

College of Natural Sciences and Mathematics

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# Temporal Relationship Between Intracellular Acidification and Caspases During Apoptosis in C3H-10T1/2 Cells

Dena Cantrell

Faculty Mentor – Steven W. Runge

Among the host of biochemical activities involved in the progression of apoptosis

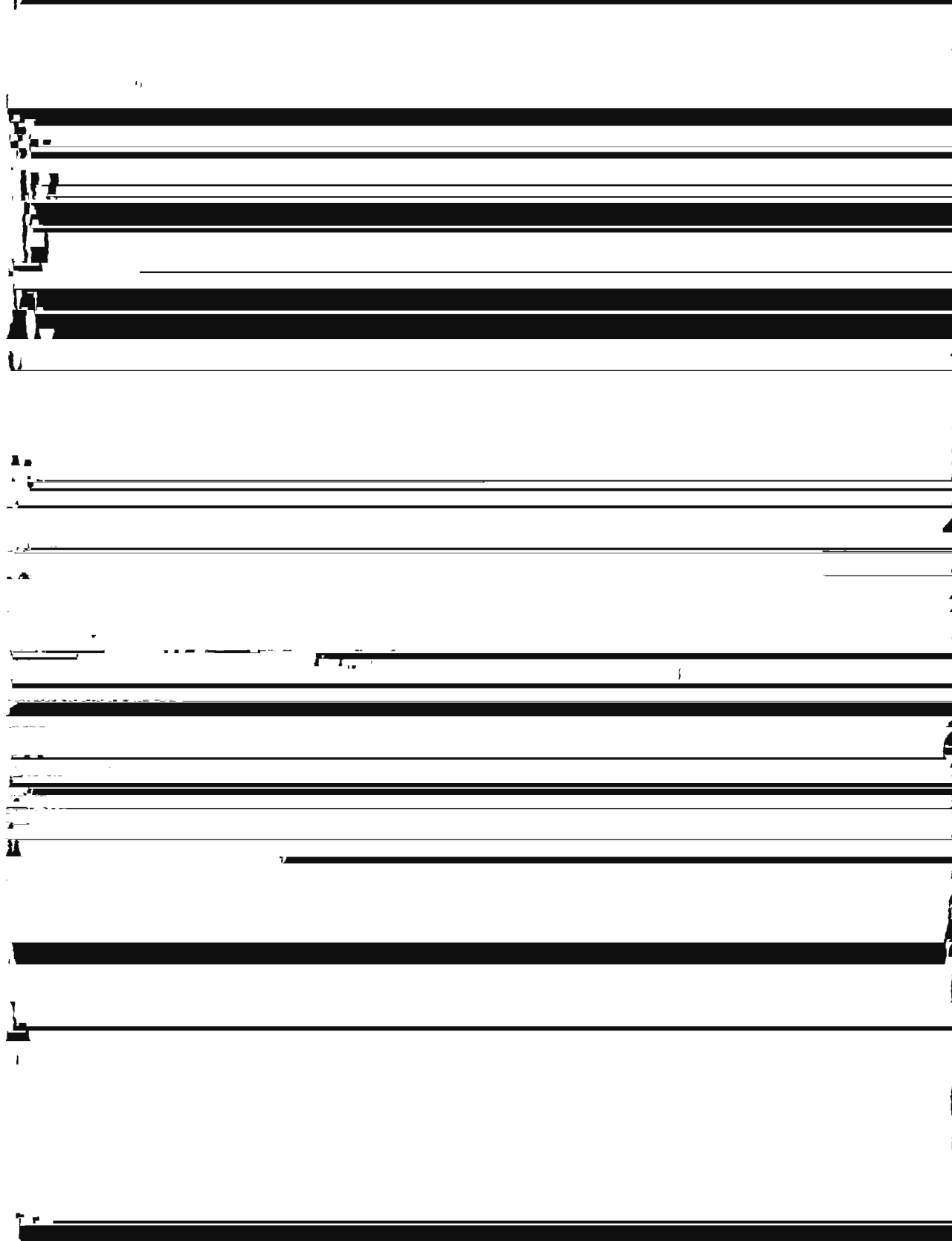
[REDACTED]

...the finish occur late in the biochemical pathway of apoptosis. Upon activation

[REDACTED]

treatment effectively clamps the intracellular pH of the cells at the extracellular pH.

While B2F significantly delayed apoptosis induced by serum withdrawal, intracellular



# Measurement of the Neuronal Activity in the Rat Basal Ganglia Following Long-Term Treatment with Two Types of

## Psychiatric Disorders

Jason C. Granger<sup>1</sup>, Lolita Palmer<sup>2</sup>, and Jay A. Vacca<sup>3</sup>  
Faculty Mentor – Deborah Kreiss<sup>2</sup>





# Comparative Screening of Arkansas Solidago Species for Anti-microbial Activities Using Modern Bioassays Methods

Ash Kaushesh

Faculty Mentor – John Choinski

Three other Goldenrod species: *Solidago canadensis* (S1) (Canada

Goldenrod), *Solidago ulmifolia* (S2) (Elm Leaf Goldenrod), and an outgroup *Euthamia leptoccephala* (S3) (also known as *Solidago leptoccephala*, *Solidago graminifolia*, and *E. camporum*), were tested for anti-microbial activity against the pathogens: *Bacillus cereus* (BC), *Staphylococcus aureus* (SA), *Dematiophilus concoloris* (DC), *Mycobacterium*

## Paclitaxel Stimulates Macrophage Expression of

**Oakley B. LaRue**  
Faculty Mentor – Thomas M. Walker

Macrophages are phagocytic immune cells involved with surveillance and tumor rejection processes. Many cytokines responsible for lymphocyte recruitment, activation

and differentiation are produced by activated macrophages. Interleukin-15 (IL-15) is a potent lymphocyte signal derived from macrophages and may play a significant role during tumor rejection. The stimuli that trigger macrophage expression of IL-15 are poorly characterized. Paclitaxel (Taxol) is a unique anticancer drug because it demonstrates direct cytotoxicity to cancer cells and serves as a potent macrophage

activation suppressed CD40 expression. Macrophage viability and activation status (as determined by nitric oxide release) were confirmed by trypan blue exclusion and the Griess test. These results show that paclitaxel induces expression of macrophage surface molecules that are associated with antitumor responses. These investigations were supported by the National Institutes of Health (CA-74380), Arkansas Scientific Information Liaison Office, Arkansas Space Grant Consortium, and UCA Research Council.

## Seed Set, Seed Germination and Seedling Recruitment of *Lonicera Japonica*, Japanese Honeysuckle

[REDACTED]

[REDACTED]

Many of our endemic plant species are endangered due to the invasion of alien plants. One successful invasion is *Lonicera japonica*, Thunb., Japanese honeysuckle. Plastic life history traits in invasive species can contribute to their ability for successful naturalization. One of these plastic responses is that of reproductive plasticity. The

questionnaire address part (1) What is the germination rate of field collected seed in

[REDACTED]

[REDACTED]

[REDACTED]

change of all three species during mass dieback of brinkly juniper (which

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

of the neurological basis of the mCPP-induced behavior may provide insight into the pathophysiology underlying OCD and may enable development of new approaches for the treatment of OCD which alleviate symptoms sooner than do current treatments

## Comprehensive Cataloguing and Study of Arkansas Medicinal Plants

Dan Wandrey

Faculty Mentor – John Choinski

The search for new antimicrobials in higher plants has become more crucial in

recent years because of the prevalence of antibiotic resistant bacteria. A novel way to

this research to use ethnobotanical information as lead. Most current research

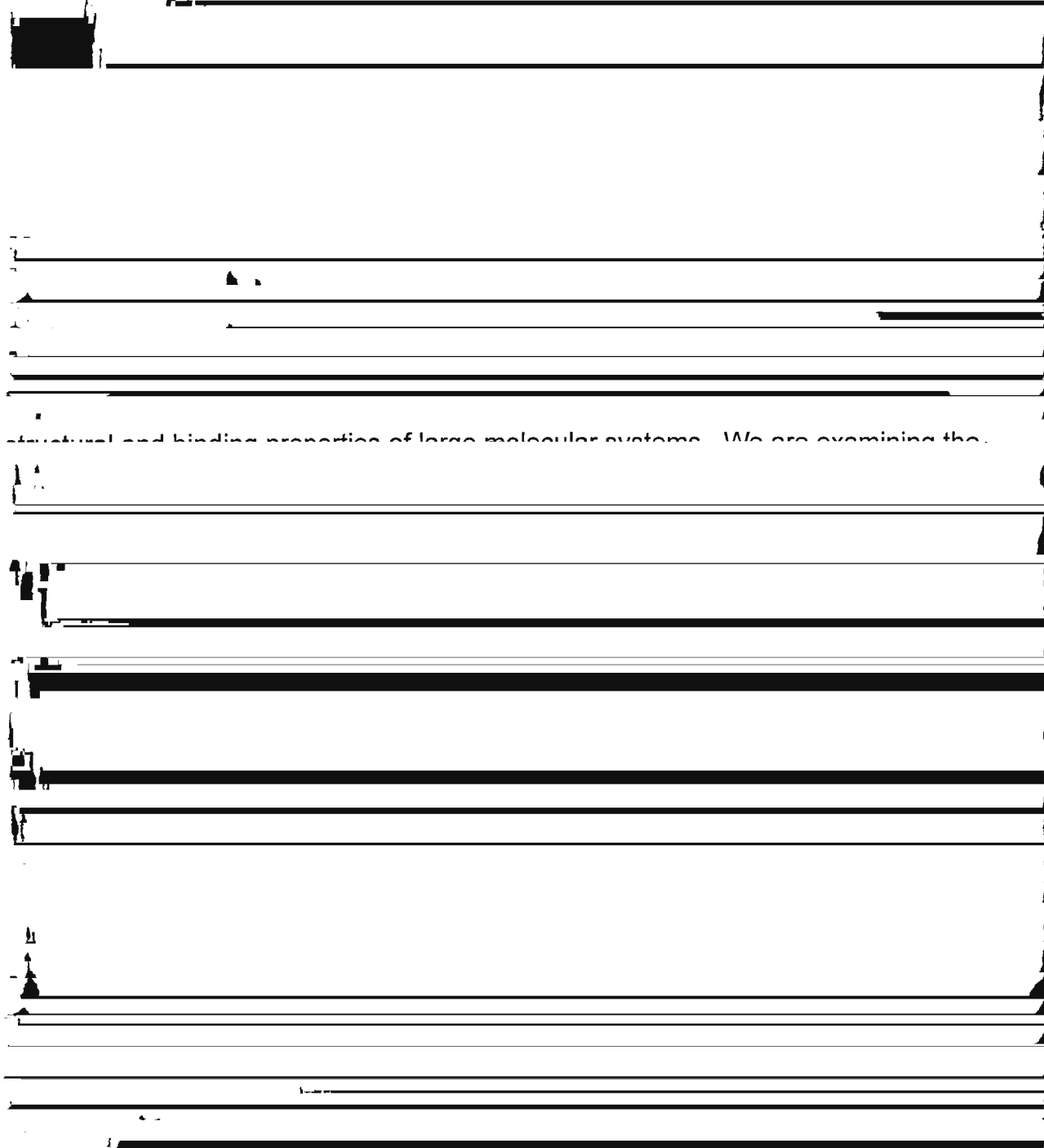


# Computational and Experimental Analysis of Mitomycin C-DNA Interactions

Micah Abrams and Scott Miller

Faculty Mentor – Patricia Draves

Computational and experimental analyses play a major role in the elucidation of



interaction of the antitumor antibiotic, mitomycin C with DNA using the molecular modeling package SYBYL 6.5 and by denaturing gel electrophoresis. Computational investigation of the structural and binding properties of mitomycin C with B-form DNA has

# State-Specific Gas Phase Association Reactions of the Group 11 Ions

Aimee Leoster and Hunter Holcomb

Faculty Mentor – William Taylor

The chemistry of gas phase transition metal ions is well-known to be state-specific. This characteristic can potentially provide sensitive control over product formation. In this study, the gas phase reactions of  $\text{Cu}^+$ ,  $\text{Ag}^+$ , and  $\text{Au}^+$  with several small organic molecules were examined. The reactions were carried out in a He buffer at room temperature using

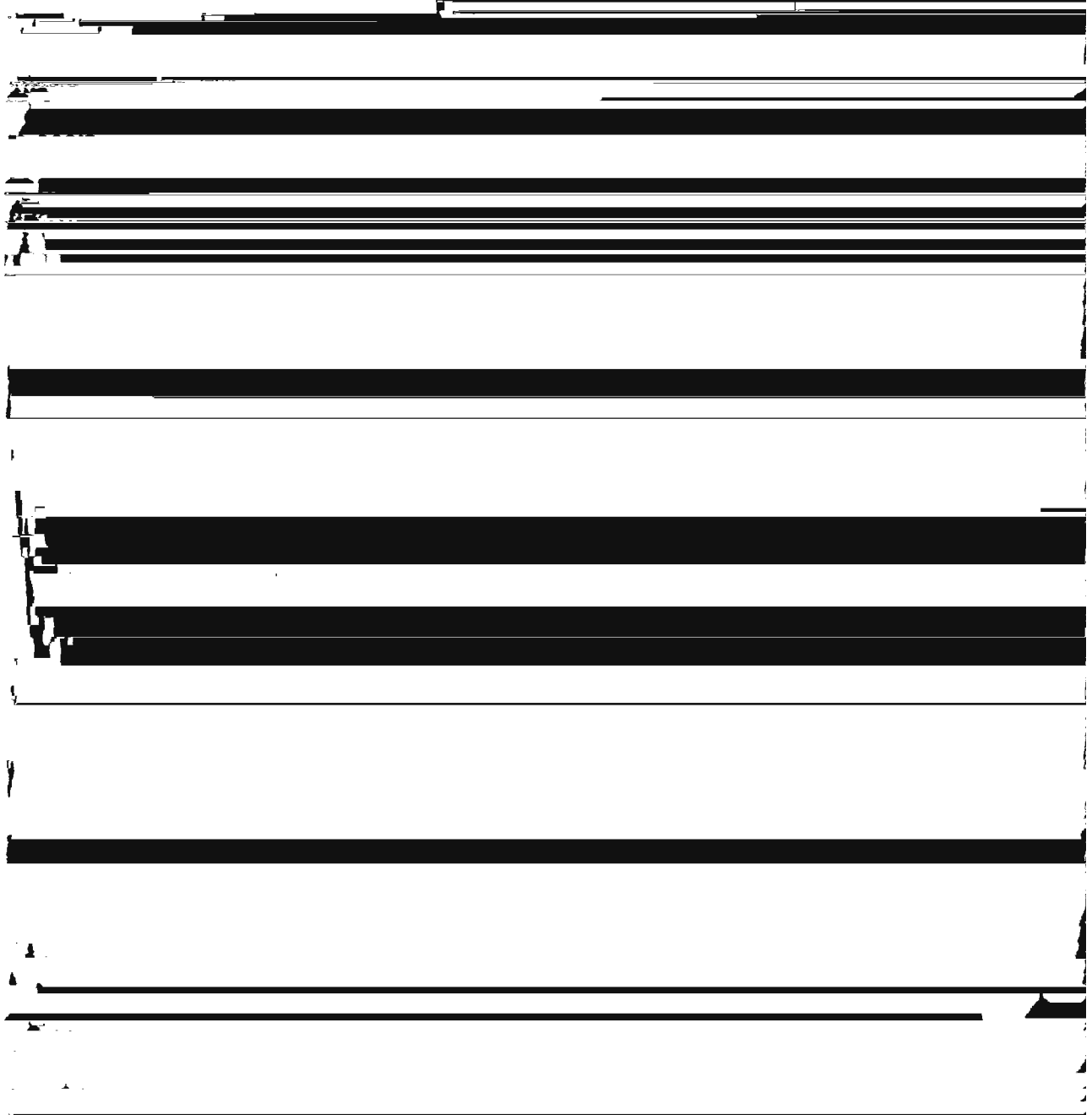
a drift cell reactor operated under near-thermal conditions. Metal ions were produced within a sputtering glow discharge. Discharge conditions were manipulated for each metal to produce the desired distribution of excited and ground state ions. Reactant ion



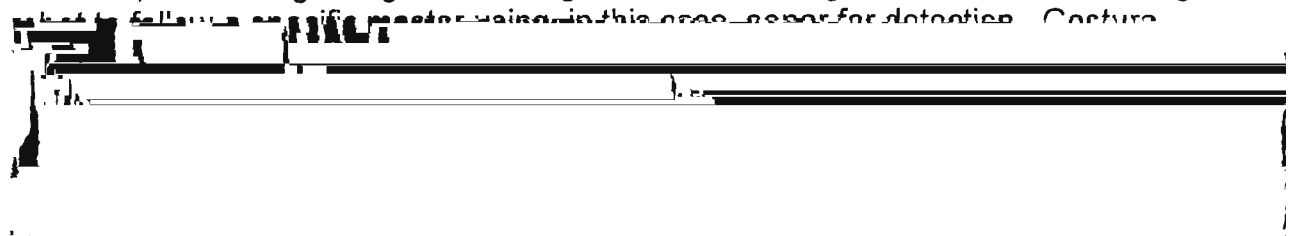
# Robotic Shadowing and Gesture Recognition

Nathan Barnes, Lee Duncan, Tim Johnson,  
and Tom Holtz

Faculty Mentor – Harold Forbes



tasks as directed without direct telerobotic control. We are working on two aspects of this behavior, shadowing and gesture recognition. Shadowing is the behavior enabling the



# Some Reflections on the Y2K Problem

[REDACTED]

Faculty Mentor – D.S.Tomer

The Y2K problem – affectionately called the Millennium Bug – is one of the largest problems ever faced in the computing discipline. The early programmers who are responsible for this problem did not expect this. The Gartner Group is estimating worldwide cost of about 1.2 trillion dollars including 600 million dollars in North America. Some people are aware of this problem, but no preparations are being made. We have

collected some information about Y2K, the state of Arkansas, and the problem at the [REDACTED]

national and international levels. As an end product of this project, we are planning to develop some literature and flyers to educate people about this problem and possible solutions available in the market. This problem is handled very poorly in other countries where no public/government agencies are equipped to address a problem of this magnitude. Hopefully, today's programmers/software developers will take the area of software engineering seriously and we will not leave such a mess in the future.

# Staffing and Efficiency Concerns at CRMC Laboratory

**Erin Weese**

Faculty Mentor – Todd Smith

Data can be very informative if one can find the correct key to unlocking the information contained within. Our client, the laboratory manager at CRMC (Conway

Regional Medical Center), had concerns about the operational efficiency of the laboratory and its staff regarding the collection and analysis of blood samples. In particular, our

Addendum:

Department of Mathematics

Using Technology to Connect the Empirical and Deductive  
Aspects of College Geometry

Sandy Dunlap

Faculty Mentor: Joan McGhee

# Non-Rutherford Scattering of Protons from Carbon\*

Donald Benson, Mark Denton, Chris Lynch, and Robert Sullivan

Faculty Mentor – Rahul Mehta

Rutherford scattering occurs when a beam of protons is scattered from the target nuclei of large atomic number. The positively charged protons are scattered by the Coulomb force created by the much larger positive charge of the nuclei. The charge on

carbon nucleus, however, is not large enough for true Rutherford scattering to occur

# Analysis of Seismic Signals in Porous Materials

Faculty Mentor – Carl K. Frederickson

The purpose of this project is to assemble a data acquisition system that will

computer, an AD/DA data acquisition card, and software to analyze the data. This system will digitize up to 8 analog signals simultaneously at rates up to 39 kS/s. This system will be used to detect and analyze acoustic signals in model porous materials. The data collected will then be used to determine characteristics of the materials. This information will then be compared to theory.

**The Investigation of Kinematical Scattering Factor for Incident**



