidic solution. To complement the acid studies, the electrolysis was performed in a basic solution using an H-cell and a potentiostat. The effects of the oxidation of magnetite in a basic solution on the electrolysis of water were analyzed. It was found that the addition of magnetite lowers the required voltage needed for electrolysis. It is important to lower the voltage for the electrolysis so that the amount of electrical input required for the entire process is minimized.

*Faculty Sponsor:* Dr. Robert Palumbo and Dr. Jon Schoer

*Student Contact:* jessica.guertin@valpo.edu

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Mary Grace and the Warthog from Hell: Violent Redemption in Flannery O’Connor’s “Revelation”

Halina Hopkins

*Departmental Affiliation:* Christ College
*Christ College*

Scholarship on the works of Flannery O’Connor is divided concerning her depiction of divine grace as a violent force. Some scholars worry that her insistence on the violence of grace makes God a violent God or excuses the pain and brokenness of the world. Despite the arguments of those who oppose O’Connor’s view of violent grace, this paper will
argue that O’Connor is right to depict violence in her short stories because, although it might be counterintuitive to think of divine grace wounding before it heals, being torn from an old life of sin is painful. While not excusing violence or the perpetrators of violent acts, O’Connor’s theology shows how God uses violence for God’s purpose, making the effects of brokenness in this imperfect world into conduits for divine perfection and wholeness. This paper makes this argument through a close reading of O’Connor’s short story “Revelation,” along with examinations of O’Connor’s essays. O’Connor not only shows violence in her stories, but enacts a mimicry of violence upon the reader through her use of the grotesque. The idea of violence therefore permeates the shape of the narrative and the relationship between writer and reader.

Information about the Author:
Halina Hopkins is a junior, majoring in biology, environmental science, and humanities. Her current project began as a term paper for Professor Edward Upton’s seminar Theology and Literature, informed by her interest in O’Connor and her relevance for modern Catholics. When she began expanding her paper into a longer research project, she read Flannery O’Connor’s major works of fiction, essays, and letters. Halina presented her research on O’Connor at the 2012 National Conference on Undergraduate Research.

Faculty Sponsor: Dr. Edward Upton

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Net Neutrality: Fight for the Survival of the Free Internet

Andrew Jarratt

Departmental Affiliation: Christ College
Christ College

The Internet is often thought of as a tool that allows for the free flow of information. Today, as a vessel of free speech, the Internet threatens to become a vestige of its original self. Increasingly, Internet Service Providers (ISPs) claim the power to regulate content and arbitrarily increase the price for customers to access certain information and have the ability to make customers financially support content that they disagree with. In these ways, ISPs have gained increased control over the flow of Internet information, while the citizen of cyberspace has increasingly lost his freedom to control his choices online. This poses an even more important problem for American democracy, which demands educated citizens, who are threatened by censorship. Only a libertarian approach to this problem, which sustains the original ideals of the Internet as a tool of unfiltered communication, will continue freedom of information. The best implementations of the libertarian approach are net neutrality laws, which ensure that all users are treated equally. This paper argues to support both the need for net neutrality laws to protect against economically driven encroachment upon the freedom of the Internet and the importance of libertarian ideas to the maintenance and strengthening of democracy.

Information about the Author:
Andrew Jarratt is a senior computer science and humanities student who is deeply interested in the effect and role that the Internet has in American democratic society. The past few years have seen the proposal of legislation that either restricts or promotes free speech online, an effect which is often unknown or misunderstood by Congressmen, and the importance of which must be recognized.

Andrew has previously presented his paper at the National Conference on Undergraduate Research.

Faculty Sponsor: Dr. David Western

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Prayers from Underground: The Psalmic Voice in Dostoevsky’s Notes from Underground

Jacob M. Just

Departmental Affiliation: Christ College
Christ College

Criticism concerning Fyodor Dostoevsky’s Notes from Underground has primarily focused on the social and historical context in which the novel was situated. Scholars have traditionally resisted a religious reading and therefore have usually found their grounding in the political, psychological, and philosophical systems of thought in mid-19th century Russian society. Though many of these readings of Dostoevsky’s short novel are valid, they have missed the deeply theological concerns of Notes from Underground, and have focused, if at all theologically, on the possibilities of the novel as a forerunner of 20th century existentialism. However, my research demonstrates that Notes from Underground serves as a narrative which illustrates the theological relationship between the human being and the divine in prayer. The novel expresses this by exploring the relationship between the reader and the author in their interaction through literature. This
paper utilizes close readings of *Notes from Underground* and the Psalms, while also utilizing the literary criticism of Mikhail Bakhtin and the theology of Dietrich Bonhoeffer to explore the author-reader relationship. Both of these latter thinkers contemplate the problems of approaching a veiled author (or Author) from a reader's isolated position. Dostoevsky's novel too meditates on the isolation and alienation of its protagonist in his quest for meaning. However, the novel also situates all of its future readers in a similar position of isolation, later enabling an ongoing and communal interpretation of literature, through literature, that is itself a prayer.

Information about the Author:
No information provided.

Faculty Sponsor: Dr. Edward Upton

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**Idealism Realized: A Closer Examination of Leo Tolstoy’s Influence on Jane Addams’ Theory of Social Reform**

Laurie Kenyon

*Departmental Affiliation: Christ College*

Christ College

Widely regarded as a champion for social reform, Jane Addams has deeply influenced the progression of American social policy since Chicago’s Hull House opened in 1889. Throughout her life, Addams struggled with how the privileged should interact with and aid those less fortunate. This struggle was fully realized as Addams compared her own response to that of Russian author and activist, Leo Tolstoy. Addams was deeply affected by Tolstoy’s conviction that only those who literally live with the impoverished can claim to have served them. In the time Addams spent at his farm in Russia, she came into disagreement with Tolstoy’s idealistic convictions. Her subsequent return to Chicago strengthened her belief that social change cannot be accomplished unless someone, such as herself, with the resources, education, and position necessary is willing and able to work for that change. Because of her rejection of the Russian author’s idealism, the substantial influence of Tolstoy on Addams is widely minimized. However, a closer examination of Addams’ work reveals the significant impact his life had on her own. Consequently, Jane Addams’ rejection of Tolstoy’s lifestyle can be viewed as only part of a larger conflict between idealism and realism in her own convictions.

Information about the Author:
Laurie Kenyon is a senior international service and chemistry double major. This paper was written in spring 2011 for the Christ College seminar *Traditions of Giving and Serving in America* taught by Professor Martin Buinicki. Laurie enjoys studying theories of social reform and this paper allowed her to explore some of the history of reform within the United States. After graduation, she hopes to study in South Africa through a Fulbright and then continue her education in graduate school.

Faculty Sponsor: Dr. Martin Buinicki

Student Contact: laurie.kenyon@valpo.edu

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**The Correlation between the Independent Lines in Easter Motets**

Shireen Korkzan

*Departmental Affiliation: Music*

College of Arts and Sciences

In the latter half of the thirteenth century, the motet – two to four Latin or French texts sung over a wordless tenor drawn from a pre-existing chant or some other melody – becomes the main polyphonic composition in France, replacing the organa, conductus, and clausulae. The word motet comes from the French mot meaning word. Each text was a tenor, motetus, triplum, or quadruplum. The texts were usually connected to the tenor chant through a similar theme. This relationship is especially evident in the Easter motets, located in the Bamberg Codex, where each line of the texts in the triplum and motetus is in Latin, is focused on the specific holiday with the tenor chant, and shares the same rhythmic value. This paper will examine the correlation between these texts, the tenor chant, and how they relate to the Easter holiday.

Information about the Author:
Shireen Korkzan is a junior flute performance major from Indianapolis. During her time at Valparaiso University, she has been involved in the Symphony Orchestra, Jazz Ensemble, Chamber Concert Band, Woodwind Quintet, Jazz Combo, and High Frequency – the VU flute choir – where she currently serves as vice-president. After graduation, Shireen hopes to continue her studies in musicology in graduate school.

Faculty Sponsor: Dr. Joseph Bognar

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Don’t Weight!: A Public Relations Campaign to Raise Awareness about Childhood Obesity

Ellyn Lange, Murphy Maes, Molly Hetzner

Departmental Affiliation: Communication College of Arts and Sciences

This research was the basis for a national campaign competition to raise awareness about childhood obesity, called the Bateman competition. As members of the Public Relations Student Society of America (PRSSA) and Valpo's student-run agency SPARK, this campaign was affiliated with PRSSA and sponsored by General Mills and United Way. Research on childhood obesity was initiated in October, 2011 and the campaign was implemented throughout the month of February. The research established one particular disturbing fact – more than 70% of those who are obese during childhood will remain the same in their adulthood (http://childhoodobesitystatistics.net/facts.php). Therefore, by naming our campaign "Don’t Weight!" the slogan encouraged children to start eating healthy and getting active before it is too late. The goal was to raise awareness about childhood obesity, survey the children on their eating and exercising habits, provide them with a healthy snack, teach them games to get active, and design a cookbook to encourage cooking with their families. After conducting the research, the team concluded that children are not exposed to enough information about healthy lifestyles.

Information about the Authors: Ellyn Lange is a sophomore public relations major and is in her second year of being a member of PRSSA (Public Relations Student Society of America). She has been involved in planning multiple events along with being the secretary of PRSSA. Murphy Maes is also a sophomore public relations major and is in her second year of being a member of PRSSA. Molly Hetzner is a freshman double major in public relations and political science. This is her first year in PRSSA. She has helped plan multiple events in the past year and is a PR director of PRSSA.

Faculty Sponsor: Dr. Bonita Neff

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Not Afraid of Lacking: Toward an Asexual Theology

Wendy Mallette

Departmental Affiliation: Theology College of Arts and Sciences

This paper details an asexual theological response to two problems that queer theologian Marcella Althaus-Reid challenges: dyadic thinking and the systematic desexualization of bodies within theological discourses as these uphold the omnipotency of God the Father. Drawing from Althaus-Reid’s discussion of critical bisexuality to address the first problem, this paper discusses how asexuality challenges the oneness logic of heterosexual dyads and demonstrates how asexuality can destabilize the sexual/asexual dichotomy. Using Luce Irigaray's understanding of dyads, this paper responds to Althaus-Reid's critique of the asexualization of poor women in liberation theology. It problematizes the desexualization of certain bodies – the bodies of poor people, people with disabilities, lesbians, women, and fat people – not only because such discourses objectify these bodies but also because these desexualizations, instead of representing asexual persons, become the site of their erasure. Lastly, this development towards an asexual theology centers on what Althaus-Reid, following Helene Cixous, calls “not being afraid of lacking, that is, doing theology while trying to distance ourselves from a Christian phallic symbolic order.”

Therefore, this paper argues that these two notions – dyadic thought and the desexualization of bodies – support a constitutive element of the Christian phallic economy that relies on a sexual/asexual dichotomy where to be sexual is to be something and to be asexual – or a desexualized body – is to be nothing. This paper develops an asexual theology as not-afraid-of-lacking which takes a critical relation of lacking to God the Father's phallic omnipotency.

Information about the Author: Wendy Mallette is a senior international service major, particularly interested in the fields of queer, feminist, and liberation theologies. This paper is a continuation of project begun after reading queer theologian, Marcella Althaus-Reid, for a course on 20th Century Theology and is part of her thesis for a course on Liberation Theology. Next year, Wendy will be interning at the Women's Alliance for Theology, Ethics, and Ritual in Washington, D.C.

Faculty Sponsor: Dr. Garry Sparks

Student Contact: wendy.mallette@valpo.edu
The Grace-Filled Form: The Repentant Transformation of Character, Reader, and Text in Dante's Inferno

Jeremy Reed

Departmental Affiliation: Christ College
Christ College

Dante scholarship has provided many different glimpses into the relationship of form and content in the Inferno. However, few have addressed the theological, and in fact sacramental, understanding of this relationship in any great detail. Like many previous treatments, my analysis depends on Thomistic understandings of grace and nature, but unlike those prior studies it uses Thomistic theology to discuss the process of writing and reading poetry in the Commedia. Dante presents the reality of grace throughout his narrative; he documents its effects on himself as the protagonist and narrator of his own poem. However, Dante does something more when he makes the text an allegory for the reader's experience of grace in the world. By doing this, Dante puts his reader and the text into a dialogical relationship, exposing the grace which inculcates his text with meaning. In exploring Dante's conception of authorship and devotional reading, this paper draws on scholarship on medieval writing practices, as well as examinations of classical poetry and Thomistic theology to demonstrate Dante’s theopoetic innovation. Ultimately, I show that the character, reader, and text of Dante’s Inferno come together in a community of grace-filled texts and readers moving toward a moment of repentance before the upbuilding of love which is Purgatorio.

Information about the Author:
Jeremy Reed is a senior English, Spanish, and humanities major in Christ College. This presentation is a shortened version of his longer Christ College honors thesis that allowed him to discuss the relationship between religion and literature, specifically in terms of the relationship between grace and nature in the form of language, which he has been interested in throughout his time at Valpo. He will be pursuing a Master’s degree in English literature this fall.

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Modeling of Early SIV/HIV Infection

Krista Schaefer, Cecilia Noecker, Kelly Zaccheo, Vitaly Ganusov, Judy Day, Yiding Yang

Departmental Affiliation: Mathematics and Microbiology
College of Arts and Sciences

Although HIV has infected over 20 million people worldwide, it is a rather poorly transmitted virus since less than 1 out of 100 to 1,000 acts of sexual intercourse results in virus transmission. The factors that could potentially explain why the probability of transmission is so small are poorly understood. It is nearly impossible to study HIV replication in the first 2-3 weeks of infection because the virus is undetectable until after that duration. By using stochastic simulations of mathematical models of early virus replication, we investigate how the duration of the eclipse phase prior to virus production (eclipse stage) affects the probability of infection of the host and time to the detectable virus load for simian immunodeficiency virus (SIV) infection of monkeys. The probability of infection strongly depends on the dose of the infectious agent and the viral production mechanism that is used, and there are significant differences in times to infection between the deterministic and stochastic models. We show that our model consistently predicts the time to virus detection in macaques infected with a low dose of SIV. However, the model fails to accurately predict the dependence of the probability of SIV infection on the initial viral dose in monkeys. Our results suggest that additional mechanisms must be considered for understanding early virus dynamics, in particular, spatial distribution and the turnover of CD4+ T cells, which are primary targets for the virus.

Information about the Authors:
Krista Schaefer participated in a REU project at the National Institute of Mathematics and Biological Synthesis at the University of Tennessee, Knoxville. Her collaboration team met there with adjunct professors from the university and peer researchers from St. Olaf and Scranton University. She enjoys math modeling of biological systems.

Faculty Sponsors: Dr. Vitaly Ganusov and Dr. Judy Day
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Beyond the Volcanoes: A Community Partnership for Health in Rural Nicaragua

Paige Snyder, Cathy Wingstrom, Chelsea Zeman

Departmental Affiliation: Nursing
College of Nursing

Background: Health inequities related to gender, ethnicity, socioeconomic status, and geography exist in rural Nicaragua due in part to lack of access to health services. The purpose of this ongoing project is to improve health equity in rural Nicaragua through social transformation using community-based participatory action research. Bronfenbrenner’s ecological model of human development, school health, and primary health care theories provided the framework for this research. Community-based participatory action research involves six phases: partnership, assessment, planning, implementation, evaluation, and dissemination. In the evaluation phase, the goal was to gather information from stove recipients to see if their new stoves have improved their health. Information was gathered by surveying the main cook in each household. Questions inquired about changes in health, perceived benefits from the new stoves, and suggested improvements for future stoves. Data was collected and recorded to be analyzed and compared to previously gathered baseline data. The information gathered from the community members will determine the effectiveness of the new chimney stoves on health. Also, the community feedback provided will help guide improvements for future stoves.

Information about the Authors:
This research project began in 2007 with a pair of nursing students and has been ongoing since. Each member of the research team has made multiple trips to the Nicaraguan community to facilitate research and build relationships with the community members. The evaluation phase for the first round of stoves has been completed, and the research team hopes to continue the project until all members of the community have received stoves. Chelsea Zeman, a senior nursing major, has been working on the project since the spring of 2010. Paige Snyder, a junior nursing major, joined the project in fall of 2010, and Cathy Wingstrom, also a junior nursing major, began working on the project in spring 2011.

Faculty Sponsor: Dr. Amy Cory

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Evaluating the Role of Cellular Swelling in Glutamine’s Induction of Heat Shock Proteins

Diana Stutzman

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College of Arts and Sciences

The goal of this study was to elucidate the mechanism by which the conditionally essential amino acid glutamine (Gln) exerts cellular protection in acute infection or trauma. Specifically, this study tested the hypothesis that cellular uptake of Gln causes the cell to swell, which in turn induces expression of protective heat shock proteins (HSPs). Gln has previously been shown to accelerate expression of HSPs at least in part by providing a key metabolic building block for HSP synthesis. The full mechanism, however, is only incompletely understood. Previous work has demonstrated that the synthetic amino acid α-aminoisobutyric acid (α-AIB) exhibits a protective effect similar to Gln. Since both α-AIB and Gln are pumped into the cell by symport of sodium ions, both amino acids cause the cell to become hypertonic (i.e. to swell). This osmotic swelling is the only known effect α-AIB has on cells.

In order to investigate what role cellular swelling might play in Gln’s protective action, rat intestine cells (strain IEC-18) were treated with varying concentrations of Gln and α-AIB and subjected to heat shock at 430C (stress) or 440C (lethal). Cell viability was assayed and HSP induction was quantified by western blotting. It was determined that both Gln and α-AIB promote cell survival (n=9, p<0.05) and induce HSP25, HSP32, and HSP70 (n=7, p<0.05) in heat shocked cells relative to controls. Dose response curves for α-AIB and Gln were not significantly different. It was concluded that Gln’s protective mechanism is mediated in part by causing cellular swelling.

Information about the Author:
Diana Stutzman is a fifth year senior at Valparaiso University, graduating this May with a Bachelor of Science in biochemistry. She presented her research during the summer of 2011 at the University of Colorado Anschutz Medical Campus with alumnus Dr. Paul Wischmeyer. Last year she presented data from research with Valparaiso University’s Dr. Thomas Goyne during the summer of 2010. She is currently searching for a job in biomedical research and pharmaceutical development.

Faculty Sponsor: Dr. Thomas Goyne

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Art Museum Curators and Management

Tiffany M. Tyler

Deptartmental Affiliation: Core
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Art museums house the greatest works from artists around the world from classics to modern pop art, without discrimination and open to interpretation. Art museums are debatably one of the most sacred places in society. Any history museum will give details about ancient artifacts or new discoveries; art, however, can change in meaning with each new visitor. Museum curators go beyond the “do not touch” signs with their large key rings opening vaults of worth and beauty. Curators work directly with artists and other museums to resurrect a dying cultural tradition. With the assistance of Valparaiso University’s own Gloria Ruff, Assistant Curator and Registrar, I have had the privilege to get a guided tour of what goes on in the life of a curator. Museums are in decline, maintaining with their heads just above the water. Laws were passed and curriculums changed in higher education so that these houses of culture do not dissipate into the history books.

Information about the Author:
When Tiffany Tyler was told that research conducted for her Core essay about real life vocations would be published in ValpoScholar, she jumped at the chance to turn a required assignment into something she could display on her résumé. She plans to pursue a career in Museum Studies, particularly art museums.

Faculty Sponsor: Professor Mandy Adams

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Beating Down the Lowly: The Criminalization of the Homeless and Alternative Solutions

Amber Will

Departmental Affiliation: History
College of Arts and Sciences

In the current economy, the issue of homelessness is increasingly pervading the normal constructs of society. Thousands of men, women, and children struggle to find a place to sleep and enough food to satisfy their hungry stomachs. While many people suffer under these conditions, local governments continue to create new anti-homeless legislation to further eject them out of society. Bans prevent the homeless from urinating, sleeping, camping, and panhandling in public through fines and prison sentences. The laws specifically target the homeless, discriminating against them for actions which are necessary for daily survival. The legal system only further hurts this already destitute population rather than alleviating the problem. Thus, this paper looks at the numerous reports and case studies that evaluate the current criminalizing efforts in order to offer alternative solutions to this social injustice. The accumulating effect of constant segregation and punishment results in a constant cycle of homelessness and the dehumanization of certain citizens. By reevaluating the current trend of criminalization, local governments can actually assist the homeless and provide life-changing services rather than contributing to the discrimination. Handcuffing the homeless only exacerbates the social problem plaguing America.

Information about the Author:
Amber Will wrote this paper as a Christ College Honors Thesis for the seminar entitled History of Homelessness. She is a triple major – political science, history, and humanities – and this topic combined aspects of all of her interests. Looking at the policies already set in place against the homeless provided a way to learn about governing and the effects on the people. Next year, she will be attending William and Mary Law and Graduate School for a dual program for a Masters in Public Policy.

Faculty Sponsor: Dr. Alan Bloom

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Complexity Theory: An Approach to Understanding the Weak Relationships between Valparaiso’s International and Non-International Student Populations

Cameron Witt, Kayla Moon, Michelle Brewer

Deptartmental Affiliation: Communication
College of Arts and Sciences

The Valparaiso University campus is becoming more diverse as each year passes. The undergraduate population on campus is experiencing a rise in international admissions. Although the University has many recognized student organizational groups, including VISA (Valparaiso International Student Association), these student organizations are failing to connect with one another, which results in a very fragmented student population rather than an intertwined group of young adults. The prior being the case, this campaign directly targets the international student association known as VISA, and
is related to increasing student awareness (both international and national) of the VISA organization, their events, and also increasing student participation and membership within the program. This campaign will likely prove to be mutually beneficial to both the VISA program and to all other campus organizations that form partnerships with VISA.

Within the campaign, several questionnaires were circulated to international and national students as well as to key dignitaries within specific and pre-identified campus organizations. With the feedback that was obtained through these questionnaires, plans were formulated to form partnerships with campus organizations, by which VISA and all partnered programs could realize a mutual benefit from the campaign. This benefit included, but was not limited to, increasing publicity and awareness of VISA events during the calendar year. The results of the campaign included the exchange of experiences between VISA and non-VISA organizations on the Valpo campus. The focus groups further confirmed: 1) stereotyping by each group toward the other, 2) the lack of incentive to mix, and 3) the need for leadership to facilitate better understanding and to create opportunities to mix student groups.

Information about the Authors:
Kayla Moon is involved in VISA, the international student organization on campus. This organization encourages learning about other cultures around the world. As the public relations chair, she became aware of a lack of American student involvement in these events, which sparked her interest in this particular campaign. Another one of the group members, Cameron, is an international student from Tasmania who wasn’t involved with VISA. This gave the group another perspective as to how and why students do or do not participate in VISA. Michelle is the other group member. She is not involved with VISA, and she is not an international student. Michelle is involved in Greek life, and the group received her perspective on VISA’s events.

Faculty Sponsor: Dr. Bonita Neff
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Human rights activists claim that healthcare is a human right and as a human right, individuals everywhere ought to be afforded it. Failure to at least strive to provide healthcare to all, advocates maintain, is unethical and actually undermines the human rights system. However, many opponents argue that claiming a right to healthcare is nonsensical because equal healthcare for all cannot be achieved in today’s society; at least not without placing intolerable burdens on the medical industry. In this paper, I attempt to stake out a middle position between these two extremes. On one hand, I argue that there is a right to healthcare, ultimately based not on the practicality or achievability of addressing the right, but on the grounds of inherent human dignity, and this right does need to be acknowledged and protected. On the other hand, pragmatically, the right to healthcare must be limited because we live in a world of finite resources and human energy. When determining the amount of healthcare an individual can rightfully demand, we must consider two major limitations: practical limitations to provision such as limited resources, and the tension between the human rights of medical caretakers and the opposing rights of the patients.

Information about the Author:
Trisha Wladecki is a junior pre-med student who is also in Christ College. This paper is her honors thesis, emerging from an intensified study of a class entitled Human Rights: Politics, Ethics, and Law.

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POSTER PRESENTATIONS

The Spirituality of Addictions: A Christian Patristic Model and Procedure for Assessment

Alyssa Abbate, Ryan Abraham, Kelly Perfect, Diana Stribl

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Addiction theory has focused on the debilitating effects that drug addicts and alcoholics face. However, addiction can permeate much further into our lives than just through drugs and alcohol. Evagrius of Ponticus presented eight tempting motions that comprised all the beliefs, behaviors, items, and emotions that an individual can be disorderly attached to. These disordered attachments can have enslaving effects on an individual that constrains the person’s will and desire for freedom.
from these preoccupations. We also include a measure that assesses spiritual involvement and locus of control. The purpose of this study is to compile a psychological measurement that will assess the many domains of disordered attachment an individual can encounter and the degree to which it constrains their lives. This measure will consist of approximately 75 Likert scale items that include questions pertaining to pride, emotions, relations, sexuality, avarice, power/control, and problems of desire. The factors we have derived through factor analysis allow for each participant to be scored on various subscales. These scores will indicate the specific nature of the addictive tendencies. Lastly, individuals who are found to be more spiritually involved are presumed to be less attached to the constructs mentioned above.

Information about the Authors:
No information provided.

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PTSD in Military Veterans: History, Evolution, and Policy Implications

Christine Albain

Departmental Affiliation: Psychology
College of Arts and Sciences

It is estimated that 30% of men and women who have served in war zones will develop post-traumatic stress disorder (PTSD). Yet, it is still a topic that is not fully understood or supported by American civilian culture. PTSD has, historically, been called many things, including malingering, shell shock, and battle fatigue and has greatly evolved as a psychiatric diagnosis. This poster will present the culmination of a comprehensive literature review, policy analysis, and a series of case studies related to PTSD among military veterans. The history and evolution of PTSD within military populations will be examined, with special care given to the stigma and attitudes associated with the diagnosis. In addition, current prevalence rates and treatment options will be reviewed. Finally, this information will serve as the basis for proposed amendments to the PTSD diagnosis in the forthcoming DSM-5, as well as suggested future directions for prevention, intervention, and PTSD-related research.

Information about the Author:
Christine Albain is a junior psychology major. She is very interested in military psychology. She intends to pursue a Ph.D. in clinical psychology following graduation.

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Examination of Social Responding in Children with Autism Spectrum Disorder

Paul Allison, Carlton Lyons, Charla Trubey

Departmental Affiliation: Psychology
College of Arts and Sciences

Impairments in reciprocal pretend play are well documented in children with a diagnosis of Autism Spectrum Disorder (ASD). The play of children with this disorder is characterized by deficits in spontaneous language, imitation, and social interaction. The effectiveness of many different behavioral teaching techniques has been examined in order to teach play skills to children with autism. The foundation for our research stems from the study conducted by MacDonald, Sacramone, Mansfield, Wiltz, and Ahearn (2009). The basis for their approach was founded upon the fact that children with autism have deficits in those behaviors listed above. Research supports the viability of these different interventions, but very few studies have directly compared their rates of effectiveness. The current study was designed to provide insight into the video-modeling technique. Researchers sought to tally the number of responses emitted by participants. Specifically, investigators were interested in learning how many motor and verbal behaviors were modeled after those depicted in the training video.

Information about the Authors:
Paul Allison is a senior psychology major. He has completed an internship working with children with autism. This experience has reinforced his plans to pursue a graduate degree in clinical psychology. Carlton Lyons is a senior psychology major, biology minor who has been working on the social modeling project for two years. He has completed an internship working with autistic children and plans to pursue related graduate studies in cognitive neuroscience. Charla Trubey is a junior psychology major who is currently studying abroad. She has completed an internship working with children with autism and has served as a camp counselor for children with developmental disabilities.

Faculty Sponsor: Dr. Angela Vernon
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Teaching Computers to Think: Analysis of Artificial Intelligence and Connect Four

Kirk Baly, Andrew Freeman, Andrew Jarratt, Kyle Kling, Owen Prough

Departmental Affiliation: Mathematics and Computer Science
College of Arts and Sciences

Connect Four is a classic two person, zero-sum game in which players utilize their wits and gravity to connect four of their own pieces in a horizontal, vertical, or diagonal row while blocking their opponent’s attempt to do the same. We have constructed a simulation of this game which we have used as a base for the implementation and testing of varying Artificial Intelligence (AI) systems. Early strategies worked according to simple strategic methods, while more advanced heuristics employed a Min-Max Tree in tandem with methods to determine how advantageous a certain board would be. This Min-Max Tree goes beyond a simple strategy, as it allows for the computer to look many moves ahead, thus picking the move that optimizes its chances of winning. The collection of statistics for the various strategies has allowed for the analysis and improvement of the AI structures.

Information about the Authors:
All the authors are computer science majors, and several have worked on artificial intelligence systems before, both for classes as well as research projects. They knew that some work had been done on Connect-4 using what is called an Expert System, but they wondered if it would be possible to make a very good computer-controlled player using simpler heuristic methods. Four of the five members of the group are graduating in May, but all will retain an interest in artificial intelligence as they move forward in their academic and professional careers.

Faculty Sponsor: Dr. Gregory Hume

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November Snowfall Variability and Trends around Lake Michigan: Sensitivity to Temperature and Teleconnection Patterns

Amanda Bandurski, Justin Barrick, Kristin Smedley

Departmental Affiliation: Geography/Meteorology
College of Arts and Sciences

Using available long-term stations, November climatology of temperature and snowfall since 1950 has been composited for the region near Lake Michigan. Daily data was examined for the available stations to explore the monthly temperature and snowfall, the number of days with snowfall, and snow cover. The characteristics of six sub-region composites were compared using composites around Lake Michigan, respectively. Early season snowfall is much more common in the eastern sub-regions, implying a dominant role of lake-effect snowfall to the overall climatology. The number of days with snowfall is greater in the eastern sub-regions.

Information about the Authors:
Amanda Bandurski has loved meteorology since she was young. She decided to pursue her career in the science by studying at Valparaiso University. Wanting to be well versed in all things weather, she researched something northern Indiana is accustomed to – lake effect snow. Amanda is involved with the AFROTC here at the university, and will be a weather officer at Scott AFB, IL after her graduation this spring. Justin Barrick has been interested in meteorology since a young age, which is why he wanted to pursue a degree in meteorology. When he found out about the lake effect research class, he thought it would be interesting to research lake effect snow cases around Lake Michigan in November. After graduation, Justin hopes to get a job at an insurance agency and work in the risk management department.

Faculty Sponsor: Dr. Craig Clark

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Calibrating the STAR Endcap ElectroMagnetic Calorimeter Using Pi-O’s

Benjamin Barber

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The default energy calibration of the STAR EEMC (Endcap ElectroMagnetic Calorimeter) uses the energy deposition of minimally ionizing particles (MIPs). An alternate method is to use pi-0’s. We are reporting a preliminary proof-of-principle calibration method using pi-0’s. This method reconstructs the invariant mass of photon pairs, assumed to be resulting from pi-0 decays, using standard two-body kinematics. When many photon pairs are analyzed, a peak is expected in the resulting invariant mass distribution near the pi-0 mass. Using the measured mass of this peak, and the known mass of the pi-0, a minimization routine adjusts the detector gains to optimize the invariant mass peak of the pi-0. Initial tests suggest that this method is promising.

Information about the Author:
Benjamin Barber is a senior physics and mathematics major. He has spent the summer of 2011 and 2009 working on projects related to the STAR Endcap ElectroMagnetic Calorimeter. He spent the summer of 2010 working at the National Institute for Standards and Technology and will spend the summer of 2012 working at Los Alamos National Laboratory. He currently plans on attending the University of Chicago next year for graduate school, focusing on beam physics.

Faculty Sponsor: Dr. Shirvel Stanislaus

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Measurements of the Angular Cross-Sections of the Decay Products of Proton Capture by Lithium-6

Benjamin Barber

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

We have studied the nuclear reaction Li-6 + p => He-3 + He-4 using protons from the 200-keV linear accelerator located in the Manning Nuclear Physics Laboratory in the Neils Science Center. We have measured the angular distribution and energy of the resulting He-3 and He-4 nuclei. Measurements were made using a Si surface barrier detector. The incident proton energy was 125 keV, and the angular measurements were made between 150 and 120 degrees downstream of the beam. Results and highlights are presented.

Information about the Author:
Benjamin Barber is a senior physics and mathematics major. He has spent the summer of 2011 and 2009 working on projects related to the STAR Endcap ElectroMagnetic Calorimeter. He spent the summer of 2010 working at the National Institute for Standards and Technology, and will spend the summer of 2012 working at Los Alamos National Laboratory. He currently plans on attending the University of Chicago next year for graduate school, focusing on beam physics.

Faculty Sponsor: Dr. Shirvel Stanislaus

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Women’s Rights in the Sex Industry

Emily Beatty, Amanda Rychtanek, Madeline Schuttey

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In the United States, exotic dancers are denied their right to work in a safe and secure work environment. Strippers are faced with a variety of abuses on a daily basis and struggle to deal with the negative perceptions and social stigma in their communities. Perceptions of this legalized form of sexual entertainment are connected to the perceptions of prostitutes but differ because of the inability of the strippers to have physical contact with the audience. Dancers are stereotyped to perform the same services as a prostitute and do not have a dignified job. Women enter this area of the sexual industry because they are coerced into believing they will make a sufficient living due to the perceived unlimited income potential and will be protected by laws which regulate the strip club’s activity. Women in this sex industry are more at risk for physical abuse, psychological abuse, verbal threats, and sexual assault, which are understood to be under-reported. Women in the sex industry do not feel safe going to the police or counseling services, which puts these women at risk for suicide, depression and emotional trauma, lack of control over their emotions, poverty, and a continuous cycle of lack of education. The aim of this study was to find a correlation between unsafe work environment and the negative connotations created by the social stigma in the communities. These findings were helpful to raise awareness of the injustices occurring in strip clubs and their potential
effects on the women participating in this line of work.

*Information about the Authors:*
Our group became interested in this topic because of the startling statistics on the abuse occurring in strip clubs. We feel there is a need to present this information to other individuals.

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### Supporting Underserved Pregnant Women through Smoking Cessation

Emily Bernhard, Lauren Paczkowski, Nathan Matejczyk, Nina Tu, Michelle De Young

*Departmental Affiliation:* Nursing College of Nursing

This project assessed smoking behaviors and supported smoking cessation in underserved pregnant women. Using a longitudinal design, women were recruited from a community prenatal center. Using the Transtheoretical model, interventions were designed to support the subjects’ movement along the stages of change. Subjects willing to quit were given a smoking cessation “quit kit.” For subjects not contemplating smoking cessation, information about the harmful effects of smoking was distributed to encourage movement towards quitting. Women who were smoking were followed throughout their pregnancy and up to one year after delivery. Subjects (N = 134) ranged in age from 18 to 41; 71% were single; and 63% had household incomes less than $20,000 per year. Subjects were primarily African American (40%). 57% had previously smoked. 35% were current smokers. Of the smokers (n = 27), 26% were not considering quitting (pre-contemplation), 56% had planned to quit (contemplation), and 18% had an action plan (preparation). Six weeks post-delivery (n = 12), one woman quit smoking and the others were planning to quit. Six months post-delivery (n = 7), two women quit smoking and the remaining smokers were planning to quit. One year post-delivery (n = 9), one woman quit smoking and of the remaining smokers only six planned to quit. Results will add to the growing body of evidence about smoking patterns of underserved pregnant women.

*Information about the Authors:* Emily Bernhard and Lauren Paczkowski are senior nursing students, Nathan Matejczyk and Nina Tu are junior nursing students, and Michelle De Young is a sophomore nursing student. This team has developed and implemented multiple research projects about smoking cessation in the Northwest Indiana area. Their current project is a longitudinal study about smoking patterns of undergraduate students and promotion of Valparaiso University’s tobacco-free campus.

*Faculty Sponsors:* Dr. Terry Kessler and Prof. Elise Alverson

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### GIS Mapping and Analysis of Lake-Effect Snowfall Patterns in Indiana and SW Michigan

Holly A. Boney, Matthew Christy

*Departmental Affiliation:* Geography/Meteorology College of Arts and Sciences

Using a multi-decade climatology of lake-effect snowfall events in northern Indiana and adjacent southwest Michigan, a Geographic Information System (GIS) analysis has been developed to explore the spatial patterns of snowfall, as well as the relationship between snowfall and upstream sounding parameters. Using a minimum peak snowfall threshold of five cm reported at one of the available locations with long-term snow reports, there are ~250 cases in the data set. While there are numerous additional reports available for more recent events, particularly with CoCoRAHs data, only the stations available for the entire period were used for the analysis. While reducing the number of reports, this allows a more direct comparison of events. The most common pattern shows a snowfall peak in southwestern Michigan and adjacent north-central Indiana, consistent with the common northwest flow during lake-effect snow events. However, there are other obvious patterns as well, with a group of events centered in northwest Indiana and another grouping with much more diffused regional snowfall. We will show a subjective classification of events, based on careful evaluation of the maps, and an objective classification based on K Means clustering. Correlation maps of snowfall and upstream parameters from the Green Bay, Wisconsin sounding highlight the effect of wind direction in northwest Indiana; the correlation is relatively strong for stations in northwest Indiana, yet there is almost no correlation of wind direction and snowfall in southwest Michigan (with the caveat that null cases are not included in the data set). The sensitivity of snowfall to lower-tropospheric temperature is rather modest, but is somewhat higher in southwest Michigan. The patterns of snowfall sensitivity to
upstream relative humidity, inversion characteristics, and wind shear will also be shown.

*Information about the Authors:* Matthew Christy is a senior and a double major in meteorology and geography. Lake-effect snow has interested him most of his life since he grew up in this lake-effect snow area. He was excited about this opportunity to study how factors like temperature and wind direction affect lake-effect snow amounts in the region. GIS is another skill that he was able to utilize in this project, which was valuable in allowing all the snowfall maps to be made. Matthew liked using GIS to map meteorological phenomena, and he wants to continue researching in the future. Holly A. Boney is a sophomore meteorology major with a double minor in math and GIS. Holly moved to Indiana from Washington state to study every facet of the weather. Lake-effect snow was something completely unfamiliar to Holly, so she wanted to explore the mechanisms behind it. In the future, Holly hopes to continue her research and possibly expand her work to different lakes.

*Faculty Sponsor:* Dr. Craig Clark

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**Transformation of Public Relations Agencies Through Evaluation of Golin Harris’ Evolution to the G4 Model Using Public Relations Theories**

Samuel Borden, Elizabeth Freeman, Nathalie Martinez, Lauren Rubio, Ryan Brule, Demetrius Amparan, Kimberly Coticchia, Liz Powers

*Departmental Affiliation:* Communication
College of Arts and Sciences

The study developed a critical analysis of public relations agency Golin Harris and their new G4 Model. This analysis was conducted by an upper-level undergraduate class *PR Leadership: From an Agency Perspective*. The eight-member, advanced class, team-researched, compared, and contrasted the new model with their previous approach to agency functions. Using key public relations theories, this PR evolution was examined to assess just what this change means to consumers, clients, and other public relations agencies. The theories used were Speech Act Theory, Social Constructionism, Weikian, Strategic Issues Management, and Diffusion of Innovation Theory. An evaluation of the documents provided by Golin Harris which documented the changes from generalized to specialized functions within their new model were identified for analysis. These functions are clustered into four communities:

- catalyst (coordinator role), connectors, creative, and strategist. Findings from the research and evaluation concluded that GH has moved to a more process approach to communication (less hierarchy or management emphasis) including a leveling of titles to emphasize openness (includes designing a new building with open space for offices). This seems like a strong step in the right direction for an agency, especially to see how some of the theories are integrated into this more communicative approach.

*Information about the Authors:* Samuel Borden is a public relations major with a communication minor. Elizabeth Freeman is a communications major (PR concentration) with a sports promotions minor. Nathalie Martinez is a communication major with Spanish and history minors. Lauren Rubio is a communications major (PR concentration) with a Spanish minor. Ryan Brule is a health sciences and systems major. Demetrius Amparan is a sociology and public relations major. Kimberly Coticchia is a public relations major with a business minor. Liz Powers is a public relations major with an art minor.

*Faculty Sponsor:* Dr. Bonita Neff

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**Does Motivation Affect Exercise?**

Angelica Brown

*Departmental Affiliation:* Physical Education
College of Arts and Sciences

In the state of Indiana, 20-29 percent of residents are obese. Being obese may impact social experiences and health conditions. This research seeks to investigate whether motivation affects an individual’s ability to engage in an exercise program. This research will utilize a convenience sample of 10 overweight, sedentary individuals living in northwest Indiana. Each of these 10 individuals will be participating in a wedding this summer (either as a bride, groom, bridesmaids, or groomsmen). Each has volunteered to be a participant in this project in hopes of getting healthier. Motivation will be evaluated by use of questionnaires specific to attitudes about exercise and motivational factors. Exercise engagement will be evaluated by comparing pre-test assessment to post-test assessment for changes in biometric parameters such as blood pressure, total body weight, and body fat. It is hypothesized that motivation will lead to subjects making changes in biometric parameters. No conclusions have been made for this study.
**Information about the Author:**
As an exercise science major, Angelica Brown is interested in helping people get physically active and reaching a state of well-being. Many of her friends admire her ability to encourage and provide help when needed. She felt this study would present an opportunity to help the participants become healthier while gaining experience in an area outside a classroom setting.

**Faculty Sponsor:** Dr. Kelly Helm

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**Secondary Student Metacognition Compared to Actual Participation in the Classroom**

Kristin Buch

**Departmental Affiliation:** Education  
College of Arts and Sciences

Many times in a conflict, there are three different accounts of what happened: person one's side, person two's side, and the truth. As often as this saying gets made and joked about, it does reveal truth about how perception and truth don't always align. With this thought, I compared students’ perceived participation in a classroom setting in comparison to their actual class participation. Each student will participate in a normal class, while their participation is being measured. They will then take a survey and be re-measured for the same amount of time so that they may be able to more accurately place their perceptions. After all data has been collected, it will be compared to that which was collected the year before in the same manner at a different school. It will be compared through mean, mode, and median.

**Information about the Author:**
Kristin Buch is a graduating senior at Valpo studying biology and secondary education. She’s excited to find her first full-time teaching job in order to start infusing the minds of youth with biology. Her classes and student teaching have brought about many different ideas about how students, especially in high school, perceive themselves. It pushed her to complete research in the spring of 2011, which was awarded first place in its category at last year’s Celebration. She decided to continue with her research this year in hopes of one day publishing it.

**Faculty Sponsor:** Dr. Del Gillispie

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**Equitable Labelings of Caterpillar Graphs**

Mark Burek, William Olson, Brock Taulbee

**Departmental Affiliation:** Mathematics and Computer Science  
College of Arts and Sciences

The Graceful Tree Conjecture in graph theory has been open for almost half a century. The conjecture states that the vertices of any tree can be labeled with distinct integers between 0 and the number of edges of the tree in a way that the edges can be uniquely identified by the absolute value of the difference between their vertex labels. One possible approach to prove the conjecture is to prove the more general k-equitable tree conjecture. In a k-equitable labeling we assign integers from the set \{0,1,2,…,k-1\} to the vertices. Each edge will receive a label that is the absolute value of the difference of its vertex labels. We want to distribute the labels as equally as possible both for the edges and for the vertices. The conjecture states that this kind of labeling is possible for every tree and every k. This conjecture is equivalent to the graceful tree conjecture when k is the number of vertices of the tree. It has already been proven that every tree is 2-equitable and 3-equitable. We attempt to show a part of the k-equitable tree conjecture by choosing a large collection of trees called caterpillars, and examining different values of k.

**Information about the Authors:**
Mark Burek has a degree in psychology and is now pursuing a degree in mathematics with the goal of becoming a mathematician. William Olson is a freshman mathematics major from Sarasota, FL, who enjoys being involved on the Valpo campus. He hopes to continue doing research with the mathematics department in the upcoming semesters. Brock Taulbee is a freshman who plays on the men's soccer team. He enjoys working with numbers, and mathematics has been his favorite subject since elementary school. He is an actuarial science major who hopes to become a sports actuary.

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The Effect of Different Training Regimens on Improved Sound Frequency Discrimination in Wistar Rats

Sam Cain, Elizabeth Grigoletti, Erin Walsh

Departmental Affiliation: Psychology
College of Arts and Sciences

Rat subjects were randomly assigned to one of three groups. The rats were presented with differing patterns of target and non-target frequencies, with the target remaining constant between groups while the non-target varied between groups. The rats were rewarded with food for successful bar presses while the target tone was playing, and no reinforcement was delivered for presses that occurred during the non-target tone. The groups were labeled as Control, Rapid, and Gradual. The control group experienced a silence in the place of non-target tone, while the rapid and gradual groups received the same tone in the beginning, but the rate of tone change differed throughout the training process. The test phase involved all three groups experiencing a multitude of different tones, with correct versus incorrect responses monitored. Researchers hypothesized that the rats that received the intensive training provided by the gradual method would exhibit a greater attunement in discriminative ability when compared to both the rapid and control groups.

Information about the Authors:
Sam and Elizabeth are junior psychology majors, and Erin is a senior psychology major. The group became interested in working with lab rats because Sam and Elizabeth are the animal caretakers for the Psychology Department, and they convinced Erin to work with them. All three took the learning lab concurrently with the beginning of the project and plan on pursuing post-graduate work in psychology.

Faculty Sponsor: Dr. Angie Vernon
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How Position of Reading Questions Affects the Reading Comprehension of High and Low Ability Readers

Sam Cain, Ben Friedman, Theresa Funderwhite, Tayler Grashel, Debra Harstad, Stephanie Kuipers, Angelique Mercier, Margaret Rufo, Tina Siganporia, Dustin Tragesser

Departmental Affiliation: Psychology
College of Arts and Sciences

This study investigates the optimum placement of reading questions in textbooks. Is it better to have reading questions embedded in chapters or placed at the end of chapters? One independent variable is reading question placement (embedded vs. end). Another independent variable is reading comprehension ability (higher vs. lower). Participants read a chapter from a statistics book, listened to stories as a distractor task, and then answered three types of questions about the statistics chapter. The dependent variable is the percent correct for each question type. Target questions tested the same content as a previous reading question. Related questions tested similar content. Non-target questions tested unrelated content. We will analyze our data with three 2 x 2 factorial ANOVAs. We expect embedded questions will help lower-ability readers on target and related questions. Further, embedded questions will hurt the performance of higher-ability readers on non-target questions. Higher and lower comprehenders differ in their ability to suppress irrelevant information. Embedded questions facilitate suppression processes by highlighting specific content in the reading. However, for high comprehenders who already suppress irrelevant information effectively, embedded questions may lead to “over suppression,” causing non-target information to be processed less well.

Information about the Authors:
This is a class project for Psych 390, Cognitive Psychology Laboratory.

Faculty Sponsor: Dr. Kieth Carlson
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The Reduction and Reporting of Data on Proto-Planetary Nebulae from Two Observatories

Wesley Cheek

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

I am documenting the light variability in a sample of proto-planetary nebulae (PPNs) observed from two observatories. PPNs are stars in the stage of evolution between the AGB and planetary nebula phases. I analyzed the digital images of the data taken on 34 nights from the SARA-South observatory located in Cerro Tololo, Chile along with data taken from the SARA-North Observatory located in Tucson, Arizona. This was done to obtain quantitative measurements of the brightness variations over time. Once I had this information for each object, I plotted light curves, which can be used to document the
amplitudes and possible periods in the light intensity. These were posted along with other information, such as finding charts, on a private website for the use of our collaborators from East Tennessee State University, Ball State University, and Butler. This website will act as a central hub for the displaying of results of studies on these objects.

Information about the Author:
Wesley Cheek is a junior physics and philosophy major with a minor in mathematics. He has done research on proto-planetary nebulae for the past two summers, doing both observational and data work. He intends to attend graduate school in physics upon receiving his BS from Valpo.

Faculty Sponsor: Dr. Bruce Hrivnak

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Relationship between Aggressive Driving and Various Types of Music
Karen Davidson, Ora Whitehead

Departmental Affiliation: Social Work
College of Arts and Sciences

This research study focused on the relationship between aggressive driving and various types of music to see what factors – i.e. age, consumption of alcohol, and genre of music – affect the individual while driving. Recent studies have suggested that different genres of music can affect one’s driving. Among articles that have been read, studies agree that age, consumption of alcohol, and genre of music affect an individual’s driving. Recent studies have indicated that different genres of music can affect one’s driving aggressiveness along with other, more established factors such as alcohol consumption and age. Our hypothesis #1 (control): There is no relationship between aggressiveness due to age, consumption of alcohol, and the genre of music. Hypothesis #2: There is an increase in aggressiveness while driving due to the music listened to while driving. Consequently, the researchers are hypothesizing that aggressive driving is related to type of music listened to by the driver.

The survey will include over 100 students, faculty, and staff from Valparaiso University in Valparaiso, Indiana. Each participant was asked to fill out a questionnaire which asked their age, gender, and alcohol consumption. Then they were asked to fill out five surveys after they listened to a particular genre of music. Students, faculty, and staff who participated in this study were given a verbal explanation regarding the purpose of the study and were assured that confidentiality would be carried out throughout this process. The music that was the focus of this study is rap, rock, and heavy metal.

Information about the Authors:
Karen Davidson, a junior social work major, is currently interning at Opportunity Enterprises and would like to become a school social worker. Her future goals include attending graduate school to receive her MSW. Karen became interested in this topic because she has always wanted to know if there is a correlation between aggressive driving and listening to various types of music while driving. Ora Whitehead, a senior social work major, is currently interning at Porter County PACT-Home Detention Program. She would like to work in a correctional facility setting with juvenile offenders/delinquents. She will be attending graduate school this upcoming fall to earn her MSW, and in the future she would like to earn her LCSW, LMHC, and LCAC. Ora became interested in the topic by having first-hand experience with how music affects one’s driving.

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Effectiveness of a Stretching and Strengthening Program on Improving Forward Shoulder Posture in Elite Competitive Swimmers
Russell Deghi, Tim Skerrett

Departmental Affiliation: Physical Education
College of Arts and Sciences

The central idea of the project that we are trying to convey is the prevention and rehabilitation of forward shoulder posture in competitive swimmers. Due to the extreme routine of competitive swimmers, various shoulder muscular imbalances are created, increasing the risk and severity of shoulder injuries. Our hypothesis is that after four weeks of completing the strengthening and stretching program, posture should improve. Procedures included measuring shoulder posture before and after the four weeks and having a control and experimental group to compare the findings of the experiment. Analysis of data will be done statistically using the program SPSS. The main findings and conclusions have not been completed, but current results seem to display significant differences between the experimental and control group.
**Information about the Authors:**
Russell Deghi is on the Valparaiso University swim team. As a swimmer, he has seen many shoulder issues including one of his own which sparked an interest in how to correct or decrease the amount of shoulder injuries in the sport. He is also interested in becoming a physical therapist, making this experiment a perfect stepping stone into the field. Tim Skerrett is an exercise science student who will be attending graduate school for occupational therapy. He has completed a 150-hour internship under the supervision of hand and shoulder therapists, which in turn has made him very familiar with the field of shoulder injuries. He himself has also suffered multiple shoulder injuries and has gone through therapy firsthand. His interest in this is to further his own pursuit of occupational therapy as well as for the pursuit of personal knowledge.

**Faculty Sponsor:** Dr. Kelly Helm

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**The Impact of Foam Rollers as a Form of Active Recovery on Lactate Disappearance**

Dannie Dolan

**Departmental Affiliation:** Physical Education
College of Arts and Sciences

After anaerobic exercise, rate of blood lactate disappearance is often monitored as a way to detect the achievement of muscle recovery. In this study, the rate of blood lactate disappearance will be examined for two methods of muscle recovery, with a focus on the effectiveness of foam rollers. After performing a strenuous anaerobic task, the participants will either conduct a passive recovery or one of the two active recoveries, the passive recovery used as the control method. Active recovery through moderate exercise post-strenuous exercise has been shown to be very effective in lactate removal, but use of foam rollers has yielded inconclusive results. Participants will have their blood lactate analyzed before, directly after, and 5, 10, and 15 minutes into each recovery method. Results will help determine the true effectiveness of foam rollers, and gain further insight into the body’s reaction to physical stress. Data collection and analysis will be conducted in the spring of 2012 at the Athletics-Recreation Center.

**Information about the Author:**
Dannie Dolan has always been interested in nutrition and in maintaining health, but was never passionate about physical activity before switching her major to exercise science as a junior. Now, she will go to graduate school to work towards a doctorate in physical therapy.

**Faculty Sponsor:** Dr. Kelly Helm

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**Wintertime Climate Variability in the Lake Michigan Region: Sensitivity of Snowfall to Temperature and Northern Hemisphere Teleconnection Patterns**

Travis Elless, Tony Lyza, Sarah Mustered, Craig Clark

**Departmental Affiliation:** Geography/Meteorology
College of Arts and Sciences

Using available long-term stations, a wintertime climatology of temperature and snowfall since 1950 has been composited for the region near Lake Michigan. The seasonal snowfall characteristics of six sub-region composites were subsequently explored, using composites for three sub-regions to the west and east of Lake Michigan, respectively. While snowfall records can be problematic due to observer changes, data within a given sub-region mostly exhibit similar variability. Not surprisingly, locations to the east of Lake Michigan have higher average seasonal snowfall and greater snowfall variability than their upstream counterparts. The variations correlate fairly well among neighboring sub-regions, with the weakest relationship between northwest and southeast regions. There is a clear relationship between snowfall and temperature, with colder winters producing greater snowfall than milder winters. However, this sensitivity is strongest in the lake-effect prone regions to the east of the lake, with an effective de-correlation of snowfall and temperature in the northwest zone. As anticipated, El Niño winters are warmer and less snowy on average than neutral and La Niña winters. The North Atlantic Oscillation has the strongest relationship to snowfall in eastern regions, with a weaker correlation in the western zones. The Pacific North America and Pacific Decadal Oscillation indices do not have a clear relationship with snowfall or temperature in the eastern zones, but do exhibit a relationship to snowfall in the northwest zones. Principle Component Analysis was utilized to further explore the temporal variability, as well as generate a regional wintertime index. The leading PC exhibits substantial noise, super-imposed on a trend toward less cold and snowy winters. Snowfall trends were also examined for each sub-region, with a downward trend in recent decades most pronounced in the southeastern sub-region. This has been mostly driven
by the tails of the snowfall season; an additional student group has been exploring the November data in detail.

Information about the Authors:
No information provided.

Faculty Sponsor: Dr. Craig Clark

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Impact of AQUA Satellite Data on Hurricane Forecast: Danielle 2010

Travis Elless, Xuguang Wang, Ting Lei, Govindan Kutty Mohan Kumar

Departmental Affiliation: Geography/Meteorology
College of Arts and Sciences

This study focuses on the impact of AQUA satellite data from AIRS and AMSU on the forecast of hurricane Danielle by the Global Forecast System (GFS) model. The data assimilation method adopted to ingest the data is the Gridpoint Statistical method (GSI) which is based on the three dimensional variational (3DVAR) data assimilation technique. Two experiments were carried out to investigate the impact of AQUA satellite radience observation on the forecast of hurricane Danielle. The first experiment (Control) assimilated all the available data while the second experiment (No AQUA) incorporated all the observations but the AQUA satellite data. Data assimilation cycling started one week prior to hurricane genesis, on 15 August 2010 06 UTC. The root mean square track forecast error shows slightly negative impact at the early lead time and slightly positive impact at later lead time. However, the root mean square intensity forecast errors by the Control are shown to be lower than No AQUA for all forecast hours, indicating positive impact of the AQUA data on the intensity forecast.

Information about the Authors:
Travis Elless is a student at Valparaiso University. Drs. Wang, Lei, and Kumar are faculty at the University of Oklahoma.

Faculty Sponsor: Dr. Teresa Bals-Elsholz

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Cultural Competency of High School Staff

Sidney Findley, Jodie Buchanan, Rachel Pollock

Information about the Authors:
All three authors are junior level social work majors. All have similar backgrounds, white middle class upbringings in areas that are not culturally diverse. While Rachel and Jodie are traditional students at Valpo, Sidney is a nontraditional student returning to school after twenty years. This group is interested in how cultural competency can be taught to high school age children to better the comfort level of students in diverse situations and the acceptance of those who are different.

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Social Consciousness: A Fair Trade Campaign

Calin Florek, Laura Van de Carr

Departmental Affiliation: Communication
College of Arts and Sciences

Campaigns addressing social issues often focus on awareness as the first step. The educational process begins with equipping people with information that is
Assessing Conceptual Knowledge of Differential Equations

Samantha Frisk, Samantha Schwartz

Departmental Affiliation: Mathematics and Computer Science
College of Arts and Sciences

The differential equations and linear algebra math classes at Valparaiso University participate in an online tutoring survey consisting of conceptual questions from the field. The test was originally constructed by a team of math professors from San Diego State University. The questions are available in an online format and most questions provide scaffolding, or a tutoring set of questions when a primary question is answered incorrectly. This project analyzes the effectiveness of the scaffolding on a subset of questions with specific focus on areas of separable variables and Euler’s method. Special attention has been given to questions with multiple knowledge components, which may complicate the effectiveness of the scaffolding. In several questions, we have found that the scaffolding is not impacting student understanding of the subject area. We are also discovering surprising anomalies in students’ conceptions that the test creators did not predict. Thus, in some cases, it may be necessary to adapt the scaffolding or question wording to maximize test efficiency and overall student comprehension.

Information about the Authors:
Samantha Frisk is a senior mathematics and international service major. She will study abroad in southern Africa next fall. Samantha Schwartz is a senior mathematics and physics major and plans to attend graduate school in physics education.

Faculty Sponsors: Dr. Michael Glass and Dr. Melissa Desjarlais

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Sorting Permutations with Finite-Depth Stacks

Timothy Goodrich, Drew Groth, Lauren Knop

Departmental Affiliation: Mathematics and Computer Science
College of Arts and Sciences

Sorting organizes information for optimal usage and is desirable in many different fields. Noted computer scientist Donald Knuth first considered using stacks of infinite depth as a powerful means to sort data. We extend this work to consider stack-sortable permutations using stacks of specified finite depths. We characterize patterns that sortable permutations must avoid and derive a handy enumeration formula. Further generalizations include the introduction of multiple stacks and the analysis of the resulting counting sequences.

Information about the Authors:
Timothy Goodrich is a sophomore computer science and mathematics double major from Franklin, TN. His interests include programming and discrete mathematics, areas which he tutors for the Academic Success Center and hopes to continue studying in
graduate school. Drew Groth is a sophomore actuarial science and finance double major from Pewaukee, WI. His interests include applied mathematics and music, and he is currently a member of Interfraternity Council and Phi Kappa Psi. Career goals include being an actuary for a consulting firm and someday owning his own firm. Lauren Knop is a freshman mathematics major from Geneva, IL. She is currently a member of the Valparaiso University swim team and is exploring her career options.

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**Varying Curricula to Meet Physics Students’ Learning Styles**

**Gavin Grillo**

**Departmental Affiliation:** Education and Physics  
College of Arts and Sciences

Through differentiation of physics curriculum, teachers are able to meet various students’ learning styles. Educators are able to differentiate the curriculum so that it builds on students’ strengths and addresses their weaknesses. An inventory can be used to assess the students’ abilities with certain concepts, and this inventory could be compiled from various assessment questions. Once teachers assess areas of weakness, they are able to make adjustments to curriculum and lesson plans to address these issues. Teaching techniques found in *Just-in-time Teaching: Blending Active Learning with Web Technology* will be used in the lesson planning and instruction of the course taught in this research. After the curriculum and lesson plans have been implemented and completed by students, educators can then administer to their students the inventory again, now post-instruction, to assess the effectiveness of their teaching techniques.

**Information about the Author:**
Since Gavin Grillo is majoring in both physics and secondary education, this research covers both areas of study. This research is both important and valuable to him as a future physics teacher because it will help him develop effective teaching strategies.

**Faculty Sponsors:** Dr. Del Gillispie/Dr. Gary Morris  
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**A Simple Understanding of Attention Deficit Disorders and Resources for the Afflicted and Their Support Group**

**Amber Hauser**

**Departmental Affiliation:** Social Work  
College of Arts and Sciences

First, my purpose in writing this paper is to enlighten myself and others about an affliction that, as of 2011, in the United States alone affects 5.3 million children, ages 3-12, according to the Center for Disease Control and Prevention. Attention Deficit/Hyperactivity Disorder (ADHD), a segment of attention deficit disorders, is a real affliction that cannot be cured. I am hoping to provide a simple but thorough explanation of what happens in an afflicted person, and what makes them different from a non-afflicted person. I also want to educate others concerning the causes and treatments of this affliction.

**Information about the Author:**
Amber Hauser is a senior social work student, who, beyond most odds, is graduating in May of 2012. Her thoughts currently reside in a field of luscious grass and the sweet harmony of rain.

**Faculty Sponsor:** Dr. Matthew Ringenberg  
**Student Contact:** amber.hauser@valpo.edu

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**Does Branch Structure of an Invasive Shrub (Elaeagnus umbellata) Alter Bird Perching Behavior?**

**Heather Herakovich, Marcy De Vries, Laurie Eberhardt**

**Departmental Affiliation:** Biology  
College of Arts and Sciences

Autumn Olive, *Elaeagnus umbellata*, has been introduced throughout the United States. Research on the impacts of invasive plants like *E. umbellata* on bird behavior has produced conflicting results with some birds preferring to use invasives while others avoid them. Branch structure has been implicated in bird preference for certain woody species. Thus, we asked the question, does *E. umbellata* differ in branch structure from common natives in the landscape and, if so, how does this difference impact the behavior of native birds? We examined this question during the non-fruiting season at study sites with mixed open and shrubby second growth forest habitats in Michigan and Indiana. We found that *E. umbellata*
branches were twice as dense and 45% smaller in diameter than those of native cherry, *Prunus serotina*, but did not differ from two other native shrubs. Birds did not show a preference for perching in native shrub branches in choice tests using bird feeders in situ with invasive or native branches. Mist net capture rates for birds also did not differ between *E. umbellata* and native shrub sites. We concluded that native birds do not avoid *E. umbellata* during the non-fruiting season for perching despite a unique branch structure.

**Information about the Authors:**
Heather Herakovich is a senior biology major. She became interested in this project after taking field courses during her undergraduate career. She plans on continuing invasive species research in graduate school. Marcy De Vries is a senior biology major interested in the environment and ecology of organisms. She hopes to continue exploring these topics in graduate school.

**Faculty Sponsor:** Dr. Laurie Eberhardt

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**The Bloody Summer of 1863: How Memory and Commemoration have Shaped the History of the Battle of Gettysburg**

Tim Hopps

**Departmental Affiliation:** History
College of Arts and Sciences

The Battle of Gettysburg often exists in the minds of the general public as the most significant battle of the American Civil War. However, at the same time, the battle over control of the Mississippi River was reaching its climax at Vicksburg, which often receives less attention. Despite the apparent significance of controlling the southern stronghold of Vicksburg, a majority of memory of the Civil War rests within the confines of the Battle of Gettysburg. Through the research of primary and secondary sources, I will establish the military history of the Battle of Gettysburg and the Siege of Vicksburg. I then look at the significance of memory construction amidst conflict and how it affects the immediate creation of history. I then examine how these battles have been commemorated and how these practices have changed over time. Through this analysis, I will develop a clearer understanding of the Battle of Gettysburg’s significance within the context of the American Civil War.

**Information about the Author:**
Tim Hopps is a senior history and secondary education major who will be completing student teaching in the fall of 2012. Through experiences in the Department of History, Tim has always been intrigued by how history is constructed.

**Faculty Sponsor:** Dr. Colleen Seguin

**Student Contact:** tim.hopps@valpo.edu

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**How Chilly is Valpo? A Campus Climate Survey**

Nicole Hudson, Erica Wickstrom

**Departmental Affiliation:** Social Work
College of Arts and Sciences

Institutions of higher education in the U.S. have a history of racial and sexual discrimination. The consequences for unfriendly campus climates are serious; Gurin found that students of color who experience “cool” climates are more likely to demonstrate depressed graduation rates and decreased satisfaction with university experiences (Gurin et. al. 2004). The aim of this study was to holistically assess Valparaiso University’s campus climate based on the University of Toledo’s campus climate survey. These researchers focused on comparing the results of students who self-identified as minorities – specifically Black, Latino, Asian, international, and LGBTQ students – with the results of students who did not identify as minorities.

Surveys were administered via e-mail to the Valparaiso University community with an anticipated response rate of 200. Leaders of multicultural student organizations and VU professors were contacted individually to encourage students to participate. This is the first time that a campus climate survey has been completed at Valparaiso University, and this is also one of the first surveys of its kind to address multiple levels of diversity. The results offered unique insights into the experiences of all students, which were useful in addressing the current campus climate on both micro- and macro-levels.

**Information about the Authors:**
Nicole Hudson and Erica Wickstrom are junior social work majors who are concerned about issues of social justice, especially in regards to diversity. These researchers hope that this survey will provide new and meaningful insights into Valpo’s campus climate.

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I Want to be a Scientist: Secondary Students’ Perceptions of Science as a Career

Kayla Kutz

Departmental Affiliation: Education
College of Arts and Sciences

Much thought and effort on the part of high school science teachers is put into educating and engaging American youth in science with the hope that our country will have a bright future in science disciplines. But do high school students consider careers in science viable occupational options, or are the subjects of chemistry and physics simply course credits they are expected to complete? This study seeks to answer that question by investigating high school students’ perceptions of careers in science as they consider their own future career paths. Data collection consists of a survey distributed to sophomore, junior, and senior students currently enrolled in a secondary-level science course at a local high school. The survey questions probe student perception of the nature of professional work in science, applications of scientific work, and the role of the scientist in society. A more full and accurate understanding of these things may lead to an increase in talented students, who have benefited from an excellent education in science subjects, actually becoming interested in pursuing careers in science. Having talented scientists in the field provides more opportunity for the bright future of science, which is one of the main goals of science education.

Information about the Author:
Kayla Kutz is a third year physics and secondary education double major who, following the completion of a Bachelor’s and a Master of Science degree in Physics, plans to begin a career teaching high school physics. The subject of high school students’ perceptions of science as a viable career choice has interested her since she became interested in the profession through the Physics Department’s weekly colloquia.

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Effect of Stray Charge on Quantum-Dot Cellular Automata: A Full-Basis Calculation

Matthew LaRue

Departmental Affiliation: Electrical and Computer Engineering
College of Engineering

The authors analyze the effect of stray charges near a line of quantum-dot cellular automata (QCA) cells. They present the results of full-basis set calculations for three- and four-cell lines, including the ground state polarization and the excitation energy of the first excited state. A comparison is made between cells with parallel-spin electrons and anti-parallel spin electrons, showing that the added complexity of accounting for the anti-parallel spins is not necessary in this case. Finally, a comparison is made between the full-basis calculations and the results of a similar calculation using the Intercellular Hartree Approximation (ICHA). The similarity between these two results demonstrates that the ICHA method is a valid tool for studying the effect of stray charges in larger systems.

Information about the Author:
Matthew LaRue is a senior electrical engineer at Valparaiso University. Upon graduation, he will pursue a doctorate of electrical engineering degree at Ohio State University, specializing in RF integrated circuits.

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Anthony Lyza, Raquel Evaristo, Eric Lenning, Sarah Mustered, Travis Elless, Sarah Al-Momar, Ian Lee, Teresa Bals-Esholz, Bart Wolf, Kevin Goebbert, Adam Stepaneck, Craig Clark

Departmental Affiliation: Geography/Meteorology
College of Arts and Sciences

During the morning hours of 25 May 2011, at least six tornadoes struck a narrow corridor of Northeast Illinois and Northwest Indiana. Two tornadoes were rated EF0, three EF1, and one EF2. These tornadoes occurred in conjunction with a mesoscale convective system (MCS) that traveled northeast across the region during the early to mid-morning hours, between 1200 UTC and 1500 UTC. The tornadoes occurred at least 65 km away from the nearest NEXRAD WSR-88D radar site. The confirmed tornadoes from this event occurred without severe thunderstorm or tornado warnings likely due to the fact that (1) the squall-line was oriented parallel to the radar beam, (2) there were minimal real-time spotter reports, (3) embedded circulations were shallow, and (4) the tornado-producing storms did
not exhibit classic radar signatures at the nearest NEXRAD locations. The tornadoes occurred anywhere from approximately 50–75 km from the C-band dual-polarimetric radar located on the campus of Valparaiso University in Valparaiso, IN. In this presentation, we examine the data gathered from the C-band, dual-polarimetric radar at Valparaiso University. We review the data in hopes of revealing methods that could have better detected the tornadoes produced during this event.

Information about the Authors:
Anthony Lyza, Sarah Mustered, Travis Elless, Sarah Al-Momar, and Ian Lee are students at Valpo. Raquel Evaristo is the Geography/Meteorology Department radar meteorologist and Adam Stepanek is a staff meteorologist in the department. Eric Lenning is the Science and Operations Officer for the NOAA/NWS Forecast Office in Romeoville, IL. Teresa Bals-Elsholz, Bart Wolf, Kevin Goebbert, and Craig Clark are all faculty members from the VU Geography/Meteorology Department.

Faculty Sponsor: Dr. Teresa Bals-Elsholz
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GPU-Based Parallel Computing for Nanotechnology Research

Alex McGuffey

Departmental Affiliation: Electrical and Computer Engineering
College of Engineering

An effective technology for parallel computing is the application of graphical processing units (GPU) to computationally intensive calculations. Present research in nanotechnology simulations requires intensive calculations that have the potential to be parallelized and may benefit greatly from GPU processing. These simulations involve eigenvalue calculations on matrices with sizes up to 7776 x 7776. GPU computing speeds up this core calculation by a factor of 2.5, saving hours of valuable research time. As the size of the matrix calculations increases, the speed up using GPU computing increases; however, at small matrix sizes the GPU actually takes longer to compute than the CPU.

Information about the Author:
Alex McGuffey is a senior electrical engineering student. His involvement in this research started when a fellow senior, Matthew LaRue, needed to increase the speed of his simulations for Quantum-Dot Cellular Automata (QCA) research. Some GPU computing research had already been performed and looked like a viable solution to support the QCA research. Alex will be working as a civilian in the Air Force in the Electronic Warfare Group starting in September.

Faculty Sponsor: Dr. Jeff Will
Student Contact: alex.mcguffey@valpo.edu

Observational Studies of Proto-Planetary Nebulae

Christopher Miko, Rachael Jensema

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

We are observing the light variability through time of a sample of 26 proto-planetary nebulae (PPNe). These observations are being carried out using Valparaiso University’s 0.4 m reflector telescope and CCD digital imaging device. A total of 28 nights of observing were accomplished last summer and research has continued throughout this past fall and winter. Of the sample of 26 PPNe, light curves displaying changes in magnitude through the last 3.5 years (2008-2011.5) were constructed for nine objects. All were variable within a range of 10-50%. Five showed cyclical variability of ~40-150 days, 3 displayed short-term periods of ~10-20 days, and one is possibly cyclical but no period has been determined.

Information about the Authors:
Christopher Miko is a junior physics and chemistry major. This research reflects his first year as an undergraduate researcher, and he hopes to continue studying evolved stars this upcoming summer. Rachael Jensema is a junior physics and Chinese/Japanese studies major. This research is also a product of her first year doing undergraduate research. She plans to do research at the University of Minnesota-Twin Cities this summer.

Faculty Sponsor: Dr. Bruce Hrivnak
Student Contact: chris.miko@valpo.edu

Verification of Monte-Carlo Simulation for STAR EEMC

Kevin Miller

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences
Spin experiments using the STAR detector at Brookhaven National Laboratory seek to measure the gluon contribution to the proton’s spin. The Endcap Electromagnetic Calorimeter (EEMC), a portion of the STAR detector, is used to enhance the clarity and quality of the measurements from proton-proton collisions. These measurements require the EEMC to be well-modeled in the STAR simulation package. This analysis will confront simulations and data from proton-proton collision runs taken in 2006. Comparisons of qualities, such as cluster energy, opening angle, particle invariant masses, and hit distributions will be shown. When validated, the Monte-Carlo simulation will serve STAR physicists as an important tool to help identify and quantify the presence of particles produced in proton-proton collisions, thus aiding the extraction of the gluon contribution to the proton’s spin.

Information about the Author:
Kevin Miller is a junior physics major.

Faculty Sponsor: Dr. Shirvel Stanislaus

Student Contact: kevin.miller@valpo.edu

The Common Call to Care: An Interfaith Analysis on Adoption and the Differing Legal Status of Orphans and Abandoned Children in Judaism, Islam, and Christianity

Megan Muta

Departmental Affiliation: Theology
Christ College

Since almost all countries face difficult decisions regarding abandoned or orphaned children, many communities today must address issues of adoption and foster care. Adoption and foster care are also themes in three central world religions: Christianity, Judaism, and Islam. Although all three of these traditions affirm care of orphans and children in need, their views of adoption differ. The purpose of this paper is to present the precise similarities and differences regarding adoption and the legal status of orphans in today’s Jewish, Muslim, and Christian communities by analyzing the works of three prominent ethicists – Muslim scholar Jamila Bargach, Jewish scholar Michael J. Broyle, and Christian scholar Timothy P. Jackson. Each discusses the perspectives on adoption in his or her religious tradition and presents ideas for strengthening community support of children in contemporary societies. The paper finds that Islam rejects full legal adoption, Christianity affirms it, and Judaism argues for a form of “quasi-adoption” that honors both the adoptive and biological parents. Despite those differences, however, all three traditions can work together to care for the needs of orphans by encouraging open adoptions, honoring those who adopt, and affirming the rights of the child. By more clearly outlining these similarities and differences, the paper can strengthen interfaith initiatives and help all readers to reflect on the needs of children.

Information about the Author:
No information provided.

Faculty Sponsor: Dr. Marcia Bunge

Student Contact: megan.muta@valpo.edu

Living Homeless: The Interactions between Homeless Individuals and the Communities in which They Reside

Rachel Okerstrom, Lena Walsh

Departmental Affiliation: Social Work
College of Arts and Sciences

This study sought to assess the public’s knowledge and views of homelessness in Valparaiso to see if there was a correlation between how the homeless individuals feel they are treated and how the community views and treats them. It was hypothesized that there would be a negatively correlated relationship between how the individuals feel they are treated by the community and how the community views them. Previous studies have uncovered a negative relationship between community members and homeless individuals because of homeless individuals using the all-night bus system due to a dissatisfaction with homeless shelter service; the community views these individuals as taking advantage of the system. The struggle that community members feel regarding how to treat homeless individuals, often using discrimination, is stressed. The sample for this study included Valparaiso University students, community churchgoers, and general community members. All were given a survey to outline personal views on homelessness as well as being asked how they feel they were treated. This was the first study of this kind in the Valparaiso area. The data will be useful in guiding the community on how to have successful interactions between the subsystem of homeless individuals and the system of the community at large.

Information about the Authors:
Rachel Okerstrom and Lena Walsh are juniors working toward their Bachelor Degree in Social...
Work. Due to the nature of the profession, both want to explore a vulnerable population and look at social implications on said population. They both have previous experience working with homeless individuals in their hometowns with a rotating homeless shelter in DuPage County outside of Chicago and Families Moving Forward in Minneapolis, MN. Their similar experiences and backgrounds have guided them to now hold a common passion for working with this population. They feel that this population is often forgotten, and they want to use this project to give the homeless a voice. The delicate relationship between homeless individuals and the community in which they live is one that is not often discussed, and Rachel and Lena wanted to take the time to explore it in Valparaiso.

Faculty Sponsor: Dr. Matthew Ringenberg

Student Contact: lena.walsh@valpo.edu

Instilling Normal Saline with Suctioning: Beneficial or Harmful?

Brent Pavell, Charity Letko, Graciela Olivares, Jenny Luedke, John Gustavson

Departmental Affiliation: Nursing
College of Nursing

Use of normal saline in suctioning has been an established practice in health care professions for decades. Researchers have found that this practice can cause infection; however, use of normal saline remains common practice among health care providers. The purpose of this EBP project is to compare the effects on respiratory infection rates of normal saline lavage and not using normal saline during suctioning of patients with tracheostomies or endotracheal tubes. A literature review was conducted searching the following databases: CINHAL, Cochrane Library, and JBI CONNECT. Key words searched included tracheostomy, intubation, normal saline, nursing, respiration, and suctioning. Limitors included: English language, research, peer reviewed, and journals. The publications we researched focused on normal saline use in suctioning in patients with endotracheal tubes or tracheostomies. Samples included patients with pulmonary infection who were intubated and mechanically ventilated. Study designs included randomized experimental, controlled trial, blinded outcome, non-experimental survey, post-test only, and retrospective chart review. Overwhelming evidence supports that instillation of normal saline during suctioning may be harmful. Implementing a policy prohibiting the use of saline during suctioning was proposed. Adherence to the policy and nosocomial infection rates of patients requiring suctioning will be monitored for evaluation over six months.

Information about the Authors:
Brent Pavell, Charity Letko, Graciela Olivares, Jenny Luedke, and John Gustavson are senior accelerated nursing students looking forward to graduating in August. They hope to contribute their unique talents to various areas of nursing. Research is an important part of their current studies and will continue to be an essential part of their future nursing careers.

Faculty Sponsor: Dr. Suzanne Zentz

Student Contact: jenny.luedke@valpo.edu

The Effect of Religious Affiliation on Social Preferences

Jeffrey R. Schatz

Departmental Affiliation: Economics and Mathematics
College of Arts and Sciences

Economic actions are determined by a variety of social and cultural influences. Unlike the ideal rational economic actor, an individual will frequently fail to make optimal, selfish decisions. In this study, we examine the effect of religious influences on such decisions. Specifically, I test whether "Catholic Guilt" is a real phenomena or simply a superstition. The study compares the actions of Catholic, Protestant, and non-religious subjects while playing Ultimatum and Dictator games. Using standard regression analysis, I find the extent to which guilt affects the economic decisions of Catholic players, revealing a component of the complex relationship between religious belief and worldly action.

Information about the Author:
J.R. Schatz is a triple major in mathematics, philosophy, and economics. He is especially interested in the relationship between thought, language, and action, leading to a strong interest in game theory. As a lifelong Catholic, the effects of religious beliefs on action are especially compelling.

Faculty Sponsor: Dr. Rick Gillman

Student Contact: jeffrey.schatz@valpo.edu
Misconceptions in Newtonian Physics: Testing Teaching Techniques

Samantha Schwartz

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

Even after instruction, introductory physics students maintain incorrect Aristotelian ideas. This can become a repetitive or more severe problem in large classes where students cannot get the individual attention needed to fully understand the subject. An experiment on student comprehension in Newtonian mechanics was performed through supplemental instruction (SI) on a set of students enrolled in introductory physics. Two test groups were taught utilizing demonstration supplemental instruction (DSI) and recitation supplemental instruction (RSI) respectively. Improvement was tested quantitatively using the pre- and post-test scores for the Force Concept Inventory (FCI). The results from these groups were compared with a control group of students who did not participate in any of the extra lectures. Preliminary results indicate a statistically significant persistence to the 97% confidence level in maintaining the incorrect Aristotelian answer choice within the DSI group. The results also show a benefit in the RSI group over the DSI and the control groups, indicating a potential area to incorporate into the normal class to improve student understanding.

Information about the Author:
Samantha Schwartz is a senior at Valparaiso University with majors in physics and mathematics. She is involved in the Society of Physics Students, Sigma Alpha Iota, and the VU Flute Choir on campus. After graduation, she intends to attend a graduate program in physics education.

Faculty Sponsor: Dr. Todd Hillwig
Student Contact: samantha.schwartz@valpo.edu

The Study of Variability in Four Oxygen-Rich Proto-Planetary Nebulae

Kristie Shaw

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

I have been working on a project to study the variability of four oxygen-rich proto-planetary nebulae; by their IRAS catalogue names, they are 18095+2704, 19386+0155, 19475+3119, and 17436+5003. Proto-planetary nebulae (PPNe) are evolved stellar objects that are in the process of losing their outer layers and in transition from an asymptotic giant branch star to a planetary nebula. Oxygen-rich PPNe, specifically, have a higher oxygen content in their nebula than they do carbon, and this occurs mainly in lower mass stars. This project includes combining our data from the Valpo Observatory with other published data, analyzing light curves of brightness versus time and looking for patterns, and performing period analysis using a sophisticated period search program called Period04. I began this project in the summer of 2010, and I have successfully analyzed all four of the objects. Over the 16-year observing interval, all of the objects show clear cyclical variations (due to internal pulsation), with periods of 114, 102, 41, and 47 days (in order as listed above); there is also evidence that suggests additional beat periods. Three of the objects show a long-term increase in brightness from anywhere between 5 and 30 percent, while 19475+3119 shows no long-term increase in brightness.

Searching for Binary Stars in Planetary Nebulae Using the ISIS Image Subtraction Software

Samantha Schwartz

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

We are exploring the theory that binary central stars of planetary nebulae are a contributing factor in the formation of planetary nebulae. We search for this photometric variability in central stars of planetary nebulae because consistent periodic variability is indicative of a close binary system. The variability of our targets is assessed with the image subtraction software, ISIS. We find that the central stars of the planetary nebulae (CSPNe) Hen 2-84 and NGC 6326 show variability. A preliminary light curve for Hen 2-84 shows periodic behavior, suggesting a binary system. Of the remaining targets observed, with sufficient data, seven do not appear to have substantial variability detected through ISIS and two targets have undeterminable variability.

Information about the Author:
Samantha Schwartz is a senior with majors in physics and mathematics. She is involved in the Society of Physics Students, Sigma Alpha Iota, and the VU Flute Choir on campus. After graduation, she intends to attend a graduate program in physics education.

Faculty Sponsor: Dr. Gary Morris
Student Contact: samantha.schwartz@valpo.edu
Information about the Author:
Kristie Shaw is a senior astrophysics and mathematics major. She has been working with Dr. Hrivnak for three summers, and they are working toward publishing a paper on the results. She plans to attend graduate school in the fall to work toward her Ph.D. in astrophysics.

Faculty Sponsor: Dr. Bruce Hrivnak

Student Contact: kristie.shaw@valpo.edu

Developing Sonde Instrumentation to Improve the Accuracy of Upper-Atmospheric Data Aggregation

Mark Spychala, Raymond Finzel, Nathaniel Behrens, Samuel Cain, Nathan Chamot

Departmental Affiliation: Physics and Astronomy College of Arts and Sciences

A GPS tracking system for recovering weather balloon packages was designed and tested, and research was also conducted to determine the practicality of a gyroscopic stabilization system for small weather balloon packages. A low budget prepaid phone served as the main component of the GPS recovery system, which proved reliable in several areas of testing. A twin flywheel system powered by small brushless motors failed to stabilize a small weather balloon package when compared to stabilization from strategic weighting of the package.

Information about the Authors:
Mark Spychala is a junior meteorology major with training in the preparation and launch of ozonesonde balloon payloads. Nate Behrens is a junior mechanical engineering major with a keen interest in wind power technologies. Raymond Finzel is a junior computer science major. He is a self-starter who conceptualized this project as the best way to combine his interests in making things, leading a group, and going into space. Special thanks to Samuel Cain, Nathan Chamot, and Colin Johnson for their hard work during the research season.

Faculty Sponsor: Dr. Gary Morris

Student Contact: mark.spychala@valpo.edu

Improving the Fun Factor at Valpo: A Student Retention Strategy

Annie Stanchak, Matthew Butcher, Randez Collett

Departmental Affiliation: Communication College of Arts and Sciences

Retention is identified by the university as problem that needs be addressed a part of the overall strategy to improve enrollment at Valpo. This team brainstormed about possible retention issues and discovered that often students describe the campus as “boring” or “uneventful.” Valpo students were polled via the Internet and additional questionnaire handouts on campus. Many students felt as though they lacked information about events on campus and that their RA did not interact with them enough. This data established the extentiveness and the depth of the “lack of fun” problem. Research further revealed that a lot of the events/activities that the students wanted to see at Valpo were already here. So there is definitely a communication breakdown. Students expressed the need for more outreach and encouragement, especially from their immediate authority figure, their RAs, to inform them of what’s going on at Valpo. There was an expressed need for a newsletter that updated students on campus activities via email. (The Torch is too inflexible). Changes need to be made to inform students about campus events. Students proposed a student email newsletter similar to the one sent out to staff (the Campus Chronicle). Students also expressed concern about how the events and activities are promoted to the students, which generally excludes others – the “silo” effect. Since most students must live on campus until they’re upperclassmen, this further increased the issue students have with lack of “fun” on campus.

The campaign team will be presenting these research findings to different groups such as IMC and Residential Life.

Information about the Authors:
The team chose to pursue this project because they all agreed that a prevalent problem on campus among students is the fact that a lot of students have expressed similar negative feelings about life on campus - "It's boring" or "There's nothing to do here."

The goal is to change the way students feel about Valpo by restructuring the invitation to join organizational activities so it’s more inclusive as well as improving how Valpo students are notified about events and activities, thus improving their Valpo experience and ultimately retention. Matthew Butcher is a sophomore majoring in public relations. Annie Stanchak is a senior marketing major and communications minor. Randez Collett is a senior.

Faculty Sponsor: Dr. Bonita Neff

Student Contact: annie.stanchak@valpo.edu
Computer-Monitored Problem-Solving Dialogues

Christine Warner, Melissa Butts, Dan Leighty

Departmental Affiliation:  Mathematics and Computer Science
College of Arts and Sciences

This project shadows the work of student groups in Math 110, a qualitative literacy class, engaged in exploratory learning exercises. An instructor monitors these groups by both walking around the room and observing group conversation at another computer. Our goal is to put this exercise online, and as a result leave the entire monitoring process up to the computer, assuming the role that the instructor traditionally assumes. Using labeling techniques to decipher meaning in dialogue of students working in groups for Math 110, we try to see how students collaborate to solve problems together. Bits of realization, conversation, and problem-solving tags are sorted out and gathered to identify the main points that are expressed during the problem solving of the two person game, Poison. Expanding upon previous research done by other students, we are able to add to bits of realization that students encounter in their work. One purpose is to explore the differences between voice-recorded dialogue and computer-mediated chat dialogue. By examining these transcripts, researchers can raise questions about what sort of content is discussed to solve a problem and prepare the computer to recognize bits or realization in students' work.

Information about the Authors:
Melissa Butts is a sophomore, math/secondary education major with a minor in theatre design. She hopes to one day be a high school mathematics teacher. She is interested in this project because it may one day help her teach her students to understand how to highlight important pieces to problem-solving situations. Christine Warner is an actuarial science major with a statistics minor. She hopes to work as an actuary for an insurance company in the future. She is interested in learning how people function in group work and how effective communication plays a vital role in any group setting. Dan Leighty is a sophomore, mathematics/secondary education major. He hopes to one day be a high school mathematics teacher. He is interested in this project because, as a future teacher, it is important to know not only how individuals think but also how groups think and work toward a common goal.

Faculty Sponsor: Dr. Melissa Desjarlais
Student Contact: daniel.leighty@valpo.edu

Evidence for the Impact of Reactive Oxygen Species on Branch Density Homeostasis in Neurospora crassa

Jacob Yablonowski, Tayler Grashel, Alex Zapata, Hamzah Abduljabar, Michael Watters

Departmental Affiliation:  Biology
College of Arts and Sciences

In preliminary screenings, genes involved in the control of reactive oxygen species (ROS), were identified as playing a role in the process of growth rate compensation of branch density. Here we examine the relationship between ROS and branch density further. The maintenance of branch density under growth at various temperatures was examined in a selection of mutants in genes known to be important in ROS control. In all ROS control mutants tested, growth showed clear sustained hypobranching when grown at lower temperatures. This can be contrasted with wild-type Neurospora which branches at the same density under both conditions. We also tested the impact of environmental agents which lower the concentration of ROS on branching. In tests on wild type Neurospora, water soluble antioxidants (reducing agents), Ascorbic Acid and Glutathione produced unusual branching patterns. While lower doses produce sustainable hypobranching in wild-type Neurospora, hypha exposed to higher concentrations of Ascorbic Acid or Glutathione display a distribution of branching with two clear maxima. They show an increase in both very closely spaced branching as well as an increase in more distantly spaced branching.

Information about the Authors:
No information provided.

Faculty Sponsor: Dr. Michael Watters
Student Contact: jacob.yablonowski@valpo.edu

Analysis of Saccharomyces cerevisiae Circadian Rhythms in Continuous Culture

Lauren Zager, Melissa Kohner, Carlton Lyons

Departmental Affiliation:  Biology
College of Arts and Sciences

The circadian rhythm is a roughly 24-hour cycle in the physiological processes of organisms. There have been many studies on the circadian rhythms in other model organisms, but not in Saccharomyces cerevisiae. To study the rhythm in S. cerevisiae, the levels of GAP dehydrogenase were observed. After
the baseline levels were recorded, the conditions were changed to see if the circadian rhythm could be manipulated. The importance of identifying and studying the circadian oscillators in *S. cerevisiae* is to understand how the circadian rhythm is altered in differing conditions. The purpose of this experiment was to identify how changing the light and dark cycles affected the overall rhythms of *S. cerevisiae*.

**Information about the Authors:**
Lauren Zager is a senior with majors in biology, chemistry and humanities. She will be attending medical school at the University of Wisconsin-Madison School of Medicine and Public Health following graduation. Melissa Kohner is a junior biology major with chemistry and history minors. She plans to continue to do research with Dr. Sara Dick next year and plans on attending medical school after graduation. Carlton Lyons is a junior biology major. He became involved in Dr. Dick’s research through his interest in how organisms work and interact with the environment.

**Faculty Sponsor:** Dr. Sara Dick

**Student Contact:** lauren.zager@valpo.edu

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**The Use of Filamentous Fungi to Convert Solid Waste into Consumable Products**

Alex Zapata, Elizabeth Phillippi, Blair Mitchell, Jacob Yablonowski, Jonathan Schoer, Michael Watters

**Departmental Affiliation:** Biology, Chemistry
College of Arts and Sciences

Here we report on the use of Neurospora to reduce human solid waste while converting it into fungal biomass which has the potential to be used as a dietary supplement. Typically portrayed as an environmental hazard and source of undesirable odor, solid waste represents an untapped resource. Filamentous fungi are natural decomposers with the ability to use this resource and reduce its environmental impact. We examined fungal growth and composition to determine the conditions which maximize the rate of conversion of waste into fungal biomass. We compared the effect of the length of incubation, method of aeration, available surface area, and presence of supplemental salts on fungal growth and nutritional composition. Rates of conversion and nutritional content were highly variable, however, rates as high as 75% (3.75g of fungus produced from 5g of solid waste), with fungal protein content up to 50%, were obtained. Additionally, fungal growth reduced the characteristic odor of the media. We present data that the fungal mass is consuming these chemicals from the media to fuel its own metabolism and thus acting to eliminate the normally associated odor.

**Information about the Authors:**
No information provided.

**Faculty Sponsors:** Dr. Michael Watters and Dr. Jon Schoer

**Student Contact:** alex.zapata@valpo.edu
## Creative Work and Research Committee
### Student Undergraduate Research Grant Recipients

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College of Engineering Design Expo
Saturday, May 5, 2012
10:00 a.m. – 1:00 p.m.
Gellersen Center

Department of Art
Student Art Exhibition
April 18 – May 13, 2012
Brauer Museum of Art
Opening Reception, April 18 – 7:00 p.m., VUCA Lobby
Works selected by VU studio art faculty

Christ College Student Scholarship Symposium

Thursday, February 9, 2012
Novels in the Internet Age: Contemporary Fictional Literature’s Adaption to the Characteristics of the Internet Medium
By Tyler Gegg, senior

Guns, Guerrillas, and Raiders: The Myth of Tactical Stagnation and the American Civil War Soldier
By Will Scupham, sophomore

Thursday, November 3, 2011
Honor in Death: A Historical Analysis of Japan’s Contemporary Issue of Suicide
By Amber Will, senior

Reinterpreting Don Giovanni: Modern Audiences and Mozart’s Masterpiece
By Christopher Burrus, senior

Supporters of Valparaiso University’s Celebration of Undergraduate Scholarship

The Valparaiso University Guild
Office of the Provost
Committee for Creative Work and Research
Teaching Resource Center
Thanks to all who participated in the planning of this event.
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