

CONFERENCE PROCEEDINGS

Listed below are abstracts of student-faculty collaborative work presented at regional, national, and international conferences.

Ian du Bois

(B.R. Parizek, Pennsylvania State University, Faculty Sponsor)

Numerical Modeling of Subglacial-Sediment Dynamics

Presented at WAIS: The West Antarctic Ice Sheet Initiative, Fourteenth Annual Workshop, Sterling, VA, September 5-8, 2007.

Basal properties affect the rate and spatial pattern of ice flow. Historically, whole ice-sheet models simulated regions of ice-stream flow based on basal temperatures and an a priori knowledge of subglacial sediment distribution. The new generation of models will include both temporal and spatial evolution of basal properties. In this preliminary study, we couple a shallow-ice model to a nonlinear bed to simulate the dynamic interaction between ice-sheet flow and subglacial sediment deformation. In future work, we plan to couple the sediment model to a "full-stress" ice-sheet model. Through ice-sheet simulations with a dynamic bed, we hope to gain a better understanding of the behavior of past ice sheets based on present landform distributions as well as the stability of modern ice sheets under various global-warming scenarios. The greatest uncertainty in our present ability to predict sea-level rise results from our inability to simulate the recently observed rapid and ongoing changes in the Greenland and Antarctic ice sheets. Subglacial dynamics likely play a critical role in grounding-line stability as well as in coupling shelf, outlet-glacier, and inland-ice flow regimes. Gaining insight into the physics underlying the fast response times of ice sheets is important as eustatic sea level and global climate can both be altered by changes in the cryosphere.

Ian du Bois

(B.R. Parizek, Pennsylvania State University, R.B. Alley, Pennsylvania State University, and T.K.

Dupont, University of California, Irvine, Faculty Sponsors)

Greenland: Beyond "Ice-Sheet" Dynamics

Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December 10-14, 2007

Subglacial dynamics likely play a critical role in coupling shelf, outlet-glacier, and inland-ice flow regimes. Furthermore, strong indirect evidence indicates that surface meltwater can penetrate through roughly 1 km of ice in Greenland and lubricate basal motion (Zwally et al., 2002), thereby linking surface and basal processes. Historically, whole ice-sheet models simulate regions of "streaming" flow based on basal temperatures and an a priori knowledge of subglacial sediment distribution. In order to capture observed changes in ice flow, both temporal and spatial evolution of controlling basal properties are required. Coupling surface melt and basal processes to a flowline model that incorporates longitudinal and vertical-shear stresses, we assess the role of variable lubrication and the potential feedbacks between lubrication and moulin initiation on the dynamics of the Greenland ice sheet.

Mary Fama, Kelly Feeney, Stacey Granat, and Blake Winokur

(Blythe Hinitz, Faculty Sponsor)

Focus on Science and Math: American Indian Insights

Presented at the New Jersey Association for the Education of Young Children Conference, Atlantic City, NJ, November 3, 2007

Attendees of this workshop received two hands-on lessons. The first showed how Navajo women make use of counting, limits, geometry, symmetry, and algebra in their daily work. For example, geometric shapes and symmetry characterize Navajo rugs. Because young children recognize shapes and patterns that follow an "A/B" pattern, such as day/night and up/down, they can learn to weave shapes and patterns as Navajo women do. The second introduced a

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Native American legend, "Why the Birch Tree Wears Slashes in Its Bark," that can be used to teach children mathematical concepts.

In both activities, children learn about Native American culture, practice mathematics, and develop their fine motor skills. Participants emphasized the importance of avoiding stereotypes and presenting information in a developmentally appropriate way.

Dawn Besser, Jessica Chesney, Jessica Kubek, Angela Rotola, and Jennie Stolte
(Blythe Hinitz, Faculty Sponsor)

Focus on Science and Math: American Indian Insights

Presented at the New Jersey Association for the Education of Young Children Conference, Atlantic City, NJ, November 3, 2007

Presenters discussed two lesson plans that focused on both a Native American tradition and a science concept. The first highlighted American Indian interest in wind and Native American respect for Earth's natural elements. The second involved the identification of footprints, stressing the importance of geography for Native tribes.

Each teacher who attended the session received a packet containing the lesson plans so that she or he could use them in their classrooms.

Dawn Besser

(Blythe Hinitz, Faculty Sponsor)

The History and Current Status of Native American Early Childhood Education

Presented at the National Association for the Education of Young Children Conference and Organisation Mondiale pour l'Éducation Préscolaire [World Organization for Early Childhood Education] Poster Seminar, Chicago, IL, November 7-10, 2007

Many inequities in the education system are harmful to the preservation of Native American culture, including such laws as No Child Left Behind and the National Core Curriculum Content Standards. My research found several organizations dedicated to helping Native American children, yet the risks of high dropout rates, low parental involvement, and culturally inappropriate curriculums remain.

Jessica Chesney

(Blythe Hinitz, Faculty Sponsor)

The History and Feminization of the Early Childhood Classroom

Presented at the National Association for the Education of Young Children Conference and Organisation Mondiale pour l'Éducation Préscolaire [World Organization for Early Childhood Education] Poster Seminar, Chicago, IL, November 7-10, 2007

Statistics reveal a lack of men in today's classrooms and the consequences it has on students. I discussed this data's relation to the crisis in boys' education, focusing on differences in boys' and girls' learning styles and asking if boys are negatively affected by female teachers, and if more men in the classroom would benefit boys. Current research indicates that not enough men are employed in the education of young children.

Jessica Kubek

(Blythe Hinitz, Faculty Sponsor)

Native American Mathematics

Presented at the National Association for the Education of Young Children Conference and Organisation Mondiale pour l'Éducation Préscolaire [World Organization for Early Childhood Education] Poster Seminar, Chicago, IL, November 7-10, 2007

Traditional Native American mathematical ideals and principles still inform the daily lives of various tribes today. Consequently, approaches to teaching mathematics to Native American children must reflect and support their learning styles and ways of life.

Jessica Chesney, Merle Froschl, and Barbara Sprung

(Blythe Hinitz, Faculty Sponsor)

Using Technology in Early Childhood Professional Education: Combating the Effects of Media Violence and Supporting Boys' Learning

Presented at the National Association for the Education of Young Children Professional Development Institute, New Orleans, LA, June 10, 2008

For some elementary-school-aged boy students, the dominance of women in education may be a problem because female teachers may not be adequately trained in meeting boys' educational and developmental needs. Recognizing this is important since boys and girls learn very differently in early childhood. Thus, it might serve many young boys well to have more male role models in early childhood education.

Joanna DeLeon

(Elizabeth Borland, Faculty Sponsor)

Religion and Local Activism: Antiviolence and Immigrant Rights Movements in Trenton, New Jersey

Presented at the 22nd National Conference on Undergraduate Research, Salisbury, MD, April 10-12, 2008

Building on previous research, this project explores differences and similarities between two kinds of activism in Trenton, New Jersey: immigrants' rights and antiviolence movements. Through qualitative data analysis of twenty interviews, archival research, and participant observation, several factors were identified as crucial to the movements given Trenton's geographic, demographic, and economic profile, including the nature of the problems the groups address and their approaches to them, religion's prominent role as a cultural, economic, and organizational resource, and participants' perceptions of their communities' attitudes and responses. Preliminary analysis of these factors suggests that although religious language and actors are a defining aspect of both movements, the inherent differences between the movements' defining issues fundamentally shapes the way in which groups on both sides identify their courses of action and incorporate demographic and cultural considerations into protest.

Tamaria Green

(Regine Saintilien, Faculty Sponsor)

Where the Learning Begins: Inner City Schools and Toxic Waste

Presented at the 22nd National Conference on Undergraduate Research, Salisbury, MD, April 10-12, 2008

Environmental injustice is most commonly experienced by individuals of low socioeconomic status. Often, hazardous factories, high volume interstate highways, waste incinerators, and other harmful environmental conditions are located near low socioeconomic neighborhoods. The North Section of Trenton, New Jersey, has experienced such environmental injustice in the case of a contaminated construction site on the grounds of Jefferson Elementary and Martin Luther King (MLK) Middle Schools. The School Construction Corporation and the Trenton Board of Education decided, in 2004, to build an annex to the Jefferson School for kindergarten through eighth grade students. But the project raised concerns about cancer-causing contaminants in a neighborhood that was already distressed by high crime rates, high levels of unemployment, and low income. After the Department of Environmental Protection tested and confirmed hazardous soil underneath the halfway constructed edifice, building was stopped. My project examines the history of the neighborhood and the housing status of its residents. Lastly it addresses the implications of this situation for other urban areas in the United States. Preliminary findings indicate that North Trenton, like many urban settings nationally, faces the most disheartening challenges in education, government, unemployment, poverty, housing, and gang and school violence. The unfortunate case of MLK/Jefferson Elementary School construction only adds to the stresses of a troubled neighborhood like North Trenton.

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Angel Hernandez

(Martin Bierbaum, Faculty Sponsor)

Analysis of the Impacts of the Relocation of the Capital Health System Hospital (CHS) Mercer Campus to Hamilton

Presented at the 22nd National Conference on Undergraduate Research, Salisbury, MD, April 10-12, 2008

The relocation of Capital Health System Hospital (CHS) Mercer Campus is a business move intended to improve its patient mix and ensure fiscal solvency. In 2006, CHS—Mercer Campus was uncompensated for approximately \$16,399,000 in charity care. At the current rate of uncompensated healthcare costs, CHS—Mercer Campus will reach an economic crisis around 2015, when it will no longer have the funds it needs to relocate. For this reason, CHS—Mercer Campus is being fiscally responsible and strategically prudent by moving at a time when it still has such funds. While reducing healthcare services located in Trenton is unfortunate and may have negative local impacts, it may be preferable for the hospital to move six miles away than possibly to face bankruptcy approximately eight years from now. While this case study of a single hospital's relocation raises serious concerns about the way our society delivers health care to its most vulnerable and least advantaged, the exploration of such concerns remains for a later project of broader scope. This project is a work in progress, for the exact impact of the relocation remains unknown. The data for this research was collected through structured interviews with both hospital and city officials in Trenton. Other sources of data include press releases and statistics made available by The New Jersey Hospital Association (NJHA).

Andrew Máthé and Alexander Rass

(Curt Elderkin, Faculty Sponsor)

River Ecosystem Restoration Within the City Limits of Trenton, NJ: The Assunpink Creek

Presented at the 22nd National Conference on Undergraduate Research, Salisbury, MD, April 10-12, 2008

Postindustrial cities are faced with the responsibilities of developing economic infrastructure and restoring balance to polluted resources and impacted ecosystems. Freshwater streams that pass through urban areas are characterized by the absence of a riparian zone, a vegetative buffer adjacent to the channel that controls flooding and stabilizes nutrient movement into the watershed. In the case of Trenton, NJ, the rehabilitation of the Assunpink Creek, a tributary of the Delaware River, has become a prominent issue. A recent report by the Delaware Valley Regional Planning Commission (DVRPC) reveals that Assunpink water quality becomes extremely poor as it enters the city limits, containing high levels of lead, nitrates, phosphates, and fecal coliform bacteria, and experiencing wide swings in dissolved oxygen (DO) levels. A significant portion of the stream is enclosed by a box culvert, and many regions are bordered by brownfield sites. The report outlines the Assunpink Greenway Project, which aims to restore the riparian zone along sections of the creek that through several municipalities. Recent passage of statewide funding in the form of the Green Acres Program, as well as a "daylighting" project spearheaded by the U.S. Army Corps of Engineers, should advance this initiative. We will consider the ecological implications of urbanization on river ecosystems (especially in the context the River Continuum Theory), and discuss current restoration initiatives. One promising approach to these problems is the Human Ecosystem Framework (HEF), through which the ecological health of a city's ecosystems is regarded as intertwined with economic development and infrastructure. HEF is currently being applied to postindustrial development within Baltimore, and may serve as a model for Trenton.

Johanna M. Soto

(Rachel Adler, Faculty Sponsor)

The Ethnic Trends of Chambersburg

Presented at the 22nd National Conference on Undergraduate Research, Salisbury, MD, April 10-12, 2008

The Chambersburg project started five years ago with Professor Rachel Adler and several students from The College of New Jersey. It focuses on the ethnic transition of Chambersburg, in Trenton, NJ, once an Italian neighborhood that changed less than a decade ago into a Latino community. With this transition came an influx of Latino businesses. The primary research goal is to analyze the relationships between Italian immigrants and recently arriving Latinos to identify similarities between the two groups and their experiences in the neighborhood. The research was conducted over eight summer weeks in 2007. My research partner and I conducted eight interviews with Italian and Latino business owners. These lasted a little over an hour each, focusing on the life and business history of the owner. Participants were selected from a list of business owners in Chambersburg, updated by taking several tours. The bulk of the research consisted of setting up interviews by telephone, personal contacts, and personal visits. Because this is an ongoing project, a limited number of conclusions can be made. Through our small number of interviews, we discovered a theme: the Italian business owners often related to Latinos moving into Chambersburg and spoke highly of them. The research needs to be expanded to include African Americans because they were frequently mentioned in interviews. Overall, more analysis is needed combining past and present research to discover more themes.

Jessica L. Tellier

(Nino Scarpati, Faculty Sponsor)

The Influence of Ethnic and Cultural Awareness on Prenatal Education in an Alternative High School

Presented at the 22nd National Conference on Undergraduate Research, Salisbury, MD, April 10-12, 2008

Project TEACH (Teens Education and Child Health), located in Trenton, NJ, is an alternative high school for pregnant or parenting teenagers. This study addressed the following: Do both clients and staff believe ethnic and cultural backgrounds are important factors in delivering quality prenatal care? Also, why did clients choose to receive prenatal care and were they satisfied with it? Project TEACH clients were interviewed individually about prenatal care, the cultural and ethnic sensitivity and awareness of health care providers, and clients' opinions of Project TEACH. Staff members were surveyed about adolescents' use of prenatal care services and the importance of ethnic background awareness. Findings were compared to those of studies of similar alternative schools. Only one client's prenatal care experience was deemed "inadequate." Most clients chose to receive prenatal care for themselves and their baby at a parent's or guardian's suggestion. All clients thought their health care providers were considerate of their ethnic or cultural background and were generally pleased with the program. Staff members emphasized that it is important for health care providers to be considerate of a client's ethnic and cultural background.

Michael J. Cucinotta, Courtney E. LeBlon, Nima S. Rahimi, and Manish Paliwal

(Manish Paliwal, Faculty Sponsor)

A New External Fixator Design for Femoral Fracture Reduction

Presented at the Design of Medical Devices Conference, Minneapolis, MN, April 15-17, 2008

Because there is a need to improve current external fixators for femoral fractures, the goal of this investigation is to design and construct an external fixator that addresses stiffness, rigidity, weight, flexibility, cost, adjustability, and ease of use. The design maintains adequate stiffness while reducing bulk and increasing comfort. Furthermore, the ring structure element of the design improves upon angulation of previous models.

External fixation is a surgical treatment that corrects bone fractures. It is used primarily when a cast would not provide proper alignment of the fracture and for open fractures, when internal fixation is not viable. External fixation requires holes to be drilled into the uninjured

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areas of bone around the fractures so that screws and/or wires can fix the frame of the external fixator to the bone. While installation of an external fixator requires the use of general anesthesia in an operating room, removal can be performed during an office visit with no anesthesia [1]. External fixators for the femoral shaft in children have been a device of choice. Perhaps the most significant advantage of external fixators is that patients can apply early weight after surgery on the fracture, which has proven beneficial in the healing.

The new design has reduced bulk at the proximal region allowing its application in adults. The axial stiffness of the proposed design is comparable to that of a two-ring hybrid, as determined from FEA. The analysis showed maximum displacement of the existing hybrid was 0.00128 mm while the maximum deformation of the new design presented in this study was 0.00187 mm. Sliding joint design allows reduced inventory, quick assembly, and improved angulation over current designs. Wire length optimization may reduce the occurrences of wire tract infections.

Michael J. Cucinotta, Courtney E. LeBlon, Nima S. Rahimi, and Manish Paliwal
(Manish Paliwal, Faculty Sponsor)

An Improved External Fixator Design for Femoral Fracture Reduction

Presented at the Third Frontiers in Biomedical Devices Conference, Irvine, CA, June 18-20, 2008
(See above.)

Bill Waters

(Lincoln Konkle, Faculty Sponsor)

Thornton Wilder's "The Warship": A Warning Against Unilateral Disengagement and Sociopolitical Entropy

Presented at the First International Thornton Wilder Conference, The College of New Jersey, Ewing, NJ, October 2-4, 2008

Thornton Wilder was known for his optimism, which sprang from a demonstrated belief in the incremental improvement of humankind. However, in his 1936 short story "The Warship," Wilder uncharacteristically focuses on a situation in which optimism and progress have been negated. On an imaginary island, entropy has unmistakably taken hold of the inhabitants, and their own isolation, in combination with a confrontation with the expansionism of others, destroys them.

This essay suggests that Wilder wrote "The Warship" in 1936 to express concern that sociopolitical entropy might ruin America were it to opt for unilateral disengagement in the face of Germany's National Socialist resurgence. In addition, the paper connects Wilder's dualistic evocation of the "beautiful, but terrible" warship to events that may have made a lasting impression on him as a child: the world tour of Theodore Roosevelt's Great White Fleet (1907-1909) – Big Stick Diplomacy in action – and the Agadir Crisis (1911), by which Imperial Germany brought the world closer to the First World War.

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