

TENNESSEE ACADEMY OF SCIENCE

West Tennessee Regional
Collegiate Meeting

April 10, 2010

Christian Brothers University

Memphis, TN

Welcome to
The West TN Regional Collegiate Division
of the
Tennessee Academy of Science
Christian Brothers University
April 10, 2010

“If we knew what it was we were doing,
it would not be called research, would it?”

Albert Einstein

Undergraduate research helps develop your mind, thereby preparing you to go out into the world, no matter what your chosen profession. Everyone has worked very hard to be here today. Enjoy yourself and revel in the fact that you are the “expert” on your subject matter today!

Dr. Malinda E.C. Fitzgerald

A handwritten signature in black ink, appearing to read "Malinda", with a long horizontal flourish extending to the right.

Schedule of Events
Tennessee Academy of Science
April 10, 2010
Christian Brothers University

Registration (Assisi Hall Foyer)	8:30
Welcome and Introduction	9:00
Introduction of Keynote Speaker	Dr. Malinda Fitzgerald
Keynote Address	AH 153

Dr. John Smarrelli, CBU President
"From cloning genes to a college presidency: Is it all in the DNA?"

Sessions 1-4 Presentations	10:00
Posters on Display	Assisi Foyer 11:15-12:15
Lunch	Sabbatini Lounge Thomas Center 12:15

Closing:
 Business Meeting
 Announcement of Best Paper Awards

Session One: Engineering AH 153

10:00-12:00

Moderator: Dr. John Ventura, Christian Brothers University

Session Two: Animal Behavior AH 155

10:00-11:15

Moderator: Dr. Anna Ross, Christian Brothers University

Session Three: Molecular Cell Biology AH 055

10:00-11:45

Moderator: Dr. Mary Ogilvie, Christian Brothers University

Session Four: Chemistry AH 007

10:00-11:15

Moderator: Dr. Sandra Thompson-Jaeger, Christian Brothers University

Posters Foyer of Assisi

11:15-12:15

Moderator: Br. Edward Salgado, Christian Brothers University

Judges

Session One: Engineering

Bert Frase, Retired, University of Tennessee Health Science Center

Ron Fitzgerald, Ellendale Electric

Pat Ryan, PhD, University of Tennessee Health Science Center

Session Two: Animal Behavior

Sarah Boyles, PhD, Rhodes College

Rena Durr, PhD, Christian Brothers University

Beth Nelson, PhD, Christian Brothers University

Session Three: Molecular Cell Biology

Jeremy Armstrong, University of Tennessee Health Science Center

Sharon Frase, St. Jude Children's Research Hospital

Eldridge Johnson, PhD, University of Tennessee Health Science Center

Charlie Biggers, PhD, University of Memphis

Session Four: Chemistry

Lou Boykins, University of Memphis

David Tran, University of Memphis

John Young, PhD, Christian Brothers University

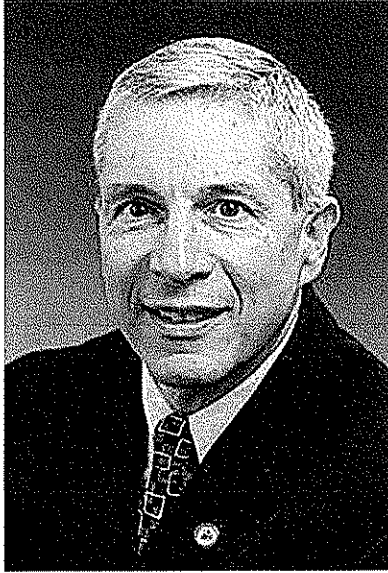
Posters

Cheryl Goudie Simco, PhD, University of Memphis

Sheharyar Minhas, St. George's Medical School

Bill Simco, PhD, University of Memphis

John Smarrelli, PhD
President, Christian Brothers University



Keynote Speaker
Twenty-Second president of Christian Brothers University

First permanent lay president of Christian Brothers University

B.S. Le Moyne College; Syracuse, New York; Biology

M.S. SUNY College of Environmental Science and Forestry; Syracuse, New York

Ph.D. SUNY College of Environmental Science and Forestry; Syracuse, New York

Served in many leadership roles through out his career
Recognized by the NACADA for administration of faculty-centered,
academic advising program

Lector and Eucharistic minister

Member of the American Society of Plant Biologists,
Sigma XI, National Association of Biology Teachers

Extensive extramural grant support and publications

Author of three textbooks

Committed to Christian education

Married to Eloise, and has three children

Session Topic Moderator	Session 1 Engineering Dr. John Ventura	Session 2 Behavior Dr. Anna Ross	Session 3 Molecular/ Cell Biology Dr. Mary Ogilvie	Session 4 Chemistry/ Biochemistry Dr. Sandra Thompson-Jaeger
Room	AH 153	AH 155	AH 005	AH 007
10:00	Binh Nguyen and Russel Saliendra	Kristi A. Prevost	Brooke Allen	Ryan A. Carroll
10:15	Ryan J. Nicolini	Stephanie N. Cassel	William Simco	Daniel Eastlack
10:30	Patrick Louie	Caroline Mitchell	Raelyn S. Pirtle	Sania Sayani
10:45	Fredrick D. Durham	Ting Wong	Caitlin Ashley	Rachel Escue
11:00	Osborn F. de Lima	Cameron Kasmai	Jessica Hines	Supriya Ponnappula
11:15	Harshit R. Shroff, Anthony Bownes, and James Brown	Wallace Coy Lock	Fatima Anmol Khan	Xiong B. Lin
11:30	Mike Yarbrough		Terence Netzel	
11:45	Grey Dziuba		Maegan Lytle	
12:00	Jacky Wong and Keith Wyrick			

**Posters
AH Foyer
(Authors present 11:15-12:15)**

Elizabeth Calabretta
Lauren E. Lieb
Allison Graham
Jeremey Branch and Yahia Hamada
Alana Antoine and Yahia Hamada

Session One: Engineering

Moderator: Dr. John Ventura

WIRELESS CHARGING STATION FOR LOW-POWERED ELECTRONIC DEVICES. **Binh Nguyen* and Russel Saliendra***, *Christian Brothers University, Memphis, Tennessee.*

RAIN CATCH/IRRIGATION SYSTEM. **Ryan J. Nicolini***, *Christian Brothers University, Memphis, Tennessee.*

BLIND SPOT AND REAR END DETECTION SYSTEM FOR VEHICLES. **Patrick Louie***, *Christian Brothers University, Memphis, Tennessee.*

GPS TRACKING DEVICE FOR AIR CONDITIONER COILS. **Fredrick D. Durham***, *Christian Brothers University, Memphis, Tennessee.*

MULTI CHANNEL BATTERY CHARGER. **Osborn F. de Lima***, *Christian Brothers University, Memphis, Tennessee.*

USE OF GREEN ENERGY IN AUTONOMOUS VEHICLES. **Harshit R. Shroff*, Anthony Bownes* and James Brown***, *Christian Brothers University, Memphis, Tennessee*

Session Two: Animal Behavior

Moderator: Dr. Anna Ross

IDENTIFYING AND EVALUATING SOCIAL, DOMINANT, AND AGGRESSIVE BEHAVIORS AMONG THREE BOTTLENOSE DOLPHINS IN KEY LARGO, FLORIDA. **Kristi A. Prevost, and Holli Byerly**, *Christian Brothers University, Memphis, Tennessee and Dolphin Cove, Key Largo, Florida.*

STOP AND SMELL THE ROSES: HOW OLFACTORY ENRICHMENT AFFECTS THE BEHAVIOR OF CAPTIVE JAGUARS (*PANTHERA ONCA*) AT THE MEMPHIS ZOO. **Stephanie N. Cassel*, Allison W. Graham*, Andrew Kouba, Morgan Powers, and Sarah A. Boyle**, *Rhodes College, Memphis, Tennessee(SC, AG, SB) and the Memphis Zoo, Memphis, Tennessee(AK,MP).*

ADVANTAGES AND DISADVANTAGES TO TWO NON-INVASIVE RESEARCH METHODS FOR THE STUDY OF WILD JAGUAR POPULATIONS **Caroline Mitchell***, **Rachel Dutkosky***, **Leandro Silveira**, and **Rahel Solomann** Christian Brothers University, Memphis, Tennessee (CM), University of Tennessee, Knoxville, Tennessee(RD), and Instituto Onça-Pintada-Jaguar Conservation Fund, Mineiros, Brasi (LS, RS).

ROLE OF THE ALPHA-1-ADRENERGIC RECEPTORS ON THE RECONSOLIDATION OF OLFACTORY FEAR CONDITIONING. **Ting Wong***, **Fabricio HM Do-Monte**, **Antonio P. Carobrez**, Christian Brothers University, Memphis, Tennessee (TW), and Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil (FD-M, AC).

EFFECTS OF DOPAMINE INHIBITION ON FLUID LICKING BEHAVIOR OF *UBE3A* DEFICIENT MICE. **Cameron Kasmai***, and **Detlef Heck**, Christian Brothers University, Memphis Tennessee and University of Tennessee Health Science Center, Memphis, Tennessee.

ATLANTOOCIPITAL DISSOCIATION: A UNIFORMLY FATAL INJURY? **Wallace C. Lock***, **Louis J. Magnotti**, and **Martin A. Croce**, Christian Brothers University, Memphis Tennessee (WL), and University of Tennessee Health Science Center, Memphis, Tennessee(LM, MC).

Session Three: Molecular Cell Biology

Moderator: Dr. Mary Ogilvie

IN VITRO MACROPHAGE RESPONSE TO TITANIUM PARTICLES. **Brooke Allen and Richard Smith**, Christian Brothers University, Memphis Tennessee and University of Tennessee Health Science Center, Memphis, Tennessee.

INFLUENCE OF ACE-1, ACE-2 AND ACE-3 GENES ON SOIL NEMATODES. **William A. Simco*** and **Lynda R. Miller**, Memphis University School, Memphis, Tennessee, and Christian Brothers University, Memphis, Tennessee.

DERMACENTOR VARIABILIS: THE EFFECTS OF TICK SALIVA ON JNK AND P38 SIGNALING PATHWAYS IN FIBROBLASTS. **Raelyn S. Pirtle***, **Carolyn D. Kramer**, **Nina Poole-Mitchell**, **Lewis B. Coons**, and **Judith Cole**, Christian Brothers University, Memphis, Tennessee (RP) and University of Memphis, Memphis, Tennessee(CK, NP-M, LC, JC).

COMPARING THE AMPLIFICATION OF WHITE SPOT SYNDROME VIRUS GENES WITH DIFFERENT PRIMERS. **Caitlin Ashley***, **Juliana R Moser** and **Maria Risoleta Freire**

Marques, Christian Brothers University, Memphis, Tennessee (CA). Universidade Federal de Santa Catarina, Florianopolis, Brasil (JM, MM).

DOSE DEPENDENT REGULATION OF TRANSGENE EXPRESSION *IN VIVO*. **Jessica Hines***, **Siddharth Desai**, **Kishore Kodali**, and **Tonia Rex**, Christian Brothers University, Memphis, Tennessee(JH) and The University of Tennessee Health Science Center, Memphis, Tennessee(SD, KK, TR).

CYSTIC FIBROSIS: DEFINING A NOVEL AND RARE REGULATION MUTANT S549N-CFTR. **Fatima Anmol Khan***, **Anthony Rudine**, **Aixia Ren**, **Sunitha Yarlagadda**, **Dennis C. Stokes**, and **Anjaparavanda P. Naren**, Christian Brothers University, Memphis, Tennessee (FK) and University of Tennessee, Cystic Fibrosis Care and Research Center at Le Bonheur Children's Medical Center, Memphis, Tennessee (AR, AR, SY, DS, AN).

POLYCYSTIC KIDNEY DISEASE-1 PROTEIN EXPRESSION IN MURINE CHOCHEA USING EGFP REPORTER . **Terence Netzel***, **Katherine Steigleman** , and **Jian Zuo** Christian Brothers University, Memphis, Tennessee (TN), and Saint Jude Children's Research Hospital, Memphis, Tennessee (KS, JZ)

DETERMINATION OF GENETIC LOCI IN BXD MOUSE MODEL GLAUCOMA **Maegan Lytle***, **Allen Vantrease**, and **Monica Jablonski**, Christian Brothers University, Memphis, Tennessee (ML) and University of Tennessee Health Science Center, Memphis, Tennessee(AV, MJ).

Session Four: Chemistry/Biochemistry

Moderator: Dr. Sandra Thompson-Jaegar

ORBIFOLD EULER CHARACTERISTICS. **Ryan A. Carroll***, Rhodes College, Memphis, Tennessee.

A NOVEL, NIRS BASED APPROACH TO CHYTRID (*BATRACHOCHYTRIUM DENDROBATIDIS*) DETECTION IN THE TOAD *ANAXYRUS FOWLERI*. **Daniel Eastlack***, **Jon Davis**, **Andrew Kouba** and **Carrie Vance**, Memphis Zoological Society, Memphis Tennessee (DE, JD, AK, CV), Rhodes College, Memphis Tennessee (DE, JD), and Mississippi State University, Starkville, Mississippi (CV).

EVALUATION OF NOVEL COMPOUNDS AS ANTINEOPLASTIC AGENTS AGAINST SOLID TUMORS **Sania Sayani***, **Ammaar Abidi**, and **Andrea Elberger**. Christian Brothers University, Memphis, Tennessee (SS) and University of Tennessee Health Science Center, Memphis, Tennessee (AA, AE).

CONTRIBUTION OF CYTOCHROME P450 (CYP) 3A4//3A5 GENETIC POLYMORPHISMS TO THE INTER-PATIENT VARIABILITY IN VANDETANIB PHARMOCOKINETICS IN PEDIATRIC DIFFUSE BRAINSTEM GLIOMAS. **Rachel Escue, Clinton Stewart, Mike Tagen, Laura Miller, and Stacy Thom.** *Christian Brother's University, Memphis, Tennessee (RE), and St Jude's Children's Research Hospital, Memphis, Tennessee (CS, MT, LM, ST).*

EFFECT OF HIGH-CHOLESTEROL DIET ON CHOLESTEROL LEVELS IN ARTERIAL SMOOTH MUSCLE. **Supriya Ponnappula*, Maria Asuncion-Chin, Anna N. Bukiya, and Alejandro M. Dopico,** *Christian Brothers University, Memphis, Tennessee(SP) and University of Tennessee Health Science Center, Memphis, Tennessee (MA-C, AB, AD).*

DERMACENTOR VARIABILIS: THE ALTERATION OF THE WOUND HEALING MECHANISM. **Xiong B. Lin *, Caroline Kramer, and Lewis Coons,** *Christian Brothers University, Memphis, Tennessee (XL) and The University of Memphis, Memphis, Tennessee (CK, LC).*

Posters: Chemistry and Animal Behavior

Moderator: Bro Edward Salgado

ASSEMBLY OF COPPER AND PALLADIUM SUPRAMOLECULES USING TWO DIFFERENT BIFUNCTIONAL LIGANDS **Elizabeth Calabretta* Andrew W. Maverick and Chandi Pariya,** *Christian Brothers University, Memphis Tennessee (EC), and Louisiana State University, Baton Rouge, Louisiana (AM,CP).*

BEHAVIORAL OBSERVATIONS OF WILD ORPHANED GRIZZLY BEARS DURING INTRODOCTION PERIOD IN A NEW CAPTIVE ENVIRONMENT. **Lauren E. Lieb*, Andy Kouba, and Sarah A. Boyle,** *Rhodes College, Memphis, Tennessee (LL, SB), and The Memphis Zoo, Memphis, Tennessee (AK).*

DEVELOPMENT OF NON-INVASIVE REPRODUCTIVE MONITORING TECHNIQUES FOR ENDANGERED SNOW LEOPARDS AND AMUR LEOPARDS. **Allison W. Graham*, Andy J. Kouba, and Erin L. Willis,** *Rhodes College Memphis, Tennessee (AG) and the Memphis Zoo, Memphis, Tennessee (AK, EW).*

IRON GLYCINE HYDROXO COMPLEXES IN AQUEOUS SOLUTIONS. **Jeremy Branch* and Yahia Z. Hamada,** *LeMoyne-Owen College, Memphis, Tennessee.*

REACTION OF MALIC ACID WITH MOLYBDENUM(VI) IN AQUEOUS SOLUTIONS. **Alana Antoine* and Yahia Z. Hamada,** *LeMoyne-Owen College, Memphis, Tennessee.*

ABSTRACTS

Engineering
Session One
Moderator: Dr. John Ventura

10:00 WIRELESS CHARGING STATION FOR LOW-POWERED ELECTRONIC DEVICES.
*Binh Nguyen**, *Russel Saliendra**, *Christian Brothers University, Memphis, Tennessee.*

The purpose of this project is the design and implementation of a Wireless Charging Station (WCS) for low-powered electronic devices. The project focuses on the charging of mobile phones, hand held media players, remote controls and sensors, and other commercial and industrial low-powered portable electronic devices. The WCS can aid the world's energy crisis by preserving energy and being environmentally friendly. This project has the potential to decrease daily energy requirements while delaying the depletion of global energy sources. The WCS successfully charged two mobile phones simultaneously, a Sony Ericsson T610i and a Samsung E700, using one charging station. This result demonstrated that multiple devices can be charged using wireless technology using one charging device and at the same time, it provides convenience to consumers.

10:15 RAIN CATCH/IRRIGATION SYSTEM. *Ryan J. Nicolini**, *Christian Brothers University, Memphis, Tennessee.*

The main purpose of the system is to provide water to the community garden at Christian Brothers University. The system is controlled by a PLC, valves, and pump. A PLC is a programmable logic controller that is essentially a rugged and simple computer. The system can run independently and has a built in timer to water the garden multiple times each week. There is a rain/freeze sensor to prevent overwatering of the garden and to protect the system and plants from freezing water. There is a barrel to collect rainwater from a nearby roof and a pump to send the water to the garden. Rainwater has more nitrogen and fewer chemicals than tap water, which results in better plant growth. The system is effective in watering the garden and it will allow students and faculty gardeners to focus on class work and not have to check on the garden everyday.

10:30 BLIND SPOT AND REAR END DETECTION SYSTEM FOR VEHICLES. *Patrick Louie**, *Christian Brothers University, Memphis, Tennessee.*

The purpose of this project is the design and implementation of a blind spot detection system for motor vehicles. It is the design and implementation of a detection system that is dependent on the blinker system of a vehicle and a rear end detection system that is independent of a vehicles' braking system. The blind spot detection system assists drivers when changing lanes and the rear end detection system allows drivers to be aware of obstructions and drivers behind their vehicles. In addition, the rear end detection system also controls a display to warn tailing drivers when they are too close to the car in front of them. The project resulted in the construction of a blind spot and rear end detection system that is accurate, precise, and cost effective. This practical system provides drivers a system that will enable them to detect otherwise undetectable vehicles or obstructions and reduce the number of accidents.

10:45 GPS TRACKING DEVICE FOR AIR CONDITIONER COILS. *Fredrick D. Durham**, *Christian Brothers University, Memphis, Tennessee.*

The purpose of this project was to design and implement a device that will allow a person to track the coils of an air conditioner in the event of theft. The device must be small, reliable, and easy to operate and maintain. A Telit GM862 GPS Module was implemented that uses GPS technology to track air conditioner coils. A GSM Network was employed to obtain tracking information on the longitude and latitude of coils from the Telit GM862 GPS Module. The coordinates of the coils can then be uploaded to Google Maps to provide the location of coils.

11:00 MULTI CHANNEL BATTERY CHARGER. **Osborn F. de Lima***, *Christian Brothers University, Memphis, Tennessee*. An Emergency Light is a device that turns on during any power failure. It consists of a battery that provides power to the lamp during a power outage and charges during regular AC power. Today, according to building code emergency lighting units are required in all buildings in the form exit signs or stairwell lighting. Philips Emergency Lighting located in Collierville, TN is a leading innovator and provider of emergency lights. Since batteries are an integral part of an emergency light, they need to be charged before being shipped off to the customer to at least half of its capacity. This project deals with the design and implementation of a safe, cost effective and efficient Nickel Cadmium Battery Charger. The charger was built successfully with the design topology selected and charged different types of batteries based on the charging specifications.

11:15 USE OF GREEN ENERGY IN AUTONOMOUS VEHICLES. **Harshit R. Shroff***, **Anthony Bownes*** and **James Brown***, *Christian Brothers University, Memphis, Tennessee*. The purpose of this project is to design and develop an autonomous a solar-powered robot to compete in the IEEE SoutheastCon 2010 Hardware Competition. The robot navigates obstacles such as two gates of different sizes, a ramp, and must travel on a ten-foot-by-ten-foot track. The only source of power is four high-intensity lamps locate on the track at regular intervals. Points are allotted for obstacles and laps completed in each run. The robot utilizes a design that includes high-quality photovoltaic cells, a two motor system, infrared proximity and photo-resistive sensors, a capacitor bank, and a microcontroller to manage all systems. The robot is capable of tracing an inner wall to pass through the two gates and complete a lap.

11:30 OFFLINE WINDOWS REGISTRY EDITOR AND AUTORUNS DISABLER. **Michael A. Yarbrough***, *Christian Brothers University, Memphis, Tennessee*. The purpose of this project is to create a new method for disabling the programs that run automatically when a Microsoft Windows computer boots up. While there are a number of programs already that will disable autoruns while the computer is running, this one can turn off unwanted entries before the computer is booted. This allows the client to disable unwanted programs without the chance of them re-enabling themselves. The project is fundamentally an offline registry editor because the platform needs to be able to edit the Windows Registry without using the advanced programming interface (API) that comes with the operating system. The program is successful in automatically backing up and modifying the registry hives, and recognizing and disabling a number of autorun entries.

11:45 CHRISTIAN BROTHERS UNIVERSITY'S IPHONE APPLICATION. **Grey M. Dziuba***, *Christian Brothers University, Memphis, Tennessee*. The purpose of this project is to design an application that allows the user the ability to obtain pertinent information from a mobile device, the iPhone. The application includes four main features: (1) a map that pinpoints the exact location of the user while on the Christian Brothers University campus; (2) a list of office locations of all Christian Brothers University professors with the ability to call or email each professor from the mobile device; (3) a link to the Christian Brothers University Connection, a bulletin of student activities; (4) a link to the Christian Brothers University's Lifeline, a weekly publication of the Christian Brothers University's career center. These features are included in one simple application that improves the efficiency of communication in the Christian Brothers University's community while using engineering techniques and principles.

12:00 AUTOMATED HOME SECURITY USING RFID TECHNOLOGY. **Keith Lynn Wyrick***, **and Jacky Wong***, *Christian Brothers University, Memphis, Tennessee*.

The purpose of the project is to design and implement a RFID security lock. The objective is to open electronically a deadbolt with the use of an RFID reader in conjunction with an RFID tag. The results are a working prototype that uses a microprocessor to validate RFID tags. The prototype has been equipped with a unique function of adding and removing additional valid RFID tags for practical use. In conclusion, RFID home security is a very costly and effective security tool that if implemented into the home could provide the user with extra safety and allow for a hassle free security system.

Animal Behavior
Session Two
Moderator: Dr. Anna Ross

10:00 IDENTIFYING AND EVALUATING SOCIAL, DOMINANT, AND AGGRESSIVE BEHAVIORS AMONG THREE BOTTLENOSE DOLPHINS IN KEY LARGO, FLORIDA. **Kristi A. Prevost* and Holli Byerly**, *Christian Brothers University, Memphis, Tennessee and Dolphin Cove, Key Largo, Florida*. Contributing factors such as health, reproductive state, genetics, climate, housing enclosures, and social dynamics appear to affect dolphin behavior and social alliances. Three male bottlenose dolphins (*Tursiops truncatus*), one juvenile and two adults, were observed multiple times daily. Data were collected post training sessions using a behavioral ethogram to monitor and categorize behavioral observations, including social and aggressive behaviors. The results demonstrated that the highest number of aggressive behaviors were from the believed to be sub-dominant male, Kimbit, perpetrated towards Leo, the youngest and least dominant male of the pod. Social variations of pairings during training sessions altered the amount of aggressive behaviors after the training sessions, as well as revealed different social alliances between the two adult males. With this knowledge, the animal care staff of Dolphin Cove may be able to curb aggressive acts between non-pair bonded and submissive animals with different social pairings during training sessions.

10:15 STOP AND SMELL THE ROSES: HOW OLFACTORY ENRICHMENT AFFECTS THE BEHAVIOR OF CAPTIVE JAGUARS (*PANTHERA ONCA*) AT THE MEMPHIS ZOO. **Stephanie N. Cassel*, Allison W. Graham*, Andrew Kouba, Morgan Powers, and Sarah A. Boyle**, *Rhodes College and the Memphis Zoo, Memphis, Tennessee*. Jaguars (*Panthera onca*) require enrichment to promote active behavior in order to maintain fitness while in captivity. The purpose of our study was to evaluate changes in behavioral and spatial activity with the introduction of novel scents for two captive female jaguars displayed at the Memphis Zoo in the fall of 2009, as well as to evaluate the effect of enrichment upon a single female jaguar in the spring of 2010. The jaguars spent more time sleeping and resting during control periods, using only a few areas within their exhibit. During enrichment periods, sleeping and resting behavior frequency decreased. The jaguars used more areas of their enclosure when enrichment items were present. Scents such as perfumes and deodorants received the greatest frequency and duration of enrichment behavior. Behavior of a single jaguar was affected similarly by olfactory enrichment. In conclusion, olfactory enrichment promotes positive active behavior in captive jaguars

10:30 ADVANTAGES AND DISADVANTAGES TO TWO NON-INVASIVE RESEARCH METHODS FOR THE STUDY OF WILD JAGUAR POPULATIONS **Caroline Mitchell***, **Rachel Dutkosky***, **Leandro Silveira**, and **Rahel Solomann** *Christian Brothers University, Memphis, Tennessee, University of Tennessee, Knoxville, Tennessee, Instituto Onça-Pintada-Jaguar Conservation Fund, Mineiros, Brasil*

Scat detection and camera trapping are two valuable non-invasive research methods used in studying wild jaguar populations. Scat detection is useful for gaining genetic, distribution, hormonal, and dietary data on the species. Additionally, camera trapping can be used to obtain information on the distribution and abundance of a population in a set area. Both methods have marked advantages and disadvantages that must be taken into consideration; however, both are valuable research methods that should continue to be utilized in future research.

Supported by Minority Health and Health Disparities International Research Training Program NIH-2T37MD001378-08.

10:45 ROLE OF THE ALPHA-1-ADRENERGIC RECEPTORS ON THE RECONSOLIDATION OF OLFACTORY FEAR CONDITIONING **Ting Wong**, **Fabricio HM Do-Monte**, and **Antonio P. Carobrez**. *Christian Brothers University, Memphis, Tennessee (TW), Universidade Federal de Santa Catarina, Florianópolis, SC, Brasil (FD-M, AC)*. After a short retrieval session (reactivation session), previous stabilized memories can become labile and subjective to pharmacological interference in a phenomenon called reconsolidation. Since the noradrenergic system has been widely involved in the long-lasting feature of the aversive memory formation, this study investigated the involvement of the alpha-1-adrenergic receptors during the reconsolidation phase. The olfactory fear-conditioning (OFC) paradigm was used since olfaction is a dominant sense in rats. Male Long-Evans hooded rats (12-16 weeks; n=27) were systemically administered with saline or the alpha-1-blocker prazosin (0.5 and 1.5 mg/kg) immediately after the reactivation session. Results showed that both prazosin treated-groups demonstrated a significant ($p < 0.05$) reduction in the defensive behavior when tested one week later in a different behavioral chamber (ANOVA followed by Newman Keuls). This finding reinforces the described lability of fear memories after retrieval, suggesting an involvement of the alpha-1-adrenergic receptors during the reconsolidation of OFC.

Supported by Minority Health and Health Disparities International Research Training Program NIH-2T37MD001378-08.

11:00 EFFECTS OF DOPAMINE INHIBITION ON FLUID LICKING BEHAVIOR OF *UBE3A* DEFICIENT MICE. **Cameron Kasmai***, and **Detlef Heck**, *Christian Brothers University, Memphis, Tennessee and University of Tennessee Health Science Center, Memphis, Tennessee*. Angelman Syndrome (AS) is a genetically-linked neurological disorder caused by a mutation or maternal deficiency of the *Ube3a* gene. Yet unpublished findings indicate elevated dopamine levels in *Ube3a* deficient mice. This experiment was to test if treatment with a dopamine antagonist would rescue a fluid licking phenotype previously found in *Ube3a* deficient mice. Mouse licking behavior was observed in the home cage with the use of a special lickometer. Randomly chosen mice were treated with the dopamine antagonist Risperdal. The results of this experiment were highly variable, possibly due to the method of drug delivery. Drug application was through intra-peritoneal injection. Other routes, such as subcutaneous nano-pumps, might be more effective. At this point, without additional experiments, no definitive conclusions can be made from these data about the action of Risperdal on fluid licking behavior in a mouse model of AS.

Supported by: UTHSC Neuroscience Institute Merit Fellowship

11:15 ATLANTOOCIPITAL DISSOCIATION: A UNIFORMLY FATAL INJURY? **Wallace C. Lock***, **Louis J. Magnotti**, and **Martin A. Croce**, *Christian Brothers University, Memphis Tennessee (WL), University of Tennessee Health Science Center, Memphis, Tennessee (LM, MC)*. The purpose of this study was to evaluate the effect of rapid diagnosis and treatment (stabilization) of traumatic AOD. The objective of this study was to affirm or dispel the hypothesis that AOD is uniformly fatal in adults. This study resulted in the discovery of 21 AOD patients, .05% of all trauma admissions over the study period. The study population included 15 men and 6 women who were evaluated for markers of injury including admission GCS, ISS, and head AIS and Mean BE. Overall mortality was 29% with deaths caused by severe traumatic brain injury, sepsis, and multiple organ failure. The remaining 71% patients were surgically stabilized. All patients undergoing stabilization survived. In conclusion, traumatic AOD remains a relatively rare injury. Prompt diagnosis is crucial in promoting rapid stabilization and contributing to increasing survivability. Traumatic AOD should no longer be considered a uniformly fatal injury in adults.

Molecular Cell Biology
Session Three
Dr. Mary Ogilvie

10:00 IN VITRO MACROPHAGE RESPONSE TO TITANIUM PARTICLES. **Brooke Allen*** and **Richard Smith**, *Christian Brothers University, Memphis, Tennessee and University of Tennessee Health Science Center, Memphis, Tennessee*. In total joint arthroplasty, the prosthesis becomes loosened due to endotoxins that reside on the wear particles from the titanium implant and the polyurethane cap. This results in the loss of the implant and osteolysis around the acetabular cup, which prevents a positive outcome after performing a second hip replacement. Due to the concern involving the cleanliness of the particles and the amount of particles, it was of interest to clean and dirty the particles at various degrees. Then, it was of importance to measure the amount of tumor necrosis factor alpha (TNF- α) that was released in correlation to the cleanliness of the particles and ratio of particles. After observing the results, it was found that endotoxin levels created high concentration levels of TNF- α and were notably greater in the dirty, LPS (lipopolysaccharide) bound particles than in relation to the clean and partially cleaned particles. Overall, it can be concluded that the dirty particles and the larger amounts of particles caused the release of the cytokine TNF- α , which causes osteolysis.

10:15 INFLUENCE OF ACE-1, ACE-2 AND ACE-3 GENES ON SOIL NEMATODES. **William A. Simco*** and **Lynda R. Miller**, *Memphis University School, Memphis, Tennessee, and Christian Brothers University, Memphis, Tennessee*. The ACE-1, ACE-2 and ACE-3 genes code for acetylcholinesterase which affects the neuromuscular junction of *C. elegans*. The role of these three genes on development and activity in the worms was investigated. RNA interference (RNAi) was used to inhibit gene expression in F₁ individuals to determine the phenotypic effect on the animal. Gene function was examined individually by inhibiting single genes as well as inhibiting multiple ACE gene combinations simultaneously. Single gene inhibition resulted in a phenotype undifferentiated from the wild-type. Multiple gene inhibition affected hatching success and muscular function.
Supported by: DOD grant to Academy of Applied Science "REAP"

10:30 *DERMACENTOR VARIABILIS: THE EFFECTS OF TICK SALIVA ON JNK AND P38 SIGNALING PATHWAYS IN FIBROBLASTS* **Raelyn S. Pirtle***, **Carolyn D. Kramer**, **Nina Poole-Mitchell**, **Lewis B. Coons**, and **Judith Cole**, *Christian Brothers University, Memphis, Tennessee (RP) and University of Memphis, Memphis, Tennessee(CK, NP-M, LC, JC)*. We examined the effects of saliva from partially fed *Dermacentor variabilis* females on MAPK signaling pathways and eighty-four different genes associated with these pathways in murine NIH-3T3 fibroblasts. The Jun N-terminus kinase (JNK) and p38 pathways were studied. Enzyme linked immunosorbent assays (ELISAs) showed that activity of the epidermal growth factor (EGF)-stimulated JNK signaling pathway in the fibroblasts was not significantly decreased. However, the saliva did slightly increase the fibroblasts' EGF-stimulated p38 activity. Polymerase chain reaction (PCR) arrays showed that the tick saliva suppresses several sets of genes associated with many important cell processes in fibroblasts. These data support the hypothesis that saliva from *Dermacentor variabilis* affects the host's wound healing abilities.

10:45 *COMPARING THE AMPLIFICATION OF WHITE SPOT SYNDROME VIRUS GENES WITH DIFFERENT PRIMERS.* **Caitlin Ashley***, **Juliana R Moser** and **Maria Risoleta Freire Marques**, *Christian Brothers University, Memphis, Tennessee (CA). Universidade Federal de Santa Catarina, Florianopolis, Brasil (JM, MM)*. This study aimed to test different primers and optimize the Polymerase Chain Reaction (PCR) for detection of White Spot Syndrome Virus (WSSV), a highly lethal disease in shrimp. Kits, labeled probes, PCR and *nested* PCR are used for detection of WSSV. DNA extraction from frozen shrimp pleopods showed degradation so previously extracted DNA samples from the laboratory (Fixed pleopods) were used. For optimization of PCR, the concentration of MgCl₂, Taq polymerase, and primers were altered to produce the best results (presence of the 500 or 800 bp band in WSSV positive samples without nonspecific bands). UV light exposure was used to visualize and photograph the results run on an agarose gel. PCR 500-4, with decreased concentrations of primers and Taq polymerase, produced the least amount of nonspecific bands for primer 500. The increased concentrations of MgCl₂ and Taq polymerase in PCR 800-3 produced the least amount of nonspecific bands for primer 800.

Supported by Minority Health and Health Disparities International Research Training Program NIH-2T37MD001378-08.

11:00 DOSE DEPENDENT REGULATION OF TRANSGENE EXPRESSION *IN VIVO*.

Jessica Hines*, **Siddharth Desai**, **Kishore Kodali**, and **Tonia Rex**, *Christian Brothers University, Memphis, Tennessee (JH) and The University of Tennessee Health Science Center, Memphis, Tennessee (SD, KK, TR)*. We hypothesized that gene expression levels can be controlled by the tetracycline (tet) inducible promoter *in vivo*. Enhanced green fluorescent protein (EGFP) was used as a quantifiable marker of gene expression. We packaged tet.eGFP into a recombinant adeno-associated viral vector (rAAV.tet.eGFP). The vector was delivered subretinally to mice that express the reverse tet transcriptional transactivators from the vitelliform macular dystrophy2 promoter to induce expression specifically in the retinal pigment epithelium. Mice were intraperitoneally injected with increasing doses of dox (0.1mg/ml, 1mg/ml, and 10mg/ml) and fluorescence was quantified *in vivo* to generate a dose curve. Peak fluorescence was detected 6.5 hours after dox injection. The fluorescence levels increased with increasing concentrations of dox. The dose curve showed that transgene expression was directly dependent on dox dosage. This is the first study to demonstrate that the tet-inducible promoter can be used to control transgene expression levels *in vivo* in a dose-dependent manner.

Supported by: the Hamilton Eye Institute, Department of Ophthalmology Merit Fellowship

11:15 CYSTIC FIBROSIS: DEFINING A NOVEL AND RARE REGULATION MUTANT

S549N-CFTR. **Fatima Anmol Khan***, **Anthony Rudine**, **Aixia Ren**, **Sunitha Yarlagadda**, **Dennis C. Stokes**, and **Anjaparavanda P. Naren**, *Christian Brothers University, Memphis, Tennessee (FK), The University of Tennessee Health Science Center, Cystic Fibrosis Care and Research Center at Le Bonheur Children's Medical Center (AR, AR, SY, DS, AN)*. A Hispanic infant diagnosed with cystic fibrosis required multiple hospitalizations. Genotyping revealed DF508 and S549N mutations and when paired, they cause classic CF with elevated sweat chloride measurements, pancreatic insufficiency, obstructive pulmonary disease, and mucoid *Pseudomonas aeruginosa*. Point mutation was generated using eukaryotic expression vector and was expressed in Human Embryonic Kidney cells (HEK-293). At the plasma membrane, S549N-CFTR appeared as a mature protein but lacked function. Does S549N-CFTR behaved similar to the regulation mutant G551D-CFTR? Previous studies illustrated that G551D-CFTR has little or no function but can be augmented with the addition of potentiator (P1). Similarly, VX770 is a G551D potentiator and is used in treating CF-patients with G551D-CFTR mutation. Results have shown increased CFTR functions, thus showing significant improvement in lung function and sweat chloride values. S549N-CFTR has little or no function but can be augmented to WT-CFTR functional levels in the presence of the CF-potentiator P1.

11:30 POLYCYSTIC KIDNEY DISEASE-1 PROTEIN EXPRESSION IN MURINE CHOLELEA USING EGFP REPORTER. **Terence Netzel***, **Katherine Steigleman**, and **Jian Zuo**, *Christian Brothers University, Memphis, Tennessee (TN), and Saint Jude Children's Research Hospital, Memphis, Tennessee (KS, JZ)*. The Polycystic Kidney Disease-1 (Pkd1) protein plays an integral role in the structure of hair cells' stereocilia in the cochlea (KA Steigleman, unpublished). To better understand how the lack of Pkd1 is producing this phenotype, we sought to examine the cell type specificity of Pkd1 in the murine cochlea. Using a Pkd1-EGFP (enhanced green fluorescent protein) transgenic animal, we were able to determine specific cell types in the organ of Corti that express Pkd1. At adult ages, these mice exhibited normal auditory brainstem response (ABR) thresholds indicating the tag is not inhibiting normal Pkd1 cochlear function. Pkd1 was visualized by immunohistochemistry for the EGFP tag and was determined to be present in hair cells of the cochlea at adult ages. Additionally, we plan to examine both embryonic and different postnatal ages with respect to the EGFP staining pattern as well as in conjunction with cell specific cochlear markers.

11:45 DETERMINATION OF GENETIC LOCI IN BXD MOUSE MODEL GLAUCOMA **Maegan Lytle***, **Allen Vantrease**, and **Monica Jablonski**, *Christian Brothers University, Memphis, Tennessee (ML) and University of Tennessee Health Science Center, Memphis, Tennessee (AV, MJ)*. Although the anatomical relationship between iris atrophy/pigment dispersion and pigmentary glaucoma is well known, the genetic predecessors of this glaucoma have yet to be fully explored. It is thought that separate genes play a role in controlling the glaucomatous phenotype. Using DBA/2J mice, which develop age-related glaucoma due to mutations in *Tryp1* and *Gpnmb* genes, and breeding them extensively with healthy C57BL/6J mice, we were able to generate multiple BXD strains that express the diseases along a wide spectrum. The mice were subjected to tests to measure intraocular pressure, corneal clouding, iris degeneration, as well as histological analysis of the optic nerves to determine damage to the microanatomy. Some results that have already been examined indicate that genes unrelated to *Tryp1* and *Gpnmb* serve to increase or decrease receptiveness to glaucoma. For example, BXD strains that have the most severe form of pigment dispersion syndrome do not exhibit optic nerve atrophy. Also there are strains that have normal *Tryp1* and *Gpnmb* genes, but an elevated IOP or vice-versa.

Supported by: The Crane Vision Fellowship

Chemistry
Session Four

Moderator: Dr. Sandra Thompson-Jaeger

10:00 ORBIFOLD EULER CHARACTERISTICS. **Ryan A. Carroll***, *Rhodes College, Memphis, Tennessee*. Imagine that you have a pineapple that weighs around 2 pounds, a watermelon that weighs around 30 pounds, and a scale with a capacity of 10 pounds. The scale finds the exact weight of the pineapple with no problem, but the greater weight of the watermelon complicates finding its true weight. One option is to break the watermelon apart into pieces that can be weighed on the scale and then added together. A similar predicament occurs while trying to find a number called the Euler characteristic for geometric objects known as orbifolds such as a sphere or doughnut with cusps and edges on their surface. In order to find useful information about these spaces we must break them into pieces and then sum their “weights”. In this presentation, I will discuss a concept known as the Gamma-Euler-Satake characteristic, which uses this method and its application.

10:15 A NOVEL, NIRS BASED APPROACH TO CHYTRID (*BATRACHOCHYTRIUM DENDROBATIDIS*) DETECTION IN THE TOAD *ANAXYRUS FOWLERI*. **Daniel Eastlack***, **Jon Davis**, **Andrew Kouba** and **Carrie Vance**, *Memphis Zoological Society, Memphis Tennessee (DE, JD, AK, CV), Rhodes College, Memphis Tennessee (DE, JD), Mississippi State University, Starkville, Mississippi (CV)*. Amphibian populations are declining globally due to, in part, the rapid spread of the pathogenic chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*). The goals of our study were to determine if *Bd* is present in Fowler’s toad (*Anaxyrus fowleri*) populations around Memphis, TN and to use the toads as a model species to develop a novel, and rapid method of *Bd* screening based on Near Infrared Reflectance Spectroscopy (NIRS) both *in-situ* and *ex-situ*. We used Taqman quantitative PCR to confirm *Bd* infection at 7 of 11 study locations in 11 of 159 sampled individuals; however, populations are thriving at these sites without evidence of widespread mortality, perhaps indicating *Bd* resistance in *A. fowleri*. Our library size of *A. fowleri* *Bd*-positive NIRS spectra is very small (n=2), yet these spectra are visibly discernable from *Bd*-negative spectra and may provide a NIRS-based diagnostic method for determination of *Bd*-status in *A. fowleri*

10:30 EVALUATION OF NOVEL COMPOUNDS AS ANTINEOPLASTIC AGENTS AGAINST SOLID TUMORS **Sania Sayani***, **Ammaar Abidi**, and **Andrea Elberger**. *Christian Brothers University, Memphis, Tennessee (SS) and The University of Tennessee Health Science Center, Memphis, Tennessee (AA, AE)*. This study was performed to evaluate the effectiveness of eighteen novel drugs to inhibit the growth of, and/or kill, human tumor cells. Experiments were conducted on the following three established cell lines: *U-87* (human glioblastoma multiforme), *HCT-15* (human colon carcinoma), and *DU-145* (human prostate cancer). All cells were treated with eleven serial dilutions of each drug investigated to obtain accurate EC₅₀ values (concentration at which 50% of the effects are observed). Results show that the most effective drugs on HCT-15 cells were SNG-II-198 and Δ^8 -THC; on U-87 cells were SNG-II-196 and SNG-II-224; and, on DU-145 cells were SMM-I-97 and SNG-II-198. Some drugs were excluded from analysis due to insolubility under assay conditions. These experiments provided preliminary results to demonstrate new drugs that could potentially be used against these types of tumors

10:45 CONTRIBUTION OF CYTOCHROME P450 (CYP) 3A4//3A5 GENETIC POLYMORPHISMS TO THE INTER-PATIENT VARIABILITY IN VANDETANIB PHARMOCOKINETICS IN PEDIATRIC DIFFUSE BRAINSTEM GLIOMAS. **Rachel Escue***, **Clinton Stewart**, **Mike Tagen**, **Laura Miller**, and **Stacy Throm**. *Christian Brother's University, Memphis, Tennessee, and St Jude's Children's Research Hospital, Memphis, TN.*

Diffuse brain stem gliomas account for a serious percentage of death in pediatric cancer patients. A new chemotherapy drug (vandetanib) is being tested that targets both VEGFR and EGFR expression and function, both of which are overactive in cancer. In this study, the role of single-nucleotide polymorphisms (snp) in affecting the metabolism of vandetanib was tested.

11:00 EFFECT OF HIGH-CHOLESTEROL DIET ON CHOLESTEROL LEVELS IN ARTERIAL SMOOTH MUSCLE. **Supriya Ponnappula***, **Maria Asuncion-Chin**, **Anna N. Bukiya**, and **Alejandro M. Dopico**, *Christian Brothers University, Memphis, Tennessee(SP) and University of Tennessee Health Science Center, Memphis, Tennessee (MA-C, AB, AD)*. High-cholesterol diet prevails in Western societies and may play a pathophysiological role in human diseases, including arteriosclerosis, coronary artery disease, stroke and systemic hypertension. High cholesterol-driven vascular pathology is usually linked to cholesterol (CHS) accumulation in endothelial cells. Whether high-cholesterol intake leads to abnormal cholesterol levels in the arterial smooth muscle itself, however, has not been systematically explored. In this work, Sprague-Dawley rats were fed with a hypercholesterolemic (2% CHS) or an isocaloric (control) diet for a total of 24 weeks. Starting at week 8 of dietary treatment, samples of de-endothelized aorta, cerebral, mesenteric and pulmonary arteries were obtained every 2 weeks for CHS determination. Remarkably, resistance-size cerebral and mesenteric arteries showed CHS accumulation \approx 10 weeks earlier than their elastic counterparts (aorta and pulmonary arteries). CHS early accumulation in resistance-size arteries may lead to significant impairment of vessel function and contribute to the pathophysiology of prevalent human diseases.

11:15 *DERMACENTOR VARIABILIS*: THE ALTERATION OF THE WOUND HEALING MECHANISM. **Xiong B. Lin ***, **Caroline Kramer**, and **Lewis Coons**, *Christian Brothers University (XL) and The University of Memphis, Memphis, Tennessee (CK, LC)*.

The *Dermacentor variabilis* or American dog tick saliva contains variety of pharmaceutical significant molecules such as immunosuppressors and anticoagulants that makes it interesting for researches. We hypothesized the *Dermacentor variabilis* saliva has the ability to down regulate the transcriptions of genes into functional proteins that involves cell proliferation, cell migration, and cell communication that are part of the healing mechanism such as MMP and TIMP. From cell cultivation of NIH/3T3 fibroblast and obtains of tick saliva, to data collection with RT² qPCR arrays takes 3-4 weeks. The results from the experiment approve the hypothesis of down regulation of genes involve in healing mechanism with a range of decreases in matrix metalloproteinase, collagen, integrin, ADAM protein, laminin, and TIMP gene family transcription from the least of 4.00 folds to the most of 388.02 folds, show the effectiveness of tick saliva on inhibition of cell proliferation, cell migration, and cell communication.

Posters
Chemistry and Animal Behavior
Moderator: Bro Edward Salgado
11:15-12:15

ASSEMBLY OF COPPER AND PALLADIUM SUPRAMOLECULES USING TWO DIFFERENT BIFUNCTIONAL LIGANDS **Elizabeth Calabretta*** **Andrew W. Maverick** and **Chandi Pariya**, *Christian Brothers University, Memphis Tennessee (EC), and Louisiana State University, Baton Rouge, Louisiana (AM,CP)*. The purpose of this research was to assemble new supramolecules by attaching pyridine and terpyridine ligand groups to copper and palladium. By attaching more complicated pyridine and terpyridine groups to the metal, information can be learned to create a cyclic metal complex with two bifunctional ligands. Previous work in the group has been done to create “molecular square” supramolecules using β -diketones. My method was different from this work, because I attached two different ligands to the metal in order to make the supramolecule. It is believed that the target supramolecule was created based on elemental analysis; however, no crystals were produced and the structure of the molecule is still unknown

BEHAVIORAL OBSERVATIONS OF WILD ORPHANED GRIZZLY BEARS DURING INTRODOCTION PERIOD IN A NEW CAPTIVE ENVIRONMENT. **Lauren E. Lieb***, **Andy Kouba**, and **Sarah A. Boyle**, *Rhodes College, Memphis, Tennessee (LL, SB), and The Memphis Zoo, Memphis, Tennessee (AK)*. We aimed to provide a better understanding of how wild grizzly bear cubs (*Ursus arctos*) adjust to a captive environment. Three bear cubs were orphaned in the wild in July 2009, and subsequently were brought into captivity. The cubs first entered their outdoor exhibit at the Memphis Zoo on September 28, 2009. We documented their initial response to the exhibit, and collected behavioral data for six months. The bears exhibited a range of behaviors, but the greatest proportion of time was spent resting, swimming, and digging. They used all areas of the exhibit, including a sand pit, den, stream, and pool. The cubs also interacted with the public through a glass viewing area, and used enrichment items. No agonistic behaviors were noted. We conclude that the bears exhibited a range of behaviors and used multiple areas of their exhibit, but we suggest that behavioral monitoring continues as the cubs mature.

DEVELOPMENT OF NON-INVASIVE REPRODUCTIVE MONITORING TECHNIQUES FOR ENDANGERED SNOW LEOPARDS AND AMUR LEOPARDS. *Allison W. Graham**, *Andy J. Kouba*, and *Erin L. Willis*, *Rhodes College Memphis, Tennessee (AG) and the Memphis Zoo, Memphis, Tennessee (AK, EW)*. An understanding of the reproductive biology of critically endangered Snow and Amur leopards can aid in conservation efforts. We compared combinations of different fecal steroid hormone extraction procedures to determine which method extracted the greatest amount of steroid hormones and to examine whether antibodies for measuring fecal steroids in other felids were also suitable for leopards. The Methanol/Vortex 20 min extraction yielded a greater amount of estrogens compared to other extraction methods. For fecal androgens, a 6.8-fold increase in hormone concentration was found when samples were extracted with methanol compared to extraction with ethanol. Results indicated that a broad scale testosterone antibody and an estrogen metabolite (E1G) antibody can be used to measure fecal androgens and estrogens in snow leopards, and may be applicable to Amur leopards. Results from these studies will improve procedures to characterize the seasonal reproductive profiles of pubertal and adult female and male leopards.

IRON GLYCINE HYDROXO COMPLEXES IN AQUEOUS SOLUTIONS. *Jeremy Branch** and *Yahia Z. Hamada*, *LeMoyne-Owen College, Memphis, Tennessee*. Recently, we have studied a variety of low-molecular-mass ligands with many metal ions using various spectrophotometric and emf measurements [1-3]. Herein, we discovered the presence of two new Hydroxo-complexes for the iron(III)-Glycine system. The new iron-Glycine complexes are: **[Fe(Gly)(OH)₂]** and **[Fe(Gly)(OH)₃]**. Djurdjevic presented the presence of Fe(Gly), Fe(Gly)(H), and the dimer Fe₂(Gly)₂(OH)₂ and their stability constants in a medium with $\mu = 0.5$ M [4-a]. Others, reported the stability constants for the bis- [Fe(Gly)₂] and the tris- [Fe(Gly)₃] complexes in $\mu = 0.6$ M using differential pulse cathodic voltammetry [4-b]. The same study presented cyclic voltammetry with one electron reversible behavior [4-b]. The crystal structure for a tri-nuclear iron-Glycine complex was also presented three decades ago [5]. We are reporting the stability constants for newly discovered hydroxo-complexes as well as their spectroscopic absorption spectra in aqueous solution at room temperature.

REACTION OF MALIC ACID WITH MOLYBDENUM(VI) IN AQUEOUS SOLUTIONS.

Alana Antoine and Yahia Z. Hamada*, LeMoyne-Owen College, *Memphis, Tennessee*. The chemistry of molybdenum encounters very complex pathways even when reacting with the simplest of ligands (the aqua ligand). Malic acid (Mal) is considered to be a simple ligand that has strong metal binding ability. A detailed literature survey of all American Chemical Society (ACS) Journals indicated lack of reports regarding the aqueous solution chemistry of the Mo^{6+} -Mal system. When the term molybdenum was used in the literature survey, a total of 1,211 hits were returned. When the term molybdenum and aqueous solutions were combined as search-terms, only 22 articles were found. It is obvious that from a thorough literature survey that this investigation on the Mo^{6+} and Mal system is merited. Using potentiometric and spectroscopic tools we are investigating the reaction of this hi-valent metal ion with Malic acid. We will present the potentiometric data collected thus far for this reaction system because this project is a work in progress.