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2001 Symposium for Research and Scholarship

Slippery Rock University of Pennsylvania

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Abstracts of Inquiry and Creativity
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Abstracts of Inquiry and Creativity

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Foreward

The Symposium for Research and Scholarship at the Slippery Rock University of Pennsylvania is intended to celebrate scholarly achievement by sharing the successes of the university community. The impetus for this event was a motion carried by the University Forum in May of 2000.

The Forum asserted that scholarship deserves a coordinated venue for dissemination that would enhance the academic climate of campus by encouraging intellectual exchange and awareness. This effort also supports the University's Mission – *Slippery Rock University will excel as a caring community of lifelong learners connecting with the world.* Without hesitation, Dr. Carolyn Steglich, Chair of the Professional Development Committee, cast the support of that body with the Forum in creating this event. Together, the committees advanced a proposal to Dr. G. Warren Smith, President, and Dr. Robert M. Smith, Provost. The administration responded in the affirmative with enthusiastic and generous support. Thus, you find yourself reading this journal today.

With an eye on future success, and the confidence that you will appreciate the diversity and sophistication of efforts described herein, I thank the participants, our keynote speaker, and everyone joining the symposium in promoting its success. Let us deepen our pride in our purpose and our achievements.

Patrick A. Burkhart
University Forum
Academic Environment Committee

Inaugural Plenary Address

Student Scholarship: Giving Credit where Credit is Due
Dr. Carl O. Moses

Common Hour
Thursday 5 April 2001
Auditorium, Strain Behavioral Science

The keynote speaker at the 2001 SRU Symposium for Research and Scholarship is Dr. Carl O. Moses. Dr. Moses is an Associate Professor in the Department of Earth and Environmental Sciences at Lehigh University, where he has been a faculty member since 1987. He also serves as the Associate Dean for Undergraduate Studies in Lehigh's College of Arts and Sciences. He earned an AB in Chemistry from Princeton University and MS and PhD degrees in Environmental Sciences from the University of Virginia. His principal research interest is physical and inorganic aqueous geochemistry, especially the geochemistry of mineral surfaces and the mineral–solution interface. Other areas of interest include computational modeling of geochemical processes and environmental materials science (environmental alteration of Earth materials used in construction, architectural preservation, and the use of Earth materials in pollution remediation). In the classroom, he is responsible for courses in aqueous geochemistry, environmental thermodynamics, water quality measurements, and general environmental science, including atmospheric science, climatology, and biogeochemistry. He is also actively involved in the Lehigh Earth Observatory, having served on its operating board and guiding the internship and research projects of numerous students. He has served as the principal research adviser for a post–doctoral associate and for numerous graduate and undergraduate students, and he has served on advisory committees for many others. His research has been funded by the National Science Foundation and the U.S. Department of Energy Office of Basic Energy Sciences.

Same Difference: Evolving Conclusions about Textuality and New Media

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Many reasons tempt us to make large claims about the meaning of the shift from print to visual "writing" with the advent of "New Media" capabilities such as the Internet. A preference for visual media has been created by mass communication vehicles such as television and print advertising. The West loves dichotomies in general, the second millenium has arrived, and the rapidity of technological development itself also precipitates this mentality. Differences between the kinds of knowledge generated by oral cultures and literate ones, the shift from aural and oral to written texts, and the development of sophisticated philosophical and scientific traditions add to this impulse to herald a new "pictoral" age, where knowledge is communicated without words or at least with fewer of them. We would like to urge caution in making grand claims about this visual "revolution."

For one thing, the move from word to image might be seen as a recapitulation of the oral age rather than a new beginning, since speech already implies the existence of a speaker present before us--a kind of visual dynamic presence. At least without advanced technologies, or pathological illness, we do not ordinarily hear disembodied voices. Maurice Merleau-Ponty testified to such a kind of perceptual knowledge as the basis for the child's animated world rather than the projection of intentionality favored by Piaget who, for all of his impressive contributions to science, projected the end of development onto the beginning. Oral contexts were always visual. Visual ones are not so different from print.

In evolutionary terms, watershed "revolutionary" moments arise where there is the opportunity for evolutionary reorganizations that are combinatorial. Hierarchical mental constructions and structural integration keep multiple cognitive units simultaneously in mind and combine them into new schemas which become subroutines in yet larger compositions (Langer and Killen 128). Rather than a revolution, the New Media may be an evolution that we wish to keep evolving in spite of our cultural preference for dis-establishment and overthrow in the rise of the image (Stephens). In cognitive development, imitation carries us across contexts and allows for adaptation. In this research, a chapter forthcoming in a volume on new media at MIT Press, we attempt to apply such evolutionary concepts as hierarchical reconstruction, recapitulation, combinatorial capacity, and synchronization to the development of visual writing in New Media. We argue for the evolution of the visual "revolution." Rather than being the opposite of imitation, originality in New Media relies on, and requires it. The death of print in the rise of the image is greatly exaggerated.

Paleohydrology of Glacial Lake East Fork, Pioneer Mountains, Idaho

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This study represents the senior thesis completed by the primary author, while residing as an exchange student at SRU. The field work was completed over ten days substituted into the typical curriculum of the Lehigh undergraduate Geology Field Camp. This arrangement offered a host of desirable aspects favoring successful inquiry by an undergraduate. Logistics of completing field study in a remote, picturesque setting were graciously supported through the camp. The project was tightly constrained in scope, and employed techniques readily managed by an individual student. Furthermore, the questions being investigated held bearing upon interpretations previously published relative to perceived flooding risks discussed for the Idaho National Environmental and Engineering Laboratory (INEEL) in the Snake River Plain.

Glacial Lake East Fork was a small, late Pleistocene, ice-dammed lake, which may have catastrophically discharged down the Big Lost river on at least one occasion, and perhaps repeatedly during the Wildhorse I advance of the Pinedale glaciation. Detailed field mapping of ice-rafted boulders (migmatitic gneisses) derived from the Wildhorse Canyon core complex accurately define a paleoshoreline with an elevation of 2298 m (7480 Ft. amsl). Using a Digital Elevation Model (DEM) and a 2298 m shoreline elevation, we calculate a lake area of 23.3 km^2, a volume of 1.3 km^3, and an average depth of 56 m. Over the approximately 20,000 years since deglaciation, it is possible that the highest ice rafted boulders may have been transported down slope to the shoreline elevation. Therefore, the subsequent volume calculation must be considered a minimum. Clast concentrations indicative of paleoshorelines below the highest shoreline may represent lower, stable lake levels. The discharge associated with the catastrophic draining of this lake is not sufficient to provide the approximately 60,000 m^3/sec calculated to be needed to create the geomorphic and geologic features located almost 100 km downstream. These features are found in the 11 km long bedrock gorge of the lower Big Lost River in Box Canyon on the Snake River Plain within the INEEL.

lfo Usigli's Medio tono and the Transition to Modern Theatre in co

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(including the author himself) consider Rodolfo Usigli (1905-79) to be the father odern Mexican theatre (Rodríguez 67). His best-known plays include El ulador [The Gesticulator], the antihistorical trilogy (Corona de fuego [Crown of Corona de sombra [Crown of Shadows], Corona de luz [Crown of Light]) and of psychological realism such as El niño y la niebla [The Boy and the Fog]; but g his long career, Usigli experimented with all dramatic genres. Among his early Medio tono [Half Tone] (1937) stands out for several reasons: it was Usigli's first ıercial success on the Mexican stage, it realized his ambition to write a deliberately ic play, and it represented a true break from the presentational style from then ced in Mexican commercial theatres. Well into the 1930s, notes Fernando de Ita,

> ...the set design and the ways of staging the works of modern dramatists was not up to the standards of the new dramatic methods. Testimony abounds to affirm that . . . the divas and scene-stealers . . . imposed their own personalities onstage and made everything revolve around them. Their broad style of acting overcame any other aesthetic consideration. (10, my translation)

ntrast, Magaña Esquivel observes that Medio tono "rompe con la muralla de las añías comerciales" [breaks down the system of the commercial companies] (133)-- , the play lacks a dominating role; no one character mesmerizes the audience with hes of great emotion. Medio tono shows the Sierra family's economic decline, but Romantic dramatic precedents, neither a hero, a distant rich relative, nor a rious stranger arrives in the nick of time to save the Sierras. The absence of these ntions, plus the quick dialogue turnover and the natural quality of the characters' ior and speech indicate a definitive break from both the kinds of plays and the kind esentation that the Mexican commercial theatre inherited from its Spanish edents.

The Effects of Sodium n-Butyric Acid on Expression of GFP-CFTR in MDCK Cells

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Cystic Fibrosis (CF) is a lethal recessive genetic disease that drastically shortens the life span of the children afflicted. CF is caused by a mutation in the cystic fibrosis trans-membrane conductance regulator (CFTR) gene located on chromosome seven.

The normal CF protein acts as a channel for Cl^- ion transport in cells. Having the incorrect form of this protein leads to improper levels of Cl^-, Na^+ and water in certain epithelial cells. This creates a sticky mucus build up in the lungs, pancreatic duct and other tissue ducts that produce mucus. This prohibits the pancreatic enzymes needed to aid in digestion from reaching the intestines. This problem is alleviated by the prescription of digestion enzymes to be taken orally with meals.

A more serious problem occurs in the lungs of patients with CF. An abnormally thick sticky mucus clogs the airways. This sticky mucus acts as a trap for any particles that are breathed in. Often harmful bacteria and viruses enter and create frequent lung infections, that leads to long term lung damage. Accumulated lung damage over time is the biggest contributing factor in fatality of the people afflicted with CF. To try to prevent the lung damage patients receive daily chest therapy, which helps to loosen the mucus. Also many patients do daily breathing treatments that help to open the airways. New orally inhaled antibiotics have been created that enter directly into the lung and help to fight bacterial infections.

Although many treatments are being developed, there remains no cure. CF is still a lethal disease. A major step for curing this disease is to learn how the CFTR protein functions and what molecules the CFTR protein interacts with in the cell. In this study we have used a gene construct that produces human CFTR protein fused at its amino terminus to green fluorescent protein (GFP). The cell line containing the gene construct was provided to us by Dr. Bruce Stanton, Dartmouth College. Fluorescence microscopy will be used as a means of visualizing the amount and location of the GFP-CFTR fusion protein in MDCK cells, a canine epithelial kidney cell line. In the first phase of this study, we have observed the effects of sodium butyrate on the expression of the GFP-CFTR fusion protein. Preliminary work shows that butyrate appears to activate production of the GFP-CFTR protein in these cells.

Sharing Knowledge and Experience: Cross-Disciplinary Conversations About the Role of Writing in Undergraduate Education

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Our oral presentation will explain a recently completed book project and seek involvement of those attending in a continuation of the activity the book describes. The primary impetus for our study was 15 lengthy interviews we conducted with eight (8) colleagues from other academic fields--Computer Science, Elementary Education, Health Education, Health Services Administration, Mathematics, Nursing, Physics, and Sport Management. We combined these audiotaped, transcribed conversations, conducted between June, 1998 and November, 1999, with our reading and our years of experience teaching first-year composition and courses in our department's professional writing program to generate an argument in dialogic form, an argument for the value of face-to-face conversations between composition specialists and professors within other disciplines. These conversations, we contend, open up one promising path leading towards significant improvement of undergraduate education. They enable: a) development of an ordinary language that can allow faculty members across disciplines to collaboratively consider the role of writing in undergraduate education; b) shared learning among conversants that can benefit students in composition, professional writing, and major program courses; and c) discovery of possibilities for mutual assistance that can enhance undergraduate teaching and curriculum design for both general studies and major programs.

We encountered many of the tensions which have become attached to the writing-across-the-curriculum movement: writing to learn versus writing as disciplinary practice; content coverage versus written application of such content; the role of first-year writing instruction in the inculcation of standard written English; and the boundaries of expertise possessed by both composition and "content" faculty when examining writing as practice and product. We explored issues related to what might be considered a contemporary liberal arts "trivium"--style, genre, and argumentation--and discussed the kinds of professional and extra-disciplinary "expertise" our colleagues would like undergraduates to eventually possess. The role of writing in gaining and executing such expertise was also examined. We described the dynamics of the interviews themselves: how we negotiated meaning, made personal and professional contact, acknowledged and discussed individual concerns, and discovered areas of possible mutual action. Symposium participants who attend our presentation will be invited to contribute suggestions of their own for continuing and further developing the conversations across disciplines regarding the role of writing in undergraduate education that we have begun here at Slippery Rock University.

Impact of Acid Mine Drainage on Benthic Communities in Streams: The Relative Roles of Substrate vs. Aqueous Effects

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STAPLETON, Michael (F), Environmental Geosciences

Restoration of streams impacted by acid mine drainage (AMD) focuses on improving water quality. Precipitates of metals on the substrata, however, can remain and adversely affect the benthos. To examine the effects of AMD precipitates, we compared community composition in 30.5 cm^2 trays of clean and AMD metal-coated substrata (3 weeks of exposure in an AMD stream) that were placed in a stream with high water quality. Five replicate trays for 4 substrata treatments, clean sandstone, clean limestone, AMD metal-coated sandstone and coated limestone, were placed in a circumneutral stream of high water quality. After 4 weeks, the substrata of the trays were sampled for invertebrate and periphyton density and composition. One rock was selected from each tray before and after the experiment to measure substratum concentrations of Fe, Al, Mn and Zn. AMD precipitate on the substrata did not significantly affect macroinvertebrate or periphyton density and species composition. Iron and aluminum were the most abundant metals on rocks with AMD precipitate, and significantly decreased after 3 weeks in the circumneutral stream. No consistent trends were apparent for changes in Al, Mn and Zn concentrations on the substrata. An additional experiment was conducted to examine the effects of aqueous metals on macroinvertebrates independent of substrata. Cages containing 10 live or dead hydropsychid caddisflies from an unimpacted stream were placed in a reference stream and an AMD impacted stream, respectively (n=7), for 5 days to examine survival and tissue concentrations of Fe, AL, Mn & Zn. Percent survival of caged live caddisflies was significantly lower when exposed to water in the AMD stream than in the reference stream. Caddisfly tissue concentrations of all metals combined and for iron alone were significantly higher after exposure to AMD water than in the reference stream. Iron, aluminum and manganese tissue concentrations were significantly higher for the dead caddisfly treatment than the live. The results suggest the aqueous chemical environment of AMD may have a greater affect on organisms than chemical precipitate on the substrata.

Clay Mineralogy of the Unstable Pittsburgh Red Bed and its Relevance to Landslides in Southwestern PA

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The challenging geography of the Pittsburgh area, underlain by an equally challenging geology, has long affected the activities of man. In fact the Monongahela River's name is derived from a Native American word for "river with sliding banks, or high banks, which break off and fall down" (Heyman & Craft, 1977). Steep slopes occupy 50-70% of the Pittsburgh area, while bottomlands occupy 20%, and uplands are a bit less extensive. Through time, most of the development has therefore taken place on land that would be considered marginal (Gardner, 1980). Of particular interest to this investigation are the slopes that dominate the area, their bedrock, and their tendency to landslide.

The study area focused on exposed outcroppings within Allegheny County, Pennsylvania where landslides associated with red bed units account for $2 - 4 million worth of damage annually (Adams, 1986). The Pittsburgh Red Bed is a stratigraphic layer of illitic claystone that has been degraded by the leaching of potassium ions and the simultaneous deposition of ferric iron ions, causing a change in mechanical behavior (Fisher, 1968). X-ray diffraction techniques (XRD) were used to analyze red bed composition, its structural characteristics, and to develop insight into the mineralogical controls over its exceptionally costly interface with society.

Samples were gathered from two sites and divided into four categories based on color and induration. Samples were prepared as randomly oriented powder mounts and as oriented mounts of the clay size fraction. Oriented mounts were additionally subjected to ethylene glycol solvation and intense heating to collapse expandable clay layers.

Moore & Reynolds (1997) suggest that a collection of XRD tracings for the common, discrete clay minerals is a most useful tool for identification. These tracings were plotted against each other, against glycolated and heat-treated sample tracings, and against tracings of the known clay minerals. Fisher (1968) and others have described red bed composition as primarily illitic. The results of this investigation confirm the presence of illite in all samples evaluated. Heat treatment of red bed samples for 2 hours at 500°C, however, produced the most interesting results. When compared with the known illite sample tracing, the red bed tracing displayed a reduction in d-spacing (interlayer spacing) at illite peaks, denoting a compositional difference. This difference is hypothesized to reflect the cation substitution of the smaller Fe^{3+} for K^{+}, and may hold the key to their instability. Additional study could begin by testing this hypothesis after attempting controlled ionic substitution in the clay and similar analyses.

Ecological Restoration at the Robert A. Macoskey Center for Sustainable Systems Education and Research – An Overview of Past Efforts and Planned Approaches

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Ecological restoration is a multi-tiered process of repairing damage caused by human actions to the diversity and dynamics of indigenous ecosystems. Our paper introduces restoration at the Macoskey Center on the SRU campus through a review of past efforts by former faculty (Karen Kainer and Marianne Sarrantonio), current monitoring, and planned new approaches.

The most prominent project is the revegetation of a 4 acre site previously excavated to provide topsoil on campus. This barren expanse lay exposed and unmanaged for several decades with limited re-colonization from proximate plant communities. Active restoration to prairie began in the mid-90's with the application of pulverized limestone and compost to rebuild soils. Wild flower seeds were dispersed and Indiangrass (*Sorghastrum nutans*), Little Bluestem (*Andropogon scoparius*) and Switch Grass (*Panicum virgatum*) seeds were germinated and individual seedlings were transplanted. Today, the site is revegetated with intended, native and opportunistic species. Here, results from soil testing and plant survival and growth monitoring are summarized, and plans to inventory community composition and reassess restoration goals are discussed.

Other planned initiatives are discussed, and include the rehabilitation of agricultural soils with a combination of reseeding with native wildflowers, forbs and grasses and soybean with the intention of fixing available nitrogen and rebuilding soil organic matter. A range of forest community stages is present on the property, from abandoned fields in early stages of reorganization to mature secondary hardwood forests. Succession may be arrested in some areas due in part to rapid colonization of noxious species (e.g., *Rhus glabra*) typical of woodland borders. Vegetation sampling protocols can be implemented and permanent plots established to document natural plant community trajectories and to assist and direct forest development with intentional re-introductions. Amending existing habitat for wildlife use includes the placement of bluebird (*Sialia sialis*) boxes in reforested areas and management of fallow lands and the prairie restoration site for the re-introduction of the upland sandpiper (*Bartramia longicavda*) once present but currently extirpated. We are also considering the establishment of willow and popular stands as foster ecosystems and wildlife habitat, as well as treatment of graywater and production of woodfuel for the Harmony Homestead.

Restoration is a process of renewal. A goal is not necessarily to return ecosystems back to pre-disturbance conditions, but rather re-establish health and re-build impaired functions and ecosystem services. The 83 acre Macoskey Center offers numerous opportunities to ameliorate disturbance stress and assist the renewal of dynamic agro-forest ecosystems.

The Pursuit of a Sustainable Agriculture through the Cultivation of Eastern Gamma Grass (*Tripsacum dactyloides*)

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Sustainable agriculture is an emerging paradigm that aims at the development of more environmentally amicable farming techniques with the purpose of managing more rationally natural resources, for the long term prosperity of human communities. A very important component of this innovative model is also the study of native species for their possible incorporation into modern farming systems and for the preservation of biodiversity. Eastern gamma grass, (*Tripsacum dactyloides*) is a perennial plant species, native to the north American continent. It has sustained for millennia the large herds of herbivore populations that once roamed through the American prairies, while holding together the most fertile soil that allowed the expansion of our agricultural systems.

Several examples related to the practical utilization of this species exist already, in order to substantiate the theoretical underpinnings of the sustainable agriculture philosophy. Therefore, this paper will provide readers with a current review of the literature in this area of endeavor. The findings have many research implications and they illustrate multiple benefits that may apply also to the agricultural conditions of western Pennsylvania.

The topography of our soils for example, makes cultivated fields very susceptible to erosion, particularly those that have been converted to pasture land, or devoted to the growth of annual plant species, in vast monocultures. Better soil erosion control demands immediate intervention, if farming systems are going to become more sustainable.

Concurrently, the nutritional aspects of the foliage seem to have a promising future for eastern gamma grass, conceived as a perennial fodder crop to be used with livestock species, in alternative to non-native plants. Therefore, agronomic as well as animal nutrition reasons are enhancing the interests of innovative agriculturists for including this perennial species into modern crop rotations. Thus, the conversion from a monoculture to a perennial polyculture will aid the transition to more sustainable farming systems.

Effect of all-*trans* Retinoic Acid on Gene Expression of Antigen Presentation-related Molecules in Murine Macrophages

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Malnutrition (specifically vitamin A deficiency) has been shown to depress immune response through a reduction in antibody production. T helper 2 (Th2) lymphocytes are responsible for activating B lymphocytes to produce antibodies, and antigen-presenting cells (APC) are responsible for activating T cells and directing their differentiation to T helper 1 (Th1) or Th2.

To study the effect of vitamin A on APC function of macrophages, murine bone marrow stem cells were isolated from BALB/c mice and cultured with or without all-*trans* retinoic acid (atRA) along with macrophage colony-stimulating factor (M-CSF). Several proteins expressed on the surface of APC are vital to antigen presentation and T cell stimulation, among them MHC class II, mCD40, mCD80, and mCD86. Macrophage expression of these antigen presentation-related genes was analyzed through mRNA isolation and reverse transcription followed by polymerase chain reaction (RT-PCR), with β-actin serving as a baseline control. Preliminary results indicate equivalent expression of MHC class II, mCD40, mCD80, and mCD86 in the atRA cultures in comparison to control cultures substituting dimethyl sulfoxide (DMSO) for atRA. The data suggest that atRA does not direct macrophages to Th2-influencing characteristics. In fact, it appears that atRA has no effect on macrophage gene transcription with respect to antigen presentation.

McIntyre, Pennsylvania, on the World Wide Web: Everyday Life in a Coal-Mining, Company Town, 1910-1947, through Documents, Photos, and Memories of Residents

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McIntyre, Pennsylvania, was one of seventeen coal mining company towns developed by the Rochester and Pittsburgh Coal Company in Indiana County, in the early part of the twentieth century. A large number of immigrants from Italy and eastern European countries flocked to McIntyre and other mining towns to secure steady jobs.

The coal company and its subsidiaries and agents were able to accumulate large tracts of coal-rich land in Indiana County by purchasing acreage from farmers. Agents for the company, who were responsible for hiring immigrants, were told what type of ethnic groups to hire and to not hire. Simple wood frame houses, a schoolhouse, company store, church, dance hall, doctor's office, and other structures were built. The center of the town was the tipple and other buildings necessary for coal mining operations.

Coal mining was a hard, dirty, and sometimes dangerous job. Cave-ins and explosions were common. Unionization was attractive to the miners since it offered them hope of better working conditions and higher salaries. The coal company tried to hinder strikes by obtaining injunctions from local anti-union judges.

Miners' wives generally did not work outside the home. Family income was low and frugality was practiced daily. Gardens were kept and produce was canned or stored. Their daily diets closely resembled the meals from their countries of origin. Housewives used plants and other home remedies to treat certain illnesses. Weddings, funerals and other major life events were often occasions when town residents came together to contribute food and support to their neighbors.

Although life was hard for the miners and their families, there was time for leisure and recreation. The many Italian born male immigrants enjoyed playing the game bocce. Children's games were simple and toys often homemade. The most popular form of entertainment for the townspeople was baseball. The coal company sponsored leagues from among nearby coal towns.

Many children did not finish elementary school. Boys in their early to mid teens often went to work in the mines to help support their families. A number of children in the four-room schoolhouse, which was built by the coal company, did not speak English. Corporal punishment was meted out to any student who misbehaved.

Since most of the immigrants were Roman Catholic, a church was established early in the history of the town. It served the spiritual as well as social needs of some of its members. Although the town was not segregated by nationality or religion, young men and women of different religions usually did not date.

In 1947, the coal company sold its assets in McIntyre to a local salvage company. This company resold the homes to residents who formerly rented them from the coal company. McIntyre's era as a company town was over.

Profiles of Alcohol Consumption and Obesity among Adolescents in the United States – Are Alcohol Consumption and Obesity Related?

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Alcohol consumption is a significant health and social problem in American society. Approximately 10 million American youths under the age of 21 drink alcohol. Compounding this problem is the fact that many of our adolescents are overweight, another major health problem in this country. This study describes the demographic factors associated with alcohol consumption and obesity and examines the relationship between alcohol consumption and obesity in adolescents.

The data for this study was taken from the National Longitudinal Study of Adolescent Health, 1994-1996. A school-based, clustered sampling design was used to investigate 6,504 adolescents in seventh to twelfth grade. The analysis for the current study was constrained for all subjects who reported weight, height, and age (n=4,750). Alcohol use was defined as having tried alcohol more than two or three times, while drinking frequency was determined as how often alcohol was being used by the student. Body Mass Index (BMI) was calculated as weight (kg) divided by height (m) squared. Obesity was defined by the upper 15^{th} percentile of BMI as presented by cycles 2 and 3 of the National Health Examination Survey.

Although males had a higher frequency of alcohol drinking than females, the prevalence of alcohol use was similar within gender. Whites were the most likely to have tried alcohol (56.4%), while African Americans were the least likely (43.9%). Whites were also found to consume alcohol considerably more frequently than any other race. Thirty-two percent of adolescents were considered to be obese (35% in males, 29% in females). Alcohol consumption and obesity decreased as age increased; however, no significant relationship was found between alcohol consumption and obesity in this study population.

The findings of this study provided useful information on the health profiles related to alcohol use and obesity among adolescents in the United States. Such information is valuable for planning health education and developing prevention programs in middle schools and high schools.

Ductile Shear Zones in the Basement Complex of the Blue Ridge Anticlinorium in Central Pennsylvania: Implications for the Evolution of the Northern Blue Ridge

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A ductile shear zone, defined by lineated, mylonitic, volcanic rocks, principally rhyolitic quartz-feldspar porphyry, crops-out in the Precambrian basement of the northern Blue Ridge anticlinorium in south central PA. These mylonitic rocks occur north of the Carbaugh-Marsh Creek (CMC) fault. In this area, the CMC fault trends east-west across the structural grain of the Blue Ridge and is interpreted as a right-lateral strike-slip fault. North of the CMC fault, mylonitic foliation strikes northeast and dips moderately southeast. Adjacent to the CMC fault, the strike is more eastward and the mylonitic rocks are cut by numerous joint sets that are prominent close to the fault. Mylonitic volcanic rocks are not known south of the CMC fault. The absence of mylonitic rocks may indicate offset during right-lateral movement along CMC fault compatible with the more eastward strike caused by drag along the CMC fault. Displacements along Triassic normal faults may also obscure the mylonite zone south of CMC fault. An alternative interpretation is that the ductile fault bends into a transverse tear at an oblique thrust ramp that has been reactivated during later right-lateral movement on the CMC fault under brittle deformation conditions.

A regionally extensive horizon of mylonitic beds, the Keedysville mylonite, has previously been recognized along the west flank of the Blue Ridge at the base of the Cambrian carbonate section in the northern Blue Ridge (Campbell and Anderson, 1996). The Keedysville mylonite is interpreted to be a fundamental detachment surface in the central Appalachians that is folded and cut by younger faults. The sheared volcanic rocks that crop-out north of the CMC fault may be a detachment stratigraphically lower than the Keedysville within the Cambrian carbonates. If these zones of ductile deformation are correlative, then they may represent the footwall cutoff of a thrust ramp along which basement rocks were carried across the platform margin onto the Keedysville flat.

In Vitro Effects of Retinoic Acid on Differentiation of Murine Dendritic Cells from Bone Marrow Stem Cells

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Retinoic acid (vitamin A) has been shown to inhibit a T helper 1 (Th1) immune response and favor a T helper 2 (Th2) dominated response. Th1 and Th2 cells both develop from T lymphocytes stimulated by antigen-presenting cells (APC) to respond to foreign proteins. Development of Th1 cells and Th2 cells from T lymphocytes is mutually exclusive in that any particular T lymphocyte can choose one or the other pathway, and the choice is influenced greatly by the APC. Previous work suggested that the APC can be affected by retinoic acid, and that retinoic acid preferentially favors APC stimulation of Th2 development. To dissect the mechanism of retinoic acid action on the APC, we analyzed gene expression of antigen presentation proteins in dendritic cells (DC), the primary APC of the immune system. Bone marrow stem cells from BALB/c mice were differentiated to DC by *in vitro* culture with granulocyte-macrophage colony-stimulating factor (GM-CSF). Three of the four treatment groups received all-*trans* retinoic acid (atRA) beginning on days 0, 4, or 6. The control group received dimethyl sulfoxide (vehicle) starting on day 0. The DC were harvested on day 8 and the cells were counted, demonstrating twice as many cells when atRA was added on day 0 compared to the control. Reverse-transcription followed by polymerase chain reaction (RT-PCR) was performed to analyze gene expression of CD40, CD80, CD86, and MHC Class II, proteins that have been previously demonstrated to be crucial in influencing Th1 versus Th2 development. Gene expression of β-actin (housekeeping gene) was analyzed as a control. The RT-PCR analysis demonstrated that CD80 and CD86 expression in DC was only detected when atRA was added to the cultures. There was no apparent difference in CD40 or MHC Class II expression from the control to atRA-containing cultures. In conclusion, it appears that vitamin A can act on DC to increase proliferation and may be necessary for expression of costimulatory proteins CD80 and CD86 in these APC. This may explain why vitamin A is necessary for optimal Th2 responses, since development of Th2 responses generally requires higher costimulation by APC than Th1 responses.

Student-focused, Collaborative, Choreographic Research with Mark Taylor

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Co-principal investigators Nola Nolen, Jennifer Keller, and Dance Department students worked collaboratively with Dance Alloy Artistic Director, Mark Taylor, in the creation of "Ice," an original dance for nine Slippery Rock University dance students set to music by Karl Jenkins. The collaboration was funded by the College of Health and Human Services Research Committee for 1999-2000.

SRU dance students worked collaboratively with Mr. Taylor in the creative process by not only learning his movement style but also by creating their own movement sequences, which Mr. Taylor incorporated into the work. After 40 hours of rehearsal in which the dance was constructed, choreographic research continued as the students interpreted and refined character motivation and choreographic intent. Assistant Professors Nolen and Keller aided this process of interpretation and refinement by serving as faculty rehearsal directors. Ms. Nolan utilized her extensive experience in ballet repertory in coaching the students, and Ms. Keller drew on her eight years of working professionally with Mr. Taylor as a dancer (1988-1996) and his assistant (1995-1996).

Performance opportunities complete the choreographic research by presenting the work to an audience for examination, reflection, and entertainment. "Ice" was performed for the Slippery Rock University campus in December 2000 and January 2001, and for Pittsburgh audiences at the Byham Theatre in March 2001. The research project has afforded the investigators an opportunity for professional development through the creative processes of performance and choreography.

Are You Listening?: An Examination of Commonly Held Beliefs About the Nature of Effective Listening

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Listening is widely recognized as the most essential but least developed communicative skill, at least among Americans. However, are some of the most fundamental assumptions related to effective listening (which serve, for example, as the basis, for college courses and corporate training programs in listening) well founded? Is it true, for example, that the average person remembers less than 25% of what they have heard after only 48 hours? Does the perceived relevance of the message listened to have an appreciable impact? Does maintaining eye-contact with the source of a message really improve message retention? How about the commonly held view that listening to certain forms of music during study and/or instruction improves academic performance (i.e., the so-called "Mozart Effect")? These are the premises related to effective listening that were investigated by this panel of student researchers under the direction of their professor as part of the requirements for a course in Communication Research Methods.

It is the shared belief of the researchers that replications of basic social science research can be as important and valuable as "original research," especially when the original findings have acquired the status of basic, taken-for-granted truth within a particular discipline. The papers included in this proposed panel were presented at the New York State Communication Association Annual Convention in Monticello, New York in September of 2000. They comprised one of a very few student panels competitively selected from submissions from communication professors, professionals and students (graduate and undergraduate), from across the country and Canada. Their research has been re-conceptualized in light of the feedback that they received from a distinguished audience of experts on the topic. Moreover, the findings (which have been reported in newspapers and on radio programs throughout Western Pennsylvania and Eastern Ohio) have great practical significance for teachers and students in every discipline, as well the general public.

The Right Myths at the Right Time: Myth Making and Hero Worship in Post-Frontier American Society – George Edward Waddell vs. Christy Mathewson

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Every fan of baseball history knows about Christy Mathewson. The Christian Gentleman was one of the finest men and one of the finest pitchers the game has ever seen. As for George Edward "Rube" Waddell, loads of fans know about him too. Fire chasing, drinking, flood sandbagging, fishing, drinking, domestic raging, hunting, drinking, sharpshooting, barnstorming, drinking, live snake masticating, band leading, drinking, acting, boxing, drinking, alligator wrestling, raw oyster scarfing, drinking, curve balling, fast balling, highballing – he did it all. If Rube had never lived and someone made up a story that told of such a life, few would believe it. Yet it happened. Around the events of Rube's and Mathewson's lives, both during their careers and ever since, a myriad of stories have arisen. Some are true, some are sort of true, and some are flat lies. In this presentation, I will engage in some separating of fact from fiction as well as use such material as a backdrop to a historical discussion about the evolution of myth making in early 20th-century America. I will endeavor to demonstrate how the sagas of such sports heroes as Rube and Mathewson were perfect subjects for new types of fables in a nation entering a new era.

Liquid Crystals and Their Potential Impacts on Technology

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If a solid crystalline substance is heated, it melts to a liquid, thus obtaining the random distribution of molecules characterizing the liquid state from the rigid arrangement of molecules in a solid state. In some organic substances, there exists an additional state in between liquid and the solid crystalline states, which has been known for more than a century. This state is given the name Liquid Crystals (LC's). Although they are liquid, they retain the physical property of 'anisotropy', which is typical for solids.

Today, LC's are used in devices such as watches, heat sensors, laptop computers and flat screen televisions, and in computers for fast data transfer. Their potential use in artificial muscles, high strength fibers, etc., and on the battlefield, is still in exploratory stages.

I will discuss some physical properties of LC's and their applications to today's growing technology.

The Medium is the Message: *Busman's Honeymoon* as Play, Novel, and Film

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Dorothy L. Sayers, writer of theological works, translator of Dante, and pioneer in modern advertising, is known today primarily for her detective fiction, especially the novels featuring Lord Peter Wimsey, an amateur sleuth, and Harriet Vane, a writer of mystery novels. *Busman's Honeymoon*, the last of the Wimsey novels, highlights at long last the marriage of the two characters and Sayers' views of the relationship between men and women.

Although *Busman's Honeymoon* appeared as radio and television productions, it is best known in three incarnations: as a play written by Dorothy L. Sayers and Muriel St. Clare Byrne; as a novel written by Sayers alone; and as a feature film adapted by Monckton Hoffe, Angus MacPhail, and Harold Goldman. The three versions of the story differ quite markedly from one another for a number of reasons: whether Sayers was working in collaboration (the play); or alone (the novel); or whether she was absent from the creation (the film). These three vehicles also differ because of the constraints as well as the opportunities presented by the stage, the printed word, or celluloid. Finally, they differ because the audiences for which they were intended varied in taste, education, class, and diversity. The play provides wit, a clever plot, an improbable murder weapon, comedy, some English eccentrics, and two famous fictional detectives, Harriet Vane and Lord Peter Wimsey, now married to each other. The novel's subtitle, *A Love Story with Detective Interruptions*, suggests that Sayers' focus has shifted, with married love more important than murder. Its opening chapter, "Prothalamion," connects the new novel with the previously published *Gaudy Night*, at the end of which Harriet Vane finally accepts Lord Peter Wimsey's proposal, and reintroduces some of the characters from the other Wimsey novels, such as his mother, the Dowager Duchess of Denver. The final chapter of *Busman's Honeymoon*, "Epithalamion," prepares the way for the final work in what would have been a trilogy on love and marriage, had Sayers completed the fragment known as *Thrones, Dominations*. The 1940 film departs from both play and novel, making Harriet inferior to Peter and excising Sayers' message about the importance of work to both men and women. Even though both the play and the novel pander to some of the prejudices of the 1930s, the film avoids the most blatant racial, religious, and social prejudices of the earlier works, but the all-male filmmakers failed to convey Sayers' philosophy of equality in marriage. The differences among the three versions of *Busman's Honeymoon* derive in part from the cultural context, the constraints and opportunities of the genres, and the degree to which Dorothy L. Sayers was involved in the production.

This paper was delivered at a conference, "Dorothy L. Sayers: The Romance of Faith," at Grove City College, 27 October 2000.

Inclusion of Environmental Education in Pennsylvania Teacher Preparation Curricula: A Survey of Elementary Pre-Service Teacher Programs

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A partnership was formed between Pennsylvania Department of Education, West Chester University and the Pennsylvania Center for Environmental Education to conduct the first statewide assessment of the inclusion of environmental education (EE) within pre-service elementary education teacher preparation programs. A survey was mailed to all colleges and universities in the Commonwealth that have such programs. This survey provides baseline data that will help Pennsylvania to chart progress towards the full integration of EE into the Commonwealth's educational system.

The results of the survey revealed that much work remains to be done to effectively include EE within the curricula of institutions that train Pennsylvania's elementary school teachers. Existing efforts to incorporate EE lack the scope and sequence, as well as the institutional structure normally associated with good educational programming. The survey found that the inclusion of EE pedagogy and content knowledge varies widely among Pennsylvania's elementary education teacher preparation programs. It is difficult to predict where EE will be found within a curriculum, as institutions include it within a wide range of coursework. While the inclusion of both EE methods and content knowledge are low, content knowledge inclusion lags behind pedagogical methods. It is noteworthy that the great majority of programs do not require a specific EE course. Of the many specific EE curricula sponsored by agencies and organizations in Pennsylvania, only a handful are commonly used by teacher preparation programs.

On the institutional level, faculty and administrator interest in EE was most frequently neutral to moderately high. State certification guidelines and standards, and faculty interest were the most frequently cited factors facilitating the inclusion of EE in pre-service programs. The primary barriers to inclusion include limited funding, time limitations, and lack of faculty interest or knowledge of EE. The wide majority of all institutions have no full-time or part-time faculty members who specialize in EE. Despite this information, institutions most frequently evaluated their program's effectiveness in eaching EE as being adequate. This contrasts with many of the survey's findings, but it rovides insight into what characterizes a satisfactory EE program from the perspective of our pre-service teacher preparation institutions. Further research is needed to evaluate the depth and quality of the EE coursework presently being offered.

Planning and Implementation of an Interpretive Trail at the Robert A. Macoskey Center for Sustainable Systems Research and Education

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A proposed interpretive trail at the Macoskey Center on the Slippery Rock University campus is a collaborative project involving students, faculty and staff. The trail, currently in the implementation phase, targets a diverse audience ranging from elementary school children to university students and the local community. An interpretive trail has long been a goal of the Macoskey Center in order to provide recreational opportunities, exposure to projects and research at the Center, as well as education about the ecology of old fields and secondary forests typical of the area. The proposed theme for the trail is "Living Sustainably at the Macoskey Center" emphasizing ecosystem management, sustainable agriculture, appropriate technologies, plant community succession and a natural history of local flora and fauna.

In the fall semester of 2000, as part of an Interpretive Methods course, students assembled information for the planning phase of the trail including site investigations, a review of methods of interpretation, team research, dissemination of results and the creation of a draft brochure. A preliminary trail was marked and mapped, a series of interpretive signs were drafted, and an implementation plan was proposed. A committee comprised of Facilities staff, PREE faculty and students was designated to review the proposal and oversee implementation.

The preliminary trail has two connected sections. A half-mile trail incorporates the Harmony Homestead, market gardens, permaculture area, composting and restoration sites. Connected to this segment is a mile long trail that brings the visitor through successional series of abandoned fields, secondary hardwood forests and wet meadows typical of Western Pennsylvania. Interpretive signs are positioned by projects at the Harmony Homestead along section 1 and near viewsheds of natural areas along section 2. Both sections emphasize ecological stewardship and identification of partnerships with nature.

While the preliminary trail covers only the southern portion of the 83 acre tract, it is possible and likely that the trail can be extended to include the northern half, which will incorporate intermittent tributary streams of the Slippery Rock Creek as well as wetland habitats, an old homestead, and fallow agriculture rotations. Initial construction will begin this spring with completion targeted by mid-summer. This trail provides further access to campus commons, complementing the planned arboretum and habitat study areas at Slippery Rock University, and promotes research and scholarship of faculty and students. It may also be possible to connect the Macoskey Center trail to other area trails enabling a regional trail network.

Harai-Goshi Throw Technique by Novice and Advanced Judo Players

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An investigation was undertaken to analyze the kinematic and kinetic characteristics of a common judo throw, the *harai-goshi*, as performed by novice and advanced judo players. Twenty-eight adult male and female judo players (age 22.2, height 173.4 cm, weight 71.2 kg) competing at the 4th Annual Rock Classic Judo Tournament held at Slippery Rock University during spring semester, 2000, participated in the study. Competition and testing occurred on campus at Morrow Fieldhouse. Prior to data collection, all subjects completed a research consent form according to the provisions set forth by SRU's Institutional Review Board for the Protection of Human Subjects.

The *harai-goshi* throw may be described as one of the fundamental throws in the sport of judo. The maneuver, starting with the opponents facing one another, involves a lead leg step-in by the tori (thrower), a pivot turn on the lead foot and simultaneous support onto the other leg so as to bring the opponent's chest against the tori's back, and a final leg sweep of the free leg to lift the uke (person thrown) forward and over the back of the tori. All throws were performed to the tori's right side and administered against the same uke (height 177.8 cm, weight 69.1 kg).

Kistler (Amherst, NY) force platform and Peak Performance Technologies, Inc. (Englewood, CO) motion video instrumentation were used for data collection and data reduction. The 28 subjects were divided into two groups according to belt rank (17 novice, 11 advanced). Eight males and nine females were classified as novice (i.e., green and white belts), while another eight males plus three females comprised the advanced group (i.e., black and brown belts). Four successful trials were recorded for each subject.

Measurement variables included vertical and horizontal ground support forces as well as sweep leg velocity of the tori; time of execution for pivot, liftoff, and total throw; magnitude and rate of drop in the tori's center of gravity; and horizontal distance and rate of approximation between tori and uke.

Results revealed non-significant differences at the .05 level in support leg application force and sweep leg velocity between novice and advanced players. The element of speed appears to be the major distinguishing feature of *harai-goshi* technique between novice and advanced judo players. Advanced judo players were faster in executing both the step-in to liftoff phase, as well as completion of the entire throw. Furthermore, although the extent of the drop by the tori underneath the uke was relatively similar between novice and advanced, the rate of that displacement was far quicker for the advanced player ($p < .05$). In addition, the advanced tori's rate of movement toward the uke was greater than for the novice tori ($p. < .05$). In conclusion, the skillful tori demonstrated more efficient technique relying on a faster drop of center of gravity under the uke, as well as a deeper and quicker approach toward the uke.

Contemporary Dance as Research: Investigating the Fusion of Hip-hop, Capoeira, Partnering and Modern Dance Styles through the Vocabulary and Choreography of Doug Elkins

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A three-week residency (April 1-19, 2000) was held with internationally known, New York-based choreographer Doug Elkins. During the residency Mr. Elkins taught the advanced level modern technique classes and created a group work on twelve students and a duet on faculty members Jennifer Keller and Ursula Payne. The students were selected for the project through an audition process.

The faculty and students, under the direction of Doug Elkins, were involved in conducting movement research during the rehearsal process en route to aiding in the final creation of the dance. This dance resulted in both students and faculty performing with each other in a seventeen-minute dance presentation on the Slippery Rock University Faculty and Guest Artist Dance Concert. The students also perform their sections of the dance separately for concerts and conventions that are student centered, such as the SRU Dance Theater fall and winter concerts, and the American College Dance regional festival held at Frostburg State University in Maryland.

This project was designed to give students and participating faculty members a chance to work collectively within a contemporary dance language, to find ways of using physicality and the development of movement as a metaphor for real life experiences, and to experience the philosophy of an established well-known professional choreographer. The research component of this project took place during the creation of the work and continues in the process of transmitting the material within the coaching and rehearsal process. The research product has been seen as a dance performed on formal concerts and other venues previously listed. This project was funded through a faculty-student research grant from Slippery Rock University of PA and the College of Health and Human Services.

Sidney Winfield Foulk: Lost Victorian Master

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This talk will explore the architectural designs of the late nineteenth century architect, Sidney Winfield Foulk (1848-1932) from New Castle in western Pennslvania. He is best known at Slippery Rock Univeristy for the designs of Old Main, West Gym, West Hall and several structures that no longer exist on campus. However, Foulk also achieved a significant reputation in the southern states that led to the establishment of a second office in Greensboro, North Carolina. His expanded practice was indirectly advanced by Foulk's association with Ira D. Sankey, a famous Gospel singer from New Castle. Sankey was heavily involved with the development of the Young Mens Christian Association (Y.M.C.A.) and commissions for these buildings in the South often went to Foulk. The popularity of these designs produced a demand for Foulk's work that led to substantial commissions throughout the south. The most prominent of these commissions were the designs of two enormous "Boom Hotels" in Lexington and Buena Vista, Virginia. These sprawling Queen Anne designs can be categorized as Picturesque Eclecticism; the Buena Vista Hotel (now owned by Southern Virginia College) is one of the few examples of its type to survive from this era. This talk will also investigate Foulk's church designs (a building type he considered his specialty), which were heavily inspired by the popular Richardsonian Romanesque Revival. These ecclesiastical designs display Foulk's often playful eclecticism that allowed him to develop a rather unique personal style. His Richardsonian designs for the Methodist Church and seminary (1893) in Greensboro, North Carolina and the City Baptist Church (1895) in St. Augustine, Florida are indicative of the northern architectural influence then occurring in the south.

An Overview of Some Constructivist-Based Curricula for the Algebra-Based Introductory Physics Course

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Systematic study into student learning in the introductory physics classroom has begun to yield a wealth of research-based curricula. This poster will review some of the curricular innovations being disseminated by physics education researchers specifically for the algebra-based introductory course. "Tutorials in Introductory Physics" produced by the University of Washington, "Context Rich Problems" from the University of Minnesota, "Ranking Tasks" developed in part by the Two-Year College group of the American Association of Physic Teachers, " Activity Based Physics" from the University of Maryland, and "Peer Instruction" developed at Harvard University will be described. A critique of the author's experience in implementing these curricula in a traditional setting will be presented.

Genetic Crosses to Illustrate Epistasis in Maize

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Epistasis is the genetic phenomenon in which one gene masks the expression of a second gene. It was first described in 1905, only five years after the re-discovery of the work of Gregor Mendel, the "father of genetics." Epistasis has been an important concept in genetics ever since, although one that students historically struggle to master. The goal of the current study was to carry out genetic crosses in maize that would produce ratios of kernels colors that illustrate epistasis. These materials could then be used to teach epistasis at both the university and high school levels.

Epistasis has traditionally been studied using the dihybrid cross. In such a cross, two parental lines that differ in two genes are crossed to produce F_1 plants that are heterozygous for these two genes. The F_1 plants are then self-fertilized to produce the F_2 generation. When there is no epistasis between the two segregating genes, four distinct phenotypes appear in the F_2 generation in a ratio of 9:3:3:1. When one of the segregating genes masks the expression of the second gene, however, epistasis results. Instead of four phenotypes, only two or three phenotypes will appear in the F_2 generation. The ratio of the F_2 phenotypes will be one of several possible modifications of the 9:3:3:1 ratio.

The trait examined in this study was kernel color, which in maize may be purple, red, yellow, or white. Which of these four colors appears in a kernel depends on its genotype at least 14 different genes, many of which interact epistatically. Kernel color is thus an ideal trait with which to investigate epistasis.

The crosses that will be described were done in the summers of 1999 and 2000. In 1999, eight parental lines were crossed in various combinations to produce a series of F_1 ears, each heterozygous for a different pair of epistatically interacting genes. In 2000, the F_1 plants (grown from the kernels on the F_1 ears) were self-fertilized to produce F_2 ears.

A total of eight crosses were successfully completed. The F_2 ears showed four different modified ratios of kernel colors, each illustrating a different type of epistasis: (1) 9:3:4 (recessive epistasis), (2) 9:7 (duplicate recessive epistasis), (3) 12:3:1 (dominant epistasis) and (4) 13:3 (dominant and recessive epistasis). Starting in the fall of 2001, these ears will be used in the Genetics labs at SRU and in Advanced Biology classes at Grove City Senior High School.

Upgrade: Cyborg Ascending a Staircase

SHUMWAY, Jon R. (F), jon.shumway@sru.edu, Art

Upgrade: Cyborg Ascending a Staircase is a video installation examining the general concept of progress as it is represented through the technological manipulation of the physical human form. The incorporated video elements consist of looped sequences of a human figure climbing a set of steps. This is juxtaposed against images of a variety of technologies that are superimposed upon some of the stair climbing figures. These superimposed images represent a series of technological ways in which the body has been manipulated and its potential for such. The alterations to the human body explored include those in such categories of manipulation as cosmetic, corrective, prosthetic, chemical, genetic and digital.

These technologies, according to Marshall McLuhan, function as extensions of humanity. In ***Upgrade: Cyborg Ascending a Staircase*** these extensions are turned inward as we, in essence, become physically united with our own technological creations.

As a species, we are engaged in a continuing and increasingly grand scale physical alteration of our own form. Whether or not this form of "progress" is viewed positively is a matter of opinion. The fact is that the body is being technologically altered, and has been to some extent for most of human history. Also, in a society where technological advancement and superiority are highly-valued, such developments are generally categorized as being progressive.

The concepts of progress and advancement tend to be understood through the use of orientational metaphors as a forward or upward movement, whereas the movement-related terms backward or downward tend to be used in describing some form of regression or reversion. Likewise, the term upgrade tends to be used in relation to the concepts of progress and advancement. We upgrade a piece of equipment by altering or adding to it in an effort to make that piece of equipment better than it was previously. This term also has a similar directional implication, as the incorporation of the word "up" implies. Thus, upgrading is thought of in terms of a similar upward or forward movement.

The utilization of a sequence of Eadweard Muybridge photographs to create the stair climbing motion of the figure makes reference to an historically significant infusion of mechanical technology into the production of artistic images. Similarly, the title ***Upgrade: Cyborg Ascending a Staircase*** along with the movement of the figure in the work makes reference to Marcel Duchamp and his painting *Nude Descending a Staircase*. Duchamp, as the originator of the "readymade," drew into question the very conception of "Art" and what constitutes it. This questioning resulted in Art's opening up to new conceptual and media-based possibilities. These "upgrades" opened the door for the inclusion of non-traditional technologies into the art making process and forever changed the way art is perceived and understood.

Madness and Our Methods: A Collaborative Approach to Interpreting Shakespeare's *Othello*

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In four centuries of Shakespeare criticism, few issues have caused as much contention as those surrounding the character of Iago in *Othello.* Iago is the diabolical figure whose machinations cause the destruction of an admired general and his new bride, and his appalling cruelty and viciousness have created almost a sub-school of Shakespeare criticism as scholars work to explain his behavior. For directors and designers of the play, the issue is crucial, as the approach to the character of Iago often proves to be the conceptual linchpin of the entire production.

Our approach to the character of Iago is to analyze him as a contemporary sociopath, a tormented being with the soullessness of a Ted Bundy. Such an approach will allow us to apply realistic psychology and motivation to the character (avoiding the trap of playing him a kind of force of evil), yet without making us too dependent upon the scanty motivations with which Shakespeare supplies us. Also, slanting Iago in this direction tends to lead the play into the realm of the psychological thriller, creating an atmosphere that seems entirely appropriate to this suspenseful story.

Thus we come to the presentation, which will consist of three parts. The first presentation will be made by my dramaturg (or research assistant) Andrea Sack and I. After I give a brief overview of the issues and our general approach to the play, she will present some of her detailed research into different pathological problems and into the psychology of this character. Actor Don Russell will perform one of Iago's soliloquies from the play, explaining how this research is informing his interpretation. The next part will feature student set designer Amy Davidson and her faculty mentor Paul Jennings. They will present Amy's set design (including sketches and models) and discuss the process of turning the director's abstract ideas into a concrete playing environment. Finally, faculty designer Rebecca Morrice and her student assistant Rebecca Henry will offer costume renderings of representative characters, with a discussion of the challenges of revealing character through costume.

Effects of a Minimal Contact Intervention on Maintenance of Physical Activity Following a Fitness Course

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Participation in physical activity (PA) seems to be an important factor in improving and maintaining health, and the college years may be a time when activity begins to decline. The purpose of this study was to examine the changes in PA, fitness, and potential mediators of PA (self-efficacy, decisional balance (DB), and stage of change), measured 18-weeks following completion of a Personal Physical Fitness (PPF) class, and to examine whether a minimal contact follow-up intervention impacted these parameters. College females (n=100, age=19.1±1.9 years) were randomly selected from students participating in PPF and reporting being in the action or maintenance stage of change. Subjects were tested at baseline and randomized into two groups; intervention (IG) and control (CG). The IG group received a minimal contact intervention using tailored material via email weekly for a period of 10 weeks. A two factor repeated measures (Group X Time) ANOVA showed no significant differences ($p>0.05$) between or within groups in dependent variables except for VO_2 max ($ml \cdot kg^{-1} \cdot min^{-1}$) (IG pre=42.2±5.2; pst=44.9±5.5 and CG pre=40.0±5.4; pst=42.1±5.3, Group Effect ($p<0.03$) and Time Effect ($p<0.001$)), BMI (kg/m^2) (IG pre=23.6±3.4; pst=23.9±3.3 and CG pre=23.2±3.6; pst=23.5±3.4, Time Effect ($p<0.01$)) and DB (IG pre=3.0±9.7; pst=1.4±11.4 and CG pre=-3.1±12.5; pst=-1.4±9.5, Group Effect ($p< 0.04$)). Chi square revealed no significant stage regression. Results suggest maintenance of PA, fitness, and mediators of PA for five months following a PPF class and a consistent relationship between PA, fitness and mediators of PA. Moreover, there is no added benefit to providing a minimal contact intervention during this period. However, future investigations should determine the length of time that individuals can maintain their PA following a PPF class, and whether a minimal contact intervention may be more appropriate at times other than the period targeted in this study.

Extensor Pollicis Myalgia Associated with an Occupational Custodial Task

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With the recent introduction of the OSHA Ergonomics standard, prevention of injury is the most cost effective measure for any employer. Ergonomic considerations should be essential to reducing worker injury and improving productivity. This study focused on the custodial occupational group but could be applied to other occupations. Repetitive stress injuries of the upper extremities can be the cause of cumulative trauma disorders (CTD) of many workers.

The purpose of this pilot study is to provide an example of a task analysis for an occupation where cumulative trauma disorder might occur and to overview the process of making change based on the analysis. This study investigated the possible relationship between forearm pain and using the mop bucket wringer. This type of disorder usually develops slowly and is not always reported as an occupational injury. Three custodial volunteers were used for this study and data collection. This data was collected using a microfet dynamometer. Each volunteer was tested 3 times in 5 minutes with a 30 second rest period between each reading. The microfet dynamometer recorded the amount of force being applied to the hand/wrist/forearm area and the extensor pollicis longus. The physiological trauma and CTD risk involved in this occupational task focused on the extensor pollicis longus tendon and muscle, the extrinsic muscles that control the hand and are placed along the outer forearm. The extensor pollicis longus muscle originates from the posterior surface of the middle of the ulna and extends to the last phlanx of the thumb where it is joined with the extensor pollicis longus tendon. Pushing down on the wringer to the palmar side, if load occurs too often or is sustained and sufficient recovery time is not given, will result in strain on the tendon sheath and a reduction of synovial fluid. Pilot data collected suggests that these workers are at risk for developing CTD. Repetitive out of neutral posture combined with applied force possibly decreases strength. Task analysis is only the first step to reducing worker injury. If these same results were found in a larger sample of the workforce, then engineering, administrative and employer support are needed to prevent permanent injury to the worker.

Testing the Effects of Ecological Diversity in Gray Water Treatment Using a Cellular System Design

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The challenge of changing waste products into reusable resources is both a philosophical and a technical one. The use of a gray water treatment system in the Robert A. Macoskey Center at Slippery Rock University is a step towards meeting this challenge that is so vital for a more sustainable lifestyle. However, the system now in place is suffering from many problems. Chief among these is the fact that it may not be cleaning the water satisfactorily. This research project serves to address the problems of the existing system and to replace the system entirely with a new more flexible system. A more flexible system will be able to change in the future, adjusting to changes in functions of the house, and providing a more active educational opportunity for current and future students in the Master of Science in Sustainable Systems program.

This new design is based on the research that has been done in the area of water treatment over the past two decades. It incorporates a cellular design that is based in principle on ecological systems. This method of water treatment has proven successful in several projects in the past few years and appears appropriate in scale to apply to the gray water system at the Macoskey Center.

This project seeks two main goals. The first is to design and construct a cellular treatment system that can be used not only for this experiment, but for the future investigations of students as well. Second, the experiment will test the effect of diversity in the water treatment system upon the quality of the water leaving the system. The diversity will be represented by the number and types of cells assembled in the system during the test periods. The work on the project will be divided into four phases. These will be:

1. Evaluation of the current system and development of testing procedures.
2. Construction of an intermediate system and evaluation of species for inclusion in the system.
3. Design of the cellular system. Continued testing and species selection.
4. Construction and experimentation with the cellular system. System evaluation.

At the end of these four phases the two goals of this project will be realized. The information learned from the pursuit of both of these goals will be useful to the current and future students at the Center.

Educational and Research Opportunities from Diverse Composting Activities at the Macoskey Center, Slippery Rock University

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Recycling biodegradable wastes into reusable compost is a vital challenge for developing more sustainable human systems. This paper introduces a variety of composting practices in place at the Macoskey Center of Slippery Rock University.

Composting Site. The composting site was selected at the Macoskey Center in 1995 and it went into operation in the Fall of 1997. Materials that are composted on this site come from two main sources: leaves collected from the curb sides of the Borough and the biodegradable wastes from two dining halls on campus, Boozel and Weisenfluh. Approximately, 160 gallons of pre-consumer food waste are delivered twice a week from the dining hall kitchens and are added to the leaves as a source of nitrogen, needed to promote the desired composition for the composting process of biomass. Compost has been used in restoration projects on site.

Clivus multrum. A composting toilet installed at the Harmony Homestead is designed to compost human feces in six months to a year. The unit is designed for 80 uses per day. Saw dust is added (as a Carbon source) with every usage, and a teaspoon of inoculant is sprinkled to this biomass once a month, in order to facilitate the decomposition process. In this manner, the composting toilet yields soil-enriching material (humanure) and saves the homestead approximately 30,000 gallons of drinkable water per year.

The house compost. The house compost consists of kitchen scraps that are produced on a daily basis by the homestead. This biomass is recycled at the compost pile, on the south-west side of the house and applied to the permaculture gardens as a soil amendment.

Vermicomposting. The earthworm species *Eisenia foetida* has been recently employed as an ecological engineer at the Macoskey Center in order to increase the biological diversity at the site, and to investigate on the ecological characteristics of this anellid. Various designs of ecological containers facilitate the determination of the optimum conditions that permit the earthworms to recycle biodegradable wastes, in a small-scale setting and during winter months.

The diversity of composting activities at the Macoskey Center contributes to the promotion of sustainability on a global scale and supports meaningful and applied research opportunities for students as well as demonstrations for community-based education and visiting collaborations. Composting also demonstrates tangibly the support of Slippery Rock University for research and education promoting sustainability.

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