

---

**2002-2003 FACULTY RESEARCH COMMITTEE**

---

Dr. Jennifer Lindline, Chair (Natural Sciences)

Dr. Steve Fox (Behavioral Sciences)

Mr. Andre Garcia-Nuthmann (Communication and Fine Arts)

Dr. Ray Martinez (Social Work)

Dr. Dick Green (Natural Sciences; Member at Large)

Ms. Edith Landau (Library)

Dr. Luis Ortiz (School of Business)

Dr. Barbara Risch (English and Philosophy)

Dr. Joseph Sabutis (Education)

**THE NEW MEXICO HIGHLANDS UNIVERSITY**

**FACULTY RESEARCH COMMITTEE**

**presents the first annual**

**RESEARCH DAY**

**April 4, 2003**

**Student Senate Chambers  
NMHU Student Center**

*Celebrating the Research and Scholarly Accomplishments of  
our Faculty and Students.*

grade; if such a drop exists, to determine if a relational-based intervention utilizing culturally relevant fairy tales can prevent a drop in self-esteem among 5<sup>th</sup> grade Hispanic girls; and, if such a preventive effect exists, to determine the mechanism through which the intervention had an effect. To meet these objectives, 5<sup>th</sup> grade girls in the Las Vegas School District will be given a standardized measure of self-esteem at the beginning and end of the school year for two years. Half of the participating girls will be assigned to the intervention and the other half to a control group each of the two years of the project. Intervention effects will be evaluated through the use of the standardized self-esteem measure and through the analysis of qualitative data gathered through interviews with each girl held at the beginning and end of the 5<sup>th</sup> grade.

## **STUDENT POSTER PRESENTATIONS**

**Thomas Evans** and Jennifer Lindline, Environmental Geology  
*The Influence of Infiltration and Evaporation on the Hydrologic Budget at the Las Vegas National Wildlife Refuge, New Mexico*

An integrated hydrogeological study was conducted to characterize the soil types and to assess the influence of infiltration and evaporation on the hydrologic budget for a small pond at the Las Vegas National Wildlife Refuge in northeastern New Mexico. Fieldwork was conducted in September 2002 at Melton Pond, a representative pond (0.029 mi<sup>2</sup>) within the refuge surface water system. Soil sampling and infiltration testing was completed during a time when the pond had been dry for several months. Ten soil samples were collected and separated into clay, sand, and silt fractions for classification. The soils underlying Melton Pond consist predominantly of clay with minor sandy clay and clay loam. A double ringed infiltration system was used to measure infiltration rates. Infiltration rates varied from 20.0 to 144.0 mm/hr averaging 55.2 mm/hr. Air temperature, wind speed, and relative humidity data over a fifteen-year period were obtained from the Las Vegas Municipal Airport and used to calculate evaporation rates. Results indicate that evaporation varies from 0.45 (November) to 2.26 (June) acre-ft per month totaling 15.36 acre-ft per year. Since Melton Pond holds 58 acre-ft of water, the results suggest that a significant amount of water is lost to infiltration throughout the year. This result is supported by the observed groundwater seeps in the Gallinas River Canyon that are recharged by pond leakage. Since the hydrogeologic characteristics of Melton Pond are representative of conditions throughout the Las Vegas region, the significant surface water losses to groundwater leakage need to be accounted for as the municipality considers the benefits of an acequia-lining plan.

**Steven Neese, Bill Harney, Alicia Racicot,** and Arlene Horne,  
Behavior Sciences  
*Age-Dependent Effects Of Cerebrolysin And Glucose On Memory*

The effects of glucose and cerebrolysin administration on memory in young (6-month-old) and aged (923-month-old) rats were examined. Following treatment, the rats were trained and tested on a one-way passive avoidance task. Glucose and cerebrolysin treatments, when compared to saline, enhanced memory for both age groups.

---

## **WELCOME**

---

Welcome to the first annual New Mexico Highlands Research Day! The faculty research included in today's program represents work that was funded through the Faculty Research Funds. Research and travel grants are awarded each term to faculty through a rigorous review and selection process. The Faculty Research Committee congratulates all grant recipients and encourages other faculty to apply for Faculty Research Funds for research and conference travel support. We also congratulate our student participants on their hard work and dedication to scholarly research.

For more information about the Faculty Research Funds, contact Dr. Jennifer Lindline, the Faculty Research Committee Chair at 505.426.2046 or lindlinej@nmhu.edu. You are also invited to visit the Faculty Research Committee's web page at <http://www.nmhu.edu/frc.htm>.

---

## **ACKNOWLEDGEMENTS**

---

The Faculty Research Committee members wish to thank New Mexico Highlands University for its continued recognition and support of the research and scholarly activity of its faculty and students. We also thank Prescilla Salazar for her involvement in the scheduling of the 2003 Research Day. Finally, we sincerely thank Ms. Alexis Duran for her administrative assistance and continued support of the Faculty Research Committee and its grant awardees.

development to resolve modernity's state of "permanent liminality" and to re-create the social cohesion once experienced in pre-modern times. A meta-ethnographic study of economic organizations influenced by cooperativism (i.e. labor-managed firms) is conducted to demonstrate that Max Weber ignored an alternative drive for rationality, *rational-collective*, given the collapse of cottage industries and the rise of large production systems. *Rational-collective* legitimate authority attempts social re-aggregation by creating a system of owners/workers living in mutual cooperation and interdependency.

12:00 Lunch Break.

### **STUDENT ORAL PRESENTATIONS**

1:20 **G.C. Ortiz**, M.S. Amick, and R.A. Castillo, M.J. Montoya, B.S. Nelson, E.R. Greene, Biology *Carotid Blood Flow During Ergometer Exercise: Effects of Endurance Exercise Training*

The effects of endurance exercise training [ET] on central hemodynamics in healthy adults are well established. Conversely, the effects of ET on hemispheric cerebral blood flow have not been reported [Pubmed 2002]. Accordingly, we tested the hypothesis that ET would modulate blood flow to the cerebral circulation. We used noninvasive image-guided Doppler flowmetry [ $\pm$  7% precision  $\pm$  11% accuracy] to measure absolute values and percent changes in common carotid blood flow [CQ, ml/min; an index of dynamic (6msec) hemispheric blood flow]. We studied two anthropometrically similar cohorts: 1) eight [4F] healthy, sedentary adults [mean age 22  $\pm$  3 yrs; VO2 max 38  $\pm$  6 ml/kg/min]; and 2) eight [4F] healthy, moderately exercised-trained adults [mean age 23  $\pm$  2 yrs; VO2 max 52  $\pm$  4 ml/kg/min] during rest, and approximately 50% VO2 max ergometer exercise. Resting CQ values were similar ( $p > 0.10$ ): 485  $\pm$  73 ml/min and 511  $\pm$  69 ml/min, respectively. During submaximal exercise, CQ increased similarly ( $p > 0.10$ ) in both cohorts: 21  $\pm$  7% in the sedentary group and 19  $\pm$  6% in the endurance trained cohort. From this cross-sectional, descriptive study, we conclude that exercise training does not significantly affect hemispheric cerebral blood flow during rest or submaximal exercise. To minimize genetic and behavioral variables, a longitudinal study is currently underway. Supported, in part, NSF grant #23126-11010

1:40 **Rebecca Montoya** and James Huntley, Chemistry  
*Investigation of the Structural Dynamics of Human CksHs1*

Human CksHs1 is a member of the highly conserved Suc1/Cks family of cell cycle regulatory proteins purported to have multiple roles involving several protein complexes. Recent studies have indicated that CksHs1 is intimately involved in the degradation of the cyclin-dependent kinase inhibitor p27<sup>Kip1</sup> by mediating the docking of the SCF<sup>Skp2</sup> ubiquitin ligase complex to the phosphoThr187-p27/CDK2-cyclin(A/E) complex. This results in the degradation of p27<sup>Kip1</sup> thereby leading to the activation of CDK2/cyclin(A/E). X-ray crystal structures and mutational analysis have revealed three distinct binding faces on CksHs1. One face is specific for CDK2, while another is specific for Skp2. Another, a lysine- and arginine-rich segment of the C-terminal portion of CksHs1 (a.k.a. the "anionic" binding site) is present, but its precise role in this system is still not well understood. Furthermore, the protein contains a "beta-hinge" that has the potential to extend out and allow for the formation of a CksHs1 beta-strand exchange dimer presenting the possibility of CksHs1-dependent CksHs1 regulation. CksHs1 is interesting in that it is capable of binding a myriad of protein partners, possibly itself, and perhaps nucleic acids as well, despite its small size (9 kDa). It is our *hypothesis* that CksHs1 may exhibit novel features of polypeptide-chain dynamics that give it the ability to fold into slightly different structures depending on the structure of its cognate binding

---

## **2003 NMHU RESEARCH DAY PROGRAM**

---

### **FACULTY PRESENTATIONS**

8:50 **Dr. Jennifer Lindline**, Faculty Research Committee Chair  
*Opening Remarks*

9:00 **Dr. Peter Linder**, Associate Professor of History  
*Halting Transitions: Turn-of-the Century Zulia & the Venezuelan State under Cipriano Castro, 1898-1908*

In the late nineteenth century, the western Venezuelan state of Zulia was in the midst of both economic expansion and modernization. Long before the appearance of the oil industry Zulia was a prosperous region, because of its role as the outlet for coffee exports from the Venezuelan Andes and a large part of eastern Colombia. Zulia was also an ongoing source of ongoing problems for Venezuela's national state. Throughout the nineteenth century, the mercantile and propertied elite in Caracas had to contend and compete with powerful regional elites and military leaders who sought both freedom of action and even the opportunity to seize control of the national government. This tradition of regional autonomy was particularly strong and problematic in the case of Zulia. Zulia's commercial and agricultural elites had a particularly strong tradition of resistance to the central government. Throughout much of the nineteenth century, national authorities sought to establish effective control over Zulia. Despite their efforts, Zulia and other regions distant from Caracas retained considerable autonomy until the end of the nineteenth century.

That autonomy came to an end beginning in 1899. In that year a force from the Andean state of Táchira, commanded by Cipriano Castro, seized control over the national government. Castro stayed in power until 1908, when he was ousted by his erstwhile subordinate Juan Vicente Gómez. Castro embarked on a rapid centralization and consolidation of the power of the national state. His program included the professionalization of the Venezuelan army and the military defeat of recalcitrant regional caudillos. He ruled outlying regions by appointing loyal subordinates—often *andino* veterans of Castro's 1899 seizure of power—as state presidents and *jefes civiles* (local executives). In addition, the regime sought whenever possible to enlist local supporters—particularly dissident liberals—as supporters of the new order. But efforts to establish centralized control also involved undermining the economic and cultural autonomy of Zulia. Castro transferred part of Zulia's territory to the neighboring state of Mérida, closed the Universidad del Zulia, and even closed Maracaibo to trade. These efforts did not, however, have the desired effect. Castro's hold on Zulia remained tentative.

9:20 **Dr. Michael T. Carroll**, Professor of English  
*B(e)ing Modern: Crosby and the Matrix of Popular Modernity*

By the mid-1920s, ongoing industrialization led to a new economic era known as Fordism, which assumed that the expanded role of consumerism in mass society entailed a valorization of leisure and desire that ran counter to both the dictates of the earlier producer-based economy and to vestigial Puritanism, thus setting the stage for "The Jazz Age" with its ethos of personal indulgence. Because of the inherently and paradoxically anti-productive impulses of Fordist culture as well as the disruption caused the rapid development of new media, popular modernity entered a disruptive phase that was reflected in the popular entertainment of the time. The disruptive phase of modernity is followed by an incorporation phase, in which dominant-hegemonic ideology absorbs and

neutralizes that which is "other" and places it at the service of commercial interests. By 1935, the media celebrity became an important vehicle for these commercial interests, who sought to merge brand identity with the significations of an idealized self as embodied by the celebrity construct.

This study is focused on the broadcasting career of Harry L. ("Bing") Crosby (1903-1977) as it relates to phases of disruption and incorporation from 1926-1944, with particular emphasis on his years as a "crooner" in the early 1930s and later, his transformation into an avuncular radio host during his years with The Woodbury Soap Program and The Kraft Music Hall. The central focus of the study is a semiotic analysis of advertising discourse and the signification of "Crosby" as constructed by the J. Walter Thompson Agency, which represented Kraft Foods had full creative control of the Music Hall program during the 1940s. Crosby's radio career thus serves as a model for the ongoing processes of disruption and incorporation in media culture.

9:40 **Dr. James Huntley**, Assistant Professor of Chemistry  
*Evaluation of the Role of Structural Dynamics in Cyclin-dependent Kinase 2 Regulation*

While steady advances have been made in the treatment of cancer, this disease remains a significant problem for scientists engaged in the study of the regulation of cell growth, and clinicians involved in the treatment of cancer. Central to regulation of cell division is cyclin-dependent kinase 2 (CDK2), a member of a family of enzymes whose regulation is necessary for normal cellular proliferation. Comparison of CDK2 in differing states of activation have suggested that conformational flexibility in the vicinity of the active site may play a pivotal role in the mechanisms of CDK2 regulation. However, investigations have not precisely determined the nature of this flexibility, or exactly how it relates to CDK2 function. This represents a significant problem, since without an understanding of the role of dynamics in CDK2 regulation, a complete picture of the mechanisms of CDK2 control will not be possible. Our central hypothesis is that structural dynamics of CDK2 is not only crucial to how it functions, but indeed as to how it is regulated. Therefore, we plan to conduct a series of investigations using Nuclear Magnetic Resonance Spectroscopy to evaluate the dynamic changes that occur to CDK2 as a function of activation state. We will employ advanced NMR techniques to assign backbone amide resonances for CDK2 in an inactive and partially active form. Subsequent analysis of NMR relaxation data will then provide estimates of the extent of motion, the timescales over which these motions take place, and will allow us to determine changes to CDK2 dynamics that occur upon activation. This investigation will be significant in that it will be one of the first to explore the role of dynamics in the regulation of protein kinases. More importantly, though, this study will contribute to our fundamental understanding of the mechanisms of CDK control, how misregulation of CDK2 can result in cancerous transformation, and will provide a strong scientific foundation for potentially novel or improved therapeutic strategies to treat cancer or other diseases of uncontrolled cell proliferation.

10:00 **Dr. Veronica Saunero-Ward**, Assistant Professor of Languages and Literature  
*Woman's Journey Inwards in Va' dove ti porta il cuore by Susanna Tamaro*

*Va' dove ti porta il cuore* is the story of an octogenarian, Olga, who sees death approaching and wants to leave a memoir for her estranged granddaughter who she raised after her daughter's death. Alone, in her empty house, Olga writes a diary in the form of letters addressed to her granddaughter hoping she will read them upon her death. In the

letters, Olga tells the story of four generations of women against the background of historical events that took place in the 20<sup>th</sup> century in Europe. In this essay I would like to explore Tamaro's narrative strategies that transform this deceptively simple text to a woman's call to arms. The autobiographical mode in which the story is told elicits the emergence of a true feminine self devoid of pre-conceived constants about herself and about her interaction with a patriarchal society. The memories become the "absent" feminine text, that is a women's self-referential text that is not read against a male-gendered context, but a text that creates commonality among women and eventually empowers them to embrace their personal choices.

10:20 **Dr. David Wiedenfeld**, Assistant Professor of Chemistry  
*Excimer Studies of Fluorocarbon Conformations*

The rotational barriers of the C-C bonds of halocarbons are believed to be rather different than those of hydrocarbons. We wish to systematically study the effect of halogen substituents on the conformational flexibility of hydrocarbons. As our initial approach to this problem, we have synthesized the following molecules: Pyrene-(CF<sub>2</sub>)<sub>n</sub>-Pyrene (n = 3, 4, and 6) and Pyrene-(CF<sub>2</sub>)<sub>n</sub>-F (n = 4 and 6). We describe here the concentration and temperature dependence of the emissive behavior of these materials.

10:40 Coffee Break.

11:00 **Dr. Steven Williams**, Professor of History  
*Roger Bacon and the Scientific Movement of the Thirteenth Century*

Dr. Williams' presentation will briefly describe 1) the project, its rationale, and its current status; and 2) the research results.

11:20 **Dr. Daniel B. Williams**, Assistant Professor of Biology  
*Non-Genomic Effects of Hormones at the GABA-A Receptor*

The gamma-aminobutyric acid type A (GABA<sub>A</sub>) receptor is the main inhibitory neurotransmission system in the central nervous system (CNS). Its function, and processes involving inhibitory transmission, such as sleep, epilepsy, and anxiety, can be modulated by a variety of different endogenous and exogenous ligands. Some of these modulators include the pregnane steroid hormones and thyroid hormones. These classes of hormones usually act on cells by a nuclear mechanism; at the GABA<sub>A</sub> receptor, however, they act on the receptor directly: ie: at the plasma membrane or by non-genomic mechanisms. The action of these hormones, either increasing or decreasing GABA function, may influence sleep, stress levels, and epilepsy. I will show evidence of the membrane actions of thyroid hormones at the GABA<sub>A</sub> receptor. Then I will suggest that other normally genomic acting hormones, such as Vitamin D, and Vitamin A exist, and have important roles in the CNS, for example, in calcium homeostasis and in sight. They are also structurally similar to steroid or thyroid hormones. I hope to demonstrate such membrane actions of vitamin A or vitamin D.

11:40 **Dr. John T. Luhman**, Assistant Professor of Management  
*Rational-Collective as Legitimate Authority*

The history of 19<sup>th</sup> and 20<sup>th</sup> century cooperativism can be seen, in the perspective of Szalcolczai (2000), as one attempt by workers alienated from the process of industrial

partner(s). Therefore, we propose to conduct a series of detailed NMR investigations to characterize the structural dynamics of CksHs1. We will first express and purify  $^{15}\text{N}/^{13}\text{C}$ -labeled CksHs1 and complete the backbone resonance assignments for the protein. We will then employ advanced NMR relaxation techniques that will allow us to probe the polypeptide-chain dynamics of the protein. This investigation is *significant* in that it will provide *novel* information critical to the complete understanding of CksHs1 in cell-cycle regulation and cellular proliferation. Furthermore, this study will form a basis from which to explore the role of CkSHs1 dynamics in the SCF<sup>Skp2</sup>/p27<sup>Kip1</sup>/CDK2-cyclin(A/E) biomolecular pathway of cell-cycle control.

2:00 **Cathryn Brooks-Williams and Jacob Carroll**, School of Social Work.  
Supervisors: Dr. Rey Martinez, Associate Professor and Corrine Dominguez, Deputy Director- Las Vegas Medical Center  
*New Mexico Highlands University: "No Show" Study of Non-Compliance Among Psychiatric Patients Receiving Aftercare Services*

The purpose of this study was to find correlating factors of clients who miss their aftercare appointments with Las Vegas Medical Center-Community Based Services. This study, utilizing secondary data analysis, hypothesized that factors in non-compliance are age, severity of mental illness, ethnicity, and mental illness. The study is based on patients who did not show up for two or more appointments. The months of August, September, and October (2002) were statistically analyzed for no show rates. Age, gender, and Axis V diagnosis were other factors under consideration.

2:20 **Johnathan-Michael Garcia**, Fine Arts  
*Juxtaposition of the Mind with Malleable Substances*

This will be a slide presentation explaining how the multimedia experience has influenced my thinking and work. I will talk about how my education in the fine arts has stimulated the creative drive in my artistic endeavors.

2:40 **Lauren Addario**, Fine Arts  
*Paintings and Drawings*

This presentation will show my landscape paintings and figurative drawings and paintings from the last five years.

3:00 **Jean Hill, Melissa Ortiz, Melanie Martinez, Stephanie Olguin, Elisharose Trujillo, Bobbie Ella Valdez, Kathy Underhill, Randi Davis, Colton Hackley, and Katie Surina**  
*Instilling a Collective Sense of Voice and Empowerment in Pre-Adolescent Females*

In 1992 the AAUW presented data suggesting that girls, particularly Hispanic girls, experience a drop in self-esteem in pre-adolescence relative to boys. This potential drop in self-esteem is of concern given the links between self-esteem and depression, academic achievement, and mental health. The relational view of female development of self-concept based on the work of Carol Gilligan and others supports the view that positive self-esteem in females can be supported through the use of stories and the development of personal narratives and a sense of voice. Previous research by a Highlands student suggests that Hispanic girls do experience a drop in self-esteem over the course of the 5<sup>th</sup> grade and that this drop can be prevented through the use of an invention focusing on culturally relevant fairy tales. The current research project has the following objectives: to determine if Hispanic girls experience a drop in self-esteem over the course of the 5<sup>th</sup>

**S. P. Pedro, M. L. Meyer, Natural Resources Management and M. Lujan, USDA - Santa Fe National Forest**  
*Viveash Fire Impact on the Gallinas Watershed Water Quality*

The New Mexico Environment Department (NMED) classifies the Gallinas River as a high quality cold water fishery. The 2000 NMED 303d report lists the Gallinas River for sediment deposits and turbidity from the City of Las Vegas, NM to the headwaters. In 2000, the Viveash Fire burned 2700 acres within the watershed. The City and irrigators rely heavily on the surface flow of the Gallinas River for water supply. In the summer 2001 the US Forest Service and New Mexico Highlands University cooperated to monitor and assess the impact of the Viveash Fire on the Gallinas River one year after the fire. Six monitoring sites, three of which are on two tributaries to the Gallinas River, were selected in the upper watershed. Approximately 19 grab-samples were collected at each site from July through October. Samples were collected with increased frequency during storm events. Water quality variables examined were total suspended solids (TSS), turbidity (TRB), and inorganic-N (IN, as ammonia+nitrite+nitrate-N). Approximately one-fifth of the uppermost monitoring site on the Gallinas River burned during the Viveash Fire. Nineteen samples at this site produced the greatest concentration of pollutants of all six sites, especially after storm events. Median (and range) for TSS, TRB and IN were 10.4 mg/L (3 to 267 mg/L), 3.4 NTU (1 to 88 NTU), 0.3 mg/L (0.3 to 1.77 mg/L), respectively. Downstream impacts were evident but attenuated by distance from the burned area. The Viveash Fire had a negative impact on downstream sites one year after the fire.

**Missy Trujillo, Environmental Science and Management**  
Supervisors: Dr. Maureen Romine and Dr. Jennifer Lindline  
*Comparison of Soil Chemical Properties and Mycorrhizal Populations in Burned and Unburned Sites at Elk Mountain, NM*

The purpose of this study was to determine the effects of fire on soil chemical properties and on the vesicular-arbuscular (V-A) mycorrhizal populations in the Elk Mountain area. V-A mycorrhizae are symbiotic fungi growing mainly within roots of a wide variety of plants where they aid in the uptake of nutrients. Soil and plant samples were collected in September 2002 from areas moderately and severely burned during the Viveash fire, which occurred in May 2002. Samples from nearby unburned plots were also collected for comparison. The soils were analyzed for pH and potassium, phosphorus, nitrate-nitrogen, calcium, magnesium, aluminum and sulfate contents. Roots from plant samples were examined for percent infection. With the exception of nitrogen and magnesium, the moderately burned site showed higher nutrient levels and a higher pH than the unburned site. This is to be expected since fires are a means of releasing nutrients into the soil. In contrast, with the exception of aluminum, the severely burned site had nutrient levels lower or equal to the unburned and moderately burned sites. The pH was also lower than the unburned site. In the severely burned site, there may have been some volatilization of nutrients, accounting in part for the lower levels. The examination of plant roots from the sample sites and from the barley roots grown in the soil samples all showed V-A mycorrhizal infections ranging from 30-70%, with no significant differences in the infection rates. This indicates that the soils had recovered from any immediate harmful effects of the fire on the mycorrhizal population.