

2007 ABSTRACTS

Index of Authors

Anderson, Ben Baker, Debby Bate, Amanda Batteiger, Emily Beachler, Leslie Beck, Ryan Bender, Andrew Borys, Teri Boschert, Carl Braun, Jonathan Brown, Kendall Brown, Valerie Burden, Camill Carlson, Rachel Colar, Laura Cottrell, Sarah Coulter, Ashley Cox, Paige Cullar, Emily Dukich, Luka Edwards, April Erickson, Jared Erikson, Kelly Fraaza, Karissa Francis, Cory Friedhoff, Jared Frith, Stacey Fuller, Jaclyn Galgani, Paul Gargas, Lindsey Garvin, Joe Gerhardt, Jessica Gordon, Katherine Grutz, Kayla Hall, Audrey Halstead, Chris Hassink, Bethany Hassler, Zachary Hillmer, Ansel Hoffman, Megan Hoover, Alex Hosmer, Kerry Humpris, Steven Israel, Kendre Johnson, Jenny	Joll, Gayle Jones, Abby Joyce, Steven Kardas, Kristen Keifer, Molly Kellams, Joshua Keller, Zachery Kelter, Ann Kirkwood, Rachel Klingensmith, Amie Kooyers, Nic Kwon, Hannah Kunnath, Christine Lary, David Lentz, Chris Letkewicz, Casey Levar, Alison Lueck, Erin Lukas, Jacqueline Macke, Jeff Malan, Joe Maloney, Erin Mar, Sara Mary, Michaelle Massura, Jeffrey Matusiak, Jamie McDonough, Brian McElwee, Erin McGinnis, Sean Mefferd, Ashley Meyer, Brett Michael, Rezene Miller, Elise Mohnen, Debra Moore, Melissa Murray, Erin Mutka, Andrew Nosie, Amanda Oestmann, Timothy Painting, Kristen Porter, Abby Preuss, Lindsay	Rausch, Jana Rehkop, Becky Rifai, Hadie Rossi, Michelle Russell, Alison Saunders, Jessica Saylor, Pamela Schmeltz, Shelly Schmid, Paul Schon, Mackenna Schuster, Ted Sedlak, Matt Selvy, Lawrence Shull, Adam Spagna, Kelly Spalding, Alex Spier, Cassie Speen, Fred Steele, Callista Stefanich, Amie Steffen, Deborah Steffen, Michael Strains, Jason Stypka, Carolyn Thomas, Jackie Thompson, Robert Tkaczyk, Emily Turchyn, Jim Velasco, Judy Vredevoogd, Joshua Wagner, Chris Wagner, Kevin Washburn, Ryan Whitcraft, Annie Wicks, Kendra Wielgos, Erik Will, Megan Wisz, Lisa Wolfe, Ben Wong, Sarah Wolthusen, Meghan Yamanoi, Shawn Zuellig, Josh
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Valpo CORE Reader

Joseph Goss, Editor

Valpo CORE Reader features some of the best writing done from the previous year, highlights models of the kinds of writing students will be doing in the current year, and perhaps most importantly, invites additional ways of thinking about our texts.

The idea of research is closely related to one of the best aspects of a portfolio writing course--its emphasis on revision. Revision, like research, implies work over time, and most of time, "seeing again" and "searching again" takes place through dialogues with others. One of the larger papers which involves both re-searching

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and re-visioning is the "worker profile," an ambitious paper in the second semester involving interviews and contextual framing.

You might notice that many of these essays address the idea of vocation or calling in the lives of the authors or their subjects. It is intentional. We have been given permission to devote some serious thinking about the spiritual world of vocation and how first-year students think about their place in that world. We are grateful to participate in the Celebration of Undergraduate Scholarship.

Contributing Authors

Ryan Beck, Rachel Carlson, Emily Cullar, April Edwards, Kelly Erikson, Cory Francis, Jenny Johnson, Christine Kunnath, Chris Lentz, Jeff Macke, Michaelle Mary, Alison L. Russell,

Alex Spalding, Jim Turchyn, Kevin Wagner, Ryan Washburn, Ben Wolfe

An Analytic and Approximate Calculation of the Atomic Polarizability of Hydrogen
Ben Anderson

Departmental Affiliation: Physics

College of Arts and Sciences

The only atom for which analytic wave functions exist is the hydrogen atom, thus it is the only atom which we can find the atomic polarizability analytically. My research uses several methods for finding the atomic polarizability from first order time independent perturbation theory, to a direct solution of the Dirac equation. I use several computational methods for solving the complicated integrals involved and currently have a range of $3-5.34a^3$, which is close to the exact solution of $4.5a^3$. A more rigorous treatment with relativistic quantum mechanics is currently in progress.

Information about the Author:

Ben is a physics, theology, math major with plans to go to graduate school for Atomic physics. His current project is in preparation for honors work senior year dealing with the frequency dependence of the Verdet constant.

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Evidence for the Prevention of Surgical Wound Site Infections in the Hospital

Debby Baker, Joe Garvin, Abby Jones,

Becky Rehkop, Kelly Spagna, Meghan Wolthusen

Departmental Affiliation: Nursing

College of Nursing

The aim of this evidence-based nursing project was to answer the research question: What interventions best reduce the rate of surgical site infections (SSIs) that occur in hospitals? Six Valparaiso senior nursing students searched the following databases: CINAHL, Pub Med, and Cochrane Library. Group members used the following key terms in their search: "surgical site infections," "preventions of surgical site infections," and "nosocomial infections." Using a team approach, the following criteria were used when critiquing articles: significance of the data, proposed interventions, and effectiveness of the intervention. In addition to

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research studies in journal articles (n=8), the Center for Disease Control (CDC) guidelines for the prevention of SSIs were also utilized. Study samples included elderly subjects admitted for surgical procedures. Variables included observations of surgical sites, glucose testing, types of dressing applied, and antibiotic use. The overall findings supported that the universal standard of care of SSI preventions include: strict adherence to aseptic technique, maintenance of glucose control, use of antibiotics and proper wound cleansing. The CDC guidelines provide a list of fourteen interventions that were included in their protocol for best practices. A plan for educating the staff and implementing the policy is proposed.

Information about the Authors:

Six senior nursing students dedicated to improving patient outcomes through the use of evidence worked on this project. They valued the team approach in achieving excellence during this project. They were enthusiastic upon receipt of their topic of surgical site infections. As they begin their nursing careers they look forward to implementing protocols and educating others in the health care field.

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What is Best Practice When Providing Culturally Sensitive, Physical Care for Hispanic Adults at the End of Life?

Leslie Beachler, Sarah Cottrell, Bethany Hassink, Ann Kelter, Jacqueline Lukas, Rezene Michael, Lisa Wisz

Departmental Affiliation: Nursing

College of Nursing

The patient population is changing. Hispanics are the fastest growing demographic group, requiring knowledgeable and culturally sensitive care. The projects purpose is to answer: What is best practice when providing culturally sensitive, physical care for Hispanic adults at the end of life? After searching CINAHL, nine research articles met inclusion criteria. Qualitative research designs were used in many of the studies to compare the attitudes of Hispanics verses other ethnic groups toward end-of-life care. Focus groups, chart reviews, chart audits, surveys, and methodology were types of studies utilized. Overall finding included the repeated themes of family involvement and emphasis on spirituality. After reviewing data on end-of-life care for Hispanics, the research group decided to implement a holistic approach to nursing care. This would include three principles: Consulting family in plan of care, incorporating specific spiritual needs, and rooming-in. The policy focuses on holistic end-of-life care for the Hispanic clients. Family involvement and spiritual needs of the clients are addressed within the policy. Staff and family interactions will be encouraged to promote family-centered patient care. Spiritual counselors' availability for individual and family needs will be discussed upon admission and rooming-in will be encouraged and supported.

Information about the Authors:

Six senior nursing students and one accelerated nursing student slaved over this evidence-based nursing research project.

Faculty Sponsor: Dr. Nola Schmidt

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Andrew Bender, Stacey Frith, David Lary, Dr. Gary Morris

Departmental Affiliation: Physics

College of Arts and Sciences

Mapping quasi-conserved atmospheric constituents, such as lower stratospheric ozone, into potential vorticity (PV) - potential temperature (Theta) coordinates is a common technique used to analyze sparse data sets. Ozone transformed into a flow-following dynamical coordinate system is insensitive to meteorological variability. Therefore data from a wide range of times and locations can be compared, so long as the measurements were taken in the same air mass, as defined by the PV. The mapping approach assumes a high correlation between the ozone and PV fields. In this study, we use the comparatively high resolution of the MLS data to test the correlation between ozone and PV in the lower stratosphere. We evaluate the ability of the PV mapping technique to reproduce the MLS profile data by comparing reconstructed data to the original data as a function of latitude, altitude, and season. We use dynamical data from the NCEP assimilation to represent the PV and Potential Temperature (Theta) fields.

Information about the Authors:

Andrew Bender is a VU Computer Science and Economics student with interests in the physical sciences. He assisted Professor Gary Morris with atmospheric research at NASA Goddard Space Flight center in Greenbelt, MD, the summer of 2006. Stacey Frith and David Lary are two of the Goddard researchers who assisted with this project.

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The Search for China's Destiny: The Chinese Civil War and the Communist Revolution

Carl Boschert

Departmental Affiliation: History

College of Arts and Sciences

The Communist-Nationalist Civil War was a turning point in the history of modern China. In 1945, Japan's surrender ended its brutal occupation of China which had cost millions of Chinese lives. The Chinese then hoped that they would be able to establish a lasting peace after the brutal seven year war. During the later stage of the war, however, the stage was being set for the final battle between the Communists under Mao Zedong and the Nationalists under Chiang Kai-shek. Although the United States tried to broker a peace deal between the two sides, both sides could not agree with the other and soon took up arms in a final showdown.

The reason why the Nationalists lost China and the Communists gained control are numerous. Nevertheless, the main problems facing the Nationalist government were corruption, economic troubles, and bad morale. In contrast, the Communist armies had few of these problems and in fact were able to exploit them to their advantage. Whereas the Nationalists earned the hatred of the common Chinese

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people, the Communists won their support and used this to launch a "people's war" which ended with their victory in 1949.

Information about the Author:

Carl Boschert is a senior majoring in Chinese studies and history. Carl has maintained an interest in China throughout college, and has studied Chinese all four years at VU. In 2005, Carl studied in China for eight months, greatly improving his language skills. In the summer of 2006, Carl was a member of a VU research team which studied how Chinese people view the United States. Carl is also an active member of Sigma Pi Fraternity. After graduation, he plans to either conduct Fulbright research in China or attend a graduate program at Johns Hopkins University.

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Marketing, Advertising, Public Relations: The Key Functions When Integrated

Valerie Brown, Lindsey Gargas

Departmental Affiliation: Communication

College of Arts and Sciences

The fields of marketing, advertising, and public relations are constantly competing against one another for resources, control, and prestige. This results in the lack of a true working relationship, which constantly affects communication campaigns everyday. The solution to this problem-Integrated Communications is the union of these disciplines and to recognize the potential of the fields. In two prior surveys of PR and business students, definitions of their respective fields were very accurate.

However, the perceptions and attitudes towards the students' other field was not examined. This time, the study was replicated to reflect attitudes as well as information knowledge. The solutions clarify a need for a better informational understanding of how each practice operates. Such an understanding allows for a better cooperative effort, making for better cooperation in communication campaigns.

Information about the Authors:

Lindsey Gargas is a junior art history and public relations double major. She is a member of PRSSA, Spark PR, a student-run PR agency, Delta Delta Delta sorority, and Lambda Pi Eta Honors Fraternity. Lindsey has curated three art exhibitions at Valpo and is a "Star of Art History." After Valpo, Lindsey plans on attending graduate school for arts administration. Ideally, she would love to be the curator of contemporary art at the Art Institute in Chicago.

Valerie Brown is a junior marketing and public relations double major. She is a member of PRSSA, Spark PR, Delta Sigma Pi business fraternity, and is an Ambassador in Admission. Valerie was recently selected as the recipient of the Daniel Edelman/PRSSA Award for the Outstanding PR Student and will intern with Edelman at the Chicago headquarters this summer. She ultimately wants to pursue a career in a PR agency like Edelman, specializing in consumer health.

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Learning Stimulus Discrimination: Observing a Human Memory Effect in Rats

Departmental Affiliation: Psychology

College of Arts and Sciences

Many investigations have demonstrated differential learning outcomes after spaced or massed practice trials. Normally, spaced learning trials produce better memory. The current study used rat subjects to determine whether pre-exposure to learning conditions would influence the spacing effect. Specifically, researchers tested the rats' ability to generalize between different flavors of milk. A conditioned taste aversion paradigm was used to train subjects to differentiate between flavors of milk. One of these flavors, the target flavor, was paired with an illness-inducing drug. Some subjects were pre-exposed to non-target milk flavors. Pre-exposure occurred in either a spaced (six total pre-exposures, one per day) or a massed (six total pre-exposures, two per day) fashion. Researchers predicted that those rats pre-exposed in a massed fashion would exhibit decreased performance. Namely, after massed pre-exposure, rats would show less differentiation between the flavors (greater generalization between target and non-target flavors). Findings support this prediction.

Information about the Authors:

Camill Burden is a freshman sociology/criminology and psychology major. Paul Galgani is a freshman biology and chemistry major. Abby Porter is a junior creative writing major and biology minor.

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Relationships of the Future: University/Students Relations

Laura Colar, Jonathan Braun

Departmental Affiliation: Communication

College of Arts and Sciences

Internal public relations is a major career choice for professionals. Higher education is the second highest employer of public relations professionals after the health profession. The role of the public relations office in relating to the student is crucial in these formative years. The relationship of the students with the public relations office is examined through the communication process, both the messages and the channels of communication.

Our study assessed the attitudes of students in regard to their experience at the university toward their administration, what makes them feel the way they do, what do they view as positive things that have occurred and what do they see as negatives, as well as what ways in which they feel universities can improve the college experience for students around the nation.

We feel that students believe the key to improving relations is more open communication. Students must feel that they are a part of a school, not that they simply attend it. They must be included in decision-making processes and be given roles of leadership that cause them to interact with members of the administration, making them an accessible entity.

We surveyed multiple students ranging from alumni, graduates, and undergraduates of all grade levels. Our finding is that the universities believe

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they are enacting specific measures for the betterment of their campus and their students, but they need to be asking how plans (before they are executed) could potentially be received. Students would like to be consulted, even after graduation. This way they feel like even after they have left, they became part of something for four years and that has not changed (this feeling would also assist in monetary support being continued).

Information about the Authors:

Jonathan Braun is a senior sports marketing major with double minors in public relations and business administration. Laura Colar is a graduating senior with a major in public relations and a minor in news media journalism.

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Supporting Underserved Pregnant Women Through a Smoking Cessation Program
Sarah Cottrell, Katherine Gordon, Teri Borys

Departmental Affiliation: Nursing

College of Nursing

An ongoing study assessing smoking patterns and supporting smoking cessation of underserved pregnant women was implemented using questionnaires to determine smoking history and preference to stop smoking during prenatal visits at a community health center in Northwest Indiana. Using the Transtheoretical Model, interventions for smoking cessation were designed to support the movement along the stages of change. Using a longitudinal design, a convenience sample of 25 underserved pregnant women was recruited.

Subjects ranged in age from 18 to 39 (M=23.78); educational level ranged from 10 to 16 years (M=12). The majority of the subjects were white (48%); the remaining subjects were African American (24%), Hispanic (20%) and Biracial (8%). Fifty percent had household incomes less than \$20,000 per year. Nine (36%) of 25 subjects indicated current smoke exposure at home, and eight (32%) indicated working in an environment with smoke exposure. All subjects received information on the effects of second-hand smoke. Of the 25 women surveyed, 18 (72%) had a history of smoking and five (28%) continued to smoke during pregnancy (mean number of cigarettes smoked daily was 8.2). Four (80%) women smoking attempted to quit on at least two previous occasions.

Using the Transtheoretical Model, two (40%) women identified that they were in the precontemplation stage, two (40%) were in the contemplation stage, and one (20%) was in the preparation stage. Once willingness to quit smoking was identified, smoking cessation kits were given to subjects. For subjects not contemplating smoking cessation, information about the harmful effects of smoking was distributed. Current smokers will be followed over a total of 18 months to evaluate the effectiveness of the interventions. Additional subjects will be recruited until a sample size of N = 100 is achieved.

Information about the Authors:

Sarah Cottrell is a senior nursing major. Katherine Gordon is a junior nursing major at Valparaiso. Teri Borys is a sophomore nursing major at Valparaiso.

Faculty Sponsors: Dr. Theresa Kessler, Prof. Elise Alverson

Valparaiso Chain of Lakes Watershed Water Quality Monitoring Project

Ashley Coulter, Shelly Schmeltz

Departmental Affiliation: Chemistry

College of Arts and Sciences

This project, along with extended examination of historical data, provided a more comprehensive view of how the watershed has been affected by local land uses. This information is critical knowledge for further city planning. The historical data in comparison with that collected in 2005 and 2006 gives insight as to how the watershed's health has changed, especially when viewing the change in nutrients and in conductivity values. Nutrients can speed the process of eutrophication which is an aging process. Conductivity is sensitive to the salinity of the water, which, in excess, is unhealthy to freshwater plants and animals. Whether construction work disrupts the soil, or steel plants emitting heavy metals into the air that fall into the lake, or people using fertilizer and pesticide on their lawns, or road crews putting salt on the roads during the winter, local land use plays a significant role in the quality of water in the watershed. Therefore, increased monitoring to gauge the watershed's health is important.

Information about the Authors:

Shelly Schmeltz is a senior chemistry and geography double major. She became interested in this project by listening to a presentation given in the fall of 2005 and started working on it in the summer of 2006. Through working on this project, she has been given the opportunity to travel to China to do water quality research after she graduates in May 2007. After her travel abroad, she wishes to pursue a career in environmental chemistry.

Ashley Coulter is a senior chemistry major with an environmental studies minor. She became interested in the project two years ago and has worked to help maintain watershed health since then by working with a number of organizations.

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The Role of Pectin Genes in Plant Reproduction

Paige Cox, Kerry Hosmer, Debra Mohnen,

Dr. Robert Swanson

Departmental Affiliation: Biology

College of Arts and Sciences

The purpose for this research is to isolate the genes that control plant reproduction. Determining which genes are responsible for fertilization is important because after isolation, they can be manipulated to increase crop yields which would help feed undernourished individuals.

The purpose of this project is to study the components that make up a plant's cell wall. These components, called pectins, may aid in the reproduction of a plant's pollen. Our lab has obtained pectin mutants and is observing how the plant's pollen reproduction corresponds to the wild type plant's reproduction. For my procedure, I will grow mutant pectin plants and compare their reproductive rates with the wild

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type. My hypothesis is that plants with disrupted pectin genes will show disrupted pollen reproduction.

If my hypothesis that pectin genes are responsible for plant reproduction is supported by data, the information will provide the plant biology scientific world with an answer to a much sought after question. It will also initiate genetic research that will, over time, be able to increase crop production and yields in agriculture.

Information about the Authors:

Our lab has been collaborating with Debra Mohnen, an associate professor at the University of Georgia, and her graduate student, Kerry Hosmer. Professor Mohnen has been studying genes involved in the biosynthesis of pectin. Her lab has supplied our lab with the mutant plants that are defective in making pectin. These plants will be used to test whether pectin is necessary for plant reproduction. After results have been collected from the laboratory testing, information will be sent to Prof. Mohnen for further analysis and for a possible paper to be published on our findings.

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Density Functional Study of Propane Oxidative Dehydrogenation by VO₄H₃ and V₂O₇H₄ Molecules: Gas Phase and Supported on TiO₂

Jared W. Friedhoff, Dr. Stan A. Zygmunt

Departmental Affiliation: Physics and Astronomy

College of Arts and Sciences

We present a B3LYP/6-31G(*) density functional study of propane oxidative dehydrogenation catalyzed by VO₄H₃ and V₂O₇H₄ molecules, both in the gas phase and supported on (001) anatase TiO₂. The mechanism involves propane adsorption at a vanadyl oxygen, followed by desorption of H₂O and adsorption of O₂ to fill the oxygen vacancy. The singlet potential energy surface has a 78 kcal/mol activation energy for gas phase VO₄H₃, but this is lowered by 15 kcal/mol by considering the possibility of a triplet state. For VO₄H₃ supported on anatase, the activation energy is reduced by an additional 20 kcal/mol, while for supported V₂O₇H₄ it is another 10 kcal/mol lower. Since the rate-limiting step involves formation of a propyl radical, the TiO₂ support appears to lower the activation energy, in part by reducing the singlet-triplet excitation energy of the catalyst. Our results are consistent with the experiment and help explain the catalyst-support effect.

Information about the Authors:

Jared is currently a junior physics and chemistry double major at Valparaiso University. He is currently searching for research that combines these fields in ways that are new and interesting. Jared became interested in this topic when applying for research within the department and noticing the topic on which Prof. Stan Zygmunt earned his Ph.D. at Massachusetts Institute of Technology.

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Comparison of Public Relations in the United States and Germany; Is it Really International?

Departmental Affiliation: Communication

College of Arts and Sciences

German Public Relations is not something I would think about on an everyday basis. When I decided to study in Reutlingen, Germany, for the Spring 2006 semester it became an interesting concept. Until then, I had never thought about public relations practices in other countries.

Through my travels, I discovered that public relations in Germany is similar to US practices, but also different. To conduct my research I interviewed various individuals, as well as surveyed, and surfed the Web to find the answers to my questions. The basis of my research addressed two questions: What is public relations in Germany and how do people perceive it? To find the answers I surveyed 50 German students that lived in my dorm, interviewed 10 individuals in Berlin, and researched the work of Dr. Gunther Bentele. I found that the public relations field in Germany is a growing field. While the initial feeling toward the practice of PR is negative in Germany, it has not had the time to build itself up as the US has been able. In the future German public relations may very well be as successful as the United States.

Information about the Authors:

Jaclyn is a junior public relations major, originally from Canton, Ohio, and she has just recently completed her second semester abroad. Since January, Jaclyn has been an intern in the Office of Public Affairs in the Smithsonian's National Museum of Natural History. At Valparaiso she is a member of Kappa Kappa Gamma, PRSSA and Spark PR.

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The "World Banquet" of Cultural Arts: A Campaign for Inclusiveness

Jessica Gerhardt, Amanda Bate, Erik Wielgos

Departmental Affiliation: Communication

College of Arts and Sciences

The international organization, VISA, felt the goal to increase American student involvement in the World Banquet was important. Thus the Public Relations Student Society of America's student agency, SPARK, was invited to create a campaign to attract more participants from the student body.

The banquet is an opportunity for students, staff, and faculty to experience ethnic foods and cultural arts. The two objectives established early in the campaign included: 1) an invite that indicated the celebration was inclusive and not just for international students and 2) an approach that focused both on electronic and traditional promotions with a strong pre- and post-evaluation component. In previous years, the World Banquet was heavily attended by community members with few students attending. Although ticket sales were always good, as was the food and entertainment, VISA wanted more student involvement.

The public relations team coordinated plans with VISA members, faculty advisors, and students around the campus. The research focused on past evaluations, information from other students, and valuable history from dining services, the VISA

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office, and the international student association. The results from the evaluations
and review of the two-day event strongly supported the objectives of the campaign.
The fact that the experience surpassed expectations was very satisfying.

Information about the Authors:

Erik Wielgos is a senior public relations major from Bartlett, IL. Erik concentrates his interests on the non-profit and agency sectors. He will be graduating in May. Amanda Bate is a junior public relations major who has an interest in VISA because she enjoys learning about new cultures and religions. She has PR experience working for Chordcraft Music Company, as well as Greater Media Detroit Radio, doing promotion. Jessica Gerhardt is a junior public relations major who is interested in campaign work and communications research. She likes traveling and learning about new cultures.

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Spontaneous Social Engagement in Children with Autism

Kayla Grutz, Steven Joyce, Emily Batteiger

Departmental Affiliation: Psychology

College of Arts and Sciences

One of the impairments characterizing Autism Spectrum Disorders (ASD) is a deficit in social functioning. Children with autism typically do not spontaneously engage others in social exchanges. Eye contact, gestural greetings and social speech may be delayed, awkward, or absent altogether.

The current study examines the prevalence of verbal and nonverbal social greeting responses (hello, goodbye) among ASD diagnosed children in a special learning program. Performance of these children was compared with that of typically developing preschoolers in an area early-education facility. Furthermore, ASD participants were examined to determine the influence of social training on the prevalence of social responses in beginning and advanced learners.

Researchers hypothesized that social responding deficits would be apparent in ASD participants when compared to control participants. Moreover, it was expected that ASD children with advanced verbal training would perform more social responses than children who were just beginning verbal instruction.

Information about the Authors:

Kayla Grutz is a junior psychology major. She plans to attend graduate school and study child psychology. Steven Joyce is a senior natural sciences major. He plans to attend medical school and specialize in emergency medicine. Emily Batteiger is a junior psychology major. She plans to attend graduate school and study forensic psychology.

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STD Knowledge Among Valparaiso Students Based on High School Background

Audrey Hall, Gayle Joll, Kristen Kardas

Departmental Affiliation: Social Work

This study attempts to determine whether there is a difference in knowledge levels concerning STD's among Valparaiso students based on grade level, gender, and type of high school attended, whether private or public.

Information about the Authors:

The three authors are students in the Department of Social Work.

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Public Relations: Campaign Affects Smoking Behavior in Youth: A US Case Analysis.

Zachary Hassler, Megan Will

Departmental Affiliation: Communication

College of Arts and Sciences

Anti-smoking campaigns are having a major impact on youth smoking behavior across the country. The most effective campaign is the "Truth" campaign which doesn't use overbearing messages about the dangers of smoking to prevent kids from smoking, but graphic images such as body bags on the steps of big tobacco corporate offices to convey their message. In 1998 a nationwide tobacco settlement called for Big Tobacco to endorse the "Truth" campaign. The American Legacy Foundation runs and models the campaign after the Florida "Truth" campaign, (1998-2000) which targeted Hispanic youth. What exactly is making the "Truth" campaign so successful? Is the "Truth" as effective now as it was when the campaign began? How is the youth market being targeted, and what strategies are being implemented? The theoretical foundation is a grassroots effort. It effectively exposes manipulative marketing techniques used by the tobacco companies to addict youth. By analyzing reports, and data from the "Truth" campaign itself and outside research, we found that awareness in 2007 is similar to the highs of 2000-2002. Despite fears of decreased funding, due to Big Tobacco possibly losing enough market share to stop supporting the campaign, the campaign is still highly effective among America's youth.

Information about the Authors:

Zach Hassler is a junior geosciences major, and PR minor and a brother of Phi Mu Alpha. Mostly he concentrates his studies in GIS and environmental conservation and restoration. This stems from a life-long interest in the outdoors and the environment. He hopes that a public relations minor will help him in his endeavors to inform the public on the dire situation our natural world is in. Megan Will is a senior public relations and English double major with a psychology minor. She is presently subsumed by the job search and is endeavoring to work in health PR post graduation. She is interested in special public health campaigns and hopes to be a part of their making one day.

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An Investigation into the Periodic Nature of 10 Proto-Planetary Nebulae

Ansel Hillmer, Joe Malan

College of Arts and Sciences

This project outlines the scientific background of proto-planetary nebulae, then continuing with an outline of the techniques used for data collection, reduction, and analysis. The Periodicity of each of ten PPNe is then discussed, with ample charts, graphs, and phase plots to provide visual evidence supporting the findings. Ultimately, one distinct and one faint but feasible period are found, with one PPN lacking periodicity and being only cyclical in nature. The findings on the last two PPNe are indecisive; the data is not accurate enough and there is not enough of it to formulate a firm conclusion of the object.

Information about the Authors:

Ansel Hillmer is a physics/mathematics double major and a member of the VU swim team. Joe Malan is a creative writing major with a minor in physics and writes for *The Torch*.

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Role of Humor on Recall of Captions and Keywords for Within-Groups and Between-Groups Designs

Megan Hoffman, Amie Klingensmith, Lindsay Preuss

Departmental Affiliation: Psychology

College of Arts and Sciences

Commercials use humor to increase sales by aiding memory of the product. It has been shown that humor can be used to increase memory of certain information. This phenomenon is called the humor effect, which occurs when humorous material is recalled more than non-humorous material. The present study duplicated this phenomenon in a controlled setting through the use of non-humorous and humorous posters. Previous research found the humor effect in within-groups designs. The purpose of the present study is to find the humor effect in a between-groups design. Participants viewed posters with a caption and keyword. After several math questions, they were asked to recall the above. Captions were analyzed via two different criteria: gist and lenient. Participants recalled the gist if they wrote the general meaning of the caption. Lenient recall involved memory of at least one word from the caption. Factorial ANOVAs will be run to compare recall of humorous and non-humorous captions and keywords. It is expected that a between-group effect will be found for all three dependent variables. Data has not been analyzed but will be at the conference. If our hypothesis is correct, our results can solidify the value of humor in commercials.

Information about the Authors:

This project is a continuation of one that was began in the lab component of Professor Carlson's Human Cognition class. After the completion of that class the authors joined his research team to gain more insight into the research process. All three authors are junior psychology majors.

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Kendre Israel, Rachel Kirkwood, Kendra Wicks

Departmental Affiliation: Social Work

College of Arts and Sciences

According to the American Cancer Society, cigarettes kill more Americans than alcohol, car accidents, suicide, AIDS, homicide, and illegal drugs combined. Due to the deadly consequences of cigarette smoking, the aim of our research project is to discover which factor is most influential in deterring young adults from smoking cigarettes. Our research question asks whether personal relationships or public health education play a stronger role in a young adult's decision not to smoke cigarettes.

Our sample includes freshman men and women enrolled in Valparaiso University's CORE program. The freshmen students must be between the ages of 18 and 25 years old. Our survey will ask questions concerning public health education such as the D.A.R.E. program, primary and secondary school health classes, and media campaigns against cigarette smoking. Questions regarding relationships include influences from siblings, parents, guardians, adult mentors, and/or peers.

We desire that our results will indicate which method or methods of intervention are most successful in preventing a young adult's decision to begin cigarette smoking. Our research will allow us to advocate directing policy and funding toward the most effective preventative measure or measures.

Information about the Authors:

Rachel Kirkwood is a junior from Chesterton, Indiana. She is majoring in social work and minoring in ethnic studies and gender studies. After graduation, Rachel is interested in working in a school setting. Kendre Israel is a junior from Allen, Texas. She is majoring in social work and minoring in Spanish. Kendre is interested in public health issues, such as cigarette smoking. She hopes to attend graduate school and concentrate on similar issues. Kendra Wicks is a junior from Saint Louis, Missouri. She is double-majoring in social work and political science. She plans to attend graduate school and concentrate on issues related to the criminal justice system.

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Indoor Study of Radon Concentrations

Joshua N. Kellams

Departmental Affiliation: Physics

College of Arts and Sciences

Radon gas in the home is a very large problem and presents significant health risks to the people who live in a dwelling with high concentrations. Since it is a gas, it is capable of getting into any area that is not air tight, namely cracks in the foundation, spaces next to sump pumps and drains. According to the EPA, radon exposure is the leading cause of lung cancer among non-smokers. In 2005, the Surgeon General issued a national health advisory for radon.

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Radon (Rn222) comes from a known decays chain starting at uranium (U238), which is found in the ground, and then goes through several decays before reaching radon gas. The other decay products are not of much concern because they are not gases and therefore have no way to leave the ground and get into our bodies. Once the radon gas is inhaled it is then possible that the particle decays (half-life of 3.823 days) while inside the body. If this decay happens inside the lungs, the alpha particle will deposit that energy into the lungs, possibly mutating the cell.

Information about the Author:

Joshua Kellams lives in Portage, IN, and is a senior. He is 22 years old and has enjoyed studying science and math since a young age.

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Choosing a Context: The NSA Surveillance Program

Zachery Keller

Departmental Affiliation: Christ College

College of Arts and Sciences

On December 16, 2005, *New York Times* journalist James Risen uncovered a secret surveillance program run through the NSA. Specifically, Risen discovered that the Bush administration had authorized the NSA to eavesdrop on Americans without court warrants. Initial responses to this program formed their arguments in the context of two basic settings. Opponents of the NSA program saw President Bush's actions as a return to privacy violations of the past. Challengers drew parallels to President Nixon's use of the C.I.A. for domestic spying in the 1970s.

Therefore, these people viewed the program as a dangerous extension of executive power that, if left unchecked, would prove costly to the civil liberties of Americans. Defenders, on the other hand, saw the program as a reality of the post September 11 world, where national security must always be a primary focus of the nation, and where citizens must sacrifice some civil liberties to ensure security. These people argued that the NSA program was a critical part of the United States' defense of its homeland. In my paper, I consider each of these potential contexts in detail, exploring the benefits that each offer to understanding the complex national security and civil liberties issues involved.

Information about the Author:

Zachery Keller selected this project for his Christ College Honors Thesis in the spring of 2006. He wrote the paper in conjunction with Professor Murphy's course that semester on liberty and freedom. Driven by both his own interest and current events, he chose to write a paper on the NSA surveillance program. By examining various sources, including James Risen's *State of War*, Zachery was able to explore various responses to the surveillance program.

Faculty Sponsor: Dr. Andrew Murphy

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Arabidopsis 2010: Functional Analysis of Pollen Exine Assembly

Nic Kooyers, Andrew Mutka, Alex Hoover

College of Arts and Sciences

This project focuses on determining the genes, the gene products, and the biochemical synthesis of a pollen grain. Such studies of plant reproductive biology have implications in crop propagation and breeding, in determination of the evolutionary history of plants, and understanding mechanisms of speciation. The genes controlling production of the outer pollen wall, the exine, were examined using both a candidate gene approach and a visual forward genetic screen in the organism *Arabidopsis thaliana*. Exine mutant plants were characterized into groups using microscopy. These plants are currently being used to collect metabolomic data that should give insight into a mechanism for the biosynthesis of this exine layer. Currently, over 13,000 lines have been processed through the genetic screen and 250 candidate genes have been examined. Sixteen distinct groups of mutants have been defined and characterized. Preliminary metabolomic data of one exine mutant (At1g69500) has indicated mystric acid-like and protopumeric A-like compounds are higher in wild-type than exine mutant. However, paedersoside-like and 8-methylthio-like compounds are in excess in the exine mutant compared to the wild-type. The genetic screen has been completed, but metabolomic analysis will continue until all 16 groups of mutants have been processed.

Information about the Authors:

Alex Hoover (Valparaiso U.), Nic Kooyers (Valparaiso U.), Andrew Mutka (Valparaiso U.), Ann Carlson (Valparaiso U.), Robert Swanson (Valparaiso U.), Ewa Urbanczyk-Wochniak (The Samuel Roberts Noble Foundation), Lloyd Sumner (The Samuel Roberts Noble Foundation), Anna Dobritsa (U. of Chicago), Daphne Preuss (U. of Chicago)

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An Investigation of a Teacher's Discursive Moves to Foster Student Discourse in an Inquiry-Based Differential Equations Classroom

Hannah Kwon, Molly Keifer

Departmental Affiliation: Mathematics

College of Arts and Sciences

Many studies have been conducted to understand how a teacher's discursive moves affect student learning in the K-12 mathematics classroom. However, little research has been conducted to investigate the teacher's moves at the undergraduate level. Also, inquiry-based mathematics is becoming increasingly popular because it requires students to explain and justify their thinking, thus emphasizing conceptual understanding as opposed to procedures and formulas. The purpose of this research is to analyze one teacher's discursive moves to understand how it affects student discourse and learning processes.

We watched nine days of an inquiry-based differential equations class. The class consisted of nine undergraduate engineering and mathematics majors with a mathematics professor using inquiry-oriented strategies for the first time. The class was learning how to find solutions to systems of differential equations. We coded and then analyzed the teacher utterances using the transcriptions of the

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75-minute classes. The coding scheme had four major categories: revoicing, questioning, telling, and directing. Our analysis revealed that the teacher used primarily questioning to elicit student discourse and prompt student explanation and justification as the class constructed the new knowledge. In the future, we intend to utilize the coding scheme in other classrooms.

Information about the Authors:

Hannah Kwon is a sophomore math and secondary education major. She wanted to join this research team to learn about a style of teaching that would help her in a mathematics classroom. Molly Keifer is a sophomore majoring in accounting and finance, and minoring in mathematics. She is intrigued by different teaching styles and wants to learn how to improve teacher/student relationships in the classroom.

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Using CASA Radars to Improve Road Weather and QPE

Casey Letkewicz

Departmental Affiliation: Geography & Meteorology

College of Arts and Sciences

Weather conditions can play a large role in causing traffic accidents as well as huge losses in the transportation industry due to delays. Using traffic data from the H.E. Bailey Turnpike along Interstate 44 in Oklahoma, normal traffic patterns have been determined and the effects of different weather variables on driving behavior have been evaluated. Heavy rainfall events were used not only to study their effect on traffic flow, but were also used to determine how well two NEXRAD radars, Oklahoma City and Frederick, estimated precipitation. Though CASA radar data were unavailable at the time of this research, it is a hope of the CASA project to mitigate traffic accidents and other road hazards due to weather with an improved Quantitative Precipitation Estimate (QPE).

Information about the Author:

This research project was a part of a Research Experience for Undergraduates in the summer of 2006 located at the University of Oklahoma. Casey worked with the Collaborative Adaptive Sensing of the Atmosphere Engineering Research Center funded by the National Science Foundation under Dr. Jerry Brotzge. As a senior, Casey plans on continuing his education by pursuing a Master of Science degree in meteorology beginning in the fall of 2007.

Faculty Sponsor: Dr. Jerry Brotzge, University of Oklahoma

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Image Restoration Theory: How Public Relations Affects Political Campaigns.

Alison Levar, Karissa Fraaza

Departmental Affiliation: Communication

College of Arts and Sciences

Research indicates that negative campaigning does have a significant impact on publics. Thus it is critical for there to be means or a correction factor to address this potential imbalance within the political process.

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For this study, political candidates were interviewed and publics surveyed to assess the balance between positive and negative messages in a campaign. The results suggest that the negative element varied

according to the type of campaign developed. Thus those campaigns with negative elements served as the focus of this analysis. The results indicated that there is very little knowledge of theory much less the Image Restoration Theory by the candidates. Instinctively the candidates did respond but not with any great sense of a plan. Often the negative aspects were carried out in the media and the outputs from the media (clippings, broadcasts, etc.) served as the primary source of verification. Web sites and the Internet also aided the analysis.

Information about the Authors:

Karissa Fraaza is a junior public relations major from Kalamazoo, Michigan. She is currently a co-president of The Association of Women in Communications and participated in Festival of Voices as a member of the media relations team. After graduation, Karissa plans to work in entertainment or media public relations.

Alison Levar is a junior theater and Public Relations double major from Des Plaines, Illinois. As a member of Delta Delta Delta, she assists the VP of Public Relations with internal PR as the Sunshine Chair. She is also the PR chair for The Association of Women in Communications at Valparaiso University. Next year she looks forward to her role as president of Alpha Psi Omega, the national honorary theater fraternity. After college, she plans to attain a job at Edelman Worldwide at one of their international offices as an arts and entertainment account executive.

Faculty Sponsor: Dr. Bonita Neff

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Light Curve Study and Period Analysis of Binary Star AU Serpentis

Erin Lueck

Departmental Affiliation: Physics/Astronomy

College of Arts and Sciences

AU Ser is a short period binary star with a period of about 10 hours. It is an overcontact type of binary system in which the stars are actually touching. Observations of AU Ser were made by summer research students over eight nights from May to July 2006. Data was combined to make light curves, which show the variation in brightness due to one star passing in front of the other. Observed was four times of minimum brightness, which was used to calculate the period of variability. Light curves are being analyzed and then combined with velocity observations to determine various properties of the stars, such as mass, size, temperature, luminosity, and inclination of the orbit. The method of analyzing light and velocity curves of binary stars is the only way to determine masses of stars. This work is supported in part by the Indiana Space Grant Consortium and the National Science Foundation.

Information about the Author:

Erin Lueck became interested in binary stars while doing undergraduate research at Valparaiso in the summer of 2006. They observed several binary stars and other objects, including AU Ser. He is studying physics with a concentration in astronomy, and plans to go to graduate school in astronomy.

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A Eulogy for Dead Metaphor

Erin Maloney

Departmental Affiliation: Philosophy

College of Arts and Sciences

What happens when a metaphor is no longer recognized as a metaphor by both speakers and hearers? Philosophers call such an expression a dead metaphor. For example, when one talks about the mouth of a river, no one begins to think about the orifice used for eating and speaking, attributing it in a metaphorical sense to a river. We simply know the geographical feature to which this phrase refers, and no further cognitive activity takes place. There are many examples of dead metaphors in language; three different characterizations: some metaphors become definite descriptions, as in my initial example, which name objects. Others remain conduit metaphors, through which we express ideas and understanding, and still others are idiomatic structures determined by culture. Dead metaphors are never recognized in conversation but are extremely prolific in everyday language. Such a great quantity of dead metaphors has certain repercussions on language, culture, and society. While some philosophers believe dead metaphors are detrimental to our ability to communicate and to our capacity to understand concepts, I believe they have positive effects on language itself, enriching meaning and making our language more vibrant and poetic. This belief is contingent upon dead metaphors acquiring a literal truth upon dying; otherwise, our primarily figurative language remains false and meaningless. The scope of dead metaphors is wide; they structure not only our language but also the development and transfer of ideas and scientific theories, making it easier for us to grasp and relate abstract concepts through familiar vehicles of dead metaphors. Ultimately, dead metaphors are beneficial to human beings and to our communication, even across language and cultural barriers.

Information about the Author:

Erin Maloney is a senior in Christ College, majoring in philosophy, French, and humanities. Erin studied in Paris, France, in Spring 2006. She plans to attend graduate school and has been accepted to a master's of linguistics program at Ohio University. This paper was her Christ College honors thesis in Professor Visser's Philosophy of Language course and was presented at the National Conference for Undergraduate Research in California in April 2007.

Faculty Sponsor: Dr. Sandra Visser

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A Light Curve Study and Analysis of the Short-Period Contact Binary Star XZ Leo

Jeffrey Massura

Departmental Affiliation: Physics

College of Arts and Sciences

Observations of the short-period eclipsing binary XZ Leo were made with the Valparaiso University telescope during the spring of 2006; complete VRI light curves were obtained. These show minima of nearly equal depths but some

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variation in the heights of the maxima. These new light curves differ somewhat from previously published ones. Preliminary modeling of the light curves, together with previously published radial velocity data, has been done using the Wilson-Devinney code, and the results of this study will be presented. This work was supported in part by the Indiana Space Grant and the National Science Foundation.

Information about the Author:

Jeff Massura, a senior, is majoring in physics, astronomy, and secondary education. Jeff chose to research XZ Leo after researching binary stars for two summers at Valparaiso University. He is currently student teaching at Merrillville High School. After graduation, he hopes to teach high school physics in the Chicago area.

Faculty Sponsor: Dr. Bruce Hrivnak

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Quantifying Africa's Air Quality with Satellite Data

Jamie Matusiak

Departmental Affiliation: Meteorology

College of Arts and Sciences

Africa is a continent rich with natural resources, exotic animals, and aerosols. Microscopic particulate matter (PM_{2.5}) is expelled into the atmosphere as biomass burns; the PM_{2.5} can lead to respiratory problems as the particles accumulate in one's lungs. Burning fields and fossil fuels are the two main sources of PM_{2.5} in Africa. Additionally, the climate of Sub-Saharan Africa only allows for a few months of atmospheric cleansing through rain showers. This study used MODIS and GLAS data to determine the concentration of PM_{2.5} and other aerosols in the atmosphere above Africa and where these particles are located in the atmosphere, respectively. Annual and monthly means were calculated to discover general trends, and correlation values were used to discover relationships between total aerosol and PM_{2.5} optical thicknesses. The climate of Africa was also investigated to discover the source of the annual particle concentration patterns. The results of this study may be used to help the World Bank determine which of the 5 regional areas require the most help in order to clean their air, and they appear to be the northwest and midwest sections of Sub-Saharan Africa as defined in the study.

Information about the Author:

Jamie Matusiak is a senior meteorology major from Oak Lawn, IL. During the summer of 2006, she participated in the Summer Institute on Atmospheric, Biospheric, and Hydrospheric Sciences at the Goddard Space Flight Center. She used satellite data to decipher the concentration and location of aerosols above Sub-Saharan Africa while at Goddard.

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Matriculation to Graduation: Student Attitudes toward Homosexuality and HIV/AIDS

Erin McElwee, Pamela Saylor, Carolyn Stypka

Departmental Affiliation: Social Work

When students enroll in an institution of higher education, they each bring their own ideology to campus life. This study examines Valparaiso University students' attitudes toward homosexuality and HIV/AIDS. Do these attitudes change from matriculation to graduation when the student has been exposed to different world and educational perspectives, student organizations and different religious views?

This study will also examine educational, religious, and political backgrounds as a means of determining student attitudes toward homosexuality and HIV/AIDS. The data has been collected from a representative sample of the current student body at Valparaiso University.

Previous studies of heterosexual students at liberal arts colleges have found that females are more accepting of homosexuality than males. Other attributes that predict acceptance of homosexuality include holding liberal sex-role attitudes, lower religiosity, and having positive contacts with gay, lesbian, and/or bisexual persons.

This presentation will also include data from other relevant studies to determine whether attitudes on VU's campus are consistent with findings at institutions across the country.

Information about the Authors:

Erin McElwee is a senior in the social work department. She is interested in this topic because it relates to work with vulnerable and oppressed populations. After graduation, Erin will be attending the University of Michigan to pursue her master's degree in social work, with a concentration in interpersonal practice with children and youth. Pam Saylor is also a social work senior. This topic is of interest for Pam as she plans to work in the HIV/AIDS field of social work after attending graduate school to pursue a master's degree in social work. Carolyn Stypka is a junior social work and art double major. She is interested in this topic to explore students' perspectives and feelings at a private Lutheran university towards HIV/AIDS and homosexuality. After graduation, Carolyn hopes to teach English in Japan for a year, and then work towards her master's degree in social work.

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An Analysis of Meteorological Factors that Influence Boundary Layer Ozone Concentrations Using Ozonesonde Data from Valparaiso, Indiana, Pellston, Michigan, and Houston, Texas

Ashley Mefferd

Departmental Affiliation: Geography/Meteorology

College of Arts and Sciences

As part of NASA's IONS and IONS-06 campaigns, 52 ozonesondes were launched from Pellston, Michigan in July and August 2004 and Valparaiso, Indiana in April and May 2006. In this study, the data from the lowest 3 km of each profile is examined to identify the impacts of mixed layer heights and environmental variables, such as potential temperature and relative humidity, on boundary layer ozone concentrations. The evolution of the boundary layer throughout the day is observed from separate launches taken in Houston, Texas and is found to largely influence ground-level ozone concentrations. The Valparaiso and Pellston launch days are classified based on three ozone categories: high, mid and low

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ozone days. These categories are determined by adding or subtracting a standard deviation from the mean ozone concentration at 0.25 km above the surface. Values less than 23.74 ppbv are classified as low ozone days while readings greater than 51.61 ppbv become high ozone days. Any 0.25 km concentration between these values is classified as a mid ozone day. By determining the mixed layer height for each launch day and using the designated categories, it was found that days with higher 0.25 km ozone concentration had higher mixed layer heights.

Information about the Author:

As a research assistant for the Tropospheric Ozone Pollution Project, Ashley Mefferd developed an intense interest in air quality while launching ozonesondes from Valpo's campus. Data analysis was performed on these launches throughout the summer and during her senior year. She presented this research on a national stage at the American Meteorological Society's 87th Annual Meeting in San Antonio, Texas. After graduating in May, she plans to attend graduate school and specialize in air quality.

Faculty Sponsor: Dr. Gary Morris

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Education: The Equalizing Factor in Public Relations

Elise Miller, Kendall Brown

Departmental Affiliation: Communication

College of Arts and Sciences

The formal history of public relations was established almost exclusively by males. However, the discipline now is balanced toward females with nearly 60% of the profession represented by women. This pattern is also reflected at Valparaiso University and other educational institutions offering public relations as a major. Research indicates that as more women enter the field of public relations, a good portion of these practitioners are represented in the technician level, and that level is reflected by a lower wage scale and much less responsibility. However, there is also a significant growth of females being represented on the managerial level and as account executives. This emerging female leadership is tied closely to the educational opportunities in public relations majors. The academic training serves as an equalizing factor to the typical "old-boy network".

However, public relations as a formal profession is relatively new. This study interviewed public relations majors at several academic sites, a sample of females and males, to assess their goals and career aspirations. The results indicate females are not seeking the technician role and are looking for a career in public relations. The males equally strive for these levels of achievement. The outcomes of this research suggest the flexibility for career paths in public relations remains a major factor in establishing a career in public relations. However, the academic degree definitely moves the candidates into a serious level of commitment, meaning that there will be both males and females seeking those top career opportunities in public relations.

Information about the Authors:

Kendall Brown is a sophomore public relations major and a business minor. She is a member of the Public Relations Student Society of America (PRSSA), Chi Omega sorority and the women's soccer team. Elise Miller is a sophomore public

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relations major and a Spanish minor. She is a member of Delta Delta Delta sorority and secretary for the Public Relations Student Society of America. She presently has an internship with a regional public relations agency.

Upon graduation, they both plan on pursuing a position at a major public relations firm.

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Can Social Bonds Predict Civic Engagement? An Extension of Travis Hirschi's Social Bond Theory

Melissa Moore

Departmental Affiliation: Sociology

College of Arts and Sciences

Since the early 1990s, much research has shown the vital role that civic engagement plays in the preservation of strong communities. These findings have prompted other researchers to pick apart specific variables in an effort to obtain a comprehensive understanding of what civic engagement is all about. Unfortunately, given their minimal scope, these theories are inadequate at what they set out to do. The purpose of this project is to present an alternative, more comprehensive approach that not only encompasses all existing theory, but also offers a more complete understanding of civic engagement. This study will attempt to show how the four aspects of Travis Hirschi's social bond theory--attachment, commitment, involvement, and belief--can explain and possibly predict students' levels of engagement. This will be done by analyzing the results of a survey distributed to thirty Valparaiso University students with questions designed to measure each of the four aspects of social bonds as well as each student's level of civic engagement. More specifically, the study will attempt to show that students with strong social bonds are more likely to become civically engaged than students with weak social bonds.

Information about the Authors:

Melissa is a junior political science/sociology major and plans on attending law school after graduation.

She often hears theories for why people commit deviant and antisocial acts, while such theories' necessary counterpart, the study of good acts, is left in the dark by comparison. With this project, I hope to partially make up for this oversight and promote interest in others to explore the interesting and controversial implications of studying people's drives to do good.

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Using Public Relations Restoration Theory to Restore the Image of Major League Baseball after the 2001 Contraction Issue

Timothy Oestmann, Jackie Thomas

Departmental Affiliation: Communication

College of Arts and Sciences

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After the 2001 season, Major League Baseball (MLB) announced it would contract two teams, the Minnesota Twins and Montreal Expos, before the next season for business reasons, reducing the league to 28 teams. Fans, especially those in Minneapolis, were confused and upset by this decision. After an off season filled with unrest, neither of the teams was eliminated and are still a part of the league today, with Minnesota winning a division title last year and the Expos recently moving to Washington. This study examined the public relations tactics used by MLB to communicate their actions during this time. Books, magazines, surveys, Internet research and interviews were utilized in the research. The findings show that, although MLB was very active in their discussion of these issues, public relations could have been used in a more effective manner. While there were many reasons that this plan for contraction failed, this study shows that MLB attempted to be proactive in explaining the situation and, as a result, fans only vaguely recall this issue today.

Information about the Authors:

Jackie Thomas is a sophomore public relations and sports management double major. She is working as a ticket office intern this summer with the Kansas City T-Bones, a minor league baseball team, and hopes to work in the community relations department for a MLB team in the future. She also plays on the women's soccer team.

Timothy Oestmann is a junior sports management major with liberal arts business and public relations minors. Mr. Oestmann is the head manager for the men's basketball team and has held an internship with the Kansas City T-Bones. He plans to work as a graduate assistant while attending graduate school upon completing his undergraduate degree.

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Integrating Energy in the Third World

Kristen Painting

Departmental Affiliation: Mechanical Engineering

College of Engineering

Valparaiso University has maintained a close relationship with Ometepe Island, Nicaragua for the past fifteen years through medical missions. In the past two years, the College of Engineering began to provide engineering skills to that same island. The objective of Integrating Sustainable Energy in the Third World was two-fold. First, the project proposed to research cost effective and durable sustainable energy systems for Nicaragua. Secondly, the project proposed to prove to residents that a sustainable energy source is beneficial and feasible to install. With the help of a Nicaraguan engineer, her team designed and built a wind generation system on the island. She found most of the physical structure of the system could be built using materials and craftsmanship from Nicaragua alone. Blades, an alternator and some necessary electrical components, such as deep cycle batteries, must be purchased and are too costly for an ordinary Nicaraguan budget. Therefore, the initial installation will require a source of external funds. After installation, a simple wind generation system will provide a source of electricity for the basic power needs of a community. Currently two

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systems provide energy storage on the island and with monetary aid, more can be implemented by islanders alone.

Information about the Author:

This project was by no means a personal undertaking. The team included electrical and mechanical engineering students with educational backgrounds in mechanical properties of materials, fluid mechanics, and power circuits that make us strongly suited for this project. The combined work experiences have involved metal manufacturing, design of support towers for lightning protection, and electric utilities, all of which were employed throughout this project. The team gained an increased interest in using their skills to benefit society because of this experience. The team plans to pursue future engineering service projects through organizations such as Engineers Without Borders. The skills gained through their education gives them the ability to help many people throughout the world, and team members will continue to do so after leaving Valparaiso University.

Faculty Sponsor: Dr. Pete Johnson

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Investigating Non-profits and the Roles Internal Relations Play in Local, Mid-size and National Organizations

Jana Rausch, Cassie Spier

Departmental Affiliation: Communication

College of Arts and Sciences

Internal communications within different sized non-profit organizations are documented as crucial to the success of an organization. Through the use of surveys, interviews, and observation, they reviewed the value of internal communications within non-profit organizations. What kinds of team building activities are used? How does the organization get the word out about themselves? They wanted to discover the way internal communications help keep non-profits operational and what their duties are. This project determined the strengths that internal communications provide, in that internal relations are really the glue that holds an organization together, making internal relations a more recognized and supported field. This study is based on three different levels of internal communication--local, midsize, and national--within a non-profit organization. This study will allow the future of non-profits to realize the value of internal relations and the significant improvements of the operations of non-profits.

Information about the Authors:

Jana Rausch is interested in non-profit public relations because she has been very involved with volunteering her entire life. She is also excited to be participating in this research project. Jana is a public relations major who plans on having a career in non-profit public relations. Cassie Spier is a public relations minor who loves internal relations and all its inner workings. She is thinking about a career in internal relations in the media.

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Does PKC-beta II Modulate Growth in Colon Cancer Cells?

Hadie Rifai, Sara Mar

College of Arts and Sciences

Colon cancer is a leading cause of death in our society and is incurable in about one-half of patients found with this malignancy. Elucidating any path to malignancy will afford researchers and clinicians insight into preventative measures as well as potential cures. Studies in colon cancer indicate that the molecule Protein Kinase C beta II is over-expressed and more active in tumor tissue vs. tissue collected from nearby non-tumor tissue in colon carcinomas. Protein Kinase C is known to interact with a number of other proteins to cause production of growth factors or other proteins which regulate cell growth and/or programmed cell death (apoptosis). Our laboratory seeks to answer the following questions:

1. Is the increased expression of Protein Kinase C beta II a causative step in tumor formation?
2. Are the phosphorylation events that Protein Kinase C participates in (kinase activity) necessary for the role of Protein Kinase C beta II in tumorigenesis?

To answer these questions, they are in the process of screening cell lines (CaCO2s, C2B, HT29, SW480, T84, HCT116) for their expression of PKC beta II. Subsequently, they will prepare tissue culture cell lines which have altered of PKC beta II expression using previously isolated plasmids. Following this preparation, they will assess these cell lines for hallmarks of tumorigenesis-cell growth, invasiveness, and ability to evade apoptosis.

Information about the Authors:

Hadie Rifai and Sara Mar are seniors double majoring in biology and chemistry. Hadie will be attending dental school at Indiana University in the summer of 2007. Sara will be attending medical school at Arizona College of Osteopathic Medicine in the fall.

Faculty Sponsor: Dr. Beth Scaglione-Sewell

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Noises Off - A Backstage Look at Props

Michelle Rossi

Departmental Affiliation: Theatre

College of Arts and Sciences

Noises Off is being presented as part of the Valparaiso University Mainstage faculty-directed productions this spring season. Michelle Rossi is the prop mistress and is responsible for supplying rehearsal props and creating or buying show props for the show with a budget. Some of her design challenges include breaking telephones, half a dozen plates of sardines, bathmats and sheets turned into headdresses and robes, and an original large flower bouquet. Farce means "to be stuffed with" and the play is surely stuffed with props in this popular sex farce set in America with the play-within-the-play in England.

Information about the Author:

Michelle Rossi is a senior theatre and creative writing double major and Spanish minor from West Dundee, Illinois. She works in the costume shop, is an active member of Alpha Psi Omega, Soul Purpose, and Dance Etc. She stage managed

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The Crucible, Riches, and Hurlyburly/Acting-Directing Showcase. Other technical credits include *For Whom the Southern Belle Tolls* (director), *Home Free* (props design), Regionally, Michelle stage managed *The Tricky Part* and assistant stage managed *Marlowe* and *A Kiss From Alexander* at Bailiwick Repertory and served as a stage management intern for *Seussical the Musical* at Chicago Shakespeare Theater.

Faculty Sponsor: Prof. Ann Kessler

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A Numerical Study of the 1998 Oak Grove, Alabama Tornado

Paul Schmid

Departmental Affiliation: Geography/Meteorology

College of Arts and Sciences

On April 8, 1998 a series of tornadoes spawned across the Southeast. One of these was the F5 tornado that killed 32 people in Oak Grove, Alabama. The violent tornadoes of this day happened in association with an isolated supercell ahead of the cold front. Because synoptic reanalysis alone could not explain these tornadoes, a mesoscale model was used. The Purdue Regional/Mesoscale Model was used to study this outbreak. A dual run of the model using a nested grid centered over the Southeast successfully initialized the long track supercell that spawned the deadly tornadoes. It also showed the presence of localized vorticity maxima, sensible heating anomalies, and moisture fluxes which lead to the strength, longevity, and isolation of the supercell that led to the deadly tornadoes.

Information about the Author:

Paul Schmid is a senior meteorology, mathematics double major from Fairfax, VA.

He is a member of the Chi Epsilon Pi meteorology honor society and Sigma Pi social fraternity. In the fall, he plans to attend graduate school and begin work on a Ph.D. in Atmospheric Science.

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Comparison and Contrast of Public Relations and Business Majors in terms of Multicultural Awareness

Mackenna Schon, Shawn Yamanoi

Departmental Affiliation: Communication

College of Arts and Sciences

The topic of multiculturalism has had a significant increase in importance within the professional world. In the GolinHarris Agency report on the future, diversity and a multicultural world was cited as one of the key elements of focus for public relations professionals. In the field of business, multicultural awareness is often overlooked. Our purpose is to establish that the public relations profession is taking a stance on the importance of multiculturalism. To establish this commitment, students from both the study of business and public relations were surveyed on the topic of cultural sensitivity. The hypothesis stated that public relations students would respond to the questionnaire in a more culturally sensitive manner. As we expected, the public relations students were more sensitive and aware of

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multiculturalism. The significance of multiculturalism is and will continue to grow. While our results were among students, they will soon be professionals, and it is important to be aware of multiculturalism in the professional world.

Information about the Authors:

Mackenna Schon is a sophomore majoring in public relations with a liberal arts business minor. She is involved with The Source, PRSSA and its student agency SparkPR, Alpha Lambda Delta, and is a OIA student representative with the Valparaiso phone program. Mackenna is also the Valparaiso PRSSA representative for the National Public Relations Society of America Assembly this spring in Nashville, Tennessee.

Shawn Yamanoi is a junior with a double major in public relations and geography and a minor in television/radio. He is involved in Kantorei, PRSSA and its student agency SparkPR, and House Council.

Shawn has a rich cultural background from living in Japan and Europe. He is bilingual and is currently learning a third and fourth language.

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Anatomy of a Crisis

Ted Schuster, Erin Murray

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Televised sports have become a large part of American culture, and the Super Bowl is the most watched sporting event every year with audience members at every age. Therefore, when there was a “wardrobe malfunction” during Super Bowl 38’s halftime show, people were infuriated. What was supposed to be a family television program was upgraded to adult content when Janet Jackson’s top fell off. CBS was broadcasting the Super Bowl that year and had to handle the crisis immediately in order to keep viewers from turning away. By identifying what measures CBS took to take control of the situation, it can be determined how successful their crisis management plan is. With secondary data gathered from different web sites including CBS, Nelson Media Ratings, and FCC documents, it was determined that CBS did not lose a significant portion of their viewing audience. The future for CBS does not seem to be severely affected by this incident. However, the organization must review their crisis plan to assess any potential weakness or for future protection if they ever have to handle another crisis situation. Most importantly, the public relations department should have a major leadership position in this effort.

Information about the Authors:

Erin Murray is a junior marketing major and public relations minor. She currently is a member of the Valparaiso University women’s soccer team and is the secretary of the Student Athlete Advisory Committee. Ted Schuster is a sophomore public relations major, who is a member of PRSAA. When not studying, he enjoys playing basketball.

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Matt Sedlak, Jared Erickson, Adam Shull

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

Consider the vector space $C(k,k)$ which includes all $k \times k$ matrices with entries from the complex numbers. We tried to determine which subspaces of $C(k,k)$ have certain properties that make them equivalent to rank one matrices. The property we were looking for was $A(m,n)$. We say that a subspace has property $A(m,n)$ if for every array of equivalence classes $[L(ij)]$ in the quotient space with i between 1 and m and j between 1 and n , we can find vectors $x(i)$ and $y(j)$ such that the tensor product of $x(i)$ and $y(j)$ is equal to $[L(ij)]$. We were able to find several subspaces that have property $A(m,n)$.

Information about the Authors:

Matt Sedlak is a junior mathematics major. He worked on this project in an REU program last summer. Jared Erickson is a sophomore mathematics major and chemistry minor. He participated in a different math research project last year. Adam Shull is a freshman double majoring in mathematics and computer science. After receiving his bachelor's degree, he plans to go to graduate school and receive a Ph.D. in mathematics or a related field.

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An X-Ray Reflectivity Study of the Hydrophobic Properties of Octadecyltrichlorosilane (OTS) in Protein Adsorption.

Lawrence Selvy

Departmental Affiliation: Physics

College of Arts and Sciences

Recent theoretical and experimental studies have suggested that water at a hydrophobic interface may have a lower density than the bulk as water near the interface cannot satisfy all its hydrogen bonds. Using in situ X-ray reflectivity, we have examined the possibility of a depletion layer on top of self-assembled monolayers of octadecyltrichlorosilane (OTS) in contact with water and characterized its structural properties. Our preliminary results show that a depletion layer does exist between the OTS and water, with dimensions on the order of 0.3 nm, one molecular thickness of water. The density of the depletion layer is approximately 50% of that of bulk. These dimensions match very well with theoretical and computational models, much better than any previous experimental work. One reason that hydrophobic interfaces in contact with water is an important area of study is that one of the principle ways that proteins, in aqueous solutions, interact with themselves, with other proteins, and with interfaces is through hydrophobic-hydrophobic interactions. Consequently, we deposited serum albumin protein on top of the OTS films and examined the resulting film structure. Interestingly, we see evidence that the depletion layer continues to exist between the OTS and the protein film, perhaps indicating that depletion layers may be pivotal in intermediating hydrophobe-protein interactions.

Information about the Author:

Office of Sponsored and Undergraduate Research - Valparaiso University
Lawrence Selvy is a physics student from southern Nevada. Like most juniors, he has been at Valpo for three years studying physics. He hopes to go on to graduate school and research quantum gravity.

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Graphical Searching Results

Fred Spreen, Brett Meyer

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

Information retrieval applications have grown through time. While original applications enabled knowledgeable users to search thousands of documents, nowadays any untrained web user can search billions of web pages. However, the one aspect of information retrieval applications that has remained relatively unchanged is the result: the user receives a simple ordered list of documents to read through. In our experiment, we are attempting graphical representation of IR results. The user can select one of several maps highlighting the structure or relevancy of the documents in question. The user then interacts with the graphical map to view the desired documents. In this way, we hope to exploit the much greater information-processing capacity of the visual field. We are using the Code of Federal Regulations as a collection of documents for testing. Some of our visualizations illustrate the structure of the Code, so the user can see physically where within the volumes of laws the relevant statutes reside. Other visualizations show how strongly different statutes relate to the various search terms and to each other.

Information about the Authors:

Fred Spreen is a junior majoring in computer science who has been programming computers since sixth grade. He has a passing interest in languages which he hopes can someday be integrated with his love for computers.

Brett Meyer is a junior computer science major and mathematics minor from the Fort Wayne, IN area. While in Valparaiso, he enjoys participating in research groups, leading worship at Celebrate!, playing intramural sports, and working part-time as a PHP programmer with Healthcall/Yescorp.com. Brett will be working full-time as a software engineer intern this summer at Raytheon's Fort Wayne location and hopes to continue with the corporation after graduation.

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Observations and Analysis of the Binary Star System AC Bootis

Callista Steele

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AC Bootis is an eclipsing binary star system. The two stars orbit each other with a period of 0.35 days. There is a possible third star in the system. It is important to study binary systems because the masses of stars can be found only if they are in a binary system. AC Bootis was observed last summer at the Valparaiso University

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observatory using a CCD camera. The data were reduced and a complete light curve was created. Several times of minimum light were observed, which, when compared to older published times, were used to refine the orbital period. Using a computer modeling program to analyze the light curve, the masses of the stars, their luminosity, and their radii will be found. This work is supported in part by the Indiana Space Grant Consortium and the National Science Foundation.

Information about the Author:

Callista Steele is a junior physics major.

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Characterization of Metal-Reducing Enzymes Expressed by the Bacterium
Shewanella algae Under Anaerobic Conditions

Deborah Steffen, Amanda Nosie, Jessica Saunders

Departmental Affiliation: Chemistry

College of Arts and Sciences

Our project is a small part of a large effort by the United States Department of Energy (DOE) to use microbes to immobilize actinide contaminants (mainly uranium and plutonium) in soil and ground water at numerous former nuclear test sites around the nation. These microbes are essential to the clean-up process because when they transfer electrons to the contaminants, the contaminants are no longer soluble in ground water and thus the contaminant plume will stop spreading through the ground. The specific goal of our project is to characterize the metal-reducing enzymes expressed by the bacterium Shewanella algae. Our experimental strategy is directed towards two objectives: 1) sequencing the genes that code for these metal-reducing enzymes and 2) using two-dimensional electrophoresis to observe the expression of these enzymes under a variety of experimental conditions. Initial sequence data is not homologous with bacterial metal-reducing enzymes and, hence, probably results from nonspecific annealing of the PCR primers. Membrane-associated proteins have been separated by ultracentrifugation on a sucrose gradient. Initial two-dimensional electrophoresis analysis of this mixture of membrane-associated proteins has not yet yielded consistent results.

Information about the Authors:

Deborah Steffen is a senior biochemistry and mathematics major from Springfield, IL. Amanda Nosie is a junior biochemistry major from Plainfield, IN. Jessica Saunders is a junior biochemistry major from Lombard, IL.

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Use of Virtual Reality for Teleoperation of Autonomous Vehicles

Michael Steffen

Departmental Affiliation: Electrical and Computer Engineering, College of Engineering

Office of Sponsored and Undergraduate Research - Valparaiso University
Though off-road equipment is moving more and more towards autonomous control, practical implementation does not fully eliminate human interaction.

Teleoperation is a promising compromise between manual control and fully autonomous operation. A compelling solution to teleoperation is the use of virtual reality to create a simulated yet realistic environment in which the operator can feel immersed, as if at the site, while still being located at a distance. Our research is a collaboration between Japan's National Agriculture Research Center (NARC) and Valparaiso University's Scientific Visualization Laboratory (SVL) to improve control of a remotely operated farm vehicle. Located in Hokkaido, Japan, the NARC semi-autonomous off-road vehicle utilizes GPS and heading sensors with a wireless network for data transfer. The vehicle has actuators for control of throttle, transmission, and auxiliary controls; all computer-controlled. The vehicle sends sensor status and receives actuation commands over the Internet. The SVL's stereoscopic 3-D virtual reality display system located in Valparaiso, IN, receives this information over the Internet in real-time and allows the user in the SVL to visualize and control the operation of the vehicle in Japan. A 3-D model of the terrain and buildings is pre-programmed into the system and the vehicle is rendered at its real-time position. The system allows the user to have several views, such as cockpit, bird's-eye, and aerial. Using a handheld controller, the user is able to start the engine, sound the horn, activate the blinkers, control auxiliary hydraulics, and control the speed of the left and right tracks of the vehicle.

This research has demonstrated the feasibility of real-time teleoperation of a semi-autonomous vehicle utilizing standard network protocols at a distance over 9,000 km while the user is immersed in a virtual reality environment.

Information about the Author:

Michael is a 5th year mechanical and electrical engineering student at Valparaiso. Upon graduation in May, he will pursue a Ph.D. degree in computer engineering at Iowa State University.

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A Search For Metals in Exhaust Emissions

Jason Strains

Departmental Affiliation: Physics

College of Arts and Sciences

Pollution is a major topic for discussion in the scientific community. I will be studying the metals emitted from the exhaust of several vehicles. I will study the samples using Energy Dispersive X-Ray Fluorescence Spectrometry (EDXRF). Through this method, I hope to determine what metals are eminent in vehicle exhaust.

Information about the Authors:

Jason is a senior physics major. He has had previous research experience at Valparaiso University in the field of astronomy and at Argonne National Laboratory in materials science. Jason will be part of the LEAPs program post-graduation.

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The Role of Public Relations during the 2000 Sydney Olympics: PR Leadership
Within an Integrated Communications Context

Emily Tkaczyk, Chris Halstead

Departmental Affiliation: Communication

College of Arts and Sciences

Public Relations was a key element in promoting Australia during the 2000 Sydney Olympics. A top priority of the Sydney Olympic Committee was to create an official website which included: news releases, sport information, frequently asked questions and call centre scripts generating media attention and public attention. The Olympic Committee used strategic public relations and effective tactics to achieve recognition and to gain revenue in areas of sponsorship, fundraising, licensing, and merchandising. This study examines the effectiveness of these communication actions when public relations provided the leadership when integrating the marketing and advertising elements. Unlike most cities that lose money when they host the Olympics, Sydney broke even and served as a model for the rest of the world.

Information about the Authors:

Emily Tkaczyk is a sports management major with minors in business and public relations. Emily is very interested in sports and has been involved with various sporting events on campus. Her career goal is to work for a professional sports team in either their marketing or public relations department. Chris Halstead is a business management major and public relations minor. He is a pitcher on the Crusader's softball team and a member of Pi Beta Phi sorority. She participates in are I Need a Hug, Habitat for Humanity, and Relay for Life. She spent six weeks last summer in Australia studying tourism and recreational management.

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The Development of Students' Thoughts on Homosexuality on a Lutheran Campus

Judy Velasco, Amie Stefanich, Sean McGinnis

Departmental Affiliation: Social Work

College of Arts and Sciences

For many years there has been tension among students at Valparaiso University (VU) regarding negative feelings toward homosexuality. The Gay Straight Alliance at VU has made efforts to inform students about "National Coming Out Week." This publicity of sexual orientation raises uncomfortable questions for many students at the university. We will research the relationship between religiosity and the developing views of homosexuality among college students on campus. We are planning on answering the following questions: Do the views of Valparaiso University students become accepting towards homosexuals during their stay at the University? As well as, if Valparaiso University students' views on homosexuality change during their stay at VU, is that change influenced by the religious atmosphere of the university? The findings will be based on survey data collection from freshman (the age of 18), sophomores, juniors, and senior traditional students all of whom have only attended Valparaiso University.

Information about the Authors:

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Judy Velasco is a junior with a social work and Spanish major from Hobart, IN.

Amie Stefanich is a junior social work major from Saint Joseph, MI. Sean McGinnis is a senior social work major from Chicago, IL. They became interested in this topic based on some of the information they had heard about National Coming Out Week on VU's campus three years ago. Out of the information they gathered, an interest developed on whether or not the religious influence of the University influences the students' views of homosexuality.

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A Determination of the Absolute Angular Cross-Section for Compton Scattering of 662 keV Photons

Joshua Vredevoogd

Departmental Affiliation: Physics

College of Arts and Sciences

We will use a 200-mCi CS-137 source to test the Klein-Nishina equation for Compton scattering of photons from free electrons. A NaI detector will be used to measure the intensity of scattered photons from aluminum as a function of angle. The product of the incident photon intensity and detector efficiency will be determined by measuring the intensity of photons transmitted through a thin layer of lead. Measurements will be made for scattering angles between 30° and 120° at intervals of 15°, where qualitative differences between the Klein-Nishina equation and Thomson's classical model are most qualitatively distinct.

Information about the Author:

Josh Vredevoogd is a senior physics and mathematics major from Muskegon, MI. He will be beginning a Ph.D. program next year, likely at Michigan State University.

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Fledging Festivals: How Effective Public Relations Can Help a Troubled Industry

Annie Whitcraft, Luka Dukich

Departmental Affiliation: Communication

College of Arts and Sciences

Recently, surveys and statistics show that the popularity and attendance of local and traveling music festivals, such as Lollapalooza, has significantly decreased. This hurts both the music industry and gives consumers fewer entertainment options, and overall, is an economically disturbing trend. With this decrease in attendance, it is necessary for festivals to change their approach towards promotion. Studying models of both successful and unsuccessful festivals, this study established the key strategic and innovative public relations tactics needed for organizational survival. The results show that those festivals who fail are not building relationships with their audiences through communication and are less likely to engage to interactive communication (negotiation, research, evaluation).

Information about the Authors:

Annie Whitcraft is a sophomore public relations major. She worked with a music festival, the Lancaster Festival, in her hometown for two years and is interested in

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how that festival can use public relations more effectively. She is also a member of SPARK PR, the student-run Public Relations Student Society of America agency, and is a member of the team promoting a mystery writer's series of book releases. She is also a member of Delta Delta Delta. After graduation, she hopes to work in a PR agency focusing on event planning.

Luka Dukich is a freshman public relations major from Chicago. He has worked extensively with T.U.T.A. theatre company in Chicago in their theatre department and is interested in pursuing a public relations career, particularly in the entertainment and performing arts field.

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Views of Interracial Dating Among College Students

Sarah Wong, Steven Humpris

Departmental Affiliation: Social Work

College of Arts and Sciences

This study examines current trends in views towards interracial dating on a primarily white campus. In abstracting data, the following research questions were posed:

1. When dating interracially, are certain races more likely to be acceptable than others?
2. Are students of color more likely to date outside of their race or are caucasian students?
3. Will individual student's views be more accepting towards dating outside of one's race, or will one's family?
4. Will a student be more likely to date outside of one's race than to marry outside of one's race?

The sample consists of two intentionally representative comparative groups that are surveyed with factors such as race, preference, family and experience being taken into consideration.

Information about the Authors:

Sarah Wong and Steven Humpris are both part of the undergraduate social work department preparing to receive their BSW's. As a junior and a senior, they are both currently completing hands-on practicums that are required for the degree. The inspiration for this topic arose due to both participants' interest in multicultural issues in the context of social work.

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Variations and a Generalization of the Tower of Hanoi

Josh Zuellig, Robert Thompson, Brian McDonough, Chris Wagner, Dr. Rick Gillman

Departmental Affiliation: Mathematics

College of Arts and Sciences

Office of Sponsored and Undergraduate Research - Valparaiso University
In the classic Towers of Hanoi problem, the stack of n disks must always be decreasing in size starting at the bottom. The Tower of Stanford problem (AMM IIV #4 April 2004 pp 364-365) relaxes this requirement so that in any stack only the largest disk of a given stack must be at the bottom. We are investigating a generalization of the Tower of Stanford problem: the k largest disks of any stack must be in decreasing order from the bottom. Thus, $k=1$ is the Tower of Stanford problem and $k=n$ is the Tower of Hanoi. This presentation describes our progress to date, including a conjecture for the optimal moves for $k=2$.

Information about the Authors:

The four students are math majors at Valpo. The authors sent in applications for research in mathematics and were accepted. The project was selected by Professor Gillman.

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