

Table of Contents

Schedule of Events.....	2
Awards Presentations, Bryant Conference Center.....	3
Schedule of Oral and Poster Presentations	4
College of Arts & Sciences	4
Oral Presentations.....	4
Poster Presentations.....	10
College of Engineering.....	20
Poster Presentations.....	20
Culverhouse College of Commerce and.....	27
Oral Presentations.....	27
Poster Presentations.....	27
College of Communication & Information Sciences	29
Oral Presentations.....	29
Poster Presentations.....	29
College of Education.....	30
Oral Presentations.....	30
Poster Presentations.....	31
College of Human Environmental Sciences.....	31
Oral Presentations.....	31
Poster Presentations.....	31
Capstone College of Nursing	34
Oral Presentation	34
Poster Presentations.....	34
School of Social Work	35
Oral Presentation	35
Poster Presentations.....	35
Abstracts	37
Index	103
Student Participants.....	103
Faculty Mentors.....	107
Departments	111
Acknowledgments.....	113

3rd Annual Undergraduate Research and Creative Activity Conference

Schedule of Events

April 15, 2010

Registration

Sellers Lobby 12:00pm - 2:00pm

Oral Presentations, Bryant Conference Center

Capstone College of Nursing
Lackey Room 3:15pm – 3:45pm

College of Arts and Sciences
Morgan Board Room 2:00pm – 3:45pm
Rast Conference Room A 2:00pm – 4:30pm
Rast Conference Room B 2:00pm – 4:15pm
Smith Board Room 2:00pm – 4:15pm
Central Bank Room 2:00pm – 3:45pm
Nichols Room 2:00pm – 3:30pm

College of Communication and Information Sciences
Lackey Room 3:45pm – 5:00pm

College of Education
Lackey Room 2:30pm – 3:00pm

College of Human Environmental Sciences
Lackey Room 3:00pm – 3:15pm

Culverhouse College of Commerce and Business Administration
Lackey Room 2:00pm – 2:15pm

School of Social Work
Lackey Room 5:00pm – 5:15pm

Poster Presentations, Bryant Conference Center, All Colleges

Sellers Auditorium 2:00pm – 6:00pm

Conveying of Judges, Bryant Conference Center

Thames Room and Cavalier Room 2:00pm – 6:00pm

Awards Presentations, Bryant Conference Center

Capstone College of Nursing
Morgan Board Room

4:30pm

College of Arts and Sciences
Sellers Auditorium

6:00pm

College of Communication and Information Sciences
Rast Conference Room B

5:30pm

College of Education
Central Bank Room

4:30pm

College of Engineering
Rast Conference Room B

5:00pm

College of Human Environmental Sciences
Rast Conference Room B

4:30pm

Culverhouse College of Commerce and Business Administration
Central Bank Room

5:00pm

School of Social Work
Lackey Room

6:00pm

Schedule of Oral and Poster Presentations

3rd Annual Undergraduate Research and Creative Activity Conference

College of Arts & Sciences Oral Presentations

Morgan Board Room

2:00

Daniel Hollander, New College
Faculty Mentor: Dr. Janeann Dill, New College
The Gift of the Nonverbal Narrative

2:15

Chris Nicholson, Philosophy, Political Science
Faculty Mentor: Dr. Scott Hestevold, Philosophy
Why Life Doesn't Need to be Explained

2:30

Stephen Killen, New College
Faculty Mentor: Dr. Andrew Dewar, New College
Metal Music Magic

3:00

Laurel Walker, Dance
Faculty Mentor: Dr. Sarah Barry, Dance
Break Through

3:15

Daniel Bush, History, Computer Based Honors Program
Faculty Mentor: Dr. Andrew Huebner, History
Mae and Lige: Military Life and Courtship in WWI

3:30

Amanda Kimbrough, New College
Faculty Mentor: Dr. Janeann Dill, New College
Perceptions of Social Interactions and Creativity

Rast Conference Room- A

2:00

Candice Hovell, Biological Sciences
Faculty Mentor: Dr. Ryan Earley, Biological Sciences
Mineralocorticoid Receptors and Stress

2:15

Cassandra Coleman, Sara Glenn, and Laura Frost, Biological Sciences
Faculty Mentor: Dr. John Clark, Biological Sciences
*A preliminary phylogeny of the neotropical plant genus *Drymonia*: multiple shifts between bee-adapted and hummingbird-adapted flowers*

2:30

Elyse Love, Biology, Computer Based Honors Program
Allometry and Correlates of Organ Mass and Position in the Diamondback Water Snake

2:45

Jessica Mitchell, Biological Sciences, McNair Scholars Program
Faculty Mentor: Dr. Stevan Marcus, Biological Sciences
*Cyclic AMP-Independent Phosphoregulation of Protein Kinase A in the Fission Yeast, *Schizosaccharomyces pombe**

3:00

Katherine Romelfanger, Biology, Computer Based Honors Program
Faculty Mentor: Dr. Gary Sloan, Biological Sciences, Microbiology
*Characterization of Plasmid pALE-1 from *Staphylococcus capitis**

3:15

Maggie Adams, Biology, Computer Based Honors Program
Faculty Mentor: Dr. Laura Busenlehner, Chemistry
Studying Friedreich's ataxia: In Vivo Characterization of Frataxin

3:30

Mike Zhang, Biological Sciences
Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Sciences
Identifying Genetic Factors Associated with Aging that Influence Susceptibility to Parkinson's Disease

3:45

S. Kyle Lee Biology
Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Sciences
Searching for Ionic Liquid Partners That Will Enhance the Neuroprotective Role of Lidocaine

4:00

Susan DeLeon, Biological Sciences, McNair Scholars Program

Faculty Mentor: Dr. Guy Caldwell, Biological Sciences

Investigating the neuroprotective role of miRNAs in a C. elegans model of Parkinson's disease

4:15

Phillip Grant Cochran, Computer Based Honors Program, Chemical and Biological Engineering

Faculty Mentor: Dr. John Yoder, Biological Sciences

Investigating the Regulation of the Morphogen Wingless and its Role in Promoting Sexual Dimorphism in Drosophila

Rast Conference Room-B

2:00

Hannah Box, Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Chemistry

Synthesis of water-soluble phosphines and their application to recyclable, aqueous-phase palladium-catalysts

2:15

Ashleigh Kirstin Sockwell, Chemistry

Faculty Mentor: Dr. David Nikles, Chemistry

Attachment of AEAPT to Single Crystal Magnetite Nanoparticles for Future Tagging of Adenovirus

2:30

Duncan Harmon, Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Chemistry

Synthesis, Characterization, and Application of Neopentylphosphine Palladium Complexes

2:45

Jackie Parks, Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Chemistry

Effect of ligand steric demand on palladium-catalyzed coupling of sterically hindered aryl bromides and amines

3:00

James Allen, Chemistry, McNair Scholars Program

Faculty Mentor: Dr. Martin Bakker, Chemistry

Grazing Incidence Small Angle X-ray Scattering (GISAXS) Study of Mesoporous Silica Thin Films on Metal Substrates

3:15

Mark Pinkerton, Biology, Computer Based Honors Program
Faculty Mentor: Dr. Matthew Jenny, Biological Sciences
Gene Induction in Response to Oxidative Stress in Zebrafish Embryos

3:30

Matthew Thacker, Chemistry
Faculty Mentor: Dr. Laura Busenlehner, Chemistry
Investigating Frataxin ISU Protein Interactions Using Size Exclusion Chromatography

3:45

Sarah Stuart, Chemistry
Faculty Mentor: Dr. Scott Spear, AIME
Aqueous Dissolution Studies of Polyetheramine-Pectin Beads

4:00

Susanna Tubbs, Chemistry, AIME
Faculty Mentor: Dr. Rachel Frazier, AIME
Forced Assembly of Graphene through Oil-Water Interface Procedure

Smith Board Room

2:00

Emily Wayman, Chemistry, Computer Based Honors Program
Faculty Mentor: Dr. Patrick A. Frantom, Chemistry
Biochemical Characterization of Glycosyltransferase Enzyme MshA

2:15

John Ricketts, Biological Science
Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Science
Human torsinA functions to attenuate cellular stress and maintain homeostasis

2:30

Joseph Nelson, Chemistry, Department of Energy, DuPont Corporation
Faculty Mentor: Dr. Anthony J. Arduengo, III, Chemistry
Tridentate carbene ligand for the synthesis of transition metal complexes and hypervalent compounds

2:45

Josh Sullivan, Electrical and Computer Engineering; Emerging Scholars Program
Faculty Mentor: Dr. Celia Lo, Criminal Justice
Race, Gang Membership, and the Code of the Street

3:00

Kalen Berry, Biology, Computer Based Honors Program

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biology
Investigating Synapse Defects in a C. elegans Model of Epilepsy

3:15

Mitchell Hughes Physics & Astronomy, Computer Based Honors Program
Faculty Mentor: Dr. Andreas G. Piepke, Physics & Astronomy
Remote Control Software for the EXO Muon Veto System

3:30

Kristen Conerly, Chemical and Biological Engineering
Faculty Mentor: Dr. Laura Busenlehner, Chemistry
Heavy Metal Inhibition of the DNA repair protein, MutM

3:45

Natalie Gist, Chemistry, Community and Rural Medicine (University of Alabama School of Medicine); Computer Based Honors Program
Faculty Mentor: Dr. Heather Whitley; Stormy L. O'Bryant, Department of Community and Rural Medicine
PhRMA Guiding Principle Amendments Effects on Direct-to-Consumer Advertising of Prescription and Over-the-Counter Pharmaceuticals

4:00

Ryne Saxe, Physics & Astronomy
Faculty Mentor: Dr. Ion Stancu, Physics & Astronomy
Miniature Scanning Electron Microscope Development

Central Bank Room

2:00

Kristin Schneider, New College
Faculty Mentor: Dr. Marysia Galbraith, Anthropology
The Mata Ortiz: Innovation, Art, and Globalization

2:15

Jerrod Seaton, Political Science, McNair Scholars Program
Faculty Mentor: Dr. Utz McKnight, Political Science
Music as a Means to Describe Our Politics

2:30

Leah Hickerson, New College
Faculty Mentor: Dr. Marysia Galbraith, New College
The Impacts of Globalization on Mata Ortiz Pottery and Society

2:45

Michael Proaps, Political Science

Faculty Mentor: Dr. Doug Gibler, Political Science
*Does Force or Agreement Lead to Peace?: A Collection and Analysis of Militarized Interstate
Dispute Settlement(MID), 1816-2001*

3:00

Sam Mantel, Psychology, Sociology
Faculty Mentor: Dr. Bronwen Lichtenstein, Criminal Justice
Knowledge of HIV/AIDS Among Teens in Alabama

3:15

Maria Cortez, New College
Faculty Mentor: Dr. Marysia Galbraith, New College, Anthropology
Zapotec Weavings: Then and Now.

3:30

Alan Blinder, Political Science
Faculty Mentor: Dr. Doug Gibler, Political Science
The Anglo-American Relationship since the Start of the War on Terror

Nichols Room

2:00

Bryan Bofill, History
Faculty Mentor: Dr. Dan Riches, History Department
*With God On Our Side: Christian Atrocity Propaganda During the Great War in America (1914-
1918)*

2:15

Carly James, Anthropology
Faculty Mentor: Dr. Norman Singer, Anthropology, Law School
*Determinants of Success in Microfinance: A Comparative Analysis of Grameen Bank, Banco
Solidario, and K-Rep Bank*

2:30

Isabela Morales, History
Faculty Mentor: Dr. Steven Bunker, History
*Los Fieles: Faith, Anxiety, and Prejudice in the Press during Mexico's "Religious Crisis,"
February-July 1926*

2:45

Jennifer Harris, History
Faculty Mentor: Dr. Dan Riches, History
Female Camp Followers in Early Modern Europe

3:00

Susan Gorin, History

Faculty Mentor: Dr. David Michelson, History

East Syrian Evangelization Methods During the Tang Dynasty

3:15

Jared Denson, Political Science

Faculty Mentor: Dr. Barbara Ann Chotiner, Political Science

Jewish Politics between the World Wars.

Poster Presentations

Sellers Auditorium

1A

Amelia Bass, English

Faculty Mentor: Dr. Ashley McWaters, English

You Are My Sunshine: A Tribute to Mothers and Daughters

1B

Mark Penner, English, Computer Based Honors Program

Faculty Mentor: Dr. Fred Whiting, English

English Department Intranet Project

2A

Rebecca Ansoerge, English, Computer Based Honors Program

Faculty Mentor: Dr. Robert Nelson, English

Technology and Text Analysis: Creating The ESL Academic Writing Corpus (EAWC)

2B

David Butler, Music

Faculty Mentor: Dr. Rebecca Kelly, Health Promotion and Wellness, Computer Based Honors

WellBama Data Integration and Analysis

3A

Kimberly Cockrell, Music Therapy

Faculty Mentor: Dr. Andrea Cevasco, Music Therapy

Differences between Music Majors and Non-Music Majors' Starting Pitches of Familiar Songs

3B

Casey Brasher, Music Therapy

Faculty Mentor: Dr. Andrea Cevasco, Music Therapy

The Effect of Music Therapy on Self-reported Mood Levels of Cancer Patients Receiving Chemotherapy Treatment

4A

Julia Oh, Casey Brasher, and Kimberly Cockrell, Music Therapy

Faculty Mentor: Dr. Andrea Cevalco, Music Therapy

The Effect of Music Therapy on Premature Infants' Heart Rate, Respiratory Rate, and Oxygen Saturation Levels

4B

Julia Oh, Lelia Hubur, Ellyn Hamm, Casey Brasher, Kimberly Cockrell, Anna Baird, Ellen Kuykendall, and Laura Hagery Music Therapy

Faculty Mentor: Dr. Andrea M. Cevalco, Therapy

Evaluation of song decades on singing and motor responses of individuals with Alzheimer's disease and other related dementia (ADRD)

5A

Corinth Young, School of Music, McNair Scholars Program, Music Education

Faculty Mentor: Dr. Carl B. Hancock & Dr. Diane B. Shultz, School of Music

Spectrographic analysis of flute timbres produced from silver and gold head joints made by different instrument manufacturers.

5B

Shannon Lindamood, Theatre and Dance

Faculty Mentor: Dr. Sarah Barry, Theatre and Dance

George Balanchine: Theory and Technique

6A

Akeem Borom, Biological Sciences

Faculty Mentor: Dr. Guy Caldwell, Biological Sciences

Association Between the Insulin-Signaling Pathway and Development of Parkinson's Disease

6B

Andrew Sawyer, Biological Sciences

Faculty Mentor: Dr. Katrina Ramonell, Biological Sciences

Characterizing the role of CRP1 in plant defense and development

7A

Josh Aquino, Biological Sciences

Faculty Mentor: Dr. Ryan Earley, Biological Sciences

Physiological Mechanisms Underlying Experience-Induced Changes in Fighting Performance

7B

Lindsay Reynolds, Biological Sciences

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Sciences

Investigating GIPC as a novel neuroprotective target for Parkinson's Disease

8A

Marisa Younanian, Biological Sciences

Faculty Mentor: Dr. Leslie Rissler, Biological Sciences

Phylogenetics of a Potential New Species of Salamander at Mount Cheaha, Alabama

8B

Amanda Hanninen, Adam Fuller, and Shu-Ping Huang, Biological Sciences

Faculty Mentor: Dr. Ryan L. Earley, Biological Sciences

Phenotypic variation in a clonal organism: perspectives from hormones and behavior

9A

Michael Karafotias – Gibson Nelson and Brittany Nelson, Biological Sciences

Faculty Mentor: Dr. Leslie Rissler, Biological Sciences

Predicting the Geographic Distributions of Several Codistributed Bat Species: Implications for Conservation under threats from Climate Change and an Emerging Pathogen

9B

Caitlin Clark and Davis Taylor, Biological Sciences

Faculty Mentor: Dr. Janis O'Donnell, Biological Sciences

Characterization of suppressors of GTP cyclohydrolase mutations in Drosophila

10A

Trenton Phillips and Justin Ray, Biological Sciences

Faculty Mentor: Dr. Katrina Ramonell, Biological Sciences

Characterization of the ATL2 family of stress response genes in Arabidopsis

10B

Lucille Woodley, Biological Sciences

Faculty Mentor: Dr. Carol Duffy, Biological Sciences

11A

Nathan Roberts, Biological Sciences

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Sciences

Graduate Mentor: Pat Chen

RNA interference screening to identify factors that influence torsinA activity in C. elegans: Implications for dystonia, a human movement disorder

11B

Major Burch and Ryan Roddy, Biological Sciences

Faculty Mentor: Dr. Margaret D. Johnson, Biological Sciences

Defining the Origin of a Newly Uncovered 20KDa myo-Inositol Phosphate Synthase

12A

Laura Davis, William O'Donnell, and Coston Rowe, Biological Sciences

Faculty Mentor: Dr. Janis O'Donnell, Biological Sciences

Modeling Behavior of Autism Spectrum Disorders in Drosophila

12B

Bryan Herren, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Dr. Guy Caldwell & Dr. Kim Caldwell, Biological Sciences
Worming Out Therapeutics to Combat Alzheimer's Disease

13A

Matthew Lee Hicks, Biological Sciences, Honors College, McNair Scholars Program
Faculty Mentor: Dr. Guy Caldwell, Biological Sciences
Post-Developmental Role of HDA-1 in the Cytoskeletal Control of Epileptic-like Convulsions in C. elegans

13B

Kaylan Gee, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Dr. Jennifer Edmonds, Biological Sciences
Evaluating Microbial Community Response To Beaver Wetland Demise

14A

Paige Dexter, Biological Sciences, Howard Hughes Medical Institute, American Parkinson Disease Association, Parkinson's Association of Alabama, McNair Scholars Program
Faculty Mentor: Dr. Guy Caldwell & Dr. Kim Caldwell, Biological Sciences
Genetic Screening of Candidate MicroRNAs (miRNAs) for Dopaminergic Neuroprotection in C. elegans

14B

Ayesha Al-Akhdar, Biology
Faculty Mentor: Dr. Kim Caldwell, Biological Sciences
Identifying the Neuroprotective Role of GAIP-Interacting Protein C-terminus on Parkinson's Disease through the Endocytic Pathway

15A

Kyle Fricke, Biology
Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Sciences
Functional analysis of human VPS41 as a neuroprotective therapeutic target for Parkinson's disease

15B

Reed Morgan, Biology
Faculty Mentor: Dr. Jason Scofield, Human Development and Family Studies
Who Do Children Trust? Accuracy versus Conventionality

16A

Richard Feist, Biology
Faculty Mentor: Dr. Joseph Thrasher, Chemistry
Long-Term Diffusion of Sulfur Hexafluoride in Plastic Syringes

16B

Matthew M. May and Adam Zelickson, Biology

Faculty Mentor: Dr. Ryan Earley, Biology

The effects of Corticotropin Releasing Hormone (CRH) receptor antagonism on territorial aggression in the convict cichlid (Amantitlania Nigrofaciata)

17A

Yi Chen, Biology, Emerging Scholars Program

Faculty Mentor: Dr. Juan Lopez Bautista, Biology

Subaerial Algal Diversity Inferred from Environmental Samples

17B

Kirsten Ansoerge, Biology, Computer Based Honors Program

Faculty Mentor: Dr. Matthew Jenny, Biology

Oxidative Stress Response to Cadmium in Zebrafish Embryos

18A

Zac Lovoy, Biology, Computer Based Honors Program

Faculty Mentor: Dr. John L. Clark, Biology

Making the Gesneriaceae Image Library Accessible

18B

Lindsay Jones, Biology, Computer Based Honors Program

Faculty Mentor: Dr. Matthew Jenny, Biology

Biliverdin Reductase and Glutathione Reductase Response to tBHQ and Cadmium in Zebrafish Embryos

19A

Daniel Ross Turner, Anthropology

Faculty Mentor: Dr. John Blitz, Anthropology

Palisade Construction and Labor Costs in the Moundville Chiefdom

19B

Glennise Marshall, Anthropology

Faculty Mentor: Dr. Christopher Lynn, Anthropology

Fire and Stress Reduction

20A

Gloria Goodloe, Anthropology

Faculty Mentor: Dr. Lisa LeCount, Anthropology

The Origin of Current Fijian Living Techniques

20B

Savannah Leach, Anthropology

Faculty Mentor: Dr. Jason Decaro, Anthropology

Physical Activity and the Architecture of Daily Life Among Alabama Mexican-Americans : A Biocultural Investigation

21A

Teri Robinson, Anthropology

Faculty Mentor: Dr. Vernon J. Knight, Anthropology

Distinguishing Pottery Vessel Shape Modes Using Potsherds at the Pride Place Site

21B

Ashley Miller, Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Chemistry

Suzuki Coupling of Hindered Substrates

22A

Charles Mathis, Chemistry

Faculty Mentor: Dr. David Dixon, Chemistry

Untitled

22B

Hanna Welch, Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Chemistry

The use of mono-phosphine palladium chloride dimers in organic coupling reactions

23A

Sarah Nikles, Chemistry

Faculty Mentor: Dr. David E. Nikles, Chemistry

Synthesis and Characterization of Poly(ethylene glycol)-b-polycaprolactone Diblock Copolymers for Drug Delivery Systems

23B

Zachary Hawkins, Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Chemistry

Synthesis of Phosphine Selenium Compounds to Establish Electron Donating Ability

24A

Joseph Taylor Massey, Chemistry

Cameron Bolt, Management Information Systems

Faculty Mentor: Dr. Karen Burgess, Pediatrics

Kids in Balance

24B

Erica Schwalm, Chemistry, CBHP

Faculty Mentor: Dr. David A. Dixon, Chemistry

Site Isolated Transition Metal Catalysts: Combining Aspects of Heterogeneous and Homogeneous Catalysts

25A

Matthew Kelley, Chemistry, CBHP

Faculty Mentor: Dr. David A. Dixon, Chemistry

Potential Energy Surfaces for Catalytic Reactions on Group VI Transition Metal Oxides and Single Site Selected Metals

25B

Darryl A. Outlaw, Chemistry, Computer Based Honors Program, Chemical Engineering

Faculty Mentor: Dr. David A. Dixon, Chemistry

Electronic structure predictions of the properties of metal borane amine complexes

26A

J. Pierce Robinson, Chemistry, Computer Based Honors Program, Chemical Engineering

Faculty Mentor: Dr. David A. Dixon, Chemistry

Potential energy surfaces of the reactions of hydrazine with models of spent fuel from ammonia borane dehydrogenation

26B

Joni Corbin, Chemistry, Computer Based Honors Program, Civil Engineering

Faculty Mentor: Dr. David A. Dixon, Chemistry

Predictions of the acidity constant of UO_2^{2+} and metal ions in aqueous solution

27A

Jessica Duke, Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David A. Dixon, Chemistry

Computational Geochemistry: Predicting Reactions of H_2O in Models of Supercritical CO_2 for the Geological Sequestration of CO_2

27B

Rebecca Long, Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David A. Dixon, Chemistry

The Prediction of the Electron Affinities and Fluoride Affinities of Transition Metal Fluorides

28A

Richard Cockrum, Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David A. Dixon, Chemistry

Energetics of the Decomposition of Chemical Weapons of Mass Destruction

28B

Ashley Elizabeth Getwan, Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. John Vincent, Chemistry

Testing the Effect of Chromium on Cholesterol Uptake and Retention in Liver Cells

29A

Jessica Jones, Chemistry, Emerging Scholars Program

Faculty Mentor: Dr. Kevin H. Shaughnessy, Chemistry

Ligand Steric Effects in Palladium Catalyzed alpha-Arylation of Ketones

29B

T. Gannon Parker, Chemistry, Honors College
Faculty Mentor: Dr. Robin D. Rogers, Chemistry
Thermal Properties of Ionic Liquid-Lunar Regolith Mixtures

30A

Natalie Gist, Chemistry, Pre-pharmacy, Computer Based Honors Program
Faculty Mentor: Dr. David A. Dixon, Chemistry
DFT Studies of the Hydration Reactions of TiO₂ Nanoclusters

30B

Audry Turner, Communicative Disorders
Faculty Mentor: Dr. Priscilla N. Davis, Communicative Disorders
Avoiding Cultural Conflicts in the Clinical Setting

31A

Whitney Freeman, Communicative Disorders
Faculty Mentor: Dr. Priscilla Davis, Communicative Disorders
Prevention of Communicative Disorders in Urban and Rural Areas

31B

Chris Kendall, Criminal Justice
Faculty Mentor: Dr. David Forde, New College
Game Day Setup: A Look at Security Measures on UA Game Days

32A

Tacoma Morrissey, Geological Sciences
Faculty Mentor: Dr. Paul Aharon and Dr. Julie Olson, Department of Geological Sciences and
Department of Biological Sciences
*Composition of bacterial communities in Blount Springs, Alabama, and assessment of
chemolithotrophic capabilities*

32B

Jeremey Henning and Colby Henderson, Geological Sciences; Geological Survey of Alabama
Faculty Mentor: Dr. C. Fred T. Andrus, Geological Sciences
*A study of variation in shell morphology of *Flemingostrea cretacea* and other oysters from the
Upper Cretaceous of Alabama*

33A

Alana L. Rogers, Environmental Science
Stormi Barrett, Geography, Geology
Faculty Mentor: Dr. Lisa Davis, Geography
Particulate Carbon Storage in River Channel Deposits

33B

Barrett Gutter, Geography

Faculty Mentor: Dr. David Brommer, Geography

An Analysis of Air Temperature in Bryant-Denny Stadium

34A

Diane Schneider, Geography

Faculty Mentor: Dr. Jason Senkbeil, Geography

Understanding Perception of Meteorological Hazards within Tuscaloosa County

34B

Benjamin Stewart, Geological Sciences

Faculty Mentor: Dr. Amy Weislogel, Geological Sciences

U-Pb Zircon Ages from the Karoo Basin, South Africa

35A

Jacob Spry, Geological Sciences

Faculty Mentor: Dr. Fred Andrus, Geological Sciences

A Study of Hypersaline Lake Microbial Mat Metabolic Diversity, San Salvador Island, Bahamas

35B

Stanton Ingram, Geology

Faculty Mentor: Dr. Amy Weislogel, Geology

Detrital-Zircon Geochronology of the Pottsville Formation of Tuscaloosa County and the Rodessa Formation from the Citronelle Oil Field in Mobile County

36A

Nathaniel Corder, Mathematics, Computer Based Honors Program

Faculty Mentor: Dr. Buddy Goertz, Advancement Services

Tracking Alumni Donor Decay and Reactivation

36B

Andrew Tuggle, MINT Center, Physics and Astronomy

Faculty Mentor: Dr. Patrick LeClair, MINT Center, Physics and Astronomy

Magnetic Circular Dichroism in Iron-Palladium Thin Films

37A

Amanda Sockwell, New College

Faculty Mentor: Dr. Anna Yaros, Center for the Prevention of Youth Behavior Problems

Hostile Attribution Bias in Proactive and Reactive Aggressive Children

37B

Heather Baker, New College

Faculty Mentor: Dr. Marysia Galbraith, New College

Japanese Potters and Globalization

38A

Mark Perkins, New College

Faculty Mentor: Dr. Joe Brown, New College

Income and Drinking Water Access: An analysis of socio-economic factors and drinking water accessibility in Tuscaloosa, Alabama

38B

Robert Clark, Political Science

Faculty Mentor: Dr. David Lanoue, Political Science

The Effects of Mass-Media Consumption on the Political Socialization of Today's Youth

39A

Annie Ostrow, Political Science, Computer Based Honors Program

Faculty Mentor: Dr. Doug Gibler, Political Science

Does Force or Agreement Lead to Peace: A Collection and Analysis of Militarized Interstate Dispute Settlement, 1816-2001

39B

Jessica Emmons, Psychology

Faculty Mentor: Dr. Laura Klinger, Psychology

College Programs for Students with ASD: Predictors of Successful College Transition

40A

Jessica Emmons, Psychology

Faculty Mentor: Dr. Laura Klinger, Psychology

Emotion Recognition Through Nonverbal Channels in Children with Autism Spectrum Disorder

40B

Katherine O'Brien, Psychology

Faculty Mentor: Dr. Rosanna Guadagno, Psychology

Gendered Power: An Examination of Masculine and Feminine Strategies for Attaining Power

41A

Muriah Wheelock, Psychology

Faculty Mentor: Dr. Mark Klinger, Psychology

Prototype Learning in Autism Spectrum Disorder

41B

Neal Pollock, Psychology

Faculty Mentor: Dr. Rosanna Guadagno, Psychology

To Blog or Not to Blog: Personality Answers the Question

42A

Nicole Broka, Psychology

Faculty Mentor: Dr. Laura Klinger, Psychology

Implicit Learning in Children with Autism Spectrum Disorder

42B

Olivia Bandy, Psychology

Faculty Mentor: Dr. Beverly Thorn, Psychology

Pain References Used in Trait Catastrophizing Measures

43A

Samantha Price, Psychology

Faculty Mentor: Dr. Randy Salekin, Psychology

Adolescent Psychopathy: Examining the Depressive Subtype

43B

Katelyn Davis and Melissa Pouncey, Psychology

Faculty Mentor: Dr. Jason Scofield, Human Development and Family Studies

Do children use past actions to determine the future reliability of an actor?

44A

Abigail Kacpura, Psychology, Emerging Scholars Program

Faculty Mentor: Dr. Angela Barber, Communicative Disorders

Peer Modeling to Decrease Repetitive Behaviors in Young Children with ASD

44B

Heather Sunny Hayes, Psychology, Emerging Scholars Program

Faculty Mentor: Dr. Frances Connors, Psychology

Implicit Learning, Phonological Memory, and Language in Down Syndrome

45A

Taylor Monson, Psychology, McNair Scholars Program, Psychology Honors Program, Blount Undergraduate Initiative

Faculty Mentor: Dr. Jeff Parker & Dr. David R. Forde, Psychology & Sociology

Heteronormative Relationship Interaction Model: First Date Interactions

45B

Kayla Lisenby, Honors College

Faculty Mentor: Dr. Shane Sharpe, Honors College

Web Presence For the Emerging Scholars Program

College of Engineering Poster Presentations

Sellers Auditorium

46B

Alex Blackwell, Austin Finnen, and Clayton O'Brien, Metallurgical and Materials Engineering

Faculty Mentor: Dr. Subhadra Gupta, Metallurgical and Materials Engineering

Test Your Strength!

47A

Andrew Magee, Mechanical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Xiangrong Shen, Mechanical Engineering

Mechanical Elbow Joint for Transhumeral Prosthesis

47B

Ashley Johnson, Kimberley Kopecki, and Anna Willemin, Metallurgical and Materials Engineering

Faculty Mentor: Dr. Subhadra Gupta, Metallurgical and Materials Engineering

XRD: A Body-Centered Peak Show!

48A

Ben Austin, C.J. Searcy, and Zach Jaime, Mechanical Engineering

Faculty Mentor: Dr. John Baker, Mechanical Engineering

Biomimetic Thermal Regulation: Hygromorphs and Heat Transfer

48B

Ben Austin, C.J. Searcy, and Zach Jaime, Mechanical Engineering

Faculty Mentor: Dr. John Baker, Mechanical Engineering

Application of Biological Thermal Regulation in the Development of a Synthetic Hygromorph

49A

Billy White, Mechanical Engineering

Faculty Mentor: Dr. Kevin Chou, Mechanical Engineering

Diamond-coated Cutting Tools – Coating Thickness Measurements by Optical Profilometry

49B

Blake Bassett, Computer Science, Computer Based Honors Program

Faculty Mentor: Dr. David Michelson, History

Syriac Font Rendering for Mac OSX

50A

Brandi Freeman, Blake Whitley, Franklin Garner, Faisal Salman and Gregory Holmes, Metallurgical and Materials Engineering

Faculty Mentor: Dr. Subhadra Gupta, Metallurgical and Materials Engineering

Get the Picture?

50B

Brittany Fossett, Civil, Construction, and Environmental Engineering

Faculty Mentor: Dr. Kenneth Fridley, Civil, Construction, and Environmental Engineering
Civil Engineering and its Impact on the Economy

51A

Cameron Patterson, Electrical Engineering
Faculty Mentor: Dr. Susan Burkett, Electrical Engineering
Design and Simulation of a 3-D Antenna

51B

Chad Hornbuckle, Metallurgical and Materials Engineering; Naval Research Laboratory
Faculty Mentor: Dr. Gregory Thompson, Metallurgical and Materials Engineering
Chemical-Partitioning in (Co_{1-x}Ni_x)₈₈Zr₇B₄Cu₁ Soft Magnetic Nanocrystalline Alloys

52A

Christopher King, Aerospace Engineering and Mechanics
Faculty Mentor: Dr. David Cordes, Computer Science
Analysis of Factors of Engineering Student Retention

52B

Courtney Kronenberger, Aerospace Engineering and Mechanics, Emerging Scholars Program
Faculty Mentor: Dr. Amy Lang, Aerospace Engineering and Mechanics
Design of a Drop Tank Facility for Low Reynolds Number Drag Measurements

53A

Daniel Gerber, Mechanical Engineering
Faculty Mentor: Dr. Paul Hubner, Aerospace Engineering and Mechanics
Analysis of Friction-Stir Welds on the Space Shuttle External Tank Using a Luminescent Photoelastic Coating

53B

Daniel Hershman, Mechanical Engineering
Faculty Mentor: Dr. Chip Cooper, Mechanical Engineering
Refinement of Content and User Interface of the Honors College Website

54A

Daniel Preston and Roger Rozanski, Mechanical Engineering
Faculty Mentor: Dr. David Grau, Civil, Construction, and Environmental Engineering
Localization with Motes

54B

David Dozier, Chemical and Biological Engineering
Faculty Mentor: Dr. Yuping Bao, Chemical and Biological Engineering
Synthesis of Iron Oxide Nanoparticles with Biological Coatings

55A

Denzel Evans-Bell, Electrical and Computer Engineering, Emerging Scholars Program

Faculty Mentor: Dr. Sushma Kotru, Electrical and Computer Engineering
Resistivity Differences Between Semiconductors, Conductors, and Insulators

55B

Donald Tyler Paul, Aerospace Engineering and Mechanics
Faculty Mentor: Dr. Sammit Roy, Aerospace Engineering and Mechanics
Manufacturing and Mechanical Characterization of Crosslinked Silica Aerogel

56A

Drew Smith, Aerospace Engineering and Mechanics
Faculty Mentor: Dr. Amy Lang, Aerospace Engineering and Mechanics
Flow Mechanisms Induced by 2D Embedded Cavities Leading to Separation Control

56B

Dustin Heaton, Computer Science, REU – Software Language Engineering
Faculty Mentor: Dr. Jeffrey Carver, Computer Science
Enabling Citizen Roboticians

57A

Elizabeth Junkin, Chemical and Biological Engineering, Computer Based Honors Program
Faculty Mentor: Dr. Joseph S. Thrasher and Dr. Rick Fernandez, Chemistry
Hydrodechlorination of a Pharmaceutical Company Waste Product

57B

Emily Jones, Aerospace Engineering and Mechanics, Computer Based Honors Program
Faculty Mentor: Dr. Amy Lang, Aerospace Engineering and Mechanics
Boundary Layer Control of Shark Scales

58A

Eric Dowling, Lauren Bialoskurski, and Ben Hornsby, Mechanical Engineering
Faculty Mentor: Dr. John Baker, Mechanical Engineering
Biomimetic Analysis of Clean Water Harvesting

58B

Jennifer Conway and Anthony Ortiz, Aerospace Engineering & Mechanics
Faculty Mentor: Dr. Stanley E. Jones, Aerospace Engineering & Mechanics
Estimating the Ballistic Limit of Aerospace Materials

59A

Jereme Gray, Mechanical Engineering, Computer Based Honors Program
Faculty Mentor: Dr. Marcus Ashford, Mechanical Engineering
Alabama's Infinitely Variable Engine Cycle Simulator

59B

Jill Hoover, Computer Based Honors Program, Mechanical Engineering
Faculty Mentor: Dr. Jan Brakefield, Consumer Sciences

Camp Cash - A Financial Literacy Program for Middle School Students

60A

John Cody, Mechanical Engineering

Faculty Mentor: Dr. John Baker, Mechanical Engineering

Parametric Study of Transient Cold Gas Thruster Performance

60B

John Stabler, Electrical and Computer Engineering

Faculty Mentor: Dr. Silas Blackstock, Chemistry

Single Molecule Charging by Atomic Force Microscopy

61A

Joseph Holland, Aerospace Engineering and Mechanics

Faculty Mentor: Dr. Semih Olcmen, Aerospace Engineering and Mechanics

Penetrator Nose Drag Measurements in Supersonic Flows

61B

Katherine Barton, Chemical and Biological Engineering, University Honors Program

Faculty Mentor: Dr. Tonya Klein, Chemical and Biological Engineering

Intelligent Polymerized Colloidal Crystal Arrays for Perchlorate Detection in the Environment

62A

Alejandro Carrasquilla, Chemical and Biological Engineering, Emerging Scholars Program

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Sciences

Utilizing microinjection to study candidate genes in C. elegans for the prevention of Parkinson's disease

62B

Kenny Mahan, Mechanical Engineering

Faculty Mentor: Dr. John Baker, Mechanical Engineering

Development of a Fractal Heat Exchanger for Thermal Rocket Applications

63A

Kimberly Kosta, Computer Science, Computer Based Honors Program

Faculty Mentor: Dr. David Michelson, History

Syriac Manuscript Preservation

63B

Kurt Guynn, Chemistry, Chemical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. David A. Dixon, Chemistry

Prediction of the Thermodynamics of Key Products and Intermediates from Biofuel

64A

Kyle Redding, Computer Science, Computer Based Honors Program

Russell Isaiah Clemons, Chemical Engineering & Computer Based Honors Program

Faculty Mentor: Dr. Yunjae Cheong, Department of Advertising and Public Relations
Analyzing the Olympic Message Strategies of the Beijing Olympic Commercials

64B

Kyle Scott, Aerospace Engineering and Mechanics, Computer Based Honors Program
Faculty Mentor: Dr. Paul Hubner, Aerospace Engineering and Mechanics
Experimental Analysis of Pretensioned Flexible Membrane Airfoils Applicable to Micro Air Vehicle Flight

65A

Larry Justin Williams, Mechanical Engineering
Faculty Mentor: Dr. Ajay K. Agrawal, Mechanical Engineering
Noise Mitigation by Manipulating Combustion using Porous Inert Media

65B

Laura Mould, Chemical Engineering, Computer Based Honors Program
Faculty Mentor: Dr. Peter Clark, Chemical Engineering
Carbon Dioxide Interaction with Reservoir Fluids

66A

Lauren Wintzinger, Chemical and Biological Engineering
Faculty Mentor: Dr. Yuping Bao, Chemical and Biological Engineering
Synthesis and Modeling of Fluorescent Gold Nanoclusters

66B

Marc Hansen and Rachael McCarty, Mechanical Engineering
Faculty Mentor: Dr. John Baker, Mechanical Engineering
Biomimetic Pump using Capillary Flow and Cohesion Theory

67A

Matt Sims, Civil, Construction, and Environmental Engineering, Computer Based Honors
Faculty Mentor: Dr. Andrew Graettinger, Civil, Construction, and Environmental Engineering
Mapping Wisconsin ... Again

67B

Matt Westberry, Mechanical Engineering
Faculty Mentor: Dr. John Baker, Mechanical Engineering
Modeling and Analysis of a Pulsed Thermal Rocket Propulsion System

68A

Matt Westberry, Nathan Ivey, and Daniel Whitaker, Mechanical Engineering
Faculty Mentor: Dr. John Baker, Mechanical
Use of Geodesic Structures as Lighter-than-Air Platforms

68B

Matthew York, Electrical and Computer Engineering

Faculty Mentor: Dr. Patrick Kung, Electrical and Computer Engineering
ZnO Nanowires for Intelligent Solar Cell Design

69A

Nicholas Neveu and Ryan Syslo, Electrical and Computer Engineering
Faculty Mentor: Dr. Yang-Ki Hong, Electrical and Computer Engineering
Ferrimagnetic, biferroic Y-type hexaferrite nanofilm for magnetoelectric random access memory (ME-RAM)

69B

Ryan Syslo, Nicholas Neveu, and Gavin Abo, Electrical and Computer Engineering
Faculty Mentor: Dr. Yang Ki Hong, Electrical and Computer Engineering
Array of CoFe Nanodots for High-density, Non-volatile Magnetic Random Access Memory (MRAM) Application

70A

Sarah Betzig, Electrical and Computer Engineering, Emerging Scholars Program
Faculty Mentor: Dr. Patrick LeClair, Physics and Astronomy
Noise Properties of Tunneling Devices

70B

Travis Midkiff, Mechanical Engineering, Computer Based Honors Program
Faculty Mentor: Dr. Ajay Agrawal, Mechanical Engineering
Rijke Tube Experiment to Study Combustion Instabilities

71A

Trenton Elkins, Chemical Engineering
Faculty Mentor: Dr. Yang-Ki Hong, Electrical Engineering
Synthesis of uniform spherical magnetite nanoparticles for extremely high-density magnetic data storage

71B

Tyler Clark, Aerospace, Honors College, Emerging Scholars Program
Faculty Mentor: Dr. Marcus Ashford, Mechanical Engineering
Alcohol Based Motor Fuels and Engine Efficiency

72A

Will Warren, Mechanical Engineering
Faculty Mentor: Dr. John Baker, Mechanical Engineering
Chaotic Behavior of Mesoscale Hybrid Rocket Motor Performance

72B

William Baughman and Michael Murphy, Electrical and Computer Engineering
Faculty Mentor: Dr. Margaret Kim, Electrical and Computer Engineering
Terahertz Imaging and Sensing

73A

Zachary Coppens, Mechanical Engineering
Faculty Mentor: Dr. John Baker, Mechanical Engineering
Characterization of Chaotic Mesoscale Solid Rocket Motor Behavior

73B

Gaines Gibson, Computer Based Honors Program
Faculty Mentor: Dr. Glenn Davis, Rural Health Institute for Clinical and Translational Science
Emergency Medical Services Data Analysis

74A

Reese Dunton, Emerging Scholars Program
Faculty Mentor: Dr. Karen Boykin, Engineering
EMAP On UA

74B

Jon Lauer, Mathematics
Faculty Mentor: Dr. Yingyan Lou, Civil, Construction and Environmental Engineering
Factors influencing students' usage of school bus seat belts: an empirical analysis of Alabama pilot project

Culverhouse College of Commerce and Business Administration Oral Presentations

Lackey Room

2:00

Ryan Kern, Management and Marketing, Emerging Scholars Program
Faculty Mentor: Dr. Jim Cashman, Management and Marketing
Sustaining Economic Longevity

Poster Presentations

75A

Brooke McLeod, Economics
Faculty Mentor: Dr. Paan Jindapon, Economics
Child Care Costs and Labor Force Participation of Women

75B

Christopher Armbrester, Management Information Systems, Statistics, and Management Science, Computer Based Honors Program

Faculty Mentor: Dr. Sharif Melouk, Management Information Systems, Statistics, and Management Science

Simulation Optimization Approach to Incident and Emergency Management

76A

Jim Wills and Hallett Ogburn, Economics, Finance, and Legal Studies

Faculty Mentor: Dr. Paan Jindapon, Economics, Finance, and Legal Studies

Regression Analysis for College Football Tickets

76B

Josh Moncrief, Management Information Systems

Faculty Mentor: Dr. David Hale, Management Information Systems

Creating Sustainable Fisheries in the Mobile Bay

77A

Julia Simcoe and Karly Tuggle, Management Information Systems, Computer Based Honors Program

Faculty Mentor: Dr. David Hale, Management Information Systems

NOAA Sustainability of the Gulf

77B

Taylor Ashy, Business

Faculty Mentor: Dr. Utz McKnight, Political Science

The Economics of the 2010 Healthcare Reform

78A

Mark Greene, Management Information Systems

Faculty Mentor: Dr. Uzma Raja, Management Information Systems

Effects of Structural Complexity and Volatility on Software Maintenance Outcomes

78B

Matt Newton, Management Information Systems

Faculty Mentor: Dr. David Hale, Management Information Systems

Creating Sustainable Fisheries in the Mobile Bay

79A

Randy Beavers, Economics, Finance, and Legal Studies

Faculty Mentor: Dr. Paan Jindapon, Economics, Finance, and Legal Studies

Elasticities of U.S. Energy Data

79B

Sarah Spiller, Business Administration, Computer Based Honors Program

Faculty Mentor: Dr. Burcu Keskin, Business Administration

College of Communication & Information Sciences Oral Presentations

Lackey Room

3:45

Blake Williams, Communication Studies

Faculty Mentor: Dr. Frank Thomsson, Communication Studies

Atwater: Fixin' to Die

4:00

Carly Palmour, New College

Marcus Tortorici, Telecommunication and Film

Faculty Mentor: Dr. Adam Schwartz, Telecommunication and Film

Effective Storytelling Through Short Film

4:15

Christopher West and Heath Williamson, Telecommunication and Film

Faculty Mentor: Dr. Adam Schwartz, Telecommunication and Film

The Multiverse - Making a Trilogy

4:30

Nikki Hall, Lindsay Vick, and Elizabeth Maxwell, Advertising and Public Relations

Faculty Mentor: Dr. Teri Henley, Advertising and Public Relations

Insurance: Young Adults' Perspective

4:45

Rachel Childers, Public Relations, Emerging Scholars Program

Faculty Mentor: Dr. Eyun-Jung Ki, Advertising and Public Relations

Examining the Affects of Organization-Public Relationships on Attitude and Behavior

Poster Presentations

Sellers Auditorium

80A

Kyle Weeks, Finance, Computer Based Honors Program

Faculty Mentor: Kevin McQuary, Athletics

Swimming & Diving Interactive Guide

80B

Amy Moore, Advertising and Public Relations

Faculty Mentor: Dr. Carol Cooper, Advertising and Public Relations

Curbing Public Opinion: Edward Bernays and the Effects of Psychology on Public Relations

81A

Dana Lewis, Public Relations, Political Science, Computer Based Honors Program

Bradley Langston, Chemical Engineering, Computer-Based Honors

Agata Kargol, Telecommunication and Film, Computer-Based Honors

Faculty Mentor: Dr. Mark Thomas, Student Health Center/University Medical Center

Developing an online repository for ADHD campus resources

81B

Griffith Waller, Public Relations, Political Science

The Works Progress Administration

82A

Lindsey Lowe, Journalism, Emerging Scholars Program

Faculty Mentor: Dr. Jennifer Greer, Journalism

A Longitudinal Content Analysis of Topic Coverage and Elitist Frames in Gourmet Magazine: 1945-2008

**College of Education
Oral Presentations**

Lackey Room

2:30

Lindsay Scholes, Curriculum & Instruction, Computer Based Honors Program

Jack Heflin, Business, Computer-Based Honors Program

Faculty Mentor: Dr. Star Bloom, Honors College

Creating an Electronic Infrastructure for Capstone Mentors

2:45

Andrew Mitchell, New College, Computer Based Honors Program

Joseph Florence, Electrical and Computer Engineering, Computer-Based Honors

Faculty Mentor: Dr. Rick Houser, and Dr. Steve Thoma, Educational Studies, Psychology, Research Methodology, and Counseling

Utilizing Second Life in the Analysis of the Ethical Decision-Making Process

Poster Presentations

Sellers Auditorium

82B

Richard Crump and Katie Norton, Kinesiology

Mary Catherine Casteix, Health Studies

Faculty Mentor: Dr. Jen Nickelson, Health Science

Irresponsible activities among students while drinking alcohol.

83A

Cyrus Massouleh, Pre-Med/Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. Lisa Hooper, Counselor Education

Building an Online Identity for Project ACTS

College of Human Environmental Sciences Oral Presentations

Lackey Room

3:00

Tasia Washington and Kim Sanders, Human Development and Family Studies

Faculty Mentor: Dr. Jason Scofield, Human Development and Family Studies

Factors Related to Children's Video Word Learning

Poster Presentations

Sellers Auditorium

83B

Amanda Almand and Erin Vines, Athletic Training (Health Science)

Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)

The Relationship of Rotator Cuff Strength Imbalances and Shoulder Pain in the Overhead Throwing Athlete

84A

Amanda Whitaker and Katie Beard, Human Development and Family Studies
Faculty Mentor: Dr. Maria Hernandez-Reif, Human Development and Family Studies
Examining Communication Between Anxious Mothers and Their Unborn Child

84B

April Wang, Health Science
Faculty Mentor: Dr. Jen Nickelson, Health Science
Depression and Anxiety Disorders among College Students: Closing the Gap between Need and Treatment

85A

Catherine Casanta and Jesse Zora, Consumer Sciences
Faculty Mentor: Dr. Cliff Robb, Consumer Sciences
Financial Literacy in America

85B

Chelsea Ann Hewitt, Health Science
Faculty Mentor: Dr. Lori Turner, Health Science
Osteoporosis Related Behaviors Among A Select Sample Middle-Aged Women Two Years Following an Intervention

86A

Tyler Fredlund and Darryl Sheets, Athletic Training (Health Science)
Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)
The Impact of Certified Athletic Trainers on Injury Reporting and Non-Reporting by Athletes

86B

Countess Davis and Maria White, Athletic Training (Health Science)
Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)
Standing or Seated 4-way Ankle Theraband: Which Will Elicit a Greater Increase in Position Control Thereby Providing an Increase in Balance?

87A

Hannah Carter, Health Studies
Faculty Mentor: Dr. Jen Nickelson, Health Sciences
Assessing Environmental Audit Tools

87B

Jamie Schumacker and Amanda Barkley, Health Science
Faculty Mentor: Dr. Nickelson, Health Science
Six hours in jail or five minutes in a cab? It's up to you...

88A

Jessica Hulderman and Katy Steele, Athletic Training (Health Science)

Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)
Pravalence of Eating Disorders and Disordered Eating Among Athletes in Weight-Restricted Sports: A Comparison of In-Season and Out-of-Season Behaviors

88B

Julia Israel, Amanda Whitaker, and Morgan Haygood, Human Development and Family Studies

Faculty Mentor: Dr. Maria Hernandez-Reif, Human Development and Family Studies
Complimentary and Alternative Medicine (CAM) Use Among Adults and Children in Tuscaloosa

89A

Justin Skidmore, Athletic Training (Health Science)

Faculty Mentor: Dr. Deidre Leaver-Dunn, Health Science
A Comparison of Joint Mobilization and Sleeper Stretches on Improvements in Glenohumeral Rotation

89B

Laura Lasecki, Human Nutrition and Hospitality Management

Kyle Weeks and Kelly Wilson, Computer Based Honors

Faculty Mentor: Dr. Linda Knol, Human Nutrition and Hospitality Management
One World, One Waistline; A Nutrition Education Program for Students.

90A

Lesley Morris, Department of Human Nutrition and Hospitality Management

Faculty Mentor: Dr. Linda Knol, Department of Human Nutrition and Hospitality Management
Incorporating "Eco-Friendly Practices" into Weight Management and Nutrition Education Messages for college Students

90B

Lesley Oglesby and Ryan Richardson, Athletic Training (Health Science)

Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)
The Effect of Stretching Frequency on Glenohumeral Internal Rotation Deficit

91A

Paige Herring and Meghan Hubbard, Athletic Training (Health Science)

Faculty Mentor: Dr. Deidre Leaver-Dunn, Health Science
The Impact of Tape on Ankle Proprioception During Activity: A Comparison of Powertape and Zonas

91B

Patricia Ryann Taylor, General Health Studies

Faculty Mentor: Dr. Jen Nickelson, Health Science
Quality of Life In College Students

92A

Ryan Vicknair and Mark Waller, Athletic Training (Health Science)

Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)
A Comparison of Surface Effectiveness at Eliciting Proprioceptive Gains in Patients with Ankle Sprain Pathology

92B

Satoru Ozawa and Jonta Pritchett, Athletic Training (Health Science)
Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)
A Comparison of Delayed Onset Muscle Soreness from Squats and Leg Press

93A

Theresa Mince, Clothing, Textiles, & Interior Design, Computer Based Honors Program
Faculty Mentor: Dr. Amanda Thompson, Clothing, Textiles, and Interior Design
Mobile Textile Tutor

93B

Trenton Butler and Chris Jordan, Athletic Training (Health Science)
Faculty Mentor: Dr. Deidre Leaver-Dunn, Athletic Training (Health Science)
A Comparative Difference in Muscle Strength Before and During Delayed Onset Muscle Soreness

Capstone College of Nursing Oral Presentation

Lackey Room

3:15

Kimika Jackson, Nursing, McNair Scholars Program
Faculty Mentor: Dr. Cassandra Ford, Nursing
Discrepancy in Breast Cancer Treatment: Race and Locale as Risk Factors for Women in Alabama

3:30

Samantha Lindsay, Computer Based Honors Program
Michael Robson, Computer Science, Computer Based Honors Program
Faculty Mentor: Dr. Felecia Wood, Nursing
Managing Type Two Diabetes with iPod Touch Technology

Poster Presentations

Sellers Auditorium

94B

Katherine Whitley, Emerging Scholars Program

Faculty Mentor: Dr. JoAnn Oliver, Capstone College of Nursing

Health Utilization and Health Disparities: Race, Gender and Regional Differences

95A

Nicole Humphrey and Rachel Humphrey, Nursing, BSN

Faculty Mentor: Dr. Monika Gragg, Nursing

Obsessive Compulsive Personality Disorder in College Students

95B

Christopher Williams, Nursing, Emerging Scholars Program

Faculty Mentor: Dr. Norma Cuellar, Nursing

A Secondary Analysis of Data Gathered from Ferritin Levels in Type II Diabetes Patients with Restless Leg Syndrome

School of Social Work Oral Presentation

Lackey Room

5:00

Eric King, Social Work

Faculty Mentor: Dr. Javonda Williams, Social Work

Prostitution in Tuscaloosa: Implementing Effective Social Services

Poster Presentations

Sellers Auditorium

96A

Sean Hudson, Social Work

Faculty Mentor: Dr. Debra Nelson-Gardell, Social Work

Program Evaluation: Child Focused Program

96B

Hailey Parlett and Charles West, Social Work
Faculty Mentor: Dr. Javonda Williams, Social Work
Childhood Suicide Awareness

97A

Sarah Lancaster, Social Work
Faculty Mentor: Dr. Javonda Williams, Social Work
Autism Services for Families and Individuals

97B

Erin Jacobs, Computer Based Honors Program
Faculty Mentor: Dr. Christa Hackney, Alabama Disabilities and Advocacy Program
ADAP Access Database

98A

Robin Sullivan, Social Work
Faculty Mentor: Dr. Javonda Williams, Social Work
Policy Analysis of Gay Adoption

Abstracts

Maggie Adams, Department of Biological Sciences, Computer-Based Honors Program

Faculty Mentor: Dr. Laura Busenlehner, Department of Chemistry

Studying Friedreich's ataxia: In Vivo Characterization of Frataxin

Friedreich's ataxia (FRDA) is a genetic disease caused by a deficiency in frataxin which leads to iron-deficiencies in other proteins, and accumulation of toxic iron. We study the function of frataxin to understand how the deficiency leads to FRDA. First, we disrupted the frataxin gene in fission yeast. We are determining the phenotype of this knockout. The lack of frataxin is lethal, so we will rescue the phenotype using yeast frataxin and human frataxin to ensure that they have the same function. We are also using a yeast-two hybrid screen to determine the proteins and pathways frataxin interacts with.

Ayesha Al-Akhdar, Department of Biological Sciences

Faculty Mentor: Dr. Kim Caldwell, Department of Biological Sciences

Identifying the Neuroprotective Role of GAIP-Interacting Protein C-terminus on Parkinson's Disease through the Endocytic Pathway

Parkinson's Disease is an age-dependent neurodegenerative disorder that affects the dopamine (DA) neurons. This elicits problems in motor skills. *Caenorhabditis elegans* (*C. elegans*) is a well established model for studying PD by expressing the human PD gene, alpha-synuclein, (α -syn) in the DA neurons of the worm. Through a large genetic screen completed in our lab, GAIP-Interacting Protein C-terminus (GIPC) has been identified as a neuroprotective factor. In addition to studying the regulation of DA signaling in neuroprotection (see poster Reynolds et al.), GIPC may influence receptor recycling and/or degradation of proteins affected by alpha-synuclein through the endocytic pathway.

James Allen, Department of Chemistry, McNair Scholars Program

Faculty Mentor: Dr. Martin Bakker, Department of Chemistry

Grazing Incidence Small Angle X-ray Scattering (GISAXS) Study of Mesoporous Silica Thin Films on Metal Substrates

Mesoporous silica (MS) thin films contain ordered arrays of nanometer-sized pores and are of interest for many applications. Prior work using GISAXS, a scattering/diffraction technique that allows determination of pore spacing and degree of ordering and alignment, found that for MS templated by the block co-polymer, Pluronic P123, the type of metal substrate used impacts the size, spacing, ordering, and alignment of the pores. It is expected that different block co-polymer templates will similarly impact the pore spacing, ordering and alignment in unique ways. We report here on an analysis of GISAXS data from MS thin films on a range of metals templated by the block co-polymers, Pluronic P123 and Pluronic L92.

Amanda Almand, Department of Health Sciences

Erin Vines, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn

The Relationship of Rotator Cuff Strength Imbalances and Shoulder Pain in the Overhead Throwing Athlete

The shoulder girdle is stabilized dynamically by muscles which contribute to control, function and balance. These muscles must be strong and balanced to stabilize the joint in extreme ranges

of motion, in particular. Injuries to the shoulder are common in sports involving overhead activity where the extremes of motion are reached. In the absence of frank injury, muscle imbalances also contribute to shoulder pain. This study will focus on the relationship between muscle imbalance and pain in the overhead athlete.

Kirsten Ansoorge, Department of Biological Sciences, Computer Based Honors Program
Faculty Mentor: Dr. Mathew Jenny, Department of Biological Sciences

Oxidative Stress Response to Cadmium in Zebrafish Embryos

Cadmium (Cd), a toxic heavy metal that is capable of causing oxidative stress, activates the transcription factor MTF-1 which is responsible for regulating metallothioneins (MTs), metal-binding protein that sequester toxic metals. Preliminary data suggests that MTF-1 may also activate the Heme Oxygenase-1 (HO-1) gene in a Cd-dependent manner. Zebrafish embryos were challenged with varying concentrations of Cd (0, 10, 50, and 100 μ M) at several developmental time points. Real-time PCR was used to confirm the induction of MT and determine if HO-1 is induced in a Cd-dependent manner. Future experiments will explore the role of MTF-1 in regulating HO-1 expression.

Rebecca Ansoorge, Department of English, Computer Based Honors Program

Faculty Mentor: Dr. Robert Nelson, Department of English

Technology and Text Analysis: Creating The ESL Academic Writing Corpus (EAWC)

The EAWC will be the first freely available linguistic corpus dedicated to written composition in English as a second language in an American academic setting. Linguistic corpora like the EAWC are samples of text or speech that can be searched and analyzed by scholars. The two main aspects of this project will produce an efficient method of completing this resource through two software applications. The first is an “automatic tagger” which labels thousands of words based on their linguistic part of speech. The second will allow the user to easily and efficiently label parts-of-speech and grammatical errors in a text.

Josh Aquino, Department of Biological Sciences

Faculty Mentor: Dr. Ryan Early, Department of Biological Sciences

Physiological Mechanisms Underlying Experience-Induced Changes in Fighting Performance

Animals alter their behavior in future aggressive contests following prior wins and losses. Few studies, however, have investigated the physiological mechanisms responsible for measurable changes in fighting performance. Immediate early genes (IEGs), such as early growth response-1 (*egr-1*), are activated in response to social challenges, and often act as transcription factors, triggering downstream gene expression and initiating the physiological responses animals mount following exposure to social stimuli. We isolated candidate IEGs from the brains of the lizard, *Anolis carolinensis*, and we are using these tools to investigate changes in neural IEG expression patterns in response to winning and losing experiences.

Christopher Armbruster, Department of Information Systems, Statistics, and Management Science, Computer Based Honors Program

Faculty Mentor: Dr. Sharif Melouk, Department of Information Systems, Statistics, and Management Science

Simulation Optimization Approach to Incident and Emergency Management

Traffic incidents and natural or man-made disasters can impose significant safety risks and disruptions on traffic flows. The main goal of this research effort is to assist dispatchers and transportation system managers in optimizing emergency vehicle response and transport time. The result will be a tool to help compare dispatching options based on availability and location of emergency response units, network traffic conditions, lane closures due to the emergency, traffic management strategies (such as signal pre-emption), and user preferences. To test the validity and the applicability of this method, a specific scenario will be identified in Birmingham, AL.

Taylor Ashy, Business

Faculty Mentor: Dr. Utz McKnight, Political Science

Through my research, I will show the potential economic effect of the different healthcare reform plans that are currently be debated in Congress. I will show the effect on the individual, the employer, the healthcare industry, and on the economy as a whole. Also, I will show which plan will hurt insurance companies and which plan will benefit them. Moreover, I will show which plan will negatively impact physicians and which plan will positively impact them. I plan on giving a breakdown of the certain terms that are used by the media when discussing this debate and providing a chart of the specific facts and myths. Lastly, I will compare the current plans to those models in order countries and the current plans in some U.S. states, such as Massachusetts.

Ben Austin, Department of Mechanical Engineering

C.J. Searcy, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Application of Biological Thermal Regulation in the Development of a Synthetic Hygromorph

The results of a study on the biological principles of thermal regulation are presented. Both natural and mechanical technologies must be able to detect and adjust to thermal changes in the ambient environment. Through application of natural strategies, efficiencies in thermal processes can be improved. The mathematical model focused on predicting the outcome of a synthetic hygromorph. The physical model was constructed to scale up such technology from nature to an applicable size for everyday purposes. Discrepancies between the results predicted from the mathematical model and the actual results from the physical model were discussed.

Heather Baker, New College

Faculty Mentor: Dr. Marysia Galbraith, New College

Japanese Potters and Globalization

The folk craft movement in Japan began in the 1930s in reaction to the increasing mass-production of everyday goods. The attention of the nation was pulled to the Onta potters, whose community-based lifestyle and traditional pottery methods fulfilled the nostalgic ideals of the movement. Globalization helped to spread the movement and created a market for the Onta pottery, but also led to a gradual drift from tradition in both the pottery and in the interaction within the community.

Olivia Bandy, Department of Psychology

Faculty Mentor: Dr. Beverly Thorn, Department of Psychology

Pain References Used in Trait Catastrophizing Measures

In recent years, catastrophizing has emerged as a major factor in the pain research. Catastrophizing when measured in the absence of pain is known as trait catastrophizing. Catastrophizing measured in the context of actual pain is known as state catastrophizing. Campbell and colleagues (in press) suggested that the researchers do not know what type of pain participants are referring to when measuring trait catastrophizing. The current study answers the question of what type of pain participants use as a reference when given the Pain Catastrophizing Scale (PCS) as a trait measure.

Katherine Barton, Department of Chemical and Biological Engineering, University Honors Program

Faculty Mentor: Dr. Tonya Klein, Department of Chemical and Biological Engineering
Intelligent Polymerized Colloidal Crystal Arrays for Perchlorate Detection in the Environment
The water contaminant perchlorate can affect proper functioning of the thyroid gland. Testing for perchlorate in drinking water is difficult. An easy use perchlorate sensor that reads low concentrations is needed and may be developed using Intelligent Polymerized Crystalline Colloidal Arrays. IPCCAs are made of polystyrene spheres that form crystal formations that Bragg diffract light. The crystal lattice can be stabilized in hydrogel on which functional groups can be attached. When the functional groups react with a specific analyte it will cause a volume change in the hydrogel. This causes shift in the diffracted light detectable as a color change.

Amelia Bass, Department of English

Faculty Mentor: Dr. Ashley McWaters, Department of English

You Are My Sunshine: A Tribute to Mothers and Daughters

I have chosen a collection of poems dealing with the relationship between mothers and daughters. The insanity of the complex and changing relationship dates back to instances in the Bible and I have chosen to begin and end my collection with "Genesis and "Revelation." In the most basic sense, the mother is the creator of the child and the child-like love for a mother diminishes as the rest of the world is revealed. This is a collection of 9 poems, represents the 9 months a child is carried in the womb as well as the 9 years I grew up with my single mother before she left. This is an examination into the world of mothers and daughters taken and lost.

Blake Bassett, Department of Computer Science, Computer Based Honors Program

Faculty Mentor: Dr. David Michelson, Department of History

Syriac Font Rendering for Mac OSX

The Syriac script is used by a minority population worldwide to write in the Syriac, Aramaic, or Arabic (Garshuni) languages. As a font, it requires smart font technology to allow for the contextual substitutions needed to accurately display the script. Many fonts are available on Windows, using OpenType to allow for the contextual substitutions. However, these fonts do not function correctly on Mac OSX. The project we have been working on is to explore possibilities in making a cross-platform Syriac font that will display identically on Windows and Macintosh computers.

William Baughman, Department of Electrical and Computer Engineering

Michael Murphy, Department of Electrical and Computer Engineering

Faculty Mentor: Dr. Margaret Kim, Department of Electrical and Computer Engineering

Terahertz Imaging and Sensing

We report the use of Terahertz Time Domain Spectroscopy to identify visually indistinguishable compounds. A LT-GaAs photoconductive antenna was used to produce broadband Terahertz radiation from 0.1 to 4THz with peak intensity at 0.6THz. The Terahertz radiation was detected by electro-optic sampling in a ZnTe crystal. The time domain absorption spectrum and frequency domain power spectrum were measured for a variety of materials and used as a database. Terahertz imaging contrast was then performed on a sample with an arbitrary pattern, and the spectroscopic information used for identification of these materials in the various regions.

Randy Beavers, Department of Economics, Finance and Legal Studies

Faculty Mentor: Dr. Paan Jindapon, Department of Economics, Finance and Legal Studies

Elasticities of U.S. Energy Data

Elasticities of energy data from the Short Term Energy Outlook were analyzed to determine relationships and patterns in temperature, supply, consumption, sector, and region. The analysis was broken down into three steps. First, information for the United States about average prices of crude oil, coal, natural gas, and electricity and temperature data from the Residential Energy Demand Temperature Index (REDTI) were examined. Second, natural gas and electricity were studied based on their respective commercial, industrial, and residential sectors. Finally, natural gas and electricity were considered with respect to the nine census regions.

Kalen Berry, Department of Biological Sciences, Computer Based Honors Program

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

Investigating Synapse Defects in a C. elegans Model of Epilepsy

Normal neuronal activity is dependent upon tight regulation between the excitatory and inhibitory neuron circuitry. An unfortunate outcome of an imbalance between these circuits is over-excitation, which can manifest as seizures or epilepsy. We utilize the nematode *C. elegans* as a model system to more definitively characterize factors influencing the function of specific neurotransmitter circuits. This microscopic roundworm has a defined neuroanatomy and displays behavioral responses to subtle changes in neurotransmitter function. Using digital videography, in combination with genetic and pharmacological manipulation of *C. elegans*, we have revealed previously unreported genetic relationships that may contribute to neuronal dysfunction and epilepsy.

Sarah Betzig, Department of Electrical Engineering, supported by the Emerging Scholars Program

Faculty Mentor: Dr. Patrick LeClair, Department of Physics and Astronomy

Noise Properties of Tunneling Devices

A tunneling device consists of two metal electrodes separated by a thin layer of insulating molecules, about 1-2nm. Due to the wave nature of electrons on this distance scale, an electric current can be made to flow across the insulator, a process known as tunneling. This project involves measuring both the resistance and electrical “noise”, or random thermal electron motion, of tunneling devices. Since tunneling conduction is very different from normal conduction, it has unique signatures in resistance and noise power. Early measurements test tunneling devices containing molecules with known electrical properties, and subsequent measurements deal with molecular layers with small variations or substitutions compared to those previously tested. By making these minor changes and comparing the measurements, the electrical properties of the molecules can be better understood on an atomic scale.

Lauren Bialoskurski, Department of Mechanical Engineering

Eric Dowling, Department of Mechanical Engineering

Ben Hornsby, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Biomimetic Analysis of Clean Water Harvesting

Results of a study in the biomimetic application of fog and dew harvesting are presented. With 80% of all diseases and sicknesses being water-born, there is an increasing necessity to find alternative clean water sources. The mathematical model predicts the use of convective cooling due to the movement of wind to condense water out of the air. A physical model was created using polypropylene netting that condenses water from the air and collects it. The amount of water collected by the physical model was measured and compared to the results of the mathematical model.

Alex Blackwell, Department of Metallurgical and Material Engineering

Austin Finnen, Department of Metallurgical and Material Engineering

Clayton O'Brien, Department of Metallurgical and Material Engineering

Faculty Mentor: Dr. Subhadra Gupta, Department of Metallurgical and Material

Test Your Strength!

Mechanical properties of various types of steels and cast irons were determined by a series of hardness and tensile pull tests. Rockwell hardness tests were taken of 1020, 1035, 1045 steel, gray, and ductile cast iron samples. Knoop micro-hardness tests were taken of the 1045 steel and cast iron samples. The 1045 steel was the hardest material tested. Tensile pull tests were conducted on these samples as well. The elastic modulus, yield strength, tensile strength, ductility and toughness were estimated from stress-strain curves and compared between the different materials. These properties can be used to select materials for various applications

Alan Blinder, Department of Political Science, University Honors Program

Faculty Mentor: Dr. Doug Gibler, Department of Political Science

The Anglo-American Relationship since the Start of the War on Terror

Few dispute that the United Kingdom is America's best friend, but since the commencement of the so-called War on Terror, the Anglo-American relationship has been at its best and worst. While studying at Oxford University, Alan Blinder interviewed eight former British politicians, including five who served as foreign secretary, to develop an assessment of the Anglo-American relationship from the British perspective. While the British agree that the Anglo-American relationship remains of the utmost importance, the officials said the relationship is in need of serious repair and cannot be taken for granted by either the Obama administration or the British.

Bryan Bofill, Department of History

Faculty Mentor: Dr. Dan Riches, Department of History

With God On Our Side: Christian Atrocity Propaganda During the Great War in America (1914-1918)

During the Great War, many Americans believed themselves to be fighting for a righteous and just cause. Much historical scholarship has been devoted to why Americans thought that way by interpreting a broad spectrum of propaganda. They have however overlooked the use of Christian rhetoric and symbolism in Allied propaganda during the Great War, particularly

American. This is what I call, ‘Christian Propaganda’ was intended to dehumanize the enemy and give reason for fighting. It is important to look at this subject because it gives us a more complete understanding of the American population during the Great War.

Akeem Borom, Department of Biological Sciences

Faculty Mentor: Dr. Guy Caldwell, Department of Biological Sciences

Association Between the Insulin-Signaling Pathway and Development of Parkinson’s Disease

Parkinson’s disease (PD) is an age-related neurological disorder that is characterized by the progressive loss of dopamine neurons and protein misfolding. Because the insulin-signaling pathway is a major regulator of aging and has been implicated in several diseases, such as cancer and diabetes, we hypothesized that it might be involved in the development of PD. Exploiting the advantages of conducting cellular and genetic analyses in *C. elegans*, we examined how changes associated with aging affect susceptibility to PD. Our results have uncovered, for the first time, an association between the insulin-signaling pathway and dopamine neurodegeneration, a hallmark of PD.

Hannah Box, Department of Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Department of Chemistry

Synthesis of water-soluble phosphines and their application to recyclable, aqueous-phase palladium-catalysts

The ability to do organic chemistry in the aqueous phase has become of great interest in order to make these processes safer and less environmentally harmful. In particular, the ability to do metal catalyzed coupling reactions has been a focus of much of this research. Our research group has developed a pair of water soluble phosphines, DAPPS and DTBPPS, that show better activity from the catalysts derived in palladium coupling reactions compared to similar phosphine ligands previously developed. While both show relatively good activity, it has been the focus of my research to determine which facilitates Suzuki coupling at a faster rate against *t*-Bu-Amphos. In addition to determining the rate of reaction, I am also investigating the synthesis of new water soluble phosphines in efforts to overcome the limitations of DAPPS and DTBPPS. The ability to recycle catalysts derived from these water-soluble ligands is also being explored

Casey Brasher, Department of Music

Faculty Mentor: Dr. Andrea Cevasco, Department of Music

The Effect of Music Therapy on Self-reported Mood Levels of Cancer Patients Receiving Chemotherapy Treatment

Twenty-five adult cancer patients of the DCH Cancer Center rated their feelings of calmness, anxiety, ease, upsetness, tension, and comfort on a likert scale before and after receiving Music Therapy services during their chemotherapy treatments. The patients’ responses were recorded. Calculations show a statistically significant improvement in patients’ feelings of calmness, ease, tension, and comfort. For 22 of the 25 patients, levels of anxiety either improved or remained the same; and for all but 1 of the patients, levels of upsetness either improved or remained the same. All 25 patients reported being interested in receiving music therapy services again, and that the music improved their overall mood.

Nicole Broka, Department of Psychology

Faculty Mentor: Dr. Laura Klinger, Department of Psychology

Implicit Learning in Children with Autism Spectrum Disorder

Klinger, Klinger, and Pohlig (2007) proposed that impairments in implicit or unconscious learning may underlie many of the symptoms seen in Autism Spectrum Disorders (ASD). This study examined contextual learning, a type of implicit learning, in 8 to 12 year olds with high functioning ASD using a visual search task. Although data collection is not complete, we are currently analyzing the data we have already collected. Results thus far appear to be confirming the implicit learning theory.

Major B. Burch, Department of Biological Sciences

Ryan R. Roddy, Department of Biological Sciences

Faculty Mentor: Dr. Margaret D. Johnson, Department of Biological Sciences

Defining the Origin of a Newly Uncovered 20KDa myo-Inositol Phosphate Synthase

Cells use an indispensable nutrient, inositol phosphate (IP), to talk to each other. It is hypothesized that abnormal levels of IP in the brain produce distorted cell-cell communication, which leads to numerous brain disorders. Laboratory studies discovered that the production of IP is developmentally regulated in the mouse brain and that this regulation is altered in the brains of mutant mice that have identical genes but different susceptibilities to abnormal brain development (Alebous et al., 2009). Moreover, these studies uncovered a 20kDa enzyme that makes IP, myo-Inositol Phosphate Synthase, and its possible role in postnatal brain development.

Daniel Bush, Department of History, Computer Based Honors Program

Faculty Mentor: Dr. Andrew Huebner, Department of History

Mae and Lige: Military Life and Courtship in WWI

Dr. Huebner possesses a series of letters written by a World War I soldier and his fiancée (later his wife). The goal of our project was first to preserve these letters, which was done by creating scanned digital copies. Next, to facilitate research by Dr. Huebner, and later by others, a database needed to be created cataloging all 147 of the letters by date, author, location, and key terms and themes. Finally, work began to get such a database available online for researchers everywhere and find a permanent home for the letters themselves.

David Butler, Department of Music

Faculty Mentor: Dr. Rebecca Kelly, Department of Health Promotion and Wellness, Computer Based Honors Program

WellBama Data Integration and Analysis

The WellBama program is the principal Health and Wellness program for all benefit eligible employees at the University of Alabama. The project centers around automation of the WellBama program in three phases. First, the registration process will be automated and linked to the participant's myBama page. Second, a database will be created to capture participant biometric and health-risk data. Finally, the information stored in the database will be used to statistically analyze participant health data gathered during the WellBama screenings. The analysis of this data is vital to improving the overall health and productivity of University employees.

Trenton Butler, Department of Health Sciences

Chris Jordan, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Sciences

A Comparative Difference in Muscle Strength Before and During Delayed Onset Muscle Soreness

Delayed onset muscle soreness (DOMS) is believed by some to be a reason for strength loss after workouts. The purpose of this study is to examine the strength difference of the Pectoralis major muscle before, during and after experiencing DOMS. Subjects will perform a 3 repetition maximum (RM) bench press to assess their strength. They will then complete an eccentric workout to induce DOMS. Subjects will be asked to report back daily to measure their pain level and reassess their strength. This will be done until DOMS has subsided and their strength is back to its baseline measurement.

Alejandro Carrasquilla, Department of Chemical and Biological Engineering, University Honors Program, Emerging Scholars Program

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Biological Sciences

Utilizing microinjection to study candidate genes in C. elegans for the prevention of Parkinson's disease

Parkinson's disease (PD) is characterized by neurodegeneration of the central nervous system, leading to impaired motor skills and bodily functions. In our study of this crippling disease, *C. elegans*, a tiny nematode, allows us to create an experimental model exhibiting the degenerative symptoms of PD patients. Through microinjection, we are able to express potential target genes in the dopamine neurons of the worms that will directly affect the aberrant protein misfolding that triggers degeneration of the nervous system. By finding genes that will significantly affect neurodegeneration, we hope to identify therapeutic targets that will serve as useful treatments for PD.

Hannah Carter, Department of Health Studies

Faculty Mentor: Dr. Jen Nickelson, Health Sciences

Assessing Environmental Audit Tools

Neighborhood environments are assessed by environmental audit tools to determine the features in the environment that may influence physical activity and healthy living. The purpose of this study was to compare the measures of different environmental audit tools for the ultimate purpose of creating a more comprehensive instrument. Five environmental audit tools were selected to extract information from, such as validity and reliability, concepts measured, method of collecting data, and time required to conduct. That information was then placed into a chart, making it easier to compare each tool in order to determine useful measures for a more comprehensive tool.

Catherine Casanta, Department of Consumer Sciences

Jesse Zora, Department of Consumer Sciences

Faculty Mentor: Dr. Cliff Robb, Department of Consumer Sciences

Financial Literacy in America

By definition, financial literacy is the ability to read, analyze, manage, and communicate about the personal financial conditions that affect material well-being. While many people are able to understand what financial literacy is, only a fraction of the population is actually financially literate. It should be no surprise that close to forty-three percent of American families spend well beyond what they earn each year; leaving them in serious financial debt. By requiring a financial literacy course in high school, students will gain the financial knowledge needed for the rest of

their lives. Whether balancing a checkbook or learning to invest, our hope is that the information gained in high school curriculum will result in a more financially literate America

Yi Chen, Department of Biological Sciences, Emerging Scholars Program
Faculty Mentor: Dr. Juan Lopez Bautista, Department of Biological Sciences
Subaerial Algal Diversity Inferred from Environmental Samples

Knowledge about the natural diversity of subaerial algae is getting more complex and captivating. The 23S-rDNA marker has been previously demonstrated to reveal algal diversity in aquatic environments but never in the subaerial environment. In this project we demonstrate the utility of the 23S-rDNA gene to reveal the algal diversity of subaerial environments collected from Bocas del Toro, Panama. Total DNA was extracted from the samples, amplified, and then cloned to generate gene sequences used for phylogenetic analysis. If successful, this technique will be a first application to study algae from terrestrial habitats.

Rachel Childers, Department of Public Relations, Emerging Scholars Program
Faculty Mentor: Dr. Eyun-Jung Ki, Department of Public Relations

Examining the Affects of Organization-Public Relationships on Attitude and Behavior

This study was designed to examine the relationship between local banks and their customers. It seeks to learn how the customers' relationship perceptions affect their attitudes and behaviors towards the local banks. The organization-public relationship is important to improve because satisfied customers are the basis of all profits. If a business was comprised solely of disgruntled customers, then it would eventually cease to operate because of lack of customers. To achieve the purpose of the study, the customers of local banks were asked to fill out surveys which were used in determining the results of the study.

Caitlin Clark, Department of Biological Sciences

Davis Taylor, Department of Biological Sciences

Faculty Mentor: Dr. Jannis O'Donnell, Department of Biological Sciences

Characterization of suppressors of GTP cyclohydrolase mutations in Drosophila

In humans, GTP cyclohydrolase (GTPCH) is required for biosynthesis of neurotransmitters, dopamine, serotonin, and nitric oxide. Mutations in the human gene encoding this enzyme, *gch-1*, are associated with DOPA-responsive dystonia, pain insensitivity, and other neuronal disorders. GTPCH in *Drosophila* is highly conserved, and can be used as a disease model. We are studying genes that interact with the *Drosophila* gene encoding GTPCH, *Punch*, and characterizing mutations that suppress the phenotypes of a dominant GTPCH mutant. Complementation analysis with known neurotransmitter regulatory genes was conducted. In addition, the mutants were assayed for behavioral and chemical sensitivity abnormalities associated with neurotransmitter defects.

Robert Clark, Department of Political Science

Faculty Mentor: Dr. David Lanoue, Department of Political Science

The Effects of Mass-Media Consumption on the Political Socialization of Today's Youth

The current generation of students, ranging from elementary to graduate, are bombarded by mass-media at rates never before seen in human history. The Internet, television, smart phones, and social-networking sites enable them to consume media and at time and in any place. My research attempts to discover how this exposure to highly premeditated advertising affects how

today's students perceive the political world. It includes survey data of current UA freshman and a review of recent research on the subject.

Tyler Clark, Department of Aerospace Engineering, University Honors Program, Emerging Scholars Program

Faculty Mentor: Dr. Marcus Ashford, Department of mechanical Engineering

Alcohol Based Motor Fuels and Engine Efficiency

This project is to convert a carbureted single-cylinder engine into a directly-injected version, using a production Audi fuel injector. After modification and qualification of the modified engine, we will investigate pathways to mitigate some of the difficulties of using alcohol-based motor fuels. Our efforts are focused on trying to develop the engine to run efficiently off of alcohol based fuels. Initially, we will also be researching cold-starting and efficiency losses. This project is headed by a graduating-senior undergrad. According to Dr. Marcus Ashford the project is on track to have the modification/qualification stages completed by the end of spring 2010

Phillip Grant Cochran, Department of Chemical and Biological Engineering, Computer Based Honors Program

Faculty Mentor: Dr. John Yoder, Department of Biological Sciences

Investigating the Regulation of the Morphogen Wingless and its Role in Promoting Sexual Dimorphism in Drosophila

Many organisms exhibit forms of sexual dimorphism, a phenotypic dissimilarity between genders of a species. Among these is the fly species *Drosophila melanogaster* that exhibits an exterior cuticle number differing by one between males and females. We hypothesize that during development, due to the differing regulation of certain genes, which govern formation of the abdomen, the seventh cuticle segment in males is reduced and transformed into a posterior sixth segment fate. This study aims to measure the size of fourth, fifth, and sixth cuticle segments in males and females of several mutations to support the hypothesis of male segment transformation.

Kimberly Cockrell, Department of Music

Faculty Mentor: Dr. Andrea Cevasco, Department of Music

Differences between Music Majors and Non-Music Majors' Starting Pitches of Familiar Songs

The purpose of this study was to determine differences between music and non-music majors' starting pitch when singing a familiar tune. Each individual was recorded singing Twinkle, Twinkle Little Star. Differences between chosen starting pitches of music majors verses non-music majors were measured by determining the participants starting pitch on the piano, using "C3" as standard pitch and counting up or down on the piano by semitones based on the individual's starting pitch. Results indicated that music majors' starting pitches were significantly higher than non-music majors.

Richard Cockrum, Department of Chemistry, Computer Based Honors Programs

Faculty Mentor: Dr. David Dixon, Department of Chemistry

Energetics of the Decomposition of Chemical Weapons of Mass Destruction

High level molecular orbital theory has been used to predict the energetics for the decomposition of the chemical weapons of mass destruction tabun, soman, and VX to understand their environmental behavior. The heats of formation and bond energies were predicted to determine:

(1) how quickly these compounds decompose in the atmosphere; (2) what gases could be added to enhance their decomposition; (3) their potential destruction by chemical means; and (4) their initial biochemical activation mechanism. New approaches to the prediction of reliable bond energies were developed and the results provide the first reliable bond energies for these nerve agents.

John Cody, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Parametric Study of Transient Cold Gas Thruster Performance

A numerical model has been developed to explore the transient performance of a cold gas thruster. A cold gas thruster is perhaps the simplest rocket propulsion archetype employing only a propellant storage tank, a pressure regulator, a control valve, and a converging-diverging nozzle. Cold gas thrusters are typically used for attitude control on spacecraft. The performance of an idealized cold gas thruster was examined in parameter space to determine the optimal design with respect to regulator pressure. Information on the impact other variables have on thruster specific impulse is also provided. This model lays the foundation for future optimization studies.

Kristen Conerly, Department of Chemical and Biological Engineering

Faculty Mentor: Dr. Laura Busenlehner, Department of Chemistry

Heavy Metal Inhibition of the DNA repair protein, MutM

Heavy metals can inhibit DNA repair processes, which might be one possible mechanism of heavy metal carcinogenicity. The enzyme MutM is a DNA glycosylase from E. coli that is thought to be inhibited by heavy metals and is analogous to a human repair protein. MutM removes damaged DNA bases, as part of the base excision repair pathway. We are using a continuous hyperchromicity assay (CHA) to test whether heavy metals inhibit MutM excision activity and if there is a correlation between metal binding affinity and the degree of inhibition. The CHA assay monitors the change in absorbance at 260 nm for a double-stranded oligonucleotide substrate lesion as a function of time. As MutM removes the lesion, the gapped duplex disassociates and the absorbance at 260 nm increases due to the hyperchromic effect.

Jennifer Conway, Department of Aerospace Engineering and Mechanics

Anthony Ortiz, Department of Aerospace Engineering and Mechanics

Faculty Mentor: Dr. Stanley Jones, Department of Aerospace Engineering and mechanics

Estimating the Ballistic Limit of Aerospace Materials

Vulnerability to impacts is a property that is essential to the design of military aircraft. A perforation test was used to determine the ballistic limit (velocity at which there is a 50 percent probability of perforation) of thin titanium alloy plates. In this test, 164 caliber cylindrical projectiles of 4340 steel (RC-50) are launched from a smooth bore powder gun at velocities ranging from 50 m/s to 350 m/s. These projectiles impact the target at normal incidence and perforate it. The residual velocity was measured with a chronograph and we were able to estimate the ballistic limit for the target.

Zachary Coppens, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Characterization of Chaotic Mesoscale Solid Rocket Motor Behavior

The study into the behavior of mesoscale solid rocket motors is presented. Mesoscale rocket motors present an analog for the chaotic behavior of large scale rocket motors. The experimental thrust profile was plotted in time series and phase space. From this data, the average model burn rate profile and fractal dimension were determined. The hope is that this analysis can be scaled to provide insight into large scale rocket motor behavior.

Joni Corbin, Department of Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David Dixon, Department of Chemistry

Predictions of the acidity constant of UO_2^{2+} and metal ions in aqueous solution

The acidity constants of metal complexes in aqueous solution are critical to understanding metal ion speciation and transport in the environment. The gas phase acidities of uranyl (UO_2^{2+}) clusters with different numbers of water molecules as well as the hexaquo clusters of +2 and +3 metal ions were predicted. The COSMO solvation model is used to predict the solution pKa's. For the +2 aquo ions, the prediction of the correct pKa leads to the prediction of the correct size of the first solvation shell enabling direct comparison with EXAFS and HEXS experiments and providing critical thermodynamic speciation data.

Nathaniel Corder, Department of Mathematics, Computer Based Honors Program

Faculty Mentor: Dr. Buddy Goertz, Department of Advancement Services

Tracking Alumni Donor Decay and Reactivation

Unique to fund-raising in the not-for-profit sector is a self-refilling constituency; in academia, namely: alumni. Alumni from The University of Alabama can expect to receive, on average, at least two solicitations per year indefinitely, assuming the mailing address stays current. In an attempt to curb costs of indefinitely mailing individuals who will never give, my research analyzes when an alumni gives his/her first gift versus years since graduation to identify a point after which it is unlikely for a donor to activate. Also, the number of years until the second gift are analyzed to identify a "one-time giver" cut-off.

Maria Cortez, New College

Faculty Mentor: Dr. Marysia Galbraith, New College, Anthropology

Zapotec Weavings: Then and Now.

This paper explores the Zapotec people of Teotitlán de Valle in Oaxaca, Mexico and how their long-standing tradition of handicraft production has transformed through the centuries. The role of weaving in communities such as Teotitlán de Valle was shaped by historical events like the Bracero program and the arte popular movement. Furthermore, the rise in tourism has intricately linked the community to the global market as they strive to be responsive to the demands of consumers who desire authentic and traditional handicraft items. The Zapotec people continue to weave in the present era of globalization adapting in some areas of production, however, maintaining the traditional to the best of their abilities.

Richard Crump, Department of Kinesiology

Mary Catherine Casteix, Department of Health Studies

Katie Norton, Department of Kinesiology

Faculty Mentor: Dr. Jen Nickelson, Department of Health Studies

Irresponsible activities among students while drinking alcohol.

Riding with a drunk driver, and drunk driving are both serious problems among college students. One study completed by the Harvard School of Public Health concluded that nearly one in four students reported riding with a drunk driver, and one in three students reported driving after drinking. These numbers are alarming and can lead to accidents and even death among young students. The goal of our research is to further understand why students are making these decisions and to develop ideas that, if put into action, will lower the percentage of students who are involved in drinking and driving.

Countess Davis, Department of Health Science

Maria White, Department of health Science

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Science

Standing or Seated 4-way Ankle Theraband: Which Will Elicit a Greater Increase in Position Control Thereby Providing an Increase in Balance?

Ankle ligament injuries are the most common injuries in sports and physical activity due to the forces the ankle withstands and the masses it supports. An additional concern, is the substantial percentage of patients with repetitive sprains that result in chronic pain and disability. The high rate of ankle sprain recurrence indicates a need for development of better preventative measures. Because clinicians implement balance exercises early in the rehabilitation phase, our investigation will compare seated and standing strengthening measures.

Katelyn Davis, Department of Psychology

Melissa Pouncey, Psychology

Faculty Mentor: Dr. Jason Scofield, Department of Human Development and Family Sciences

Do children use past actions to determine the future reliability of an actor?

Past research shows that children distinguish between, and prefer to trust, accurate over inaccurate speakers (Koenig, Clement, & Harris, 2004). Study 1 asked whether 3- and 4-year-olds also distinguish between, and prefer to trust, accurate over inaccurate actors. Study 2 asked whether 4-year-olds willingly trust unknown actors and whether they will reverse trust when an unknown actor later proves inaccurate. Results show that children trust accurate actors (Study 1) and unknown actors (Study 2), but do not reverse trust when the unknown actor proves inaccurate (Study 2).

Laura Davis, Department of Biological Sciences

William O'Donnell, Department of Biological Sciences

Coston Rowe, Department of Biological Sciences, Emerging Scholars Program

Faculty Mentor: Dr. Janis O'Donnell, Department of Biological Sciences

Modeling Behavior of Autism Spectrum Disorders in Drosophila

Individuals diagnosed with autism often are over- or under-responsive to stimuli. Chromosomal deletions and duplications of the gene Ube3a have been found in some Autism Spectrum Disorder patients. The gene's dosage variation in Drosophila, as in humans, leads to neurotransmitter and mobility abnormalities. Using a panel of behavioral assays for sensory responses and movement, we have investigated whether Ube3a dosage in Drosophila models the behavioral abnormalities expressed in ASD traits. Our goal is to develop behavioral assays that not only test the Ube3a gene's influence on ASD, but also identify related genes interacting with Ube3a and possibly contributing to ASD.

Susan DeLeon, Department of Biological Sciences, McNair Scholars Program

Faculty Mentor: Dr. Guy Caldwell, Department of Biological Sciences

Investigating the neuroprotective role of miRNAs in a C. elegans model of Parkinson's disease

Age-dependent dopamine neuron degeneration is a hallmark of Parkinson's disease (PD), thus factors that lead to this result warrant further investigation. Utilizing *C. elegans* as a model system for studying PD, we previously identified a set of genes that confer neuroprotective capacity against insults linked to PD in humans. We analyzed these genes via bioinformatic analyses and found that their gene expression was regulated by shared microRNA (miRNA) molecules. Here we report the findings of our work whereby we experimentally examined the hypothesis that select miRNAs may function to co-regulate target genes in networks that can attenuate dopamine neuron degeneration.

Paige Dexter, Department of Biological Sciences, McNair Scholars Program

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

Genetic Screening of Candidate MicroRNAs (miRNAs) for Dopaminergic Neuroprotection in C. elegans

miRNAs are short single-stranded molecules of RNA that regulate gene expression. Our laboratory hypothesizes that certain miRNAs may factor in the regulation of multiple neuroprotective genes that have implications for Parkinson's disease where dopaminergic neurodegeneration is a hallmark. We genetically crossed mutant nematodes lacking specific miRNA function with transgenic worms engineered for neurodegeneration and overexpressed the same miRNAs in varied genetic backgrounds to examine resulting neurons for morphological changes. This strategy enables validation of bioinformatic predictions of miRNA targets by scoring for the impact of selected miRNAs on neurodegeneration over the course of the short lifespan of *C. elegans*.

David Dozier, Department of Chemical and Biological Engineering

Faculty Mentor: Dr. Yuping Bao, Department of Chemical and Biological Engineering

Synthesis of Iron Oxide Nanoparticles with Biological Coatings

For biological and biomedical applications, it is required to produce nanoparticles that are water soluble and biocompatible. Here, we report the synthesis of iron oxide nanoparticles coated with biological molecules (e.g., gluconic acid, lactobionic acid, or polyacrylic acid) via a co-precipitation method. These nanoparticles have narrow size distribution and are highly water soluble. Because of the biological coatings, they will have great potential in numerous biomedical applications, such as tissue engineering.

Jessica Duke, Department of Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David Dixson, Department of Chemistry

Computational Geochemistry: Predicting Reactions of H₂O in Models of Supercritical CO₂ for the Geological Sequestration of CO₂

The capture and storage of CO₂ in deep geologic formations is a promising option for mitigating the impacts of greenhouse gases on global warming. A critical issue is to demonstrate that CO₂ will remain stored over the long-term in the geological formation where it is injected. The structures of H₂O/CO₂ clusters as a function of the number of CO₂ molecules in the cluster have been studied to understand the possible reactions of water in supercritical CO₂. Vibrational

frequencies have been calculated to interpret experimental data. We showed that Lewis acid-base interactions are important in controlling the cluster energetics.

Reese Dunton, Emerging Scholars Program

Faculty Mentor: Dr. Karen Boykin, Department of Engineering

EMAP On UA

EMAP stands for Engineering Math Advancement Program. This is a math based program to prepare University of Alabama students for engineering courses. This research project involves the collection and analyzing of such data. Different sets of data over eight years have to be compiled and looked at. This data can range from surveys, to exam scores, and grades. The purpose of this project is to make a positive connection between EMAP and the success of engineering students. The end result will in turn be a paper summarizing new materials and the impact of EMAP.

Trenton Elkins, Department of Chemical Engineering

Faculty Mentor: Dr. Yang-Ki Hong, Department of Electrical Engineering

Synthesis of uniform spherical magnetite nanoparticles for extremely high-density magnetic data storage

We have previously synthesized 25-30 nm sized spherical barium ferrite (S-BaFe) particles by a unique adsorption-diffusion conversion process from spherical magnetite (S-Mag) particles [1]. In an effort to improve the magnetic properties and to further reduce the particle size to 20-25 nm, we have studied the effect of reaction parameters on the control of size and shape of magnetite particles. It was observed that during the thermal decomposition, temperature (ramping rate and soak time), solvents and capping agents play key roles on the shape and size of the magnetite nanoparticles. Therefore, the parameters have been optimized to achieve smaller size. [1] J. Jalli, Y. K. Hong, S. Bae, G. S. Abo, J. J. Lee, J. C. Sur, S. H. Gee, S. G. Kim, S. C. Erwin and A. Moitra, IEEE Trans. Magn, 45, No 10, 3590, October (2009)

Jessica Emmons, Department of Psychology

Faculty Mentor: Dr. Laura Klinger, Department of Psychology

College Programs for Students with ASD: Predictors of Successful College Transition

A substantial number of individuals with autism spectrum disorder (ASD) possess the cognitive and academic skills to be successful in college. This longitudinal study examines the predictors of college success for students with ASD. Eleven freshmen with ASD enrolled in one of two university-based college transition programs completed measures of social, emotional, and academic functioning. Analyses were conducted examining relations between variables at the beginning and end of the first semester of college. Data suggest: 1) higher anxiety predicts poorer adaptation to college, 2) poor social motivation predicts lower GPA, and 3) college programs can reduce social stress for students with ASD.

Jessica Emmons, Department of Psychology

Faculty Mentor: Dr. Laura Klinger, Department of Psychology

Emotion Recognition Through Nonverbal Channels in Children with Autism Spectrum Disorder

A face-processing deficit has been proposed to underlie the social and communicative impairments in autism spectrum disorders (ASD; Langdell, 1978; Klin, Jones, Schultz, Volkmar, & Cohen, 2002). Atypical face-processing has been linked to emotion perception difficulties.

This study investigated other aspects of nonverbal emotion perception important to social interaction, namely prosody and gestures. Ten participants have completed this study (TD=6, ASD=4) with plans to collect data from an additional three before the conference. Data analyses will examine emotion perception accuracy using a 2 (diagnosis; ASD or TD) x 2 (channel; gesture, prosody) x 4 (emotion; happy, sad, angry, afraid) ANOVA.

Denzel Evans-Bell, Department of Electrical and Computer Engineering
Faculty Mentor: Dr. Sushma Kotru, Department of Electrical and Computer Engineering
Resistivity Differences Between Semiconductors, Conductors, and Insulators

In this project, several distinct, yet common elements and compounds will be prepared for resistivity testing in order to sort each into three categories: conductors, insulators, and semiconductors. In addition to categorization by properties, the resistivity of each element or compound will be tested against extreme conditions to determine how each can be used to benefit various electrical materials and devices by improving efficiency and decreasing costs.

Richard Feist, Department of Biological Sciences

Faculty Mentor: Dr. Joseph Thrasher, Department of Chemistry
Long-Term Diffusion of Sulfur Hexafluoride in Plastic Syringes

During vitreoretinal procedures, sulfur hexafluoride (SF₆) is commonly used as a tamponade for retinal reattachment. To correlate mass measurements, with gas chromatography data, plastic syringes, fitted with three-way plastic stopcocks were filled with various concentrations of SF₆. Mass measurements were taken over a period of 90 days to track the diffusion of SF₆ from the syringes. Attempted transfer of 100% SF₆ into 60cc syringes showed the highest initial concentration (77.78%) and the highest final concentration (74.74%). Syringes containing 20% SF₆ in a volume of 30cc showed the lowest transfer efficiency (66.73%) and the lowest final concentration (1.35%).

Brittany Fossett, Department of Civil, Construction and Environmental Engineering

Faculty Mentor: Dr. Kenneth Fridley, Department of Civil, Construction and Environmental Engineering

Civil Engineering and its Impact on the Economy

With the economic downturn, the employment rate has taken a tremendous plunge. The government is now working frantically to help employ those out of work. One way the government plans to help is to create jobs through civil engineering-based public works projects, such as building roads, bridges, etc. The goal of this research is to determine which transportation projects would create the most jobs and if jobs would simply shift from the private construction sector to the newly funded public sector projects without any job creation. This research should also reveal the true efficiency of our tax dollars within these projects.

Tyler Fredlund, Department of Health Sciences

Darryl Sheets, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Sciences

The Impact of Certified Athletic Trainers on Injury Reporting and Non-Reporting by Athletes

Participation in sports inevitably leads to injuries, whether from overuse or acute trauma. This typically impacts an athlete's performance and may result in removal from participation for a period of time. Because of potential removal from play, some athletes choose not to report

injuries to the athletic trainer. There are many factors which influence an athlete's decision to report or not to report an injury. It is important that athletic trainers who provide care for athletes understand the dynamics of this process and how they impact the process.

Brandi Freeman, Department of Metallurgical and Materials Engineering
Franklin Garner, Department of Metallurgical and Materials Engineering
Gregory Holmes, Department of Metallurgical and Materials Engineering
Faisal Salman, Department of Metallurgical and Materials Engineering
Blake Whitley, Department of Metallurgical and Materials Engineering
Faculty Mentor: Dr. Subhadra Gupta, Metallurgical and Materials Engineering
Get the Picture?

In order to fully comprehend the properties of a material, an engineer must first have a fundamental understanding of the material's microstructure. In order to view such microstructures, we have employed the use of optical and scanning electron microscopy (SEM). Through images obtained from these procedures, information on phases present, grain shape, size, and diameter can be attained. After microscopic examination of 1020, 1030, and 1045 steels, as well as gray and ductile cast irons, various carbon dispersions can be noted. It is this distribution of carbon which determines the properties of the metals. Hence, optical and scanning electron microscopy are significant procedures in identifying the properties and composition of materials.

Whitney Freeman, Department of Communicative Disorders
Faculty Mentor: Dr. Priscilla Davis, Department of Communicative Disorders
Prevention of Communicative Disorders in Urban and Rural Areas
Alabama ranks among the top five states with injury rates from falls and machinery accidents. Exposure to toxins, loud noises from machines and hunting accidents, drug abuse and misuse may result in speech, language and hearing disorders. The purpose of this study is to present current literature about disorders that may cause communicative disorders and how they may be prevented.

Kyle Fricke, Department of Biological Sciences
Faculty Mentor: Dr. Guy Caldwell and Kim Caldwell, Department of Biological Sciences
Functional analysis of human VPS41 as a neuroprotective therapeutic target for Parkinson's disease
Parkinson's disease (PD) is the second most common neurodegenerative disorder, affecting over 1 million people in the USA alone. Our lab has established the roundworm, *Caenorhabditis elegans*, as a model for studying 2 pathological hallmarks of PD, including α -syn aggregation and dopamine neuron degeneration. Using this model, our lab identified several potential therapeutic targets, including the lysosomal trafficking protein, VPS41. Functional analysis of VPS41 identified two domains required for neuroprotection, and bioinformatic databases identified a potential phosphorylation site within one of the domains. Using molecular techniques, we have mutated this site to evaluate phosphorylation on the neuroprotective properties of VPS41

Kaylan Gee, Department of Biological Sciences, Computer Based Honors Program
Faculty Mentor: Dr. Jennifer Edmonds, Department of Biological Sciences

Evaluating Microbial Community Response To Beaver Wetland Demise

Beaver dams create wetlands that are fundamentally different from other wetlands. This work relates beaver dam demise in a Coastal Plain stream to bacterial community composition in sediments. We used a molecular “fingerprint” analysis (T-RFLP) to test the prediction that the influence of beaver-created wetlands on bacterial communities is evident long after a wetland drains. These "fingerprints" directed our efforts in choosing samples to further investigate using a high-throughput sequencing technique called pyrosequencing. We developed an appropriate protocol for preparation of sediment samples for pyrosequencing, and these data will be evaluated for differences in community composition and functional gene composition.

Daniel Gerber, Department of Mechanical Engineering

Faculty Mentor: Dr. Paul Hubner, Department of Aerospace and Mechanics

Analysis of Friction-Stir Welds on the Space Shuttle External Tank Using a Luminescent Photoelastic Coating

The external tank (ET) of the space shuttle is constructed from Al 2195 sections fastened together using friction-stir welding (FSW) which forms a strong bond without compromising strength. However, during the FSW process a void is sometimes created in the metal and the plug weld used to fill this void alters the characteristics of the weld at its point of insertion. A series of tension tests were performed on an Al 2195 specimen with a combination friction-stir and plug weld to simulate the loaded conditions of the ET. The specimen was coated with a luminescent photoelastic coating for strain analysis.

Ashley Elizabeth Getwan, Department of Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. John Vincent, Department of Chemistry

Testing the Effect of Chromium on Cholesterol Uptake and Retention in Liver Cells

In this experiment that sought to determine the benefits of Chromium compounds in combating Type II diabetes, it was hypothesized that trivalent chromium will lower the concentration of cholesterol in the plasma cell membrane, thereby increasing insulin secretion and glucose uptake in liver cells. Chromium was added to the cellular media while the hepatocarcinomic cell population grew within each flask. The plasma membranes were isolated by a process of sub-cellular fractionation and then analyzed using a cholesterol assay kit and fluorescence. The results of the analysis will determine the effectiveness of Cr(III) in decreasing cholesterol concentration in the cell and thereby initiating insulin secretion and glucose uptake in the bloodstream.

Gaines Gibson, Department of Engineering, University Honors Program, Computer Based Honors Program

Faculty Mentor: Dr. Glenn Davis, Rural Health Care Institute for Clinical and Translational Science

Emergency Medical Services Data Analysis

The goal of this research is to improve the overall quality and performance of the Emergency Medical Services(EMS) in Alabama. We are using SQL queries and the CARE program that was developed here at the Capstone to organize, sort and analyze the large amount of data that is recorded by EMS agencies throughout the state. Currently we are organizing and sorting the data. Once this step is complete we will be able analyze the data and offer sound advice and suggestions to EMS agencies to improve their service.

Natalie Gist, Department of Community and Rural Medicine, Computer Based Honors Program
Faculty Mentor: Dr. Heather Whitley, Department of Community and Rural Medicine
PhRMA Guiding Principle Amendments Effects on Direct-to-Consumer Advertising of Prescription and Over-the-Counter Pharmaceuticals

Changes in recent pharmaceutical (PhRMA) guidelines have decreased face time between prescribers and pharmaceutical sales representatives. This is suspected to increase direct-to-consumer advertising among mainstream media, including national magazines. Twenty-six magazines were selected to represent a range of targeted audiences. Advertisements were tallied for prescription, over-the-counter, and herbal products. Herbal supplements, which are not Food and Drug Administration regulated, served as a control. Pre- and post-amendment data over 4-month periods were collected and analyzed to evaluate the impact of recent PhRMA guideline amendments on the magnitude of direct-to-consumer advertisements within published magazines with regard to various patient demographics.

Natalie Gist, Department of Chemistry, Computer Based Honors Program
Faculty Mentor: Dr. David Dixon, Department of Chemistry
DFT Studies of the Hydration Reactions of TiO₂ Nanoclusters

This work describes a DFT study of water splitting on the ground and first excited triplet state surfaces of TiO₂ nanoclusters containing from 1 to 4 TiO₂. The reaction proceeds by a Lewis acid-base addition of the water to the metal followed by hydrogen transfer to a Ti=O bond. The excited state surfaces are quite similar to the ground state surfaces. An important conclusion from her work is that the solar energy that is absorbed is not going into splitting the water but is going into the formation of the H₂ and O₂ which is an endothermic process.

Gloria Goodloe, Department of Anthropology
Faculty Mentor: Dr. Lisa LeCount, Department of Anthropology
The Origin of Current Fijian Living Techniques

In summer 2009, I participated with the National Science Foundation Research Experiences for Undergraduates program in Nayau, Fiji. Over the course of four weeks, we gathered archaeological data on the ancient Fijian diet, house structure, and cooking methods. The incentive of this research was to compare and contrast the present Fijian diet, house structure, and cooking methods with those used in the Middle Prehistoric (AD 20-1400) and Late Prehistoric Period (AD 610-1690). After excavating the house mound Na Masimasi Yavu and the cave of Waituruturu East, the conclusion was that the prehistoric techniques, used due to limited recourses, still impact current villagers.

Susan Gorin, Department of History
Faculty Mentor: Dr. David Michelson, Department of History
East Syrian Evangelization Methods During the Tang Dynasty

My presentation will be about Nestorian, or East Syrian missionary efforts during the Tang Dynasty in China. I will be explaining how the monks sent from Persia to evangelize the Chinese people borrowed heavily from pre-existing and widely held Chinese philosophical beliefs to accomplish their missionary goals. This is the first example of religious accommodation taking place in China. Another attempt was not made until the Jesuit order entered China in the late 16th century.

Jereme Gray, Department of Mechanical Engineering, Computer Based Honors Program
Faculty Mentor: Dr. Marcus Ashford, Department of Mechanical Engineering

Alabama's Infinitely Variable Engine Cycle Simulator

A rapid compression and expansion machine was developed to replicate the motion of a piston for an internal combustion engine. Because it was not tied to a crankshaft, the piston's motion could be varied infinitely to match any specified parameter. Motion controllers connected to a computer created these profiles, and programs governing movement were written. This electronic control provided the machine with the capability to match compression ratios at cranking speeds for the compression and expansion strokes of an unlimited selection of motion profiles. This realtime parameter matching allowed the machine to precisely reproduce the motion for differentiating engine configurations.

Mark Greene, Department of Management and Information Systems

Faculty Mentor: Dr. Uzma Raja, Department of Management and Information Systems

Effects of Structural Complexity and Volatility on Software Maintenance Outcomes

This research examines the effects of structural complexity and volatility on maintenance tasks in a large scale open source software system. Managing structural complexity is a challenge faced by software engineers since it affects the overall quality of software systems. Changes made to operational software vary in frequency and size, as reflected by software volatility. Besides these factors we also examine how defects of one version affect successive version releases. Data archives of Linux were used to test the hypothesis. The results support the model that structural complexity and prior patterns of defect evolution effect maintenance outcomes. However, the model failed to detect any significant effect of software volatility.

Barrett Gutter, Department of Geography

Faculty Mentor: Dr. David Brommer, Department of Geography

An Analysis of Air Temperature in Bryant-Denny Stadium

The microclimate at field level of Bryant-Denny Stadium during the Alabama vs. LSU game is examined in this study. Weather sensors placed at four locations around the field measured air temperature and dew point temperature every minute throughout the game. These readings were compared to official air and dew point temperatures measured at the first-order weather station in Tuscaloosa. My goal is to see how a large number of people confined into an area and the stadium affect the air temperature.

Kurt Guynn, Department of Chemistry, Department of Chemical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. David Dixon, Department of Chemistry

Prediction of the Thermodynamics of Key Products and Intermediates from Biofuel

Computational chemistry has been used to predict the thermodynamics for a number of pathways for the rearrangements of glucose, glycerol, and succinic acid to form a broad range of reactive intermediates for use in chemical processes. G3MP2 theory and DFT were used to predict the heats of formation. Excellent agreement with experiment within ± 1 kcal/mol was found for the available data. This provides for the first time, reliable thermodynamic properties for the key compounds that can be derived from typical biofuel starting points. This data will be used to design processes, for example, to produce jet fuel from biofuel.

Nikki Hall, Department of Advertising and Public Relations
Elizabeth Maxwell, Department of Advertising and Public Relations
Lindsay Vick, Department of Advertising and Public Relations

Insurance: Young Adults' Perspective

Despite the vast amount of research on the insurance industry, very little research has been conducted specifically dealing with the Young Adult audience. State Farm has tasked The University of Alabama Advertising Team to create a campaign that attracts and maintains Young Adult (18-25) policyholders. In order to accomplish this, Ad Team conducted exhaustive research on the perceptions, attitudes and behaviors of Young Adults when dealing with the topic of insurance. Ad Team conducted content analyses, in-depth interviews, focus groups and a survey to help get a better understanding of the Young Adult mindset.

Amanda Hanninen, Department of Biological Sciences

Adam Fuller, Department of Biological Sciences

Shu-Ping Huang, Department of Biological Sciences

Faculty Mentor: Dr. Ryan Earley, Department of Biological Sciences

Phenotypic variation in a clonal organism: perspectives from hormones and behavior

The mangrove killifish (*Kryptolebias marmoratus*) is unique, as it is the only self-fertilizing, clonal vertebrate. This absence of genetic variation provides an excellent opportunity to explore differences in behavior and endocrine profiles between sexes (males vs. hermaphrodites) in response to the social environment. We size matched individuals of the same sex, observed their performance in an aggressive encounter to observe contest performance, and obtained both pre- and post-fight hormones using a non-invasive water-borne collection method. There were marked differences between males and hermaphrodites in pre-fight endocrine profiles and hormonal responses to aggressive contests, despite the sexes being genetically identical.

Marc Hansen, Department of Mechanical Engineering

Rachael McCarty, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Biomimetic Pump using Capillary Flow and Cohesion Theory

The results of a study on cohesion theory pumping and transpiration are presented. Pumps in industry are a costly investment. If some of these pumps could be replaced with more economical and energy efficient alternative, money could be saved on purchasing and energy cost. A comparison was made between results from a physical model and a mathematical model. Bernoulli's equation was used as a mathematical model to calculate the expected flow rate in an artificial tree. The physical model was an analog of the transportation of water in a real tree. Results from the mathematical and physical models are consistent.

Duncan Harmon, Department of Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Department of Chemistry

Synthesis, Characterization, and Application of Neopentylphosphine Palladium Complexes

Palladium catalysts are the centerfold in cross coupling reactions. Industrial reactions involving the synthesis of pharmaceuticals and other organic materials revolve around the formation of carbon – carbon and carbon –heteroatom bond formation. Research on palladium complexes focuses on environmentally and economically friendly catalysts. Palladium complexes of the

ligands di-tert-butylneopentylphosphine (DTBNpP), tert-butylideneopentylphosphine (TBDNpP), and trineopentylphosphine (TNnP) have been shown to be effective catalysts for carbon-carbon and carbon-nitrogen bond forming reactions. Air-stable palladium complexes of these ligands have been prepared and characterized using ^1H NMR and ^{31}P NMR spectroscopy. Once characterized, the new complexes will be applied to Pd-catalyzed cross-coupling reactions.

Jennifer Harris, Department of History

Faculty Mentor: Dr. Dan Riches, Department of History

Female Camp Followers in Early Modern Europe

Scholars have conducted many studies of female camp followers during the American Revolution and the American Civil War. However, knowledge of women who followed early modern European armies is lacking. Gender historians have extensively studied early modern women, from prostitutes to queens, yet have not addressed female camp followers. Some military historians have discussed female camp followers, but their studies tend to focus on how these women affected the armies, and why the armies allowed them. The questions that have yet to be raised are how did the armies affect the women themselves, and what forces drove women to the camps? My research is a call for further investigation, an explanation of the importance of researching these women, and presents possible theories as to why the women followed the armies.

Zachary Hawkins, Department of Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Department of Chemistry

Synthesis of Phosphine Selenium Compounds to Establish Electron Donating Ability

The design of new ligands to promote efficient metal-catalyzed coupling reactions is of significant interest to provide improved methods to prepare pharmaceuticals, agricultural chemicals and electronics materials. Understanding role of ligand properties, such as their electron donating ability and steric demand, in determining catalytic activity is important in the design of new ligand classes. In this poster, the electron donating ability of a range of phosphine ligands determined by the $^1\text{J}_{\text{P-Se}}$ coupling of phosphine selenides will be reported. The synthesis of new classes of sterically demanding, chelating phosphine ligands is also being pursued.

Heather Sunny Hayes, Department of Psychology, Emerging Scholars Program

Faculty Mentor: Dr. Frances Connors, Department of Psychology

Implicit Learning, Phonological Memory, and Language in Down Syndrome

Language impairments are commonly associated with Intelligence Disorders (ID). Evidence suggests that various types of ID's have specific language impairments. The aims of the present study are 1) demonstrate that implicit learning is severely impaired in individuals with DS, (2) demonstrate that impairments in phonological memory/implicit learning are linked to language impairments in DS, (3) test a "Partial Mediation Model" which suggests that implicit learning has a direct effect on language ability as well as an indirect effect through its influence on phonological memory. The research results will provide insight for designing future language interventions for individuals with DS.

Dustin Heaton, Department of Computer Sciences, Software Language Engineering

Faculty Mentor: Dr. Jeffery Carver, Department of Computer Sciences

Enabling Citizen Roboticists

Citizen roboticists are lay people who conduct robotics research with the goal of improving the quality of life. Working with Dr. Anderson, we surveyed citizen roboticists (i.e. hobbyists) at a conference and via mailing lists to determine the software they need to support automation. Robot automation enables more complicated tasks with minimal extra work. The results of the survey identify which software tools developers should be providing to aid citizen roboticists. In addition, the results indicate that most citizen roboticists use C/C++, so developers should provide support for these languages.

Jeremey Henning, Department of Geological Sciences

Colby Henderson, Department of Geological Sciences

Faculty Mentor: Dr. Fred Andrus, Department of Geological Sciences

A study of variation in shell morphology of Flemingostrea cretacea and other oysters from the Upper Cretaceous of Alabama

Measurements of specimens from the Geological Survey of Alabama's Cretaceous paleontology collection were databased for morphological analysis. Species measured included the oysters Flemingostrea cretacea, Exogyra costata, E. cancellata, E. ponderosa, and Pycnodonte mutabilis and are from formations ranging in age from 65.5 - 85.8 Ma. Morphological measurements include scar length and width; shell length and width; and convexity depth. Of all species, F. cretacea shows the greatest variation in shell morphology. Morphological patterns with respect to stratigraphic position indicate a correlation between marine environment and shell morphology, not unlike the relationship between modern oysters and their environments.

Bryan Herren, Department of Biological Sciences, Computer Based Honors Program

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

Worming Out Therapeutics to Combat Alzheimer's Disease

Alzheimer's disease (AD) is the most prevalent neurodegenerative disease. The cost associated with the treatment and the care of AD patients represents a huge economic burden to society. However, there is no cure or treatment for AD, thus calling for the development of new research models for this disease. The roundworm, C. elegans can be genetically modified to express human proteins involved in AD pathogenesis. We are developing C. elegans AD models which can be used to study the effect of human amyloid beta 42 (Ab42) overexpression in various neuronal subtypes and to screen for potential treatments.

Paige Herring, Department of Health Sciences

Meghan Hubbard, Department of Health Science

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Science

The Impact of Tape on Ankle Proprioception During Activity: A Comparison of Powertape and Zonas

Inversion ankle sprains have been found to be the most common athletic injury. They are associated with a loss of proprioception which can eventually lead to postural and functional instability. Approximately 40% of those who suffer an ankle injury will have a recurring injury. Ankle taping is a popular technique used to either protect an injured ankle or prevent injury during an activity. Recently, taping products espoused to provide better long-term support have been adopted by many athletic trainers. However, the accuracy of these claims has now been investigated.

Daniel Hershman, Department of Mechanical Engineering

Faculty Mentor: Dr. Chip Cooper, Department of Mechanical Engineering

Refinement of Content and User Interface of the Honors College Website

Work is being performed to improve and enhance the content available on the Honors College Website. Additionally, work is being done to improve the user interface of the website in regards to both current and prospective students. Presentations will be made on a quarterly basis to show progress.

Chelsea Ann Hewitt, Department of Health Sciences

Faculty Mentor: Dr. Lori Turner, Department of Health Science

Osteoporosis Related Behaviors Among A Select Sample Middle-Aged Women Two Years Following an Intervention

The purpose of this study was to examine osteoporosis behaviors of middle-aged women after two years from intervention participation. The group studied (n=30) had bone density readings in the low normal range. The women were first screened for osteoporosis, then they were offered educational classes, and last they were sent a survey two years later to follow-up on behavior changes. The results of the survey confirmed that the women's alcohol and caffeine intake did not exceed recommendations; they met dairy intake recommendations; the women with low dairy intake consumed calcium supplements, and over half the women consumed a multivitamin.

Leah Hickerson, New College

Faculty Mentor: Dr. Marysia Galbraith, New College

The Impacts of Globalization on Mata Ortiz Pottery and Society

The Mata Ortiz live in northern Chihuahua Mexico. They started producing pottery in 1970s after a man named Juan Quezada starting making pots inspired by pottery shreds from ancient mounds in the area. Because of globalization and the expansion of the folk art market, the Mata Ortiz were able invent a tradition that has allowed them to become economically stable in an otherwise poor area with few employment opportunities. Because of these economic implications over 15% of the village now produces pottery. Their work has been shown internationally and displayed in museums, including the Smithsonian.

Matthew Lee Hicks, Department of Biological Sciences, University Honors Program

Faculty Mentor: Dr. Guy Caldwell, Department of Biological Sciences

Post-Developmental Role of HDA-1 in the Cytoskeletal Control of Epileptic-like Convulsions in C. elegans

The nerve cell cytoskeleton regulates many aspects of neuronal activity. Perturbation of cytoskeletal dynamics leads to cognitive disorders, such as epilepsy. Histone Deacetylases (HDACs) are enzymes that have long been known to control gene expression, though there is mounting evidence that they also interact with the cytoskeleton. We recently identified an HDAC gene (*hda-1*), which regulates GABAergic vesicle transport and interacts with some members of the Rac-signaling pathway, thus implicating HDACs in cytoskeletal regulation and epileptic seizure threshold maintenance in *C. elegans*. Currently we are determining the molecular mechanism by which HDA-1 acts on the cytoskeleton to regulate GABAergic neurotransmission.

Joseph Holland, Department of Aerospace Engineering and Mechanics

Faculty Mentor: Dr. Semih Olcman, Department of Aerospace Engineering and Mechanics

Penetrator Nose Drag Measurements in Supersonic Flows

A rigid body penetrator nose shape that is optimized for minimum penetration drag has been tested to determine the aerodynamic drag of such a penetrator in comparison to three additional standard nose shapes. Fineness ratio for the studied nose geometries was chosen as $l/d=1$ to maximize variation of the aerodynamic drag forces acting on the nose shapes. The experiments were carried out in the University of Alabama's supersonic wind tunnel, using a force balance system. Results show that the nose shape optimized for penetration has the lowest drag coefficient of all the shapes at each Mach number.

Daniel Hollander, New College

Faculty Mentor: Dr. Janeann Dill, New College

The Gift of the Nonverbal Narrative

Verbalization is the most prominent and dominant form of communication we use in the world today. The retention of knowledge through self-discovery is becoming a rapidly fading luxury with the advent and growth of the internet, Wikipedia, and iPhones. In my two films, Gift and Dual, I challenge the viewer to become a participant rather than a spectator by using an entirely nonverbal narrative structure. Instead of simply being told a story, the audience is encouraged to shape and create the narrative themselves almost entirely through visual imagery alone.

Jill Hoover, Department of Mechanical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Jan Brakefield, Department of Consumer Sciences

Camp Cash - A Financial Literacy Program for Middle School Students

Camp Cash - A Financial Literacy Camp for Middle School Students is hosted in the summer by Jan Brakefield, an assistant professor in the Consumer Science Department of the College of Human Environmental Sciences. This research project involves created a website for Camp Cash in order to facilitate the teaching process as well as to provide resources for the students. Web-based games and PowerPoint presentations will be hosted on the website. Also, promotional materials as well as local contacts are developed in order to expand the reach of Camp Cash.

Chad Hornbuckle, Department of Metallurgical and Materials Engineering, Naval Research Laboratory

Faculty Mentor: Dr. Gregory Thompson, Department of Metallurgical and Materials Engineering
Chemical-Partitioning in $(Co_{1-x}Ni_x)_{88}Zr_{7B4}Cu_1$ Soft Magnetic Nanocrystalline Alloys

In our study, a series of $(Co_{1-x}Ni_x)_{88}Zr_{7B4}Cu_1$ alloys ($x = 0, 0.25, 0.5, 0.75, \text{ and } 1$) were fabricated by melt spinning, followed by an isothermal anneal to produce nanocomposite alloys (i.e. nanocrystalline grains in a residual amorphous matrix). The alloy series was designed to investigate crystallization kinetics and limits to the composition regime where a nanocomposite could be formed. As x exceeded 0.75, the as-spun ribbons exhibited partial crystallization, resulting in reduced exothermic crystallization peaks. Transmission electron microscopy and atom probe tomography specimens were prepared from specific compositions and annealing treatments from which the phase, volume fraction, and chemical-partitioning was quantified.

Candice Hovell, Department of Biological Sciences

Faculty Mentor: Dr. Ryan Earley, Department of Biological Sciences

Mineralocorticoid Receptors and Stress

The stress hormone cortisol binds to mineralocorticoid receptors (MR) in the brain, resulting in significant changes in memory acquisition and retention. I have identified the gene sequence coding for brain MR in cichlid fish (*Amatitlania nigrofasciata*), a tool that I will use to evaluate with quantitative PCR changes in MR gene expression during social stress (e.g., aggressive contests). I hypothesize that high stress associated with engaging in a contest will result in increased brain MR expression relative to naïve controls, which could facilitate memory of opponent identity or status, and prime animals to respond appropriately to dynamic social conditions.

Sean Hudson, Department of Social Work

Faculty Mentor: Dr. Debra Nelson-Gardell, Department of Social Work

Program Evaluation: Child Focused Program

A program evaluation involves collecting information about a program to help make effective decisions regarding that program. There are various types of program evaluations, including process and outcome evaluations. Process evaluations are geared towards understanding how a program works. Outcome evaluations attempt to identify the effectiveness of a program. In accordance with the funder's preferences, this project focused on a process evaluation. The goal of this project was to collect data from approximately 170 non-profit organizations around the state of Alabama to provide the programs' funder with accurate information about the clients they were intended to serve.

Mitchell Hughes, Department of Physics and Astrology, Computer Based Honors Program

Faculty Member: Dr. Andreas Piepke, Department of Physics and Astronomy

Remote Control Software for the EXO Muon Veto System

The cosmic ray muon veto system for the EXO-200 experiment, a search for extremely rare nuclear decays, has been installed at the project site near Carlsbad, NM. As a component of the commissioning process, full functionality must be verified. An electronics system has been designed, constructed, and installed that will enable batch testing of up to eight panels simultaneously. Software has been developed using LabView and C/C++, providing remote control over data acquisition and the high voltage supply for the veto system. This presentation will provide an overview of the experiment and the functionality of these software packages.

Jessica Hulderman, Department of Health Sciences

Katy Steele, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Sciences

Prevalence of Eating Disorders and Disordered Eating Among Athletes in Weight-Restricted Sports: A Comparison of In-Season and Out-of-Season Behaviors

Athletes in sports which emphasize leanness report an increased risk of eating disorders and disordered eating patterns. This elevated risk persists for athletes who participate in sports which require participants to meet specific weight criteria (eg. crew, wrestling). The cyclical nature of the traditional competitive season, off-season and non-traditional competitive season may be associated with parallel cycles in eating disturbances among these athletes. We will compare in-season and out-of-season scores on the Eating Attitudes Test to investigate this possibility.

Nicole Humphrey, Department of Nursing

Rachel Humphrey, Department of Nursing

Obsessive Compulsive Personality Disorder in College Students

There seem to be multiple links between obsessive compulsive personality disorder and perfectionism. Our research examines exactly what OCPD is and how it effects aspects of college students' lives such as eating and study habits. Research shows that OCPD is the most common mental disorder in college-age students, whether in college or not. We also found that perfectionism is main factor influencing eating habits and other obsessions.

Stanton Ingram, Department of Geography

Faculty Mentor: Dr. Amy Weislogel, Department of Geography

Detrital-Zircon Geochronology of the Pottsville Formation of Tuscaloosa County and the Rodessa Formaton from the Citronelle Oil Field in Mobile County

Samples from the Pottsville Formation of Tuscaloosa County and the Rodessa Formation from the Citronelle Oil Field in Mobile County were collected and prepared for Uranium-Lead radiometric dating of zircon grains from each sample. The zircon grains were separated from the samples using a jaw crusher, a disk mill, a Wilfley Table, a Frantz machine, and heavy liquid separation methods. U-Pb geochronology was performed at the University of Arizona Laserchron Center. Data from the Pottsville Formation had age peaks at 415 Ma and 1035 Ma while the Rodessa Formation peaked at 398 Ma and 1104 Ma.

Julia Israel, Department of Human Development and Family Studies

Morgan Haygood, Department of Human Development and Family Studies

Amanda Whitaker, Department of Human Development and Family Studies

Faulty Mentor: Dr. Maria Hernandez-Reif, Department of Human Development and Family Studies

Complimentary and Alternative Medicine (CAM) Use Among Adults and Children in Tuscaloosa

The current study is examining Complimentary and Alternative (CAM) medicine use (e.g.. supplements, herbs, etc.) by adults and children in the area. Findings for 77 respondents reveal: CAM users are 90% women, 90% white, 7% black, 1% Hispanic, 1% Asian, and 1% other. CAM purchases are used for: preventing illness/ maintaining health (94% adults, 58% children), treating illness (64% adults, 41% children). 71% of adults (57% of children) tell doctors about their CAM uses; 9% of adults (8% of children) report doctors do not approve. 55% combine doctor's medicine with CAM and 31% report being unsatisfied with doctor's medicine.

Kimika Jackson, Department of Nursing, McNair Scholars Program

Faculty Mentor: Dr. Cassandra Ford, Department of Nursing

Discrepancy in Breast Cancer Treatment: Race and Locale as Risk Factors for Women in Alabama

Rural and African American women with breast cancer are more likely to have later stage at diagnosis, decreased access to treatment, and delay between diagnosis and first treatment, relative to urban women and Caucasian women . This study compares staging of malignancies and duration between diagnosis and initiation of treatment by race and geographic locale. Data were obtained from the Alabama Statewide Registry. Results suggest that rural African American women in Alabama may not experience the disadvantages seen among rural African

American women in other states; findings are discussed in terms of equity in breast cancer diagnosis and treatment.

Erin Jacobs, Computer Based Honors Program

Faculty Mentor: Dr. Christa Hackney, Alabama Disabilities and Advocacy Program

ADAP Access Database

ADAP, the Alabama Disabilities Advocacy Program, is federally mandated to receive reports from psychiatric residential treatment facilities serving youth where suicide attempt, serious injury, or death have occurred. This data was managed on an Access database but was in need of improvements and the designing of reports and other data management tools within Access for the purpose of detecting systemic issues and problems related to the facilities that report these incidents. The database was updated according to ADAP requests and is being tailored for presentation at a national conference in July. Additionally, a user friendly manual has been written to train personnel to use the database effectively.

Carly James, Department of Anthropology

Faculty Mentor: Dr. Norman Singer, Department of Anthropology, School of Law

Determinants of Success in Microfinance: A Comparative Analysis of Grameen Bank, Banco Solidario, and K-Rep Bank

The research project analyzes a range of success stories and current trends in microfinance. The comparative analysis focuses on how the Grameen Bank model of microfinance has been successfully implemented as a tool for development in a variety of geographic and cultural contexts, concentrating specifically on Banco Solidario (Bolivia) and The Kenyan Rural Enterprise Program (Kenya). The Grameen Bank model (Bangladesh) is often considered a successful model of microfinance, and this research compares said model with the coexistent Kenyan Rural Enterprise Program and the Banco Solidario, while aiming to understand the shared traits and context-specific features that have led to the respective success of each.

Ashley Johnson, Department of Metallurgical and Materials Engineering

Kimberley Kopecki, Department of Metallurgical and Materials Engineering

Anna Willemin, Department of Metallurgical and Materials Engineering

Faculty Mentor: Dr. Subhadra Gupta, Department of Metallurgical and Materials Engineering

XRD: A Body-Centered Peak Show!

XRD: A Body-Centered Peak Show Ashley Johnson, Kimberly Kopecki, Chase Smith, and Anna Willemin We have shown that X-ray diffraction spectra are invaluable in the analysis of the crystal structure and composition of various materials. We performed an XRD analysis of 1045 steel, as well as tin powder and a thin film of Co₈₀Pt₂₀, and compared them with standard samples. The peak positions matched well with the standards for the bulk samples, but the thin-film sample had several additional peaks, possibly due to impurities incorporated in the film. We also observed that the grain size, which is inversely proportional to peak width, is much smaller in the thin film than in the bulk samples.

Emily Jones, Department of Aerospace Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Amy Lang, Department of Aerospace Engineering

Boundary Layer Control of Shark Scales

This project concerns the study of how shark scales help to prevent boundary layer separation over a shark's body. Shark scales are theorized to possess three mechanisms that aid in boundary layer separation control: they create a partial slip condition, induce turbulence augmentation, and provide a preferential flow direction. An apparatus is being designed to be mounted into the water tunnel that will induce boundary layer separation over shark scales using a rotating cylinder. The mechanisms will be studied by analyzing the flow over the scales using particle image velocimetry, PIV.

Jessica Jones, Department of Chemistry, Emerging Scholars Program

Faculty Mentor: Dr. Kevin H. Shaughnessy, Department of Chemistry

Ligand Steric Effects in Palladium Catalyzed alpha-Arylation of Ketones

Palladium catalyzed coupling reactions are powerful ways to create carbon-carbon bonds.

Phosphines have a range of steric properties, which can have significant effects on the efficiency of a reaction. The effect of ligand size on alpha-arylation of ketones has been explored by running coupling reactions with a variety of phosphine ligands, to determine which ligands are most effective in the alpha-arylation of ketones. Using tri-neopentylphosphine in a reaction of 4-bromoanisole and acetophenone with a palladium catalyst, sodium tert-butoxide, and toluene as the solvent, at approximately 110°C, a 57% yield was obtained. Results with this and other ligands will be presented.

Lindsay Jones, Department of Biological Sciences, Computer Based Honors Program

Faculty Mentor: Dr. Matthew Jenny, Department of Biological Sciences

Biliverdin Reductase and Glutathione Reductase Response to tBHQ and Cadmium in Zebrafish Embryos

Tert-Butylhydroquinone (tBHQ) and cadmium (Cd) may act as agents of oxidative stress. HO-1 catalyzes heme's breakdown into biliverdin, which quickly reduces to free bilirubin. Bilirubin has been proposed to be a novel cellular antioxidant regenerated by biliverdin reductase (BR) via mechanisms analogous to the classic role of glutathione reductase (GR) in glutathione recycling. Real-time PCR was used to quantify the expression of both BR and GR in response to various concentrations of tBHQ or Cd exposure in zebrafish embryos at several developmental time points. Future experiments will explore potential regulation of these genes by the transcription factors, MTF-1 and NRF-2.

Elizabeth Junkin, Department of Chemical and Biological Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Rick Fernandez, Department of Chemistry and Joseph Thrasher, Department of Chemistry

Hydrodechlorination of a Pharmaceutical Company Waste Product

This project consists of a lab-scale industrial process intended to be scaled up to a pilot plant for a pharmaceutical company. This process involves the hydrodechlorination of one of the waste products from the pharmaceutical company through continuous vapor phase catalysis, which changes the waste product into usable desired product and starting material. A series of experimental tests have been run to find the optimal operating conditions for the lab-scale process, and the results were sent to the company. Currently, catalyst is being run continuously under starved conditions to study the life of the catalyst.

Abigail Kacpura, Department of Psychology, Emerging Scholars Program

Faculty Mentor: Dr. Angela Barber, Department of Psychology

Peer Modeling to Decrease Repetitive Behaviors in Young Children with ASD

Peer Modeling is used for older children with Autism Spectrum Disorders (ASD) in order to decrease repetitive behaviors, change attentional focus, increase joint attention, promote friendship, etc. This project intends to attempt this strategy with younger children aged 3-5 years old. A play group containing children with ASD and typically developing children is created in which the typically developing children will employ strategies to help the ASD children become involved in social interactions. The implications for this project are that we may be able change the attentional focus, repetitive behaviors, and circumscribed interests for younger children with autism

Matthew Kelley, Department of Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David Dixson, Department of Chemistry

Potential Energy Surfaces for Catalytic Reactions on Group VI Transition Metal Oxides and Single Site Selected Metals

The dependence of the potential energy surface on the computational method in terms of the basis set and density functional theory exchange-correlation functional was explored. The trimerization of HCCH to form C₆H₆ on site selected catalysts for Rh⁺ and Ir⁺ was studied. Thirty functionals were benchmarked for the reactions of the transition metal oxide clusters (MO₃)_n (M = Cr, Mo, W; n = 1-3) with H₂O and CH₃OH. The intermolecular dehydration reaction of CH₃OH to produce (CH₃)₂O catalyzed by TMO clusters was studied. All pathways leading to the formation of (CH₃)₂O via transfer of a methyl group have high barriers.

Chris Kendall, Department of Criminal Justice

Faculty Mentor: Dr. David Forde, New College

Game Day Setup: A Look at Security Measures on UA Game Days

The present study focuses on the environmental designs and security measures seen during game day at the University of Alabama. The study utilized an observational approach and the researcher photographed different areas on and around the quad to demonstrate how crime is prevented through environmental design. The completed study is a poster that shows how territoriality, access control and supervision all contribute to make the UA campus safer during game days and also where improvements can be made to increase overall campus security.

Ryan Kern, Department of Management and Marketing, Emerging Scholars Program

Faculty Mentor: Dr. Jim Cashman, Department of Management and Marketing

Sustaining Economic Longevity

This research project is an in-depth look at four companies, two privately owned and two publicly owned, that have lasted over a minimum of 200 years. The project aims to pinpoint what has made these companies successful, and determine what qualities separate them from other companies that have died. The research entails two main focuses: What tactics have older companies implemented to sustain long term success, and what can modern day companies learn from these companies that succeeded over a long period of time, overcoming recessions worse than those occurring in today's economy.

Stephen Killen, New College

Faculty Mentor: Dr. Andrew Dewar, New College

Metal Music Magic

The purpose of my research is to dispel the myth of evil music, to understand why teens choose metal, and to understand the human brain. This can be done by attempting to unravel the mystery of how heavy metal influences people around the world through gratuitous research. These results showed that heavy metal acts as an emotional stimulus that can bring people to a state of emotional release. This is due to music's timeless interaction with the human mind and psyche. To an extent emotions can be controlled by music.

Amanda Kimbrough, New College

Faculty Mentor: Dr. Janeann Dill, New College

Perceptions of Social Interactions and Creativity

The study tried to gain a better understanding about human interactions and their relationship to creativity. It looked at social interactions in varying environments and conditions, and the affect these environments and conditions have on social interactions. The study also took into account the different social experiences of the participants. Each participant had a video documented interview in which the data was gathered. The study yielded interesting results as to how others perceive their surrounding environments. All participants were from the University of Alabama, and were between the ages of nineteen and twenty-five.

Christopher King, Department of Aerospace Engineering and Mechanics

Faculty Mentor: Dr. David Cordes, Department of Computer Science

Analysis of Factors of Engineering Student Retention

In order to understand student retention issues in the College of Engineering at the University of Alabama, it is necessary to determine causes that students transfer out of the college. To identify potential causes, all factors of an engineering student's academics must be considered. To aid in identifying these causes, a database containing relevant student academic records was designed. This database can be queried intuitively to facilitate the identification process of causes for transfers. An appropriate set of queries to aid in understanding of student retention issues is currently being determined from discussion with current and former engineering students.

Eric King, Department of Social Work

Faculty Mentor: Dr. Javonda Williams, Department of Social Work

Prostitution in Tuscaloosa: Implementing Effective Social Services

This presentation discusses Tuscaloosa's ability to provide social services to women involved in street prostitution. Currently, Tuscaloosa provides no social services to this people group. Literature shows that accessible social services are needed to reduce the number of people working in street prostitution. Additionally, social service workers must understand the personal characteristics and environments of street sex workers to be effective. There are social service programs in other communities that have reduced the local number of people prostituting. This report proposes that Tuscaloosa evaluate other communities' social service programs and adapt an effective program for female sex workers in Tuscaloosa.

Kimberly Kosta, Department of Computer Science, Computer Based Honors Program

Faculty Mentor: Dr. David Michelson, Department of History

Syriac Manuscript Preservation

Syriac was once the dominant language of the Middle East. As many as ten thousand manuscripts in Syriac survive as a valuable resource for the history of Judaism, Christianity, Islam, and the Middle East. Nevertheless, it is difficult to track down a particular manuscript amidst the large numbers of small collections throughout the world. This project reduces search overhead by creating a metasearch engine and database that unites and digitizes disparate Syriac manuscript finding aids. When complete, this model could be applied to other fields of research, especially in history and information sciences.

Courtney Kronenberger, Department of Aerospace Engineering, Emerging Scholars Program
Faculty Mentor: Dr. Amy Lang, Department of Aerospace Engineering

Design of a Drop Tank Facility for Low Reynolds Number Drag Measurements

The pattern of shark and butterfly scales can provide inspiration for new technology to reduce drag. These geometries, consisting of embedded cavities, can possibly lead to the reduction of drag at low Reynolds numbers. A drop tank is being designed to measure the drag coefficient over plates, both flat plates and those with embedded cavities, and to observe the flow over these plates to measure the boundary layer characteristics. It is projected that when the embedded cavities have too large a cavity length an embedded vortex will no longer fill the entire cavity and the drag will increase.

Cassandra Coleman, Department of Biological Sciences

Laura Frost, Department of Biological Sciences

Sara Glenn, Department of Biological Sciences

Faculty Mentor: Dr. John Clark, Department of Biological Sciences

A preliminary phylogeny of the neotropical plant genus Drymonia: multiple shifts between bee-adapted and hummingbird-adapted flowers

The neotropical plant genus *Drymonia* is exemplified by a remarkable diversity of flower shapes and colors. The classification of *Drymonia* and closely related genera is still in flux because of the convergence of pollination syndromes associated with bird-adapted flowers. This study suggests that shifts between pollinators and associated floral traits are more than previously suggested and that these shifts are the primary reason for the convergence of pouched flowers. A preliminary phylogeny of *Drymonia* and closely related genera is presented based on nuclear and chloroplast markers. Pollination systems and associated floral traits were documented for two *Drymonia* species from Ecuador.

Sarah Lancaster, Department of Social Work

Faculty Mentor: Dr. Javonda Williams, Department of Social Work

Autism Services for Families and Individuals

Services for school-aged autistic children have increased in the past decade. Autism spectrum disorder (ASD) is now being diagnosed in 6 out of every 1,000 people. This impairment of social interaction can be difficult for many families to understand. Therefore, social services play can play an important role in the lives of these families. This study will examine services for autistic children and their families in the West Alabama area.

Laura Lasecki, Department of Human Nutrition and Hospitality Management

Kyle Weeks, Computer Based Honors Program

Kelly Wilson, Computer Based Honors Program

Faculty Mentor: Dr. Linda Cole, Department of Human Nutrition and Hospitality Management
One World, One Waistline; A Nutrition Education Program for Students.

One World One Waistline is a website developed by students majoring in nutrition for their peers on the University of Alabama campus. This nutrition education program is unique because it is the first to focus on making lifestyle changes while protecting the environment. The goal of this program is to have the students at the University of Alabama reduce their intake of processed foods, decrease consumption of sugar sweetened beverages, lessen their restaurant portions, and increase the amount of "home" cooking in an eco-friendly manner. All of the resources on the website reference current resources on campus.

Jon Lauer, Department of Mathematics

Faculty Mentor: Dr. Yingyan Lou, Department of Civil, Construction and Environmental Engineering

Factors influencing students' usage of school bus seat belts: an empirical analysis of Alabama pilot project

School bus safety is of great importance to students, their parents, and various government agencies. Alabama recently started a pilot project on 12 school buses to study the effectiveness of school bus seat belts. This project attempts to explain what factors affect students' usage of school bus seat belts and how significant these factors are. Using the Alabama school bus pilot project data, this project applies discrete choice analysis to calibrate a multinomial choice model that will help explain current bus belt usage rate and provide insights on how to make better use of the bus belt for future implementation.

Savannah Leach, Department of Anthropology

Faculty Mentor: Dr. Jason Decaro, Department of Anthropology

Physical Activity and the Architecture of Daily Life Among Alabama Mexican-Americans : A Biocultural Investigation

This study delves into biological anthropology in order to produce a link between health issues, particularly obesity, and certain cultural dimensions including age, gender, perspective, motivation, social class, work patterns, and ethnicity. The study takes a particular look at individuals in the Mexican-American community and charts their activities on a daily basis as well as uses an in-depth interview to code recurring themes in order to put the data in a "bioecocultural" context to look holistically at how environment and culture reflects in the biological issue of obesity and physical activity.

S. Kyle Lee, Department of Biological Sciences

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

Searching for Ionic Liquid Partners That Will Enhance the Neuroprotective Role of Lidocaine

Using a well-established neurotoxin-induced degeneration model of Parkinson's disease in *C. elegans*, we endeavor to find a novel therapeutic agent that will ameliorate neuron loss in this assay. With our lab having previously uncovered the protective effects of the drug Lidocaine, we now work toward ways to improve its activity. Here we explore the efficacy of using Lidocaine as a partner in an ionic liquid pair with additional small molecules. We hypothesize that by combining two drugs as an ionic liquid pair it may be possible to achieve synergistic protection, above that observed using a simple combination of the drugs.

Dana Lewis, Department of Public Relations, Department of Political Science, Computer Based Honors Program

Bradley Langston, Department of Chemical Engineering, Computer Based Honors Program

Agata Kargol, Department of Telecommunication and Film, Department of Computer Sciences, Computer Based Honors Program

Faculty Mentor: Dr. Mark Thomas, Student Health Center

Developing an online repository for ADHD campus resources

This research builds on previous efforts to develop an interactive online repository for information and resources regarding Attention Deficit/Hyperactivity Disorder (AD/HD) at The University of Alabama. Prospective audiences for the site include students with ADHD, their parents, potential students and their families, and other parties interested in serving students who have ADHD. This portion of the project includes researching and organizing current data and resources from the UA ADHD Consortium, scaffolding content for the site, and filming and editing interviews of students and faculty regarding various aspects of life with ADHD on campus.

Shannon Lindamood, Department of Theatre and Dance

Faculty Mentor: Dr. Sarah Berry, Department of Theatre and Dance

George Balanchine: Theory and Technique

The research explores George Balanchine's theories about dance and ballet technique. As one of the original founders of today's New York City Ballet, Balanchine revolutionized ballet in America through his choreography and teachings. The research analyzes his ideas through his writings, original choreography on film, and numerous reviews of his work throughout the 20th century. It also seeks to identify what new concepts in his work earned him such great, long-lasting success. The project culminates in a new ballet piece choreographed to demonstrate Balanchine's ideologies at work.

Samantha Lindsay, Computer Based Honors Program

Michael Robson, Department of Computer Science, Computer Based Honors Program

Faculty Mentor: Dr. Felecia Wood, Department of Nursing

Managing Type Two Diabetes with iPod Touch Technology

Diabetes is a growing problem in America, particularly in rural areas. Because it is primarily a self-managed disease, patient knowledge is a crucial part of diabetes care. The purpose of this research is to improve type 2 diabetes self-management in an ethnically diverse sample, using iPod Touch® technology for delivery and evaluation of self-management concepts. In particular, the application will have a dictionary, an interactive quiz with informative videos, and general health reminders. All of these components are geared toward those with low literacy and health literacy levels.

Kayla Lisenby, Computer Based Honors Program

Faculty Mentor: Dr. Shane Sharpe, Computer Based Honors Program

Web Presence For the Emerging Scholars Program

The Emerging Scholars Program is a program that connects freshman students with opportunities to work with faculty on undergraduate research projects. The program is in its second year and admitted approximately 40 students this past year. Students commit to one year of research with a faculty member. Throughout the year, students take a class to develop their skills in research

and communication. Students also work on individual research projects under the direction of their faculty sponsor. Developing a web presence for the program builds awareness of the program, its expectations and benefits. Services are provided for current students and their faculty sponsors; the site also provides a means for prospective students to apply.

Rebecca T. Long, Department of Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David Dixon, Department of Chemistry

The Prediction of the Electron Affinities and Fluoride Affinities of Transition Metal Fluorides

High level electronic structure calculations were used to predict reliable thermochemical data sets for the second and third row transition metal hexafluorides. The electron affinities, heats of formation, first ($\text{MF}_6 \rightarrow \text{MF}_5 + \text{F}$) and average M-F bond dissociation energies, and fluoride affinities of MF_6 ($\text{MF}_6 + \text{F}^- \rightarrow \text{MF}_7^-$) and MF_5 ($\text{MF}_5 + \text{F}^- \rightarrow \text{MF}_6^-$) were calculated. The electron affinities are a direct measure of the oxidizer strength and many of these are “superhalogens”. The pentafluorides are extremely strong Lewis acids. The structures for RuF_7^- , PdF_7^- , AgF_7^- , PtF_7^- , and AuF_7^- are nonclassical with a very weak external F-F bond between an MF_6^- fragment and a fluorine atom.

Elyse Love, Department of Biology, Computer Based Honors Program

Allometry and Correlates of Organ Mass and Position in the Diamondback Water Snake

We are using the diamondback water snake (*Nerodia rhombifer*) to examine the allometry of organ mass and position and to test for correlates of individual variation in organ masses. Organ mass increases with body mass with log-log mass exponents 0.87 – 1.04. For four organs (heart, liver, liver and small intestine), there was significant correlation in individual variation (i.e. individuals with larger hearts also had larger livers). Organ position likewise scaled with body size, though with an increase in body size organs tended to shift forward in position. This shift is developmental as organ position stays matched to vertebrae position.

Zac Lovoy, Department of Biology, Computer Based Honors Program

Faculty Mentor: Dr. John Clark, Department of Biological Sciences

Making the Gesneriaceae Image Library Accessible

The Clark Lab at the University of Alabama is home to one of the largest collections of flora samples and images of the family Gesneriaceae in the world. Recently, there has been an increased need to make the lab’s impressive collection of images available not only to researchers around the world, but also to the Clark Lab’s researchers out in the field in an easy to use way. Therefore, this project created a web resource of the lab’s photo collections as well as made the collection usable on iPods that could be used anywhere and easily in fieldwork.

Lindsey Lowe, Department of Journalism, Emerging Scholars Program

Faculty Mentor: Dr. Jennifer Greer, Department of Journalism

A Longitudinal Content Analysis of Topic Coverage and Elitist Frames in Gourmet Magazine: 1945-2008

Gourmet magazine introduced elitist food writing, offering readers the opportunity to discover food as intellectual and produce recipes from around the world in their own kitchens. Gourmet survived for 68 years, but died in 2009. This research project explores changes in the content and style of the magazine, as well as the frame of the articles, that may have eventually led to the magazine’s demise.

Andrew Magee, Department of Mechanical Engineering, Computer Based Honors Program
Faculty Mentor: Dr. Xiangrong Shen, Department of Mechanical Engineering
Mechanical Elbow Joint for Transhumeral Prosthesis

The goal of this project is to design an elbow joint for a prosthesis intended for use on transhumeral amputees. The elbow is part of a larger project to design an entire prosthetic forearm. The design is based on the use of electric motors so as to make the prosthesis simpler and less expensive. The elbow joint has a range of motion of about 120 degrees and is capable of lifting about 10 pounds. The design was created using Pro/Engineer.

Kenny Mahan, Department of Mechanical Engineering
Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering
Development of a Fractal Heat Exchanger for Thermal Rocket Applications

A proof-of-concept heat exchanger employing a fractal-like flow network has been developed. Larger heat transfer surface area and lower system pressure drop relative to traditional heat exchangers are just two of the advantages of using fractal-like flow networks. Building upon knowledge gained from previous designs, a higher flow rate heat exchanger was developed to examine the feasibility of using fractal heat exchangers for thermal rocket application. A parametric study was performed to obtain the experimental data needed to characterize the performance of the fractal heat exchanger.

Sam Mantel, Department of Psychology, Department of Sociology
Faculty Mentor: Dr. Bronwen Lichtenstein, Department of Psychology, Department of Criminal Justice
Knowledge of HIV/AIDS Among Teens in Alabama

HIV/AIDS KNOWLEDGE OF TEENS IN ALABAMA SAMUEL MANTEL (Faculty Advisor: Bronwen Lichtenstein) Background In today's society, there is an increased need for teenagers to explore the world around them and their own sexuality. Research suggests that students are reasonably knowledgeable about the risks associated with unprotected sex and the diseases that come along with experimenting with sexuality in their teens, but there is a big question as to where this knowledge is coming from. Teenagers are infiltrated with media, but are they getting the genuine education that they need to protect themselves against sexually transmitted infections? There is definitely a need for teenagers to gain a proper education on sexuality and the risks associated with it. The purpose of this study was to gauge the level of HIV awareness among high school students. The study would elicit students' attitudes and knowledge of HIV and perhaps provide some answers about why infection rates continue to increase in this age group. Methods I conducted an online survey of sixteen public school teachers and sixty high school students, ages fourteen to eighteen, at a public high school in Shelby County. The school was predominately Caucasian with approximately fifty nine students responding as white, ten responding as African American, two responding Hispanic and four responding "other." The site was selected because sex education was not provided at the school. The respondents thus represented a "naïve" population for school survey purposes. Permission was granted by a faculty member to conduct an HIV knowledge survey as long as the questions were pre-approved. The survey consisted of fifteen questions which were broken down into two groups. The first group of questions was on HIV knowledge/awareness and the second set of questions concerned the demographics of the survey audience. The survey was administered online through Survey Monkey. Results Approximately 17% percent of students had gaps in

HIV knowledge as measured by questions regarding HIV transmission. 85% of the respondents said that HIV/AIDS had never been discussed openly with family or friends. These gaps indicated that HIV knowledge was lacking in some critical areas. The numbers of students with proper knowledge about HIV/AIDS is still low considering the duration of time that this disease has been researched. HIV/AIDS is a deadly disease and the casual knowledge of the disease is inadequate. Conclusion The lack of knowledge surrounding the subject of HIV/AIDS among these teens makes it clear that more education is needed to protect students from the risk of sexually transmitted infections. This is particularly important for teenagers who are in the highest risk group of such infections. Alabama teens are at even greater risk because they live in a region with the highest HIV/STI rates in the nation.

Glennise Marshall, Department of Anthropology
Faculty Mentor: Dr. Christopher Lynn, Department of Anthropology
Fire and Stress Reduction

Professor Christopher Lynn is in the department of Anthropology in the college of arts and sciences. We are investigating the effects of fire on stress level by blood pressure. We will be testing subjects in a dark room. They will view a DVD of fire on a computer for five minutes and a blank screen for another five minutes. The subjects blood pressure will be taken before the experiment, between each video and after the experiment. The results will determine how fire can be an agent to relieving stress.

Joseph Taylor Massey, Department of Chemistry
Cameron Bolt, Department of Management Information Systems
Faculty Mentor: Dr. Karen Burgess, Community Health Services
Kids in Balance

This project seeks to create an innovative web-based interface that will educate a younger generation about the effects of their day to day dietary choices and exercise habits. Technology has been found to be detrimental in many ways to children's health (obesity), and through a directed effort we aim to use this labeled avenue as an instructive tool to correct deficiencies in health knowledge regarding diet and exercise.

Cyrus Massouleh, Department of Chemistry, Computer Based Honors Program
Building an Online Identity for Project ACTS
Project ACTS, the Assessment of Culturally-Tailored Mental Health Treatments and Services, is a long term project directed by Dr. Lisa M. Hooper. Changes in demographics have underlined the need for mental health professionals to adapt their approaches to treatment to better suit culturally and linguistically diverse populations. The aim of Project ACTS is to gather information regarding culturally-tailored treatments, analyze this information, and disseminate the findings. The goals of "Building an Online Identity for Project ACTS", are to create a logo, website, survey, and database for Project ACTS that will be the central to Project ACTS throughout the study.

Charles Mathis, Department of Chemistry
Faculty Mentor: Dr. David Dixon, Department of Chemistry
Chemists are always working to learn more about new substances, often by observing the substance in a lab. Computational chemistry takes a different approach. By using quantum

mechanics calculations and computers we can theoretically find the properties of a substance (in our case Hafnium oxides). We first use a molecular modeling program to create the molecule we. Then we use a high performance computer to run a Gaussian calculation on the model we created. After the program runs the computer gives us analysis of the substances properties.

Matthew M. May, Department of Biological Studies

Adam Zelickson, Department of Biological Studies

Faculty Mentor: Dr. Ryan Earley, Department of Biological Studies

The effects of Corticotropin Releasing Hormone (CRH) receptor antagonism on territorial aggression in the convict cichlid (Amantitlania Nigrofaciata

Corticotropin releasing hormone (CRH) is a polypeptide that directs neuroendocrine stress axis activity. CRH exerts its effects by binding receptors CRH-R1 and CRH-R2 on target cell membranes. Some evidence suggests that CRH influences aggressive behavior but little is known about which receptor is involved and whether CRH regulates aggressive behavior differently in males and females. We antagonized (blocked) one or both receptors in convict cichlid fish, a species in which both sexes exhibit aggression, by administering drugs directly into the hypothalamus followed by behavioral observation. Preliminary results indicate that the effects of CRH on aggression are both receptor- and sex-dependent.

Brooke McLeod, Department of Economics

Faculty Mentor: Dr. Pan Jindapon, Department of Economics

Child Care Costs and Labor Force Participation of Women

Worker productivity and efficiency in the United States has grown significantly in the past few decades in part due to the growing number of women choosing to work instead of staying home with children. However, because of high child care costs, women often find it cheaper to watch their own children instead of paying for childcare while they work. Using the Panel Study of Income Dynamics 2007, I will discuss the relationship between cost of living and the opportunity cost of women choosing to enter the workforce.

Travis Midkiff, Department of Mechanical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Ajay Agrawal, Department of Mechanical Engineering

Rijke Tube Experiment to Study Combustion Instabilities

Combustion processes in turbines, rockets, and other energy conversion devices involve rapid release of chemical energy stored in fuel. Rapid heat release is accompanied by pressure oscillations, which can resonate with the natural frequency of the device. Combustion instabilities result, which can destroy the combustor/engine within a few seconds. This project aims to utilize advanced ceramic foams to control combustion instabilities. In this Rijke tube experiment, characteristics are measured using a microphone integrated with LabVIEW-based data acquisition systems. These tests seek to improve understanding of combustion instabilities and facilitate the design of combustion concepts using porous materials to attenuate instabilities.

Ashley Miller, Department of Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Department of Chemistry

Suzuki Coupling of Hindered Substrates

Palladium catalyzed couplings of arylboronic acids and aryl halides are useful methods for producing biphenyls, polyolefins, and styrenes. At room temperature, trineopentylphosphine

along with a palladium catalyst show better activity for the Suzuki coupling of sterically demanding aryl bromides than catalysts derived from tert-butylideneopentylphosphine. The application of this catalyst system to coupling of other hindered substrates will be presented.

Theresa Mince, Department of Clothing, Textiles, and Interior Design

Faculty Mentor: Dr. Dr. Amanda Thompson, Department of Clothing, Textiles, and Interior Design

Mobile Textile Tutor

The goal of this project is to create a highly effective study tool for Textiles students. We will use GFlash+, an iPhone/iTouch/Blackberry/Droid application from gWhiz Mobile, to build sets of flash cards which current students can use to study and learn information being presented in class. We will build the sets in Google Documents, allow students to download them to their personal devices, then survey the effectiveness of the application through direct surveys and review of test scores.

Andrew Mitchell, New College, Computer Based Honors

Joseph Fletcher, Department of Electrical and Computer Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Dr. Rick Houser and Dr. Steve Thoma, Educational Studies, Psychology, Research Methodology, and Counseling

Utilizing Second Life in the Analysis of the Ethical Decision-Making Process

Our work towards the study of the ethical decision-making process has revolved around developing scenarios in the online virtual world of Second Life. When implemented, these will act as a measure of, for instance, an individual's utilization of different areas of knowledge in informing themselves concerning an ethical decision. Second Life is utilized on account of its realism, its versatility, and its immersive nature. Through developing understanding of the many aspects of Second Life and by developing a proficiency in the world's scripting language, we actively seek the best methods by which to implement such scenarios as powerful research tools.

Jessica Mitchell, Department of Biological Sciences, McNair Scholars Program

Faculty Mentor: Dr. Steven Marcus, Department of Biological Sciences

Cyclic AMP-Independent Phosphoregulation of Protein Kinase A in the Fission Yeast, Schizosaccharomyces pombe

In *Schizosaccharomyces pombe*, cyclic AMP (cAMP) and cAMP-dependent protein kinase (PKA) are not essential for viability under normal culturing conditions, making this organism attractive for investigating PKA regulation. Here we show that in *S. pombe* adenylate cyclase null (*cyr1Δ*) mutants, but not wild type cells, a substantial proportion of the PKA catalytic subunit, Pka1, is hyperphosphorylated. Pka1 hyperphosphorylation is further induced in *cyr1Δ* cells, and to varying degrees in wild type cells, by various physiological stresses, including stresses associated with reduced cAMP-dependent PKA activity, suggesting that it may function to promote PKA functions under conditions in which its cAMP-dependent activities are downregulated.

Josh Moncrief, Department of management Information Systems

Faculty Mentor: Dr. David Hale, Department of Management Information Systems

Creating Sustainable Fisheries in the Mobile Bay

The Mobile Bay area is an important resource for the United States. The National Oceanic and Atmospheric Administration (NOAA) contacted the Aging Infrastructure Systems Center of Excellence (AISCE) to improve the status of the bay. The AISCE has been assigned to compile website addresses for NOAA to be able to expand and simplify its database through Google Earth and the data previously gathered by the United States Geological Survey. This research initiative will establish data on environmental, economic, social, and manmade influences from the bay area to make solving problems more efficiently for similar problems in the future.

W. Taylor Monson, Department of Psychology, McNair Scholars Program, Psychology Honors Program, Blount Undergraduate Initiative

Faculty Mentor: Dr. Jeff Parker, Department of Psychology Dr. David Forde, Department of Sociology

Heteronormative Relationship Interaction Model: First Date Interactions

Research explored how biological sex, gender identity, and sexual orientation relate to cognizance and utilization of heteronormative gender script roles when interacting with new romantic partners on first dates. Participants consisted of 843 undergraduate psychology students and GLBT organization members, homosexual and heterosexual men and women 18-24, who completed an online questionnaire assessing gender identity, sexual orientation, predisposition to socially desirable responding, and gender role cognizance and utilization of traditional heterosexual date scripts. Analyzes explored potential interaction affects between gender identity, sexual orientation, and biological sex on heteronormative vs. egalitarian date script utilization and overall gender role cognizance.

Amy Moore, Department of Advertising and Public Relations

Faculty Mentor: Dr. Carol Cooper, Department of Advertising and Public Relations

Curbing Public Opinion: Edward Bernays and the Effects of Psychology on Public Relations

This research study focuses on Edward L. Bernays and his fusion of psychology and public relations during the 1920s. During this time, Bernays coined the term “public relations counsel” to identify the new profession. The researcher analyzed newspaper articles, books, and scholarly journal articles of the time period to evaluate the public’s acceptance and understanding of the relationship between psychology and public opinion. The researcher found that Bernays’ ideas impacted the attitudes the public had about public relations. His new idea became a standard for the public relations practitioner.

Isabela Morales, Department of History

Faculty Mentor: Dr. Steve Bunker, Department of History

Los Fieles: *Faith, Anxiety, and Prejudice in the Press during Mexico's "Religious Crisis," February-July 1926*

My research centers on public discourse in both the Mexican and American press over the religious turmoil in Mexico during the summer of 1926 (prelude to the Cristero rebellion). My goal is to examine how and why the conflict was portrayed as strictly institutional, Church versus State—the significance being to gain a better understanding of the role of popular piety and anxiety among the Mexican laity, who were sparked to violence during the July 31 closure and takeover of Catholic churches.

Reed Morgan, Department of Biological Sciences

Faculty Mentor: Dr. Jason Scofield, Department of Human Development and Family Studies

Who Do Children Trust? Accuracy versus Conventionality

Children can discriminate between people who provide reliable and unreliable labels (Scofield & Behrend, 2008). However, it unclear how children determine reliability; do they prefer accuracy or conventionality more? In this experiment, 24 three-, 24 four-, and 24 five-year-olds watch silent videos in which two actors demonstrate 3 familiar and 1 novel actions. One actor performs actions conventionally and inaccurately, while another actor performs actions unconventionally and accurately. After watching familiar and unfamiliar actions, children perform the novel action to indicate which actor they endorse. This research will explain how children identify reliable informants, based on accuracy, conventionality, or both.

Lesley Morris, Department of Human Nutrition and Hospitality Management

Faculty Mentor: Dr. Linda Knol, Department of Department of Human Nutrition and Hospitality Management

Incorporating “Eco-Friendly Practices” into Weight Management and Nutrition Education Messages for college Students

The objective of this study was to determine how weight management programs for college students could incorporate “eco-friendly” messages from the environmental movement. For this qualitative study, 35 college students were recruited from introductory nutrition classes. The students were asked to list five environmental friendly strategies college students could use to manage body weight and environmental resources. They suggested strategies that overlap major themes from “eco-friendly” consumer messages of reduce, reuse and recycle. Overall, these college students were able to identify how their food and physical activity choices impact the environment.

Tacoma Morrissey, Department of Geological Sciences

Faculty Mentor: Dr. Paul Aharon, Department of Geological Sciences and Dr. Julie Olson, Department of Biological Studies

Composition of bacterial communities in Blount Springs, Alabama, and assessment of chemolithotrophic capabilities

Microbial assemblages consisting of chemolithotrophic organisms are found in extreme environments and provide clues as to how life forms survived the harsh conditions of early Earth. Diverse microbial communities were observed in a sulfur spring in Blount Springs, Alabama. DNA was extracted from samples and amplified by polymerase chain reaction. Terminal restriction fragment length polymorphism community analysis was performed to identify dominant bacterial species in the sulfur spring. Cation and anion concentrations and hydrogen and oxygen isotopes within the spring water were also evaluated to determine the potential chemolithotrophic capabilities of the resident bacteria.

Laura Mould, Department of Chemical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Peter Clark, Department of Chemical Engineering

Carbon Dioxide Interaction with Reservoir Fluids

In response to the growing interest in climate change this project models the carbon dioxide interaction with oil in the pores of rocks in oil wells. The computer program Comsol Multiphysics, using the Navier Stokes equation, was used to computationally model the

interaction. Two phase flow was used in order to model the placement of the two different fluids. Water was first pushed through the oil filled pore since the majority of oil wells are first pumped with water. This modeling is to explain the physical consequences of carbon sequestration specifically in the oil fields.

Joseph Nelson, Department of Chemistry, Department of Energy, DuPont Corporation
Faculty Mentor: Dr. Anthony Arduengo, III, Department of Chemistry
Tridentate carbene ligand for the synthesis of transition metal complexes and hypervalent compounds

The synthesis of a fluorinated tridentate imidazolium salt (I) has been accomplished from hexafluoroiso-2-butene. Bis(alkoxy)imidazolium salt I provides access to a ligand that is reminiscent of the tridentate Martin Ligand. However, the carbene binding site in I makes it a more versatile ligand for transition metal centers. This new ligand is used to generate both transition metal complexes (Ni, Pt, Pd) and hypervalent compounds from main group elements (P, Sb). Treatment of this salt with a base results in the formation of a stable zwitterion (II) that exhibits reactivity.

Nicholas Neveu, Department of Electrical and Computer Engineering
Ryans Syslo, Department of Electrical and Computer Engineering
Faculty Mentor: Dr. Yang-Ki Hong, Department of Electrical and Computer Engineering
Ferrimagnetic, biferroic Y-type hexaferrite nanofilm for magnetoelectric random access memory (ME-RAM)

Writing data (logic 0, 1) in non-volatile magnetic random access memory (MRAM) requires high magnetic field or spin-polarized current. This leads to high energy consumption and also to scalability problem of magnetic memory elements. To address the above issues, magnetoelectric RAM was introduced, which memory uses a voltage instead of magnetic field or spin-polarized current to switch magnetization direction. Voltage switching with antiferromagnetic, biferroic (ferroelectric dipole - magnetic moment coupling) BiFeO₃ film was demonstrated at room temperature. However, to further reduce switching energy and also provide scalability, magnetic properties of sputtered Y-type hexaferrite (Ba_{0.5}Sr_{1.5}Zn₂Fe₁₂O₂₂) nanofilm were investigated for biferroic properties.

Matt Newton, Department of Management Information Systems
Faculty Mentor: Dr. David Hale, Department of Management Information Systems
Creating Sustainable Fisheries in the Mobile Bay

The Mobile Bay area is an important resource for the United States. The National Oceanic and Atmospheric Administration (NOAA) is seeking to improve the status of the bay. The Alabama Infrastructure Systems Center for Excellence has been assigned to compile website addresses for NOAA to be able to expand and simplify its database through Google Earth and the data previously gathered by the United States Geological Survey. This research initiative will establish data on environmental, economic, social, and manmade influences from the bay area to make solving problems more efficiently for similar problems in the future.

Chris Nicholson, Department of Philosophy, Department of Political Science
Faculty Mentor: Dr. Scott Hestevold, Department of Philosophy
Why Life Doesn't Need to be Explained

Arguments for intelligent design have moved far beyond William Paley's famous watch example. Lately, Robin Collins has presented a scientific argument in favor of the universe having a designer. He argues that positing a designer is necessary, because if there were a designer the existence of life would be expected, while if there were no designer, the existence of life would be highly surprising. His critics tend to agree that life is a rare occurrence that requires explanation, but they favor different explanations, such as the theory that there are multiple universes. I will argue that all parties are wrong.

Sarah Nikles, Department of Chemistry

Faculty Mentor: Dr. David Nikles, Department of Chemistry

Synthesis and Characterization of Poly(ethylene glycol)-b-polycaprolactone Diblock

Copolymers for Drug Delivery Systems

We are interested in building a magnetically triggered vessel for cancer chemotherapy drug delivery. This directed us to the study of thermally triggered release from a polymeric micelle core. By dissolving poly(ethylene glycol)-b-polycaprolactone diblock copolymers in water at concentrations above the CMC, DSC curves showed endotherms near 41°C, indicating the polycaprolactone core was crystalline. Adding pyrene to the core did not interfere with this crystallization. Below the melting point of the core, the pyrene was trapped in the core. Upon heating the core above its melting point, the pyrene was released thereby demonstrating the potential for thermally triggered release.

Katherine O'Brien, Department of Psychology

Faculty Mentor: Dr. Rosanna Guadagno, Department of Psychology

Gendered Power: An Examination of Masculine and Feminine Strategies for Attaining Power

Men and Women obtain power in different ways. Men use legitimate power: relating to positions within organizational hierarchies. Women use referential power: relating to power within relationships. Two hundred ninety (103 male, 187 female) read vignettes about male or female targets who varied in both legitimate and referential power. Regardless of gender, targets high in legitimate power were rated more powerful when they were also high in referential power. Results support the idea that there may be more than one route through which individuals gain status.

Lesley Oglesby, Department of Health Sciences

Ryan Richardson, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Sciences

The Effect of Stretching Frequency on Glenohumeral Internal Rotation Deficit

Glenohumeral Internal Rotation Deficit (GIRD) is a condition commonly seen in overhead athletes such as baseball players. It is characterized by greater losses of internal rotation than gains of external rotation at the glenohumeral joint. This condition predisposes athletes to injuries such as labral pathology and posterior shoulder impingement. Internal rotation stretching has been implemented over the years to reduce this deficit, with research showing positive results when stretching is performed three times a week or daily. The purpose of this study is to determine if performing the internal rotation stretch twice a week will achieve significant results.

Julia Oh, Department of Music

Casey Brasher, Department of Music

Kimberly Cockrell, Department of Music

Faculty Mentor: Dr. Andrea Cevasco, Department of Music

The Effect of Music Therapy on Premature Infants' Heart Rate, Respiratory Rate, and Oxygen Saturation Levels

Standley (2002) conducted a meta analysis and found music therapy was effective for premature infants, $d = .8268$, $p < .001$. Since October 2009, music therapy services have been implemented for premature infants in the neonatal intensive care unit (NICU) at DCH Regional Medical Center. Music therapy services for each infant involves live singing with guitar accompaniment for approximately 15 minutes. Data was collected on each infant's oxygen saturation, heart rate, and respiratory rate prior to, during, and following music therapy. Data is currently being analyzed to determine the effect of music therapy and future protocols for the NICU.

Julia Oh, Department of Music

Lelia Hubur, Department of Music

Ellyn Hamm, Department of Music

Casey Brasher, Department of Music

Kimberly Cockrell, Department of Music

Anna Baird, Department of Music

Ellen Kuykendall, Department of Music

Laura Hagery, Department of Music

Faculty Mentor: Dr. Andrea Cevasco, Department of Music

Evaluation of song decades on singing and motor responses of individuals with Alzheimer's disease and other related dementia (ADRD)

The purpose of this study is to evaluate eight decades of popular songs on singing and motor responses of adults with Alzheimer's disease and other related dementia (ADRD). At this time, no one has examined the music preference of individuals with ADRD and researchers have not investigated specific types of music that elicits vocal and motor responses of individuals with ADRD. Two songs from each decade (1890s-1960s) were selected, and video recordings were viewed to measure each individual's participation, as indicated through singing and responding via motor responses.

Annie Ostrow, Department of Political Science, Computer Based Honors Program

Faculty Mentor: Dr. Doug Gibler, Department of Political Science

Does Force or Agreement Lead to Peace: A Collection and Analysis of Militarized Interstate Dispute Settlement, 1816-2001

Our project focuses on the idea that substantive agreements after disputes increase the likelihood of peace in the international system. My research has been to collect data on Militarized Interstate Disputes (MIDs) that ended in negotiated settlements for the presence and substance of an agreement by giving a brief description of each MID as well as including the text of the agreement if it exists or a description of the agreement if there was no primary text available. In the future, we will analyze the negotiated MIDs for 3rd party mediators and enforcement mechanisms effect on peace among other things.

Darryl A. Outlaw, Department of Chemistry, Department of Chemical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. David Dixon, Department of Chemistry

Electronic structure predictions of the properties of metal borane amine complexes

There is substantial interest in the development of new materials for the chemical storage of hydrogen for use in fuel cells in the transportation sector for economic, environmental, and national security. We are predicting the properties of chemically modified ammonia boranes to tune their ability to release hydrogen. We are predicting the thermodynamics and kinetics for the release of H₂ as compared to the energy of breaking the B-N bond for the main group and transition metal complexes derived from binding (NH₂BH₃)- or (BH₂NH₃)- to cationic main group, alkali, alkaline earth, and transition metal centers.

Satoru Ozawa, Department of Health Sciences

Jonta Pritchett, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Sciences

A Comparison of Delayed Onset Muscle Soreness from Squats and Leg Press

Delayed onset muscle soreness (DOMS) can have a significant impact on performance. The quadriceps muscle group is one of the strongest and most powerful in the body and its optimal function is essential to many athletic activities. As a result, it is the focus of many strength training techniques, including back squat and leg press. We would like to learn which exercises, back squat or leg press, produces more DOMS in the quadriceps muscle. Any exercise that limits the extent of damage associated with strength training would be of great interest and practical value to athletes, coaches and athletic trainers. We will randomly assign subjects to either the leg press or squat group and will induce DOMS using an eccentric protocol. Subjects will complete the short-form McGill Pain Questionnaires before, immediately after, 24 hours after and 48 hours after exercise. Three weeks later the DOMS and McGill protocol will be repeated using the second strength training technique.

Carly Palmour, New College

Marcus Tortorici, Department of Telecommunication and Film

Faculty Mentor: Dr. Adam Schwartz, Department of Telecommunication and Film

Effective Storytelling Through Short Film

Everyone has had an experience that they think would make a great movie. In our presentation, we will discuss how to take a life experience and translate it onto the big screen using our short comedy "Head in the Clouds" as an example. Our presentation will outline our entire process from initial experience to finished product. We will briefly cover the scriptwriting, casting, pre-production, production, and post-production processes. Our main focus will be how to clearly execute an idea within the time constraints of a short film, and the ways in which short films can be most effective.

T. Gannon Parker, Department of Chemistry, University Honors Program

Faculty Mentor: Dr. Robin Rogers, Department of Chemistry

Thermal Properties of Ionic Liquid-Lunar Regolith Mixtures

The need to sustain constant temperature on possible lunar stations calls for innovative approaches to heat delivery. Ionic liquids (ILs) have potential as heat transfer fluids (HTFs) for space and lunar applications because of their unique, tunable properties, negligible vapor pressure, low melting points, and high thermal conductivities. Our interest lies in passive heat transfer systems where heat is transferred from the underground to the surface by means of heat pipes filled with heat-conducting material. This presentation will discuss our current results in

identifying and evaluating a select group of new and commercially available ILs for their applicability as HTFs.

Jackie Parks, Department of Chemistry

Faculty Mentor: Dr. Kevin Shaughnessy, Department of Chemistry

Effect of ligand steric demand on palladium-catalyzed coupling of sterically hindered aryl bromides and amines

Palladium-catalyzed cross-coupling reactions are very important tools for C–C and C–heteroatom bond formation. In recent years, sterically demanding, electron-rich trialkylphosphines have been identified as useful ligands in these reactions. Our group has explored the use of neopentyl-substituted phosphines and found that di-tert-butylneopentylphosine (DTBNpP) provides an effective catalyst for C–C and C–N bond-forming reactions. In this study, the efficiency of catalysts derived from two phosphine ligands (DTBNpP and trineopentylphosphine (TNpP)) in palladium-catalyzed coupling reactions of sterically hindered aniline and aryl bromide substrates was compared. Calculated cone angle measurements had suggested that TNpP was more sterically demanding than DTBNpP. It was found that the catalyst derived from TNpP gave higher yields with more hindered reactants than the DTBNpP-derived catalyst, however. For example coupling of mesitylamine and 2-bromometaxylene at 80 °C gave 19.9% yield after 2.5 hours with DTBNpP/Pd2(dba)₃, while a 94.4% yield was obtained with TNpP as the ligand.

Hailey Parlett, Department of Social Work

Charles West, Department of Social Work

Faculty Mentor: Dr. Javonda Williams, Department of Social Work

Childhood Suicide Awareness

Suicide is a serious issue that has been increasing among younger children. This project will examine current research and investigate suicide prevention services that are available to younger children. This project will also assess the available programs and provide recommendations for improving services.

Cameron Patterson, Department of Electrical Engineering

Faculty Mentor: Dr. Susan Burkett, Department of Electrical Engineering

Design and Simulation of a 3-D Antenna

There are a wide variety of applications involving millimeter-wave to terahertz antennas ranging from security screening to medical imaging. To resonate at these high frequencies, antennas need to be so small that conventional semiconductor processing becomes a useful construction methodology. The student was responsible for using the Matlab and Ansoft HFSS™ software packages to simulate 3-D antenna structures and evaluate their electrical performance. The work has allowed a thorough investigation of various structures leading to optimized antenna performance and has advanced the knowledge base for forming and using surface tension-driven self-assembled structures for practical projects.

Donald Tyler Paul, Department of Aerospace Engineering and Mechanics

Faculty Mentor: Dr. Sammit Roy, Department of Aerospace Engineering and Mechanics

Manufacturing and Mechanical Characterization of Crosslinked Silica Aerogel

Crosslinked silica aerogel (x-aerogel) is a low density nanostructured porous material with good mechanical properties. Mechanical characterization tests of x-aerogel were performed to establish the multi-functionality of this material. Mechanical response of x-aerogel was studied under compression, flexural, tension, and ballistic testing. Under uniaxial compression, x-aerogel was found linearly elastic under small strains (<4%), then exhibited yield behavior followed by densification and inelastic hardening. The average specific compressive strength was found to be 3.89×10^5 Nm/kg, which is higher than that of other similar aerospace materials. Furthermore, ballistic experiments were performed on x-aerogel panels to determine its energy absorption capacity. The average ballistic limit of x-aerogel was determined to be 45.33 m/s with a peak value of 80 m/s.

Mark Penner, Department of English, Computer Based Honors Program
Faculty Mentor: Dr. Fred Whiting, Department of English
English Department Intranet Project

The purpose of the English Department Intranet Project was to create a series of online, self contained destinations that provide easy access to the diverse resources that the faculty and graduate students of the English Department require on a day to day basis. Aside from acting as a repository of department documents, the intranet allows for rapid communication of events and schedules and as a tool for sharing and collaborating on documents. The primary tool used to create the intranet was Adobe Dreamweaver, but online Google applications were used in the document management and calendar portions.

Mark Perkins, New College
Faculty Mentor: Dr. Joe Brown, New College
Income and Drinking Water Access: An analysis of socio-economic factors and drinking water accessibility in Tuscaloosa, Alabama

A study of the relationship between the socio-economic factors affecting participants in free service programs and access to potable water in the city of Tuscaloosa, AL. Participants were selected at specific free service provider locations (soup kitchens, food pantries, etc.) around the city and asked to fill out a survey and collect a sample of their drinking water. Surveys collected data related to socio-economic status including water habits, sources, and federal aid program participation. Water samples were analyzed for purity and compared with local and national standards for potable water. As of this publication data collection is still ongoing.

Trenton Phillips, Department of Biological Sciences

Justin Ray, Department of Biological Sciences

Faculty Mentor: Dr. Katrina Ramonell, Department of Biological Sciences

Characterization of the ATL2 family of stress response genes in Arabidopsis

Our research with the model plant *Arabidopsis thaliana* is focused on unraveling the defense pathways involved in resistance to fungal pathogens. We have isolated a gene family, the ATL2 family, which plays a direct role in defense against fungal pathogens. Thirteen homozygous knock-out mutants in the ATL2 family have been identified using PCR so that their individual influence on plant defense can be studied. Future experiments will include an infection study using the fungal pathogen powdery mildew to examine the affect of the knock-out mutants on the plant defense response.

Mark Pinkerton, Department of Biological Sciences, Computer Based Honors Program

Faculty Mentor: Dr. Matthew Jenny, Department of Biological Sciences

Gene Induction in Response to Oxidative Stress in Zebrafish Embryos

NRF2 is a transcription factor activated in response to cellular oxidative stress and considered to be the master regulator of the antioxidant response. Oxidative stress was induced in zebrafish embryos from three to six days post-fertilization by the pro-oxidant tert-Butylhydroquinone (tBHQ) at concentrations 0, 1, 5, and 10 μM . Real time PCR was used to confirm induction of NQO1, a known target gene of NRF2, and investigate the role of tBHQ in the induction of the potential target genes heme oxygenase (HO-1) and metallothionein (MT). Future experiments will use this data to investigate gene regulation following targeted knockdown of NRF2.

Neal Pollock, Department of Psychology

Faculty Mentor: Dr. Rosanna Guadagno, Department of Psychology

To Blog or Not to Blog: Personality Answers the Question

Current statistics show that significant portions of Internet users have read (25%) or created (9%) blogs, while six percent of the entire adult population has created blogs (Pew Internet & American Life Project, 2005). We examined how individual differences in personality may predict who is likely to use a blog to express themselves online. The results of two studies indicate that people who are high in openness to new experience and high in neuroticism are likely to be bloggers. These results indicate that personality factors impact the likelihood of being a blogger and have implications for why people blog.

Daniel Preston, Department of Mechanical Engineering

Roger Rozanski, Department of Mechanical Engineering

Faculty Mentor: Dr. David Grau, Department of Civil Engineering

Localization with Motes

Keeping track of equipment and materials on large-scale construction yards consumes much time and effort. A need for a more efficient localization method has arisen. One feasible method is using small radio transceivers attached to computer chips (called motes) to localize these items. Using motes could allow for near-instant localization via computer after motes are attached to the items to be tracked. This project will determine whether motes are applicable to the localization problem by conducting field tests in construction yards with several different localization algorithms running on the motes.

Samantha Price, Department of Psychology

Faculty Mentor: Dr. Randy Salekin, Department of Psychology

Adolescent Psychology Examining the Depressive Subtype

This study examined psychopathy, a personality disorder, in adolescents and examined depression as a possible subtype of psychopathy in youth. The depressive type has been suggested as an important distinguishing quality that may explain different types of psychopathic individuals. This might be especially important for adolescent psychopathy, a developmental period with high rates of depression. Creating four groups of high and low depression and psychopathy, we examined differences across 10 major psychosocial problem areas. Findings showed the groups differed based on these key subtyping variables. The depressive subtype showed more problems across the psychosocial scales. Further findings and are discussed.

Michael Proaps, Department of Political Science

Faculty Mentor: Dr. Doug Gibler, Department of Political Science

Does Force or Agreement Lead to Peace?: A Collection and Analysis of Militarized Interstate Dispute Settlement(MID), 1816-2001

This project aims to discover whether negotiated settlements are more effective in creating enduring peace than imposed settlements in international dispute resolutions, specifically between two countries. This project looks to analyze the 416 dyadic settlements that occurred between 1816 and 2001, specified by the Correlates of War system, and create narratives on the specifics of each case. Using these narratives, the project will compile the information to decide whether negotiated settlements are more effective in preventing further conflict, while also adding evidence to the idea that dyads using negotiated settlements are less likely to have elevated disputes leading to war.

Kyle Redding, Department of Computer Science, Computer Based Honors Program

Russell Isaiah Clemons, Department of Chemical Engineering

Faculty Mentor: Dr. Yunjae Cheong, Department of Advertising and Public Relations

Analyzing the Olympic Message Strategies of the Beijing Olympic Commercials

Olympic commercials have considerable influence on advertisers by reaching a large global media audience. This study examines the Olympic message strategies of the Beijing Olympic commercials and further investigates the differences and similarities in the Olympic message strategies across different sponsor categories (i.e., worldwide partner, domestic Beijing partner, domestic Beijing sponsor, domestic Beijing exclusive supplier, and non-sponsor/partner/supplier). Practical and theoretical implications for potential Olympic sponsors/partners/suppliers are discussed.

Lindsay Reynolds, Department of Biological Sciences

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

Investigating GIPC as a novel neuroprotective target for Parkinson's Disease

Parkinson's disease (PD) is a neurodegenerative disorder that devastates dopaminergic neurons in the brain. Curing PD is dependent upon understanding factors underlying disease development. The nematode roundworm, *Caenorhabditis elegans*, is useful in studying PD because of its small number of neurons and short lifespan. This allows for a simpler qualitative and quantitative approach to analyzing the effects of both drugs and genes on the nerves. Candidate genes are over-expressed or deleted and their impact on the nerves is determined. Here we report studies on GIPC, a gene known to function in nerve signaling, as a new therapeutic target for PD.

John Ricketts, Department of Biological Sciences

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

Human torsinA functions to attenuate cellular stress and maintain homeostasis

Human torsinA is a protein resident of the endoplasmic reticulum, a cellular compartment involved with proper protein folding and alleviation of cellular stress; it also exhibits "molecular chaperone" activity. When torsinA is mutated, it causes early-onset torsion dystonia, a severe movement disorder. We hypothesized that the normal function of torsinA is the amelioration of cellular stress and that mutant torsinA is unable to perform this critical function. Using fluorescent markers that highlight the difference between normal vs. stress-associated scenarios,

we determined that torsinA functions to reduce cellular stress, thereby providing a major molecular insight into the mechanism underlying this dystonia.

Nathan Roberts, Department of Biological Sciences

Pan Chen, Graduate Mentor

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

RNA interference screening to identify factors that influence torsinA activity in C. elegans: Implications for dystonia, a human movement disorder

RNA interference screening to identify factors that influence torsinA activity in *C. elegans*: Implications for dystonia, a human movement disorder Human torsinA, which when mutated causes a movement disorder termed dystonia, normally functions to enhance protein folding and trafficking inside endoplasmic reticulum (ER). Strikingly, the mutant form of torsinA results in added ER stress. Using RNA interference (RNAi), we screened genetic factors altered in “gene-chip” profiles from mice containing the dystonia mutation for their effect on torsinA-mediated ER stress. Surprisingly, genes implicated in Ras signaling, a major target in cancer biology, were revealed as top candidates. We are now confirming the contribution of Ras signaling in ER stress caused by mutant torsinA, shedding new light into mechanisms underlying early-onset dystonia.

J. Pierce Robinson, Department of Chemistry, Department of Chemical Engineering, Computer Based Honors Program

Faculty Mentor: Dr. David Dixon, Department of Chemistry

Potential energy surfaces of the reactions of hydrazine with models of spent fuel from ammonia borane dehydrogenation

Electronic structure calculations at the DFT and MO theory levels are used to predict the thermodynamics for a new process of regenerating spent fuels, BNH_x, from the chemical hydrogen storage molecule BH₃NH₃ using hydrazine. Even the simple spent fuel model borazine (cyclo-B₃N₃H₆ = BNH₂) has over a hundred different products that must be investigated for up to three additions of N₂H₂. Because there are a large number of different possible by-products for this process and not all are desirable, knowledge of the thermodynamics of each possible pathway is be used in process simulations to improve the overall process efficiency.

Teri Robinson, Department of Anthropology

Faculty Mentor: Dr. Vernon Knight, Department of Anthropology

Distinguishing Pottery Vessel Shape Modes Using Potsherds at the Pride Place Site

Mississippian sites in the Black Warrior River Valley commonly contain deposits of mixed temporal pottery types. At the Pride Place site in Tuscaloosa, Mississippian shell-tempered ceramics are found in mixed deposits with the chronologically earlier Baytown grog-tempered pottery. The purpose of this study is to determine if there are technological differences between the two temper types and their vessel shape modes. Samples of sherds from previous site excavations were analyzed for thickness, curvature, and rim mode to determine the extent of differences between the temper types.

Alana L. Rogers, Department of Environmental Sciences

Stormi Barrett, Department of Geology, Department of Geography

Faculty Mentor: Dr. Lisa Davis, Department of Geography

Particulate Carbon Storage in River Channel Deposits

Carbon is a naturally occurring element. In rivers, carbon is an important source of energy for aquatic organisms and a source of greenhouse gases to the atmosphere. In this poster presentation, we present results from a study that aims to quantify the amount of particulate carbon stored in sediment deposits of a single segment of a river located in northeastern Alabama. By helping to better define the role that rivers play in the cycling of carbon on continents, this research has potential to improve our understanding of the global carbon cycle and thereby contribute to better understanding climate change.

Katherine Romelfanger, Department of Biology, Computer Based Honors Program

Faculty Mentor: Dr. Gary Sloan, Department of Microbiology

Characterization of Plasmid pALE-1 from Staphylococcus capitis

Staphylococcus capitis EPK1 produces the staphylolytic enzyme Ale-1 and its associated resistance factor Epr. We have determined that Ale-1 and Epr are encoded on pALE1, the smallest of three plasmids in this organism. Sequence analysis has revealed that this plasmid also carries genes for proteins typically associated with plasmid mobilization. Mating studies using the known conjugative plasmid pGO1 are underway to determine if pALE1 is mobilizable. This is the first report of a potentially mobilizable plasmid encoding a bacteriolytic enzyme and its associated resistance factor, and its existence may explain how such genes have been spread by horizontal gene transfer.

Andrew Sawyer, Department of Biological Sciences

Faculty Mentor: Dr. Katrina Ramonell, Department of Biological Sciences

Characterizing the role of CRP1 in plant defense and development

We have identified a gene, CRP1, which is involved in defense responses against fungal pathogens and also appears to play an important role in plant development. The goal of this research is to understand the precise activity of CRP1 in the plant cell during both development and defense. A growth model was used to compare the phenotypes of wildtype and *crp1* mutant *Arabidopsis* plants. The data shows that *crp1* mutants exhibit a larger rosette leaf size and reduced male fertility. This suggests that *crp1* is involved in several developmental pathways and plays an integral role in plant maturation.

Ryne Saxe, Department of Physics and Astronomy

Faculty Mentor: Dr. Ion Stancu, Department of Physics and Astronomy

Miniature Scanning Electron Microscope Development

NASA plans to resume human space exploration. To prepare for this mission we must expand our scientific knowledge of planetary surfaces. Specifically, new exploratory instrumentation must be designed with emphasis on miniaturization, low mass and low power consumption. I collaborated to help develop a miniaturized scanning electron microscope that permits in-situ analysis of planetary surfaces. This presentation provides an overview of recent developmental stages and reviews the primary challenges we encountered in testing the microscope's electron gun assembly. A detailed discussion of mechanical design considerations includes revisions made in response to recent testing.

Diane Schneider, Department of Geography

Faculty Mentor: Dr. Jason Senkbeil, Department of Geography

Understanding Perception of Meteorological Hazards within Tuscaloosa County

West/Central Alabama is frequently impacted by various types of hazardous weather. Although the region is frequently impacted, weather hazard information is often misunderstood or misrepresented. It is important to gain a better understanding of perception in order to improve accurate warning communication and education. Using UA students as the sample population, a meteorological hazards survey was distributed to gauge their knowledge of weather hazards within Tuscaloosa County. The survey response data was then compared to actual hazard probabilities to determine the awareness level of students and extrapolate the significance of results when applied to the general public.

Kristin Schneider, New College

Faculty Mentor: Dr. Marysia Galbraith, Anthropology

The Mata Ortiz: Innovation, Art, and Globalization

This research project is centered around the Mata Ortiz and the elements of social identity through invented tradition, the economic impact of the pottery sales on potters and non-potters, and the potters' heterogeneous identities and the effects on their pots. The Mata Ortiz are unique because their social identity is based on an invented tradition. Their invented tradition of pottery has impacted their economic status, which in turn has changed the lives and pottery of the potters. The invented tradition of pottery and the heterogeneous identity of the Mata Ortiz also has affected their pottery and the demand for it.

Lindsay Scholes, Department of Education

Jack Heflin, Department of Commerce and Business Administration, Computer Based Honors Program

Faculty Mentor: Dr. Star Bloom, University Honors Program

Creating an Electronic Infrastructure for Capstone Mentors

UA student mentors working with the UH Capstone Mentors program strive to help elementary students in the Tuscaloosa area succeed. Information regarding each child's needs is gathered from UA mentors to help the program improve. The creation of a Microsoft SharePoint site has allowed this information to be collected and managed more efficiently via a central website. Additionally, a database has been developed to store information such as grades and test scores with which we hope to track progress over time, reach a broader understanding of student strengths and weaknesses, and study the correlation between Capstone Mentors and academic success.

Jamie Schumacker, Department of Health Sciences

Amanda Barkley, Department of Health Sciences

Faculty Mentor: Dr. Jen Nickelson, Department of Health Sciences

Six hours in jail or five minutes in a cab? It's up to you...

In 2006 there were 17,941 driving fatalities related to alcohol- 41 percent of the total 43,000 deaths related to drunk driving that occurred that year. Over 10 percent of the drunken driving accounts were 18-20 year olds. College students repeatedly go to bars, parties and friend's houses, drink more than the legal limit to drive and still get behind the wheel. More importantly is the number of students who still get in the car with a drunk driver. More advertisement should

be posted around the college campus letting students know what options The University of Alabama offers their students.

Erica Schwalm, Department of Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. David Dixon, Department of Chemistry

Site Isolated Transition Metal Catalysts: Combining Aspects of Heterogeneous and Homogeneous Catalysts

Oxide-supported metal complexes are a widely investigated and industrially important class of catalyst. An understanding of their chemistry is hindered by the complexity of their structures, which is linked to the intrinsic non-uniformity of the support surfaces. We are using computational chemistry to study a variety of ligands binding to the transition metal cations Co⁺, Rh⁺, and Ir⁺ in a model of the acid site of a zeolite. The ligands include C₂H₄, C₂H₅, N₂, CO, H₂, and H. The ligand metal binding energies and the isotopic signatures for vibrational frequency assignments are being calculated using density functional theory.

Kyle Scott, Department of Aerospace Engineering and Mechanics, Computer Based Honors Program

Faculty Mentor: Dr. Paul Hubner, Department of Aerospace Engineering and Mechanics

Experimental Analysis of Pretensioned Flexible Membrane Airfoils Applicable to Micro Air Vehicle Flight

Micro Air Vehicles (MAVs) are a class of aircraft characterized by a maximum dimension of 15cm. Fundamental research to continually minimize MAV dimensions often relies upon bio-inspired design, which mimics small bird, bat, or insect flight characteristics to take advantage of their proven efficacy within the MAV size regime. Wind tunnel evaluation of bio-inspired flexible membrane airfoils has demonstrated improved aerodynamic efficiency of certain flexible membrane configurations when compared with conventional, rigid airfoils. Further examination of fundamental flexible membrane phenomena has been undertaken to explain their experimentally demonstrated aerodynamic benefits and applicability to MAV flight.

Jerrod Seaton, Department of Political Science, McNair Scholars Program

Faculty Mentor: Dr. Utz McKnight, Department of Political Science

Music as a Means to Describe Our Politics

Personal politics can be discovered through analyzing music choice, particularly how song preferences describe political eras and presidential administrations and through examination of how the music is used in politics.

Julia Simcoe, Department of Management Information Systems, Computer Based Honors Program

Karly Tuggle, Department of Management Information Systems

Faculty Mentor: Dr. David Hale, Department of Management Information Systems

NOAA Sustainability of the Gulf

This project consists of assisting Management Information Systems PhD students with scholarly research on the NOAA funded project. We researched the current state of Mobile Bay and comprised a list of every type of infrastructure that affects it. Using geographical information systems software, we inputted the data and observed the changes in the oceans over time and analyzed the findings. Additionally, we assisted with proposing a simpler GIS interface to

extend its use to a broader audience. We modified the existing code and created custom code to make the GIS software easier to use.

Matt Sims, Department of Civil, Construction, and Environmental Engineering, Computer Based Honors Program

Faculty Mentor: Dr. Andrew Graettinger, Department of Civil, Construction, and Environmental Engineering

Mapping Wisconsin ... Again

The Wisconsin Department of Transportation has enlisted the help of Dr. Andrew Graettinger to assist in the integrated mapping, via Geographic Information System (GIS), of its two major road systems, STN (state roads) and WISLR (local routes, which include the STN roads). My specific role in the project is to create tools that 1) increase the efficiency of and even automate the data integration, 2) devise a method for error-checking, and 3) improve the overall functionality of the integration. Currently, I am devising an automated way to identify if a portion or roadway, or link, has been drawn incorrectly.

Justin Skidmore, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Sciences

A Comparison of Joint Mobilization and Sleeper Stretches on Improvements in Glenohumeral Rotation

Athletes who participate in overhead sports must have a full arc of at least 180 degrees of rotation at the shoulder in order to avoid injury. A common occurrence in this population is Glenohumeral Internal Rotation Deficit (GIRD). Athletic trainers use both joint mobilization and stretching to improve restricted motion. This study will compare these two approaches with respect to their impact on GIRD.

Drew Smith, Department of Aerospace Engineering

Faculty Mentor: Dr. Amy Lang, Department of Aerospace Engineering

Flow Mechanisms Induced by 2D Embedded Cavities Leading to Separation Control

Cavities embedded in the surface of an object moving through a fluid can help delay flow separation by imposing slip velocities and augmenting the boundary layer turbulence. Furthermore, recent experiments have shown that embedded cavities may have their greatest effect on separation control at the point where the flow initially encounters them. This study investigated whether this effect is observed on a flat plate model with transverse square grooves in the surface. A DPIV technique was used to obtain flow data, and an analysis of the boundary layer profiles and Reynolds stresses at multiple locations on the model was conducted.

Amanda Sockwell, New College

Faculty Mentor: Dr. Anna Yaros, Center for the Prevention of Youth Behavior Problems

Hostile Attribution Bias in Proactive and Reactive Aggressive Children

This project is designed to observe hostile attribution bias in children by using a video game to serve as a real-time situation to which the children must respond using both verbal and nonverbal methods. The responses of the children to the game will be compared with the responses of the parents to written questions about their children, which will reveal whether the child exhibits proactive or reactive aggression. The hypothesis of this study is that the proactively aggressive

children will show more aggression in their verbal responses, while the reactively aggressive children will show more aggression in their nonverbal responses.

Ashleigh Kirstin Sockwell, Department of Chemistry

Faculty Mentor: Dr. David Nikles, Department of Chemistry

Attachment of AEAPT to Single Crystal Magnetite Nanoparticles for Future Tagging of Adenovirus

Interest in MRI enhancement and magnetic hypothermia therapy have led to the creation of a mode of labeling adenovirus or herpes simplex virus with magnetic nanoparticles. The particles will enhance the MRI while the virus will target the cancerous tissue. Single crystal magnetite, cobalt ferrite, and nickel ferrite were made by literature procedures. The particles showed a narrow distribution size of 5 to 10 nm. They were covalently bound to N-(2-aminoethyl)-3-aminopropyltriethoxysilane (AEAPT) using sol-gel chemistry. Cu²⁺ was bound to the AEAPT providing a means for binding the particles to a histidine tagged virus.

Sarah Spiller, Department of Commerce and Business Administration, Computer Based Honors Program

Faculty Mentor: Dr. Burcu Keskin, Department of Commerce and Business Administration

Analysis of an Integrated Maximum Covering and Patrol Routing Problem

The purpose of this research is to address the problem of determining state trooper's patrol routes to maximize coverage of highway spots with high frequencies of crashes (hotspots). As the real life instances cannot be solved via off-the-shelf optimization software, we develop heuristic approaches including local and tabu-search heuristics based on problem characteristics. Through extensive computational experiments using randomly generated data, we test the validity of our model and solution approaches. Additionally, we also develop service measures based on percentage number of hotspots covered and hot spot coverage length.

Jacob Spry, Department of Geological Sciences

Faculty Mentor: Dr. Fred Andrus, Department of Geological Sciences

A Study of Hypersaline Lake Microbial Mat Metabolic Diversity, San Salvador Island, Bahamas

Microbial mat communities from three hypersaline lakes present on The Bahamian island of San Salvador were studied in order to understand how environmental parameters affect microbial mat metabolic processes. Hydrogen sulfide and oxygen concentrations were recorded in mats in each of the three ponds, with statistically significant differences observed between the ponds for both hydrogen sulfide and oxygen. Environmental variation may be responsible for the observed differences in hydrogen sulfide and oxygen concentrations. This research indicates that while San Salvador is an isolated island with little geographic variation, the microbial mat communities present are metabolically unique.

John Stabler, Department of Electrical Engineering

Faculty Mentor: Dr. Silus Blackstock, Department of Chemistry

Single Molecule Charging by Atomic Force Microscopy

The prospect of single molecules holding an electrical charge has been a topic of great interest in the computer engineering field recently. By transferring a single charge to an individual molecule using an AFM allows a better view of how the molecules handle the charge instead of just delivering a group charge. By viewing the individual charges reactions, a better picture of

how the energy is released can be seen. The better view will lead to further advances in solid state technology and allow for the further shrinking of electronics to the point of single molecule wide circuits.

Benjamin Stewart, Department of Geological Sciences

Faculty Mentor: Dr. Amy Weislogel, Department of Geological Sciences

U-Pb Zircon Ages from the Karoo Basin, South Africa

Sensitive high-resolution ion microprobe-reverse geometry was used to determine U-Pb ages on zircons from the Karoo Basin, South Africa. The zircons sampled were from 8 ash beds within marine turbidite sediments. The U-Pb ages provide more data to previous research (Fildani et. al., 2009) for correlating the deep-marine sediments in the central and eastern regions of the Karoo Basin. This data will improve the understanding of the Permian-Triassic boundary location. The U-Pb ages of the zircons ranged from 258-275 Ma. These ages will be evaluated to determine how ash beds from the Geelbeck and Bloukrans regions of the basin correlate.

Sarah Stuart, Department of Chemistry

Faculty Mentor: Dr. Scott Spear, AIME

Aqueous Dissolution Studies of Polyetheramine-Pectin Beads

The aim of this work was to assess the effect of two formulation variables: 1) the pectin type (with different degrees of esterification, DEs), and 2) the polyetheramine type (with different degrees of water solubility). The rate of dissolution in deionized (DI) water for beads prepared by a spray-drying method of high-methoxy and low-methoxy pectin with Jeffamine XTJ-502 and polybutyletheramine (PEBA) were studied. The dissolutions were followed by total dissolved solids (TDS) measurements and FT-IR spectroscopic studies which were compared to standard mixtures to determine how the binding of the pectin to the polyetheramine affected the dissolution rates of the beads.

Josh Sullivan, Department of Electrical and Computer Engineering, Emerging Scholars Program

Faculty Mentor: Dr. Celia Lo, Department of Criminal Justice

Race, Gang Membership, and the Code of the Street

This study aims to explain a relationship between race and the adoption of certain beliefs that Elijah Anderson labels the “code of the street,” which is the informal set of rules that govern daily life in inner-city communities. Specifically, this study intends to show that gang membership promotes code-based beliefs differently for different racial groups. Employing survey data from groups of juvenile male inmates and of male high school students from several large inner-cities, we found that gang involvement explains the high level of code-based beliefs among minority youth.

Robin Sullivan, Department of Social Work

Faculty Mentor: Dr. Javonda Williams, Department of Social Work

Policy Analysis of Gay Adoption

The presentation will discuss policies related to gay adoption in the United States with particular attention to Alabama. This presentation will examine the advocacy efforts being used to address this issue in Alabama and will include recommendations for student and local advocacy.

Ryan Syslo, Department of Electrical and Computer Engineering

Nick Neveu, Department of Electrical and Computer Engineering

Gavin Abo, Department of Electrical and Computer Engineering

Faculty Mentor: Dr. Yang Ki-Hong, Department of Electrical and Computer Engineering
Array of CoFe Nanodots for High-density, Non-volatile Magnetic Random Access Memory (MRAM) Application

There is increasing demand for a nonvolatile, high-density, high endurance, and high speed memory for applications that range from cell phones to satellites. A promising candidate to meet these criteria is magnetic random access memory (MRAM) device. Magnetic nanofilms are underpinning of high performance MRAM devices. Therefore, we have deposited Co₃₀Fe₇₀ nanofilms to investigate magnetization process, i.e. spin flip-flop. Arrays of nanodots were fabricated by magnetron sputtering, e-beam lithography, and ion beam etching. Magnetic properties of Co₃₀Fe₇₀ nanofilm were investigated by a BH loop tracer, while array of nanodots is currently under investigation by MOKE for understanding of magnetization process.

Patricia Ryann Taylor, Department of General Health Studies

Faculty Mentor: Dr. Jen Nickelson, Department of General Health Studies

Quality of Life In College Students

Opening a new chapter and advancing to college is a huge step for most high-school graduates. During this time change is a factor that begins to affect many students. Quality of life is the general well being of an individual. The NCHA research shows the top five factors that negatively impact a college student's quality of life. Using these factors my class created a survey that was distributed around campus. My presentation will show the results of this data and the conclusion to what factors negatively influence student's quality of life here at The University of Alabama.

Matthew Thacker, Department of Chemistry

Faculty Mentor: Dr. Laura Busenlehner, Department of Chemistry

Investigating Frataxin ISU Protein Interactions Using Size Exclusion Chromatography

Frataxin, an iron chaperone protein in mitochondria, is the cause of the neurodegenerative disease Friedreich's ataxia when its levels are reduced. Frataxin is believed to deliver iron to ISU, the scaffold for the construction of iron/sulfur clusters which are important cofactors in many proteins. The conditions that lead to interaction between frataxin and ISU are unclear. We are investigating the interaction of the two proteins in solutions of varying metal ions using size exclusion chromatography. These ongoing experiments have yielded details into the interaction between frataxin and ISU, and the results will be presented.

Susanna Tubbs, Department of Chemistry, AIME

Faculty Mentor: Dr. Rebecca Frazier, AIME

Forced Assembly of Graphene through Oil-Water Interface Procedure

Graphene is a densely packed honeycomb lattice of sp² bonded carbons. The structure contributes to its remarkably high electron mobility and low resistivity for electron carriers. Graphene's covalently bonded carbon structure accounts for its great strength. Isolation of a single sheet of graphene is difficult; however, the oil-water interface procedure forces graphene to assemble in a single sheet between organic and aqueous phases. The procedure was conducted at varying graphene ratios to produce a single sheet, and the addition of cross linker produced a

transferable sheet. This technology can be incorporated into polymers used in photovoltaics or to increase strength.

Andrew Tuggle, Department of Physics and Astronomy, MINT Center

Faculty Mentor: Dr. Patrick LeClair, Department of Physics and Astronomy, MINT Center

Magnetic Circular Dichroism in Iron-Palladium Thin Films

X-ray magnetic circular dichroism (XMCD) spectra were taken for iron-palladium thin films (doped with small amounts of rhodium) to determine capping layer-thickness trends. The measurements were carried out at the Synchrotron Radiation Center (SRC) (University of Wisconsin--Madison).

Audry Turner, Department of Communicative Disorders

Faculty Mentor: Dr. Priscilla Davis, Department of Communicative Disorders

Avoiding Cultural Conflicts in the Clinical Setting

The purpose of this project is to bring to light various cultural practices and beliefs to professionals in a clinical setting, so that conflicts may be avoided. This project analyzes cultural practices of those in other parts of the world, as well as cultures throughout the United States. A survey was given to determine cultural conflicts experienced most often by fellow clinicians.

Daniel Ross Turner, Department of Anthropology

Faculty Mentor: Dr. John Blitz, Department of Anthropology

Palisade Construction and Labor Costs in the Moundville Chiefdom

The purpose of this study is to estimate the required labor cost for constructing and maintaining a substantial defensive palisade at the prehistoric Moundville chiefdom. Referring to reports on excavated sections of the palisades at Moundville, this study combines previous archaeological research with experimental archaeology to estimate in terms of person-hours the required effort to build and repair defensive works at the site. Since its defensive function precludes prolonged or incomplete construction, the final model of the study will suggest a population estimate for Moundville given a reasonable timeframe of one month to complete the palisade.

Ryan Vicknair, Department of Health Sciences

Mark Waller, Department of Health Sciences

Faculty Mentor: Dr. Deidre Leaver-Dunn, Department of Health Sciences

A Comparison of Surface Effectiveness at Eliciting Proprioceptive Gains in Patients with Ankle Sprain Pathology

Ankle sprains are the most common injury in athletics and patients with previous sprains also have a high rate of re-injury. The ligaments supporting the ankle are relatively small in comparison to the forces they must withstand. Therefore, the ankle relies on dynamic control from muscles for much of its stability. Improvements in joint position awareness and proprioception will promote better dynamic control. We will examine the effectiveness of exercise performed on different surfaces in improving balance.

Laurel Walker, Department of Dance

Faculty Mentor: Dr. Sarah Berry, Department of Dance

Break Through

Merce Cunningham was an imaginative choreographer whose works were and are exceptional in the dance world. His exceptionalities encompassed a broad expression of music, movement and design as independent forces colliding upon the dancer. As a 14 year old student of classical ballet, I visited Jacob's Pillow and experienced a performance by the Merce Cunningham Dance Company. Unaware of movement free of controlled structure, I encountered an awakening for a new dance form. I was forever changed with this breakthrough. Could I embody his spirit of creativity by applying his methodology of chance in a choreographic interpretation? Through extensive research, application of chance on my choreography, I have attempted to answer my question.

Griffith Waller, Department of Public Relations, Department of Political Science

The Works Progress Administration

I want to research the origins and effects of the Works Progress Administration examining the effectiveness, necessity and how it impacted the future of the United States.

April Wang, Department of Health Sciences

Faculty Mentor: Dr. Jen Nickelson, Department of Health Sciences

Depression and Anxiety Disorders among College Students: Closing the Gap between Need and Treatment

Using the PRECEDE-PROCEED model, this project will explore the relationship between academic performance and the prevalence of depression and anxiety disorders among college students. According to the American College Health Association, depression and anxiety disorders rank in the top five barriers to academic performance. Recent data suggests an alarming gap between the number of students affected by these disorders and the number of students being diagnosed and receiving treatment. A proposed health intervention aims to bridge this gap in order to raise students' mental health status, and subsequently, their academic performance.

Will Warren, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Chaotic Behavior of Mesoscale Hybrid Rocket Motor Performance

The results of a study to characterize the behavior of a mesoscale hybrid rocket motor are presented. Hybrid rocket motors provide the cost savings and relative simplicity of solid fuel rocket motors with the controllability of liquid fuel rocket engines. A mesoscale hybrid rocket motor has been fabricated and a series of experiments has been conducted to examine the performance of this motor. A statistical analysis of the experimental thrust data is presented. The experimental data was also examined in phase space to determine if the motor exhibited chaotic thrust behavior.

Tasia Washington, Department of Human Development and Family Studies

Kim Sanders, Department of Human Development and Family Studies

Faculty Mentor: Dr. Jason Scofield, Department of Human Development and Family Studies

Factors Related to Children's Video Word Learning

Many studies have shown that television and videos can be an effective source for learning words. However, they have not addressed whether there might be certain factors that make an individual child either more likely or less likely to successfully learn words. The goal of the

current study is to closely examine such factors by surveying parents/guardians about the child's previous experience with videos, socio-economic circumstances, and demographic variables. The current study also measures the vocabularies of preschool-aged children from two populations, one urban and one rural, and ask these children to solve a basic word learning task via video.

Emily Wayman, Department of Chemistry, Computer Based Honors Program

Faculty Mentor: Dr. Patrick Frantom, Department of Chemistry

Biochemical Characterization of Glycosyltransferase Enzyme MshA

The motions of enzymes are critical for their catalytic efficiency. Our study focuses on the movement of enzymes called glycosyltransferases, which are involved in many cellular processes including bacterial cell wall biosynthesis. We will utilize the biophysical technique Förster resonance energy transfer (FRET) to characterize the motion of our model enzyme at a single-molecule level. Preliminary experimental steps will be described that include molecular biology techniques utilized to create an enzyme variant suitable for study using FRET. Ultimately, this project will allow us to observe key steps or intermediates in the mechanism of motion in this important class of enzymes.

Kyle Weeks, Department of Finance, Computer Based Honors Program

Faculty Mentor: Dr. Kevin McQuary, Athletics

Swimming & Diving Interactive Guide

University athletic departments are finding more ways to attract attention and recruits to their athletic programs. As the world becomes more digitally-focused, athletic departments including The University of Alabama have begun to adapt. In addition to printed media guides, many universities also offer “interactive guides” on athletic websites. Users can view animated pages that utilize text, pictures, and embedded videos. This research focuses on the implementation of an interactive guide for the University of Alabama varsity swim teams using Adobe Photoshop, Adobe Illustrator, and Apple Final Cut Pro.

Hanna Welch, Department of Chemistry

The use of mono-phosphine palladium chloride dimers in organic coupling reactions

Palladium-catalyzed carbon-carbon bond-forming reactions have major significance in modern synthesis of organic compounds. In the past, our group has had success with neopentyl phosphines as ligands in palladium-catalyzed coupling reactions of aryl bromides. Here the use of mono-phosphine palladium chloride dimers [(R³P)PdCl₂]₂ was investigated. These catalysts gave promising results in Suzuki, Heck, and Hartwig-Buchwald couplings of aryl bromides, while results for Sonogashira couplings indicated lower activity. Further research will include a more in-depth look at the effects that different reactant substituent groups have on catalyst activity.

Christopher West, Department of Telecommunication and Film

Heath Williamson, Department of Telecommunication and Film

Faculty Mentor: Dr. Adam Schwartz, Department of Telecommunication and Film

The Multiverse - Making a Trilogy

The Multiverse - Making a Trilogy presents the trials and tribulations that internationally award winning student film-making group Sprinkle Studios faced during the six month creation of their latest work. In a collaborative effort, Sprinkle Studios brought together students and faculty

from departments across the university including: Telecommunication and Film, Theater, Honors, Blount, New College, and Arts & Sciences. The result was *Multiverse*, an award winning epic and the first trilogy ever made for the Campus Movie Fest student film-making competition.

Matt Westberry, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Modeling and Analysis of a Pulsed Thermal Rocket Propulsion System

A numerical model has been developed to explore the use of a biomimetic energy storage system for thermal rocket engines. A thermal rocket engine uses an external heat source to heat the working fluid to a high temperature prior to expansion in a converging-diverging nozzle. Nature tends to use elastic resilience to store energy. The numerical model is used to examine the use of an elastic resilience energy storage system for thermal rocket engines. The performance of this augmented thermal rocket system is examined in parameter space. The feasibility of using this approach for future propulsion systems is discussed.

Matt Westberry, Department of Mechanical Engineering

Nathan Ivey, Department of Mechanical Engineering

Daniel Whitaker, Department of Mechanical Engineering

Faculty Mentor: Dr. John Baker, Department of Mechanical Engineering

Use of Geodesic Structures as Lighter-than-Air Platforms

Results of a study on using geodesic geometry in lighter-than-air structures are presented. The results could be applied to micro-aerial vehicles. A geodesic structure would be able to hold its shape while conserving material. A comparison was made between results from a physical model and a simplified mathematical model. Using helium, the buoyancy force was calculated using Archimedes' principle and then compared to the weight of the structure. Geodesic structures of varying sizes were similarly constructed and filled with helium.

Muriah Wheelock, Department of Psychology

Faculty Mentor: Dr. Mark Klinger, Department of Psychology

Prototype Learning in Autism Spectrum Disorder

When individuals think of a category of an object they often abstract out a best example (or prototype) that represents that category instead of recalling all the members of that category.

Prototype formation appears to occur automatically and is thus a type of implicit learning.

Behavioral studies have suggested that prototype formation may be impaired in individuals with ASD (Klinger, Klinger, & Pohlig, 2007). In this study, fMRI technology was used to investigate the cognitive and neural responses to prototypes in persons with ASD compared to typically developing individuals.

Amanda Whitaker, Department of Human Development and Family Studies

Katie Beard, Department of Human Development and Family Studies

Faculty Mentor: Dr. Maria Hernandez-Reif, Department of Human Development and Family Studies

Examining Communication Between Anxious Mothers and Their Unborn Child

The present study examined 40 pregnant mothers' (39% Caucasian; 51% African American, and 5% Hispanic) anxiety levels and communication with their unborn child. The women ranged in

age between 18 and 37 years old and averaged 28 weeks pregnant. They completed 1) a Background/Demographic Questionnaire (assessed demographic information and use of medications, illegal drugs, and alcohol), the Communicating with Your Baby Scale (six questions about the way the mother communicated with her unborn child), and the State Trait Anxiety Inventory (STAI) scale. The findings suggest a trend towards anxious mothers reading, singing, and overall communicating less to their babies.

Billy White, Department of Mechanical Engineering

Faculty Mentor: Dr. Kevin Chou, Department of Mechanical Engineering

Diamond-coated Cutting Tools – Coating Thickness Measurements by Optical Profilometry

In industry, diamond coatings are used to increase the life of cutting tools. Coating attributes such as coating thickness significantly affect tool performance. However, coating thickness is difficult to measure, typically estimated empirically. This study attempts coating thickness evaluations using a whitelight interferometer (WLI) to acquire tool edge profile data (before and after coating) that will be processed by a numerical algorithm to compute the coating thickness. The methodology has been applied to tools with different coating thicknesses and edge radii. The results show that the combination of WLI and the developed algorithm is capable of accurate and efficient measurements.

Katherine Whitley, Department of Nursing

Faculty Mentor: Dr. JoAnn Oliver, Department of Nursing

Health Utilization and Health Disparities: Race, Gender and Regional Differences

Cultural, economic, and geographic location could be associated with health care utilization and sources of information. The initiative of this project is to evaluate the relationship of differences among races using health care resources and the health disparity differences among African American and Hispanic populations compared to Caucasians. We performed a secondary data analysis of the 2007 Health Tracking Household survey. The study group included 15,339 participants. We found a statistically significant difference in sources of health care, gender, and race.

Blake Williams, Department of Communication Studies

Faculty Mentor: Dr. Frank Thompson, Department of Communication Studies

Atwater: Fixin' to Die

In the one man play/performance presented to the audience entitled *Atwater: Fixin' to Die* by Robert Myers, we are introduced to the notorious politician himself. Nicknamed the “Boogiemán” in Washington, Atwater was both an intimidating Republican campaign manager during the 80s, and an avid guitarist who had Democrats everywhere singing the blues. He transformed political mudslinging into a theatrical art, until he faced the reality of brain cancer at age 40. Ultimately, Atwater’s near death struggle to salvage truth from a life of deceit leaves us with the idea that the ends may not always justify the means.

Christopher Williams, Department of Nursing

Faculty Mentor: Dr. Norma Cuellar, Department of Nursing

A Secondary Analysis of Data Gathered from Ferritin Levels in Type II Diabetes Patients with Restless Leg Syndrome

Restless Leg Syndrome (RLS) is a sleep disorder that affects up to 10% of the population in western countries and is caused by a dysfunction in iron and dopamine metabolism. Sleep disorders such as RLS can result in higher morbidity and mortality when seen with co morbid illnesses, like diabetes, hypertension, and kidney disease. Recent studies identify 22-44% of individuals with Type II diabetes also have RLS. A secondary analysis will be conducted from a clinical trial in patients that have type II diabetes with and without RLS. Ferritin levels, a measure of iron storage, will be measured in those persons with and without RLS in hopes to improve health outcomes in the people that suffer from type II diabetes mellitus.

Larry Justin Williams, Department of Mechanical Engineering

Faculty Mentor: Dr. Ajay Agrawal, Department of Mechanical Engineering

Noise Mitigation by Manipulating Combustion using Porous Inert Media

Hearing loss from noise induced by machines, engines, and flow systems is a major concern in industry. In gas turbine engines, a major source of direct noise is the turbulent heat release process in the combustor. In this study, the combustion process is manipulated passively using high-strength, oxidation-resistant porous inert materials (PIM) rings located within the reaction zone. Effectiveness of this approach is demonstrated from noise measurements acquired in a swirl-stabilized combustor replicating typical features of a gas turbine combustor. Atmospheric pressure experiments using methane fuel were conducted for a fixed air flow rate and equivalence ratios of 0.7 and 0.8.

Jim Wills, Department of Economics, Finance and Legal Studies

Hallet Ogburn, Department of Economics, Finance and Legal Studies

Faculty Mentor: Dr. Paan Jindapon, Department of Economics, Finance and Legal Studies

Regression Analysis for College Football Tickets

The overall purpose of this research project was to determine how different variables affect football ticket prices. We chose to collect data for Alabama vs. South Carolina, Alabama vs. Tennessee, and South Carolina vs. Tennessee for the 2009 season. The data was collected using stubhub.com, organized in an excel spreadsheet, and analyzed using a linear regression analysis in Stata. We found that there were some significant variables that affected ticket prices in different ways such as days before kickoff, row, quantity of tickets sold together, and sections. We also found that these variables had different effects for different games.

Lauren Wintzinger, Department of Chemical and Biological Engineering

Faculty Mentor: Dr. Yuping Bao, Department of Chemical and Biological Engineering

Synthesis and Modeling of Fluorescent Gold Nanoclusters

Fluorescent metallic nanoclusters have great potential in bio-labeling and single molecule detection as fluorescent tags due to their extremely small sizes. Here, we report the successful production of fluorescent Au nanoclusters using two small (< 500 Dalton) biological molecules, ascorbic acid and 2-(N-Morpholino)ethanesulfonic acid (MES). We investigated how the synthetic parameters affect the fluorescent emission of the Au nanoclusters, such as reaction temperature, concentration of the molecules, and pH. Further, we used electronic structure calculations to model and predict the geometric structure and HOMO-LUMO gaps of the nanocluster complexes.

Lucille Woodley, Department of Biological Sciences

Faculty Mentor: Dr. Carol Duffy, Department of Biological Sciences

One of the goals of Dr. Duffy's research is to develop herpes simplex virus type 1 (HSV-1) as a vector for targeted nanoparticle delivery. My project aims to incorporate magnetic nanoparticles into HSV-1 virions via binding the nanoparticles to a viral protein. A Lysine coil (K-coil) has been fused to the viral protein VP22 in the context of the viral genome. My work has focused on cloning and purifying a Glutamate coil (E-coil) to attach to magnetic nanoparticles. Strong, specific interactions between the K-coil on VP22 and the E-coil on nanoparticles will drive the packaging of nanoparticles into HSV-1 virions.

Matthew York, Department of Electrical and Computer Engineering

Faculty Mentor: Dr. Patrick Kung, Department of Electrical and Computer Engineering

ZnO Nanowires for Intelligent Solar Cell Design

With global energy consumption expected to increase 50% before the year 2030 [EIA], interest in the research of high-efficiency solar cell materials has been renewed. Zinc Oxide (ZnO) has emerged as a favored material for nanostructure fabrication in die sensitized solar cells. This presentation examines the research done to improve ZnO fabrication by the current authors research group at UA.

Marisa Younanian, Department of Biological Sciences

Faculty Mentor: Dr. Leslie Rissler, Department of Biological Sciences

Phylogenetics of a Potential New Species of Salamander at Mount Cheaha, Alabama

Accurate knowledge of a species' range and distribution is critical to its conservation. Mount Cheaha, Alabama, is located at the southern terminus of the Appalachian Highlands. The mountain likely contains multiple unknown species. A study published in 1969 by Rubenstein noted a unique, undescribed salamander species in this area. Our study sampled multiple individuals of *Desmognathus monticola* and related species from Mount Cheaha and surrounding regions in *D. monticola*'s range. We analyzed mitochondrial genetic diversity and ecological distinctness using spatially-explicit climate data. We found that the Mount Cheaha population was not a unique lineage as suggested, despite Rubenstein's studies on morphology.

Corinth Young, Department of Music

Faculty Mentor: Dr. Carl Hancock and Dr. Diane Shu, Department of Music

Spectrographic analysis of flute timbres produced from silver and gold head joint

Musicians, especially flautists, are at odds regarding whether the material an instrument is constructed of affects the quality of the sound it produces. However, earlier investigations relied primarily on listeners or players qualitative descriptions of tone as a the primary measure. The purpose of this study was to examine how flute head joint material and instrument manufacturer affect instrument tone quality when performing in different pitch registers using strictly quantitative measures. A music excerpt was recorded using 75 different head joints produced by several of the leading instrument manufacturers. Intensity in dB of the first nine harmonics for pitches in the upper, middle, and lower flute registers were compared for manufacturer and material using a 4 x 2 ANOVA. Generally, results showed that differences in the intensity of harmonics were due to the instrument manufacturer with some amplifying lower harmonics, while others decreased the intensity of upper harmonics. Head joint material seemed to affect specific harmonics with head joints constructed from silver significantly amplifying the first overtone, while gold significantly increased the intensity of the third overtone. Application of

these results to flute pedagogy, performance practice, and areas of future research are discussed.

Mike Zhang, Department of Biological Sciences

Faculty Mentor: Dr. Guy Caldwell and Dr. Kim Caldwell, Department of Biological Sciences

Identifying Genetic Factors Associated with Aging that Influence Susceptibility to Parkinson's Disease

Parkinson's disease (PD) is an age-related disorder associated with aberrant protein misfolding and the progressive loss of dopamine neurons. While progress has been made in identifying genetic and environmental factors influencing PD, the greatest susceptibility factor is aging. *C. elegans* offers the advantages of a ~2 week lifespan and high homology to the human disease genome. We have depleted the function of ~700 proteins linked to aging in worms and discovered 60 targets that contribute to protein misfolding. We are discerning the significance of these positives toward the elucidation of their role at the interface between aging and PD.

Index of Student Participants

Oral Presentation Time or Poster Presentation Location, Abstract

Abo, Gavin, 26, 94
Adams, Maggie, 5, 37
Al-Akhdar, Ayesha, 13, 37
Allen, James, 6, 37
Almand, Amanda, 31, 37
Ansorge, Kirsten, 14, 38
Ansorge, Rebecca, 10, 38
Aquino, Josh, 11, 38
Armbrester, Christopher, 28, 38
Ashy, Taylor, 28, 39
Austin, Ben, 21, 39
Baird, Anna, 11, 81
Baker, Heather, 18, 39
Bandy, Olivia, 20, 39
Barkley, Amanda, 32, 89
Barrett, Stormi, 17, 87
Barton, Katherine, 24, 40
Bass, Amelia, 10, 40
Bassett, Blake, 21, 40
Baughman, William, 26, 40
Beard, Katie, 32, 98
Beavers, Randy, 28, 41
Berry, Kalen, 7, 41
Betzig, Sarah, 26, 41
Bialoskurski, Lauren, 23, 42
Blackwell, Alex, 21, 42
Blinder, Alan, 9, 42
Bofill, Bryan, 9, 42
Bolt, Cameron, 15, 74
Borom, Akeem, 11, 43
Box, Hannah, 6, 43
Brasher, Casey, 10, 11, 43, 80, 81
Broka, Nicole, 19, 43
Burch, Major B., 12, 44
Bush, Daniel, 4, 44
Butler, David, 10, 44
Butler, Trenton, 34, 44
Carrasquilla, Alejandro, 24, 45
Carter, Hannah, 32, 45
Casanta, Catherine, 32, 45
Casteix, Mary Catherine, 31, 49
Chen, Yi, 14, 46
Childers, Rachel, 29, 46
Clark, Caitlin, 12, 46
Clark, Robert, 19, 46
Clark, Tyler, 26, 47
Clemons, Russell Isaiah, 24, 86
Cochran, Phillip Grant, 6, 47
Cockrell, Kimberly, 10, 11, 47, 81
Cockrum, Richard, 16, 47
Cody, John, 24, 48
Coleman, Cassandra, 5, 69
Conerly, Kristen, 8, 48
Conway, Jennifer, 23, 48
Coppens, Zachary, 27, 48
Corbin, Joni, 16, 49
Corder, Nathaniel, 18, 49
Cortez, Maria, 9, 49
Crump, Richard, 31, 49
Davis, Countess, 32, 50
Davis, Katelyn, 20, 50
Davis, Laura, 12, 50
DeLeon, Susan, 6, 51
Denson, Jared, 10
Dexter, Paige, 13, 51
Dowling, Eric, 23, 42
Dozier, David, 22, 51
Duke, Jessica, 16, 51
Dunton, Reese, 27, 52
Elkins, Trenton, 26, 52
Emmons, Jessica, 19, 52
Evans-Bell, Denzel, 22, 53
Feist, Richard, 13, 53
Finnen, Austin, 21, 42
Florence, Joseph, 30
Fossett, Brittany, 21, 53
Fredlund, Tyler, 32, 53
Freeman, Brandi, 21, 54
Freeman, Whitney, 17, 54
Fricke, Kyle, 13, 54
Frost, Laura, 5, 69
Fuller, Adam, 12, 58

Garner, Franklin, 21, 54
 Gee, Kaylan, 13, 54
 Gerber, Daniel, 22, 55
 Getwan, Ashley Elizabeth, 16, 55
 Gibson, Gaines, 27, 55
 Gist, Natalie, 8, 17, 56
 Glenn, Sara, 5, 69
 Goodloe, Gloria, 14, 56
 Gorin, Susan, 10, 56
 Gray, Jereme, 23, 57
 Greene, Mark, 28, 57
 Gutter, Barrett, 18, 57
 Guynn, Kurt, 24, 57
 Hagery, Laura, 11, 81
 Hall, Nikki, 29, 58
 Hamm, Ellyn, 11, 81
 Hanninen, Amanda, 12, 58
 Hansen, Marc, 25, 58
 Harmon, Duncan, 6, 58
 Harris, Jennifer, 9, 59
 Hawkins, Zachary, 15, 59
 Hayes, Heather Sunny, 20, 59
 Haygood, Morgan, 33, 64
 Heaton, Dustin, 23, 59
 Heflin, Jack, 30, 89
 Henderson, Colby, 17, 60
 Henning, Jeremy, 17, 60
 Herren, Bryan, 13, 60
 Herring, Paige, 33, 60
 Hershman, Daniel, 61
 Hershman, Daniel J., 22
 Hewitt, Chelsea Ann, 32, 61
 Hickerson, Leah, 8, 61
 Hicks, Matthew Lee, 13, 61
 Holland, Joseph, 24, 62
 Hollander, Daniel, 4, 62
 Holmes, Gregory, 21, 54
 Hoover, Jill, 23, 62
 Hornbuckle, Chad, 22, 62
 Hornsby, Ben, 23, 42
 Hovell, Candice, 5, 62
 Huang, Shu-Ping, 12, 58
 Hubbard, Meghan, 33, 60
 Hubur, Lelia, 11, 81
 Hudson, Sean, 35, 63
 Hughes, Mitchell, 8, 63
 Hulderman, Jessica, 32, 63
 Humphrey, Nicole, 35, 64
 Humphrey, Rachel, 35, 64
 Ingram, Stanton, 18, 64
 Israel, Julia, 33, 64
 Ivey, Nathan, 25, 98
 Jackson, Kimika, 34, 64
 Jacobs, Erin, 36, 65
 Jaime, Zach, 21
 James, Carly, 9, 65
 Johnson, Ashley, 21, 65
 Jones, Emily, 23, 65
 Jones, Jessica, 16, 66
 Jones, Lindsay, 14, 66
 Jordan, Chris, 34, 44
 Junkin, Elizabeth, 23, 66
 Kacpura, Abigail, 20, 67
 Karafotias, Michael, 12
 Kargol, Agata, 30, 71
 Kelley, Matthew, 16, 67
 Kendall, Chris, 17, 67
 Kern, Ryan, 27, 67
 Killen, Stephen, 4, 67
 Kimbrough, Amanda, 4, 68
 King, Christopher, 22, 68
 King, Eric, 35, 68
 Kopecki, Kimberley, 21, 65
 Kosta, Kimberly, 24, 68
 Kronenberger, Courtney, 22, 69
 Kuykendall, Ellen, 11, 81
 Lancaster, Sarah, 36, 69
 Langston, Bradley, 30, 71
 Lasecki, Laura, 33, 69
 Lauer, Jon, 27, 70
 Leach, Savannah, 14, 70
 Lee, S. Kyle, 5, 70
 Lewis, Dana, 30, 71
 Lindamood, Shannon, 11, 71
 Lindsay, Samantha, 34, 71
 Lisenby, Kayla, 20, 71
 Long, Rebecca, 16, 72
 Love, Elyse, 5, 72
 Lovoy, Zac, 14, 72
 Lowe, Lindsey, 30, 72
 Magee, Andrew, 21, 73
 Mahan, Kenny, 24, 73

Mantel, Sam, 9, 73
 Marshall, Glennise, 14, 74
 Massey, Joseph Taylor, 15, 74
 Massouleh, Cyrus, 31, 74
 Mathis, Charles, 15, 74
 Maxwell, Elizabeth, 29, 58
 May, Matthew M., 14, 75
 McCarty, Rachael, 25, 58
 McLeod, Brooke, 27, 75
 Midkiff, Travis, 26, 75
 Miller, Ashley, 15, 75
 Mince, Theresa, 34, 76
 Mitchell, Andrew, 30, 76
 Mitchell, Jessica, 5, 76
 Moncrief, Josh, 28, 76
 Monson, W. Taylor, 20, 77
 Moore, Amy, 30, 77
 Morales, Isabela, 9, 77
 Morgan, Reed, 13, 78
 Morris, Lesley, 33, 78
 Morrissey, Tacoma, 17, 78
 Mould, Laura, 25, 78
 Murphy, Michael, 26, 40
 Nelson, Brittany, 12
 Nelson, Gibson, 12
 Nelson, Joseph, 7, 79
 Neveu, Nicholas, 26, 79
 Neveu, Nick, 94
 Newton, Matt, 28, 79
 Nicholson, Chris, 4, 79
 Nikles, Sarah, 15, 80
 Norton, Katie, 31, 49
 O'Brien, Clayton, 21, 42
 O'Brien, Katherine, 19, 80
 O'Donnell, William, 12, 50
 Ogburn, Hallett, 28
 Oglesby, Lesley, 33, 80
 Oh, Julia, 11, 80, 81
 Ortiz, Anthony, 23, 48
 Ostrow, Annie, 19, 81
 Outlaw, Darryl A., 16, 81
 Ozawa, Satoru, 34, 82
 Palmour, Carly, 29, 82
 Parker, T. Gannon, 17, 82
 Parks, Jackie, 6, 83
 Parlett, Hailey, 36, 83
 Patterson, Cameron, 22, 83
 Paul, Donald Tyler, 23, 83
 Penner, Mark, 10, 84
 Perkins, Mark, 19, 84
 Phillips, Trenton, 12, 84
 Pinkerton, Mark, 7, 85
 Pollock, Neal, 19, 85
 Pouncey, Melissa, 20, 50
 Preston, Daniel, 22, 85
 Price, Samantha, 20, 85
 Pritchett, Jonta, 34, 82
 Proaps, Michael, 8, 86
 Ray, Justin, 12, 84
 Redding, Kyle, 24, 86
 Reynolds, Lindsay, 11, 86
 Richardson, Ryan, 33, 80
 Ricketts, John, 7, 86
 Roberts, Nathan, 12, 87
 Robinson, J. Pierce, 16, 87
 Robinson, Teri, 15, 87
 Robson, Michael, 34, 71
 Roddy, Ryan, 12
 Rogers, Alana L., 17, 87
 Romelfanger, Katherine, 5, 88
 Rowe, Coston, 12, 50
 Rozanski, Roger, 22, 85
 Salman, Faisal, 21, 54
 Sanders, Kim, 31, 96
 Sawyer, Andrew, 11, 88
 Saxe, Ryne, 8, 88
 Schneider, Diane, 18, 88
 Schneider, Kristin, 8, 89
 Scholes, Lindsay, 30, 89
 Schumacker, Jamie, 32, 89
 Schwalm, Erica, 15, 90
 Scott, Kyle, 25, 90
 Searcy, C.J., 21, 39
 Seaton, Jerrod, 8, 90
 Sheets, Darryl, 32, 53
 Simcoe, Julia, 28, 90
 Sims, Matt, 25, 91
 Skidmore, Justin, 33, 91
 Smith, Drew, 23, 91
 Sockwell, Amanda, 18, 91
 Sockwell, Ashleigh Kirstin, 6, 92
 Spiller, Sarah, 28, 92

Spry, Jacob, 18, 92
Stabler, John, 24, 92
Steele, Katy, 32, 63
Stewart, Benjamin, 18, 93
Stuart, Sarah, 7, 93
Sullivan, Josh, 7, 93
Sullivan, Robin, 36, 93
Syslo, Ryan, 26, 93
Taylor, Davis, 12, 46
Taylor, Patricia Ryann, 33, 94
Thacker, Matthew, 7, 94
Tortorici, Marcus, 29, 82
Tubbs, Susanna, 7, 94
Tuggle, Andrew, 18, 95
Tuggle, Karly, 28, 90
Turner, Audry, 17, 95
Turner, Daniel Ross, 14, 95
Vick, Lindsay, 29, 58
Vicknair, Ryan, 33, 95
Vines, Erin, 31, 37
Walker, Laurel, 4, 95
Waller, Griffith, 30, 96
Waller, Mark, 33, 95
Wang, April, 32, 96
Warren, Will, 26, 96
Washington, Tasia, 31, 96
Wayman, Emily, 7, 97
Weeks, Kyle, 29, 33, 69, 97
Welch, Hanna, 15, 97
West, Charles, 36, 83
West, Christopher, 29, 97
Westberry, Matt, 25, 98
Wheelock, Muriah, 19, 98
Whitaker, Amanda, 32, 33, 64, 98
Whitaker, Daniel, 25, 98
White, Billy, 21, 99
White, Maria, 32, 50
Whitley, Blake, 21, 54
Whitley, Katherine, 35, 99
Willemin, Anna, 21, 65
Williams, Blake, 29, 99
Williams, Christopher, 35, 99
Williams, Larry Justin, 25, 100
Williamson, Heath, 29, 97
Wills, Jim, 28, 100
Wilson, Kelly, 33, 69
Wintzinger, Lauren, 25, 100
Woodley, Lucille, 12, 100
York, Matthew, 25, 101
Younanian, Marisa, 12, 101
Young, Corinth, 11, 101
Zelickson, Adam, 14, 75
Zhang, Mike, 5, 102
Zora, Jesse, 32, 45

Faculty Mentors

Dr. Ajay Agrawal, Mechanical Engineering, 33, 35, 96, 126
Dr. Paul Aharon, Geological Sciences, 22, 100
Dr. C. Fred T. Andrus, Geological Sciences, 22, 23, 78, 117
Dr. Anthony J. Arduengo, III, Chemistry, 8
Dr. Marcus Ashford, Mechanical Engineering, 31, 36, 62, 74
Dr. John Baker, Mechanical Engineering, 28, 31, 32, 34, 36, 52, 56, 63, 64, 76, 94, 122, 124
Dr. Martin Bakker, Chemistry, 7, 50
Dr. Yuping Bao, Chemical and Biological Engineering, 30, 34, 67, 127
Dr. Angela Barber, Communicative Disorders, 26, 86
Dr. Sarah Barry, Dance, 4, 13, 91, 121
Dr. Silas Blackstock, Chemistry, 32, 117
Dr. John Blitz, Anthropology, 18, 120
Dr. Star Bloom, Honors College, 41, 113
Dr. Karen Boykin, Engineering, 36, 68
Dr. Jan Brakefield, Consumer Sciences, 31, 80
Dr. David Brommer, Geography, 23, 74
Dr. Joe Brown, New College, 24, 107
Dr. Steve Bunker, History, 11, 99
Dr. Karen Burgess, Pediatrics, 20, 95
Dr. Susan Burkett, Electrical Engineering, 29, 106
Dr. Laura Busenlehner, Chemistry, 6, 8, 9, 50, 63, 119
Dr. Guy Caldwell, Biological Sciences, 6, 8, 9, 14, 15, 16, 17, 32, 55, 57, 60, 67, 71, 78, 80, 91, 110, 128
Dr. Kim Caldwell, Biological Sciences, 6, 8, 9, 14, 15, 16, 17, 32, 50, 55, 60, 67, 78, 91, 110, 128
Dr. Jeffery Carver, Consumer Sciences, 30, 77
Dr. Jim Cashman, Management and Marketing, 37, 87
Dr. Andrea Cevasco, Music Therapy, 12, 13, 58, 62, 103, 104
Dr. Yunjae Cheong, Advertising and Public Relations, 33, 109
Dr. Barbara Ann Chotiner, Political Science, 12
Dr. Kevin Chou, Mechanical Engineering, 28, 125
Dr. John Clark, Biological Sciences, 5, 18, 89, 93
Dr. Peter Clark, Chemical Engineering, 33, 100
Dr. Linda Cole, Human Nutrition and Hospitality Management, 90
Dr. Frances Connors, Psychology, 26, 77
Dr. Carol Cooper, Advertising and Public Relations, 40, 99
Dr. Chip Cooper, Mechanical Engineering, 29, 79
Dr. David Cordes, Computer Science, 29, 88
Dr. Norma Cuellar, Nursing, 48, 126
Dr. Glenn Davis, Rural Health Institute for Clinical and Translational Science, 36, 72
Dr. Lisa Davis, Geography, 23, 111
Dr. Priscilla Davis, Communicative Disorders, 22, 71, 120
Dr. Jason Decaro, Anthropology, 19, 90
Dr. Andrew Dewar, New College, 4, 87
Dr. Janeann Dill, New College, 4, 5, 80, 87

Dr. David A. Dixon, Chemistry, 19, 20, 21, 22, 33, 63, 64, 68, 73, 75, 86, 92, 96, 104, 111, 114
 Dr. Carol Duffy, Biological Sciences, 15, 127
 Dr. Ryan Earley, Biological Sciences, 5, 14, 17, 51, 75, 81, 96
 Dr. Jennifer Edmonds, Biological Sciences, 16, 71
 Dr. Rick Fernandez, Chemistry, 31, 86
 Dr. Cassandra Ford, Nursing, 47, 83
 Dr. David Forde, New College, Criminal Justice, 22, 26, 87, 98
 Dr. Patrick A. Frantom, Chemistry, 8, 122
 Dr. Rachel Frazier, AIME, 8
 Dr. Kenneth Fridley, Civil, Construction, and Environmental Engineering, 28, 70
 Dr. Marysia Galbraith, New College, Anthropology, 10, 24, 53, 65, 79, 113
 Dr. Doug Gibler, Political Science, 10, 11, 25, 56, 104, 109
 Dr. Buddy Goertz, Advancement Services, 24, 65
 Dr. Andrew Graettinger, Civil, Construction, and Environmental Engineering, 34, 115
 Dr. David Grau, Civil, Construction, and Environmental Engineering, 30, 108
 Dr. Jennifer Greer, Journalism, 41, 93
 Dr. Rosanna Guadagno, Psychology, 25, 102, 108
 Dr. Monika Gragg, Nursing, 47
 Dr. Subhadra Gupta, Metallurgical and Materials Engineering, 27, 28, 56, 70, 84
 Dr. Christa Hackney, ADAP, 49, 84
 Dr. David Hale, Management Information Systems, 38, 98, 101, 115
 Dr. Carl B. Hancock, Music, 13, 128
 Dr. Teri Henley, Advertising and Public Relations, 40
 Dr. Maria Hernandez-Reif, Human Development and Family Studies, 43, 45, 83, 125
 Dr. Scott Hestevold, Philosophy, 4, 102
 Dr. Lisa Hooper, Counselor Education, 42
 Dr. Rick Houser, Educational Studies in Psychology, Research Methodology, and Counseling, 41, 97
 Dr. Paul Hubner, Aerospace Engineering, 29, 33, 72, 114
 Dr. Andrew Huebner, History, 5, 59
 Dr. Matthew Jenny, Biological Sciences, 7, 18, 85, 108
 Dr. Paan Jindapon, Economics, 37, 38, 55, 96, 126
 Dr. Margaret D. Johnson, Biological Sciences, 15, 58
 Dr. Stanley E. Jones, Aerospace Engineering, 31
 Dr. Eyun-Jung Ki, Advertising and Public Relations, 40, 61
 Dr. Rebecca Kelly, Academic Affairs, 12, 59
 Dr. Burcu Keskin, Business Administration, 39, 117
 Dr. Yang Ki Hong, Electrical and Computer Engineering, 35, 68, 101
 Dr. Margaret Kim, Electrical and Computer Engineering, 36, 54
 Dr. Tonya Klein, Chemical and Biological Engineering, 32, 53
 Dr. Laura Klinger, Psychology, 25, 58, 69
 Dr. Mark Klinger, Psychology, 25, 124
 Dr. Vernon J. Knight, Anthropology, 19, 111
 Dr. Linda Knol, Human Nutrition and Hospitality Management, 45, 100
 Dr. Sushma Kotru, Electrical and Computer Engineering, 30, 69
 Dr. Patrick Kung, Electrical and Computer Engineering, 34, 127

Dr. Amy Lang, Aerospace Engineering, 29, 30, 31, 85, 89, 116
 Dr. David Lanoue, Political Science, 24, 61
 Dr. Patrick LeClair, Physics and Astronomy, 24, 35, 55, 120
 Dr. Deidre Leaver-Dunn, Athletic Training, 43, 44, 45, 46, 51, 59, 66, 70, 78, 82, 103, 105, 115, 121
 Dr. Lisa LeCount, Anthropology, 18, 73
 Dr. Bronwen Lichtenstein, Criminal Justice, 10, 94
 Dr. Celia Lo, Criminal Justice, 9, 118
 Dr. Juan Lopez Bautista, Biological Sciences, 17, 61
 Dr. Yingyan Lou, Civil, Construction, and Environmental Engineering, 36, 90
 Dr. Christopher Lynn, Anthropology, 18, 95
 Dr. Stevan Marcus, Biological Sciences, 5, 98
 Dr. Utz McKnight, Political Science, 10, 38, 52, 115
 Dr. Kevin McQuary, Athletics, 40, 123
 Dr. Ashley McWaters, English, 12, 54
 Dr. Sharif Melouk, Management Information Systems, 37, 52
 Dr. David Michelson, History, 11, 28, 33, 54, 74, 88
 Dr. Debra Nelson-Gardell, Social Work, 48, 81
 Dr. Robert Nelson, English, 12, 51
 Dr. Jen Nickelson, Health Science, 42, 43, 44, 46, 60, 65, 114, 119, 121
 Dr. David E. Nikles, Chemistry, 7, 19, 102, 116
 Dr. Stormy L. O'Bryant, CCHS, 9
 Dr. Janis O'Donnell, Biological Sciences, 15, 16, 61, 66
 Dr. Semih Olcman, Aerospace Engineering, 32, 80
 Dr. JoAnn Oliver, Nursing, 47, 125
 Dr. Julie Olson, Biological Sciences, 22, 100
 Dr. Jeff Parker, Psychology, 26, 98
 Dr. Andreas G. Piepke, Physics and Astronomy, 9, 82
 Dr. Uzma Raja, Management Information Systems, 38, 7
 Dr. Katrina Ramonell, Biological Sciences, 14, 15, 108, 112
 Dr. Dan Riches, History, 11, 57
 Dr. Leslie Rissler, Biological Sciences, 14, 15, 128
 Dr. Cliff Robb, Consumer Sciences, 43, 60
 Dr. Robin D. Rogers, Chemistry, 21, 105
 Dr. Sammit Roy, Aerospace Engineering, 30, 107
 Dr. Randy Salekin, Psychology, 26, 109
 Dr. Ion Stancu, Physics and Astronomy, 9, 112
 Dr. Adam Schwartz, Telecommunication and Film, 39, 105, 123
 Dr. Jason Scofield, Human Development and Family Studies, 17, 26, 42, 66, 99, 122
 Dr. Jason Senkbeil, Geography, 23, 113
 Dr. Shane Sharpe, Honors College, 27, 92
 Dr. Kevin H. Shaughnessy, Chemistry, 7, 19, 21, 57, 76, 77, 85, 97, 106
 Dr. Xiangrong Shen, Mechanical Engineering, 27, 93
 Dr. Diane Shu, Music, 128
 Dr. Diane B. Shultz, Music, 13
 Dr. Norman Singer, Law, 11, 84

Dr. Gary Sloan, Biological Sciences, 6
Dr. Scott Spear, AIME, 8, 118
Dr. Steve Thoma, Educational Studies in Psychology, Research Methodology, and Counseling, 41, 97
Dr. Amanda Thompson, Clothing, Textiles, and Interior Design, 46, 97
Dr. Gregory Thompson, Metallurgical and Materials Engineering, 29, 81
Dr. Frank Thompson, Communication Studies, 39, 125
Dr. Mark Thomas, CCHS, 40, 91
Dr. Beverly Thorn, Psychology, 26, 53
Dr. Joseph S. Thrasher, Chemistry, 17, 31, 69
Dr. Lori Turner, Health Science, 43, 79
Dr. John Vincent, Chemistry, 21, 72
Dr. Amy Weislogel, Geological Sciences, 23, 83, 118
Dr. Fred Whiting, English, 12, 107
Dr. Heather Whitley, CCHS, 9, 73
Dr. Javonda Williams, Social Work, 48, 49, 88, 89, 106, 118
Dr. Felecia Wood, Nursing, 47, 92
Dr. Anna Yaros, Center for the Prevention of Youth Behavior Problems, 24, 116
Dr. John Yoder, Biological Sciences, 6, 62

Departments

ADAP, 49, 84
Advancement Services, 24, 65
Advertising and Public Relations, 33, 39, 40, 41, 61, 75, 91, 99, 109, 121
Aerospace Engineering, 29, 30, 31, 32, 33, 62, 64, 80, 85, 88, 89, 106, 107, 114, 116
AIME, 8, 118, 120
Anthropology, 10, 11, 18, 19, 65, 73, 84, 90, 95, 111, 113, 120
Athletic Training, 43, 44, 45, 46
Athletics, 40, 123
Biological Sciences, 5, 6, 7, 9, 14, 15, 16, 17, 18, 22, 32, 50, 51, 55, 57, 58, 60, 61, 62, 66, 67, 69, 71, 75, 78, 79, 80, 81, 85, 89, 91, 93, 98, 99, 107, 108, 110, 112, 127, 128
Business Administration, 37, 39, 113, 117
CCHS, 40, 91
Chemical and Biological Engineering, 6, 9, 30, 31, 32, 34, 53, 59, 62, 63, 67, 86, 127
Chemical Engineering, 20, 33, 35, 40, 68, 75, 91, 100, 104, 109, 111
Chemistry, 6, 7, 8, 9, 17, 19, 20, 21, 22, 31, 32, 33, 42, 50, 57, 63, 64, 68, 69, 72, 73, 75, 76, 77, 85, 86, 92, 95, 96, 97, 101, 102, 104, 105, 106, 111, 114, 116, 117, 118, 119, 120, 122, 123
Civil, Construction, and Environmental Engineering, 28, 34, 115
Clothing, Textiles, and Interior Design, 46, 97
Communication Studies, 39, 125
Communicative Disorders, 22, 26, 71, 120
Community and Rural Medicine, 9, 73
Computer Based Honors, 5, 6, 7, 8, 9, 12, 16, 18, 21, 22, 24, 27, 28, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 45, 49, 46, 47, 50, 51, 52, 54, 55, 58, 59, 62, 63, 64, 65, 68, 71, 72, 73, 74, 75, 78, 80, 82, 84, 85, 86, 88, 90, 91, 92, 93, 95, 96, 97, 100, 104, 107, 108, 109, 111, 112, 113, 114, 115, 117, 122, 123
Computer Science, 28, 29, 30, 33, 47, 54, 88, 92, 109
Consumer Sciences, 31, 43, 60, 80
Counselor Education, 42
Criminal Justice, 9, 10, 22, 87, 94, 118
Curriculum & Instruction, 41
Dance, 4, 13, 91, 121
Economics, 37, 38, 55, 96, 126
Educational Studies, Psychology, Research Methodology, and Counseling, 41, 97
Electrical and Computer Engineering, 9, 29, 30, 32, 34, 35, 36, 41, 54, 55, 68, 69, 97, 101, 106, 117, 118, 119, 127
Emerging Scholars Program, 9, 17, 21, 26, 27, 29, 30, 32, 35, 37, 40, 41, 47, 48, 55, 59, 60, 61, 62, 66, 68, 77, 85, 86, 87, 89, 92, 93, 118
English, 12, 51, 54, 107
Environmental Science, 23
Geography, 23, 74, 83, 111, 113
Geological Sciences, 22, 23, 78, 100, 111, 117, 118
Health Promotion and Wellness, 12, 59
Health Science, 42, 43, 44, 45, 46, 51, 59, 60, 66, 70, 78, 79, 82, 102, 103, 104, 105, 114, 115, 121
History, 5, 11, 28, 33, 54, 57, 58, 59, 74, 76, 88, 99

Honors College, 16, 21, 26, 29, 36, 41, 79
Human Development and Family Studies, 17, 26, 42, 43, 44, 45, 83, 99, 122, 124, 125
Human Nutrition and Hospitality Management, 45, 89, 90, 100
Journalism, 41, 93
Kinesiology, 42, 65
Management and Marketing, 37, 87
Management Information Systems, 20, 37, 38, 52, 74, 95, 98, 101, 115
Mathematics, 24, 36, 65, 90
McNair Scholars, 5, 6, 7, 10, 13, 16, 26, 47, 67, 83, 98, 115
Mechanical Engineering, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 52, 56, 63, 64, 72, 74, 76, 79, 80, 93, 94, 96, 108, 122, 123, 124, 125, 126
Metallurgical and Materials Engineering, 27, 28, 29, 70, 81, 84
MINT, 24, 120
Music, 4, 10, 12, 13, 58, 59, 62, 87, 103, 104, 115, 128
Music Therapy, 12, 13
New College, 4, 5, 10, 22, 24, 39, 41, 53, 65, 79, 80, 87, 97, 105, 107, 113, 116, 123
Nursing, 47, 48, 82, 83, 92, 125, 126
Pediatrics, 20
Philosophy, 4, 102
Physics and Astronomy, 9, 24, 35, 55, 82, 112, 120
Political Science, 4, 10, 11, 12, 24, 25, 40, 41, 56, 61, 91, 102, 104, 109, 115, 121
Psychology, 10, 25, 26, 40, 53, 58, 66, 68, 69, 77, 86, 94, 97, 98, 99, 102, 108, 109, 124
Rural Health Institute for Clinical and Translational Science, 36
Social Work, 48, 49, 81, 88, 89, 106, 118
Sociology, 10, 26, 94, 98
Statistics, and Management Science, 37, 52
Telecommunication and Film, 39, 40, 91, 105, 123

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Members of the Undergraduate Research and Creative Activities Committee organized today's event and solicited papers from their respective students. We gratefully acknowledge their hard work in making this conference possible.

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