Undergraduate Research Creative Activity Conference

Oral and Poster Presentations Schedule and Abstracts

April 11th, 2011
Bryant Conference Center
2:00- 6:00 p.m.
April 11, 2011

Dear Participants:

Welcome to the Fourth Annual University of Alabama Undergraduate Research and Creative Activity Conference. We are excited to have students representing all academic disciplines participating in this event. The continued growth in participation proves that research and creative activities have become a hallmark of the undergraduate experience at The University of Alabama.

Our faculty constantly seeks new opportunities to engage our undergraduate students in quality research, discovery and creative endeavors that will define their academic experience at the Capstone. We want to provide special thanks to the faculty members who have mentored our student presenters today as these talented students begin what we hope will be a long journey of scholarly achievement and discovery. We also offer hearty congratulations to each student participant for his/her contribution to the impressive body of work presented today.

This year’s event builds on the Third Annual University of Alabama Undergraduate Research and Creative Activity Conference and the Research and Creative Activities program initiated by the College of Arts and Sciences almost eight years ago. Through the collaborative efforts of the Office for Research, the Undergraduate Research and Creative Activities Committee, the Graduate School and the academic colleges and schools this has become a premier event at The University of Alabama. Sincere thanks to these groups for making today's conference possible through their tireless efforts in planning and development.

We celebrate this established tradition of annually recognizing the research and creative accomplishments of our best and brightest undergraduate students.

Judy Bonner
Executive Vice President and Provost

Judy Benson
Vice President for Research and Vice Provost
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4th Annual Undergraduate Research & Creative Activity Conference

Event Schedule

April 11th, 2011

Registration:
Sellers Lobby 12:00 p.m. - 2:00 p.m.

Oral Presentations:
College of Arts & Sciences
Rast Conference Room A 2:00 p.m. - 4:00 p.m.
Rast Conference Room B 2:00 p.m. - 4:00 p.m.
Wilson Room 2:00 p.m. - 4:15 p.m.
Central Bank Room 2:00 p.m. - 4:00 p.m.
Birmingham Room 2:00 p.m. - 4:00 p.m.

Culverhouse College of Commerce and Business Administration
Nichols Room 3:00 p.m. - 3:40 p.m.

College of Communication & Information Sciences
Nichols Room 3:40 p.m. - 4:20 p.m.

College of Education
Nichols Room 4:20 p.m. - 5:00 p.m.

College of Human Environmental Sciences
Thames Room 3:00 p.m. - 4:40 p.m.

School of Social Work
Logan room 3:00 p.m. - 3:40 p.m.

Poster Presentations:
All Colleges
Sellers Auditorium 2:00 p.m. - 6:00 p.m.

Conveying of Judges:
Cavalier Room 2:00 p.m. - 6:00 p.m.
Awards Presentations

College of Arts & Sciences
Sellers Auditorium 6:00 p.m.

Culverhouse College of Commerce and Business Administration
Morgan Board Room 4:30 p.m.

College of Communication & Information Sciences
Smith Board Room 5:30 p.m.

College of Education
Nichols Room 5:30 p.m.

College of Human Environmental Sciences
Thames Room 5:30 p.m.

School of Social Work
Smith Board Room 4:45 p.m.

College of Engineering
Morgan Board Room 5:30 p.m.

Capstone College of Nursing
Logan Room 4:30 p.m.

University Libraries Undergraduate Research Prize in Humanities & Social Sciences Award
Morgan Board Room 5:15 p.m.
Schedule of Oral & Poster Presentations

4th Annual Undergraduate Research & Creative Activity Conference

College of Arts & Sciences
Oral Presentations

Division of Social Sciences

Rast Conference Room A
Group 1

2:00
Katherine Overton, Anthropology, Honors College
Faculty Mentor: Christopher Lynn, Anthropology
Flickering Light Phenomena: The Influence of Visual Stimuli on Relaxation

2:15
Lauren Wiggins, Anthropology, Emerging Scholars Programs, Honors College
Faculty Mentor: Ian Brown, Anthropology
The Spatial Distribution of Check and Rocker Stamped Ceramics at the Armory Site in Dallas County, Alabama

2:30
Kim Roy, Anthropology, Honors College
Faculty Mentor: Ian Brown, Anthropology
Society’s Say: Influences on the Placement of Women’s Burials in Evergreen Cemetery

2:45
Courtney Cooper, Political Science, Honors College
Faculty Mentor: Barbara Chotiner, Political Science
The Burden of History

3:00
Isabela Morales, History, Honors College, McNair Scholars
Faculty Mentor: Jenny Shaw, History
Abuse and Influence: Reconstructing the Lives of Seven Enslaved Women, 1830-1856
3:15
Amy Castleberry, History
Faculty Mentor: Kari Frederickson, History
Integration at the University of Alabama: An Oral History

3:30
Markus Harris, African American Studies
Faculty Mentor: Maha Marouan, African American Studies
Black Success at Bama

3:45
Johnna Dominguez, Anthropology, Honors College
Faculty Mentor: Christopher Lynn, Anthropology
Performances of Power: Crossing the Boundaries of Aggression and Sexuality in American Football and Burlesque

Rast Conference Room B
Group 2
2:00
Jonathan Williams, Political Science, Honors College
Faculty Mentor: Barbara Chotiner, Political Science
Factors in the Rise of Radicalism in Conflict

2:15
Ayla Luers, Political Science
Faculty Mentor: Barbara Chotiner, Arts & Sciences - Social Sciences - Political Science
How Hitler's policy of aggression became Stalin's political advantages during World War II

2:30
Graham Gillespie, Political Science
Faculty Mentor: Barbara Chotiner, Political Science
Lawlessness in Central Europe: The Impact of Corruption on the Democratization of Former Soviet States

2:45
James Yerby, History, Computer Based Honors Program
Faculty Mentor: Andrew Huebner, History
Mae and Lige

3:00
Whitney Hobson, Political Science, Honors College
Faculty Mentor: Barbara Chotiner, Political Science
Exploring the Technological Possibilities of Participatory Democracy
3:15  
**Carlyn James**, Anthropology, Honors College  
Faculty Mentor: Christopher Lynn, Anthropology  
*What Are Friends For?: Understanding How Social Networks Impact West African Female Immigrant Livelihood*

3:30  
**Charlotte Cover**, History  
Faculty Mentor: Renee Raphael, History  
*The Universities of Early Modern Italy*

3:45  
**Lisa Elizondo**, American Studies Honors College, McNair Scholars  
Faculty Mentor: Michael Innis-Jiménez American Studies  
*Off the Border: Mexican Americans in Washington State*

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**Division of Fine Arts & Humanities**

**Wilson Room**

2:00  
**Margaret Brandl**, English, Honors College  
Faculty Mentor: Emily Wittman, English  
*Selig sind: A Work of Translation and Requiem*

2:15  
**Forrest Phillips**, English, Honors College  
Faculty Mentor: Albert Pionke, English  
*Navigating the Image: Interpretation and Meaning in the Self-Reflexive Film*

2:30  
**Jessica Cheek**, English, Honors College  
Faculty Mentor: Nikhil Bilwakesh, English  
*J.D. Salinger’s Glass Family: Religious Medley in 20th Century America*

2:45  
**Parker White**, English, Honors College  
**Lauren Adams**, English  
Faculty Mentor: Patti White, English  
*Go Outside: The Poetics of Space*
3:00  
**Coston Perkins**, Modern Languages & Classics  
Faculty Mentor: Ignacio Rodeño, Modern Languages & Classics  
*Macho Man: Representations of Masculinity in Puerto Rican Cultural Production*

3:15  
**Shannon Lindamood**, Theater & Dance, Honors College  
Faculty Mentor: Sarah Barry, Theater & Dance  
*Creative Being*

3:30  
**Rebecca Howard**, Theater & Dance, Honors College  
Faculty Mentor: Sarah Barry, Theater & Dance  
*Transitioning from Dancer to Dancemaker*

3:45  
**Ryan Davis**, Art, Honor College  
Faculty Mentor: Andrew Dewar, Art  
*Hip Hop and Graphic Novels: Fulfillment of Kandinsky’s Artistic Composition Theory?*

4:00  
**Greg Banks**, Music  
Faculty Mentor: Jennifer Caputo, Music, New College  
*Demonstrating the Role of the Aisimevu in Ghanaian Drumming*

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**Division of Natural Sciences & Mathematics**

**Central Bank Room**  
Group 1  
2:00  
**Erica Schwalm**, Chemistry, Computer Based Honors Program  
Faculty Mentor: Patrick Frantom, Chemistry  
*Allosteric Regulation of Isopropylmalate Synthase*

2:15  
**Darryl (DJ) Outlaw**, Chemical & Biological Engineering, Computer Based Honors Program  
Faculty Mentor: David Dixon, Chemistry  
*Structure Predictions of the Properties of Metal Ammonia Borane Complexes 2:20*
2:30
Awuri Asuru, Chemistry, Honors College
Leslie Gentry, Chemistry
Faculty Mentor: Laura Busenleber
Use of Chemical Crosslinking to Determine the Interaction between the Mitochondrial Proteins Frataxin, Ferrochelatase, and Aconitase

2:45
Ashley Getwan, Chemistry, Computer Based Honors Program
Gaines Gibson, Chemical and Biological Engineering
Faculty Mentor: John Wheat, Community and Rural Medicine
Narrative Rural Medicine

3:00
Emily Wayman, Chemistry, Computer Based Honors Program, Honors College
Faculty Mentor: Patrick Frantom, Chemistry
Biochemical characterization of glucosyl-3-phosphoglycerate synthase from Mycobacterium tuberculosis

3:15
Andrew Tuggle, Physics & Astronomy, Computer Based Honors Program
Faculty Mentor: Claudia Mewes, MINT
Spinlogic -- the logic of the future?

3:30
Mitchell Hughes, Physics & Astronomy, Computer Based Honors Program, Honors College
Faculty Mentor: Andreas Piepke, Physics & Astronomy
Monte Carlo Simulation and Data Analysis for the EXO Muon Veto System

3:45
Taylor Scruggs, Biological Sciences
Elyse Love, Biological Sciences
Faculty Mentor: Laura Reed, Biological Sciences
Bioinformatic Metabolic Phenotype Database

Birmingham Room
Group 2
2:00
Mike Zhang, Biological Sciences
Faculty Mentor: Guy Caldwell, Biological Sciences
Identifying Genetic Factors Associated with Aging that Influence Susceptibility to Parkinson's Disease
2:15
Matthew Hicks, Biological Sciences, Honors College, McNair Scholars
Bwarenaba Kautu, Biological Sciences
Faculty Mentor: Kimberly Caldwell, Biological Sciences
Investigating the Role of Heterotrimeric G-protein Signaling in a C. elegans Parkinson’s Disease Model

2:30
Alejandro Carrasquilla, Biological Sciences
Faculty Mentor: Guy Caldwell, Biological Sciences
Novel Therapeutic Strategies for a More Effective Treatment of Dystonia

2:45
Laura Frost, Biological Sciences,
Faculty Mentor: John Clark, Biological Sciences
Origins of radial floral symmetry in the New World members of the flowering plant family Gesneriaceae

3:00
Bryan Herren, Biological Sciences
Faculty Mentor: Guy Caldwell, Biological Sciences
Investigating the VPS-C Complex in a C. Elegans model of Alzheimer’s Disease.

3:15
Daniel Whittelsey, Biological Sciences
Candice Hovell, Biological Sciences
Faculty Mentor: Ryan Earley, Biological Sciences
An Examination of the Neurobiology of Social Stress and its Implications for Memory Acquisition and Retention in Cichlid Fish

3:30
Douglas Weathers, Mathematics
Faculty Mentor: Roger Sidje, Mathematics
Computing the Exponential Function with Laguerre Polynomials

3:45
Maggie Adams, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Laura Busenlehner, Chemistry
Using Hydrogen-Deuterium Exchange Mass Spectrometry to Study Conformational Changes in MutM
College of Arts & Sciences
Poster Presentations
Division of Natural Sciences & Mathematics

Sellers Auditorium

1A
Kay Rainey, Biological Sciences, Honors College
Jake Powers, Biological Sciences
Faculty Mentor: Ryan Earley, Biological Sciences
Plasticity for plasticity's sake: a new perspective on gender roles in Kryptolebias marmoratus

1B
Jake Powers, Biological Sciences
Kay Rainey, Biological Sciences
Faculty Mentor: Ryan Earley, Biological Sciences
Males in a Hermaphrodite's World: What Does Temperature have to do with it?

2A
Rodney Littlejohn, Chemistry, Honors College
Faculty Mentor: Franchessa Maddox, Chemistry
Metallic solution infiltration methods for creation of high surface area metal replicas of silica monoliths with multimodal porosity

2B
Rebecca England, Biological Sciences, Honors College
Faculty Mentor: Guy Caldwell, Biological Sciences
Neuron-Specific RNAi to Identify Genes Affecting Dopamine Neuron Death in a C. elegans Model for Parkinson's Disease

3A
Paige Dexter, Biological Sciences
Faculty Mentor: Guy Caldwell, Biological Sciences
Genetic Analysis of MicroRNAs to Identify Regulators of Neurodegeneration in Parkinson's Disease Models

3B
Andrew Jones, Biological Sciences
Brandon Hill, Biological Sciences
Faculty Mentor: Carol Duffy, Biological Sciences
Attachment of proteins to magnetic iron oxide nanoparticles via a novel coiled-coil mechanism: expression and purification of engineered coil fusion proteins.
4A
Lindsay Reynolds, Biological Sciences
Faculty Mentor: Kim A Caldwell, Biological Sciences
*A genetic screen to identify genes associated with both Parkinson’s disease and aging*

4B
Jessica Jones, Chemistry
Faculty Mentor: Kevin Shaughnessy, Chemistry
*Ligand Steric Effects in Palladium Catalyzed α-Arylation of Ketones*

5A
Kali Coleman, Chemistry
Faculty Mentor: Kevin Shaughnessy, Chemistry
*Synthesis of Neophyl Phosphine Ligands and Their Use in Palladium-Catalyzed Cross-Coupling Reactions*

5B
Eric Wenzinger, Chemistry, Emerging Scholars Program
Faculty Mentor: Silas Blackstock, Chemistry
*Determining the X-ray Crystal Structures of a Recyclable Solar Fuel System*

6A
Madeline Creekmore, Chemistry, Honors College
Faculty Mentor: Silas Blackstock, Chemistry
*A Search for Ball & Socket Complexes of Buckminsterfullerene and Polyarylamines*

6B
Emma Catt, Chemistry, Honors College
Faculty Mentor: Kevin Shaughnessy, Chemistry
*Synthesis of New Water-Soluble Phosphine Ligands for use in Palladium-Catalyzed Coupling Reactions*

7A
Michael Gleason, Biological Sciences, Honors College
Faculty Mentor: Gregory Starr
*The Effects of Soil Moisture Availability on Methane Fluxes from a Short-Hydroperiod Marsh within Everglades National Park*

7B
Mikell Pearce, Biological Sciences, Honors College
Alexander Thompson, Biological Sciences
Faculty Mentor: Ryan Earley, Biological Sciences
*The True Cost of Combat: Exploring the Effects of Physical Damage on Fighting Using Fluorescein Dye*
8A
Grant Cochran, Chemistry, Computer Based Honors Program, Honors College
Faculty Mentor: John Yoder, Biological Sciences
Post-Abdominal Reduction via Wingless Regulation

8B
Akeem Borom, Biological Sciences
Faculty Mentor: Kimberlee Caldwell, Biological Sciences
Association Between the Insulin-Signaling Pathway and Development of Parkinson's Disease

9A
Kaylan Gee, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Jennifer Edmonds, Biological Sciences
Changes in Microbial Communities in Coastal Plain streams: the Influence of Beaver Wetlands

9B
Reed Morgan, Biological Sciences, McNair Scholars
Faculty Mentor: Ansley Gilpin, Psychology
Exploring Trustworthiness through Accuracy and Conventionality

10A
Cyrus Massouleh, Chemistry, Computer Based Honors Program, Honors College
Faculty Mentor: Tammy Carroll, Psychology
iHelp for Autism: Using iPads to Teach Communication Skills to Children with Autism

10B
Matthew Kelley, Chemistry, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry
Potential Energy Surfaces for Oxidative Dehydrogenation on Group VI Transition Metal Oxide Nanoclusters

11A
Jessica Duke, Chemistry, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry
Modeling Water in Supercritical CO2 and Reactions at Mineral Surfaces for the Geological Sequestration of CO2

11B
Stephen Walker, Chemistry, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry
Computational Studies of Metal Ion Complexation Reactions in Aqueous Solution

12A
Darrow Thomas, Biological Sciences
Faculty Mentor: Scott Spear, AIME
Environmentally Responsive Drug Release Matrix
12B
Claire Davis, Chemistry, Computer Based Honors Program
Faculty Mentor: Patrick Frantom, Chemistry
*Characterization of Enzymes Involved in the Biodegradation of 1-Butanol*

13A
Paul Strickland, Chemistry, Computer Based Honors Program, Honors College
Faculty Mentor: Jason Parton, Community & Rural Medicine
*Trauma vs. Medical Emergency Call Disparities in Rural and Urban Areas*

13B
Chelsea Raulerson, Biological Sciences, Computer Based Honors Program, Honors College
Faculty Mentor: Ryan Earley, Biological Sciences
*Is Infinite Strength Achievable? Implications for Dominance Hierarchy Formation in Animals*

14A
Mark Pinkerton, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Matthew Jenny, Biological Sciences
*Characterization of the Oxidative Stress Response in Zebrafish Embryos via in situ Hybridization*

14B
Rebecca Ansorge, English, Computer Based Honors Program
Faculty Mentor: Matthew Jenny, Biological Sciences
*Differential Expression of miRNAs mediated by Cadmium Exposure or Transcriptional Activation via Metal Regulatory Transcription Factor 1 (MTF-1)*

15A
Lindsay Lindsey, Biological Sciences, Computer Based Honors Program, Honors College
Faculty Mentor: Matthew Jenny, Biological Sciences
*MTF-1 and NRF2 Regulatory Interactions in Response to Metal and Oxidative Stress*

15B
Lindsay Lindsey, Biological Sciences, Computer Based Honors Program, Honors College
Faculty Mentor: Craig Wedderspoon, Art
*The Fibonacci Project*

16A
Elizabeth Lee, Biological Sciences
Griff Hall, Biological Sciences
Faculty Mentor: Ryan Earley, Biological Sciences
*The Stages of Embryological Development of Kryptolebias marmoratus*
16B
**Carolyn Craig**, Biological Sciences
**Amelia Nuwer**, Biological Sciences
Faculty Mentor: Julie Olson, Biological Sciences
*Where do sponges get their bacteria from?*

17A
**Ethan Sales**, Biological Sciences, Honors College
Faculty Mentor: Kim Caldwell, Asian Studies
*Association between Alzheimer’s disease and the insulin-signaling pathways*

17B
**Tavio Pirocchi**, Biological Sciences, Honors College
Faculty Mentor: Kim Caldwell, Biological Sciences
*Therapeutic drug discovery in an animal model for Alzheimer’s disease*

18A
**Koushik Kasanagottu**, Biological Sciences, Honors College
**Josh Kim**, Biological Sciences
Faculty Mentor: Janis O’Donnell, Biological Sciences
*Zinc and lithium in dopamine neuron disorders*

18B
**George Agee**, Biological Sciences
Faculty Mentor: Janis O’Donnell, Biological Sciences
*Dissecting the Role of Catsup at the Synapse*

19A
**Zoe Stamatelos**, Chemistry, Emerging Scholars Program
**Charles McGahey**, Biological Sciences
Faculty Mentor: Janis O’Donnell, Biological Sciences
*Mechanisms for Dopamine Function in Torsin Dystonia*

19B
**Sarah Boyd**, Biological Sciences, Honors College
Faculty Mentor: Janis O’Donnell, Biological Sciences
*The Effects of Iron Oxide Nanoparticles on Drosophila Development*

20A
**Zac Lovoy**, CBHP, Computer Based Honors Program, Honors College
Faculty Mentor: John Clark, Biological Sciences
*The Gesneriaceae Image Library – A Tool For Field Biologists*
20B
Coston Rowe, Biological Sciences
Yi Chen, Biological Sciences
Hayley Leuch, Biological Sciences
Faculty Mentor: Janis O'Donnell, Biological Sciences
Gene interactions in genetic models of Parkinson's disease and autism

21A
Micah Larsen, Geography
Faculty Mentor: Lisa Davis, Geography
Natural vs. Controlled Stream Data

21B
Joel Thorn, Geography
Faculty Mentor: Mary Pitts, Geography
A Comparative Assessment of Satellite Data Analysis Techniques in Remote Sensing

22A
Ryan Tucker, Physics & Astronomy, Computer Based Honors Program
Faculty Mentor: Patrick Leclair, Physics & Astronomy
3D Physics Simulation Program for Educational Use

22B
Kimberly Hamrick, Mathematics, Computer Based Honors Program, Honors College
Faculty Mentor: John Wait, Family Medicine
Web 2.0 Use in Primary Care Medical Education

23A
Mason Volk, Physics & Astronomy
Faculty Mentor: Andreas Piepke, Physics & Astronomy
WIPP Detector Simulation

23B
Camille Perrett, Geography, Honors College
Faculty Mentor: John Clark, Biological Sciences
Molecular Phylogeny of Adiantopsis rupicola

24A
Kirsten Ansorge, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Matthew Jenny, Biological Sciences
Differential Expression of miRNAs mediated by Cadmium Exposure or Transcriptional Activation via Metal Regulatory Transcription Factor 1 (MTF-1)
24B
**Ethan Sales**, Biological Sciences, Honors College
Faculty Mentor: Kimberlee Caldwell, Asian Studies
*Association between Alzheimer's disease and the insulin-signaling pathways*

25A
**Grace Hoover**, Chemical & Biological Engineering, Computer Based Honors Program
**Landon Mueller**, Biological Sciences
Faculty Mentor: Jennifer Edmonds, Biological Sciences
*Analysis of the Fluorescence of Stream Dissolved Organic Matter*

**Division of Social Sciences**

**Sellers Auditorium**

25B
**Matthew Cuellar**, Psychology
**Paige Bussanich**, Psychology
Faculty Mentor: Fran Conners, Psychology
*Predictors of Language Impairment in Developing Adolescents*

26A
**Courtney Guy**, Psychology, Honors College, Psychology Honors Program
Faculty Mentor: James Hamilton, Psychology
*The Relation Between Children's and Adolescents' Self-Esteem, Social Support, and Health Appraisals*

26B
**Matthew Jones**, Psychology, Honors College
Faculty Mentor: Rosanna Guadagno, Psychology
*Good vs. Evil: A Study of Gender in Avatar Selection and Alignment*

27A
**Emberly Jay**, Psychology
Faculty Mentor: Beverly Thorn
*Spiritual/Religious Values and Attitudes Regarding Complementary and Alternative Medicine*

27B
**Leslie Mathis**, Psychology
**Katelyn Hillman**, Psychology
Faculty Mentor: Mark Klinger, Psychology
*Relationship of nonverbal ability to receptive syntax and vocabulary*
28A

John Harris, Psychology, Honors College, Psychology Honors
Faculty Mentor: Rosanna Guadagno, Psychology
Social Influence Online: The Impact of Social Proof and Likeability on Compliance

28B

Rebecca Thompson, Psychology, Honors College
Faculty Mentor: James Hamilton, Psychology
The Psychology of Vicarious Victimization

29A

Natalie Hallmark, Psychology
Stephen Cheek, Psychology
Faculty Mentor: James Hamilton, Psychology
Research in Health Symptom Reporting and Social Exclusion

29B

Michelle Bailey, Psychology
Faculty Mentor: Jim Hamilton, Psychology
Femininity and Masculinity in the Sick Role

30A

Caitlyn Hearn, Communicative Disorders, Emerging Scholars Program
Faculty Mentor: Marcia Hay-McCutcheon, Communicative Disorders
Adult Cochlear Implant Recipients and Speech Timing Cues

30B

Edward Gray, History, Honors College
Ryan Stitt, History
Christian Wehby, History
Faculty Mentor: David Michelson, History
Syriac Research Portal

31A

William McCarty, CBHP, Computer Based Honors Program, Honors College
Faculty Mentor: Amy Holmes-Tagchungdarpa History
Revolutionizing Jonang Buddhism Research: Digital Mapping for the Jonang Foundation

31B

Stephen Killen, Anthropology
Faculty Mentor: Chris Lyon, Anthropology
Working on the Railroad: How Work Songs Have Shaped the Human Brain
32A
Emmalea Gomberg, Anthropology
Elizabeth Hunt, Anthropology
Faculty Mentor: Vernon Knight, Anthropology
Pottery Vessel Uses in Native Cuban Foodways

32B
Margaret McCormick, History, Computer Based Honors Program
Faculty Mentor: David Michelson, History
Ancient Documents in a Digital Age: The Syriac Reference Portal

33A
Taylor Payne, Anthropology, Honors College
Faculty Mentor: Lisa LeCount, Anthropology
An Analysis of Tempers in Ceramics from the Archaeological Site of the Asphalt Plant, AL

33B
Lindsey Tulkoff, Anthropology
Magen Kacharos, Anthropology
Faculty Mentor: Christopher Lynn, Anthropology
Getting it On (line): A Study of Sexually Compulsive Behaviors on the Internet

34A
Katlin Snow, Anthropology
Elizabeth Wilson, Anthropology
Faculty Mentor: Christopher Lynn, Anthropology
The Inking of Immunity: Investigating the Health Benefits of Tattooing

34B
Evan Alvarez, Anthropology, Emerging Scholars Program
Micki Butler, Telecommunications & Film
Faculty Mentor: Christopher Lynn, Anthropology
The Effects of Self-Enhancing Self-Deception
Division of Fine Arts & Humanities

Sellers Auditorium

35A
Matthew Shea, Art
Faculty Mentor: Christina Frantom, Art
Graphic Design at OIT

35B
Will Cotton, Theatre & Dance
Faculty Mentor: Andy Fitch, Theatre & Dance
Lighting Design for Moby Dick

36A
Laura Abston, English, Honors College
Faculty Mentor: Amy Dayton-Wood, English
Literacy and ESL in Alabama: A Survey of Adult ESL Education in Tuscaloosa

36B
Ellyn Hamm, Music, Honors College
Lelia Huber, Music
Klemel Lamb, Music
Faculty Mentor: Andrea Cevasco, Music
The Effects of Multimodal Stimulation on the Heart Rate of Premature Infants

37A
Ellyn Hamm, Music, Honors College
Faculty Mentor: Andrea Cevasco, Music
Evaluation of Parents’ Use of a Music CD Combined with Developmentally Appropriate Activities as a Cost-Effective Music Extension Program for Premature Infants After Being Discharged from the Hospital

37B
Rebecca Ansorge, English, Computer Based Honors Program
Faculty Mentor: Robert Nelson, English
Adaptive Resonance Theory: Mapping Language Learning

38A
Morgan Embry, New College, Honors College
Faculty Mentor: Jennifer Caputo, Music, New College
Benefits of Dance
Culverhouse College of Commerce and Business Administration
Oral Presentations

Nichols Room

3:00
Forrest Ford, Information Systems, Statistics & Management, Computer Based Honors Program, Emerging Scholars Program, Honors College
Doug Packard, Information Systems, Statistics & Management
Morgen Jensen, Information Systems, Statistics & Management
Faculty Mentor: David Hale, Information Systems, Statistics & Management
ALISE Process Improvement

3:20
David Wilson, Economics, Finance & Legal Studies, Honors College
Alex Clark, Advertising & Public Relations
Elisabeth Burns, Curriculum & Instruction
Faculty Mentor: Elizabeth Wilson, Curriculum & Instruction
The Think Program: Creativity. Communication. Community.

Culverhouse College of Commerce & Business Administration
Poster Presentations

Sellers Auditorium

38B
Kayla Terry, Advertising & Public Relations
Faculty Mentor: Teresa Golson, Advertising & Public Relations
Through My Lens: Exploring the campus of the University of Alabama through Photography.

39A
David Sikes, Telecommunications & Film
Faculty Mentor: Rick Dowling, Telecommunications & Film
Multimedia Services Video Crew: A High Definition Team
39B
Nathaniel Corder, Mathematics, Computer Based Honors Program
Faculty Mentor: Milton Overton, Intercollegiate Athletics
Modeling Donation Patterns of University of Alabama Athletic Ticket Holders

40A
Kyle Weeks, Finance, Computer Based Honors Program
Faculty Mentor: Kyle Fondren, Information Systems, Statistics & Management
Online Resource for the Culverhouse Investment Management Group

40B
Austin Parrish, Economics, Finance & Legal Studies, Computer Based Honors Program,
Honors College
Faculty Mentor: Gary Hoover, Economics, Finance & Legal Studies
Democrats, Republicans, and Economic Freedom: Analyzing the Effects of Political Control

41A
Austin Collins, Economics, Finance & Legal Studies, Computer Based Honors Program, Honors
College
Faculty Mentor: Paan Jindapon
Testing the Olson Paradox: A Public Goods Game

College of Communication & Information Sciences
Oral Presentations

Nichols Room

3:40
Matthew Hill, Advertising & Public Relations
Faculty Mentor: Phillip Bishop, Education-Kinesiology
Effects of exercise and heat on caffeine's diuresis: implications for military operations in the heat

4:00
Meredith Hawkins, Advertising & Public Relations
Haley Clayton, Advertising & Public Relations
Faculty Mentor: Teri Henley, Advertising & Public Relations
How Women Ages 25-34 Shop
College of Communication & Information Sciences
Poster Presentations

Sellers Auditorium

41B
Kyla Terry, Advertising & Public Relations
Faculty Mentor: Teresa Golson, Advertising/Public Relations
*Through My Lens: Exploring the campus of the University of Alabama through Photography*

42A
Miah Evans, Advertising & Public Relations
Faculty Mentor: Christina Frantom, Advertising/Public Relations
*Public Relations & Technology*

42B
David Sikes, Telecommunications & Film
Faculty Mentor: Rick Dowling, Telecommunications & Film
*Multimedia Services Video Crew: A High Definition Team*

43A
Kyle Pierce, Journalism
Faculty Mentor: Chip Brantley
*Empowering Storytellers*

College of Education
Oral Presentations

Nichols Room

4:20
Erin Shirley, Management & Marketing
Faculty Mentor: Philip Westbrook, Gender & Race Studies
*Pre-School Intervention for ESL Hispanic Students*

4:40
Joshua White, Economics, Finance & Legal Studies, Computer Based Honors Program
Faculty Mentor: Ronald Dulek, Management & Marketing
*Evaluating the Effectiveness of Service Learning*
College of Education
Poster Presentations

Sellers Auditorium

43B
**Amanda Echols**, Kinesiology
Faculty Mentor: Oleg Sinelnikov, Kinesiology
*Pre-service teachers’ perceptions and actual student participation in a Sport Education season*

44A
**Katherine Werner**, Special Education & Multiple Abilities, Computer Based Honors Program
Faculty Mentor: Andrea Mixon, Social Work
*Juvenile Justice Database*

44B
**Lindsey Blowers**, Curriculum & Instruction, Computer Based Honors Program
Faculty Mentor: Kathryn Merritt, Honors College
*Evaluating the Impact of University of Alabama Honors College Academic Outreach Initiatives*

45A
**Lauren Huffman**, Psychology, Computer Based Honors Program, Honors College
Faculty Mentor: Lisa Hooper, Counselor Education
*Project ACTS: The Assessment of Culturally-Tailored Mental Health Treatments and Services*

45B
**John Heflin**, History, Computer Based Honors Program
Faculty Mentor: Lowell Davis, CBHP
*From Plessy v. Ferguson to Brown v. Board of Education*

College of Human Environmental Sciences
Oral Presentations

Thames Room

3:00
**Melissa Powell**, Communicative Disorders
**Heather Bell**, Communicative Disorders
**Kim Sanders**, Human Development & Family Studies
Faculty Mentor: Jason Scofield, Social Sciences-Human Development & Family Studies
*Screen Media Use in Rural Children*
3:20
**Dorothy Baker**, Human Development & Family Studies
Faculty Mentor: Hyun-Joo Jeon, Human Development & Family Studies
*The Early Relationship Network of Young Children and Their Social Emotional Development*

3:40
**Sydney Wallace**, Clothing, Textiles & Interior Design
Faculty Mentor: Kristin Maki, Clothing, Textiles & Interior Design
*The Forgotten Capital*

4:00
**Kayla Kelley**, Human Development & Family Studies
Faculty Mentor: Hyun-Joo Jeon, Human Development & Family Studies
*Preschoolers Attitudes Towards Disabilities*

4:20
**Theresa Mince**, Clothing, Textiles & Interior Design, Computer Based Honors Program, Honors College
Faculty Mentor: Virginia Wimberly, Clothing, Textiles & Interior Design
*Clothing Choices of Preschool Females as Symbols of Sex Roles*

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**College of Human Environmental Sciences**
**Poster Presentations**

**Sellers Auditorium**

46A
**Evelyn Dempsey**, Health Sciences
Faculty Mentor: Lori Turner, Health Sciences
*Health Hut Wellness Education Program*

46B
**Jasmin Bush**, Health Sciences, McNair Scholars
Faculty Mentor: John Higginbotham, Community and Rural Medicine
*The Relationship of Health Literacy and Participation in Screening for Breast, Prostate, and Colorectal Cancer*
47A
Melissa Powell, Communicative Disorders
Heather Bell, Communicative Disorders
Kim Sanders, Human Development & Family Studies
Faculty Mentor: Jason Scofield, Social Sciences-Human Development & Family Studies
*Video Word Learning in Rural Children*

47B
Jenna Montgomery, Psychology
Faculty Mentor: Jason Scofield, Human Development & Family Studies
*Preschoolers Ability to Distinguish between Lying and Ignorance*

48A
Chelsea Page, Health Sciences
Faculty Mentor: Lori Turner, Health Sciences
*Reducing Motor Vehicle Accidents Among College Students: Utilization of the PRECEDE-PROCEED Model*

48B
Kylie Forbes, Health Sciences
Faculty Mentor: Lori Turner, Health Sciences
*Reducing Obesity Among Children and Teens: Exploring Involvement in Team Sports*

49A
Hayley Howard, Human Development & Family Studies, Honors College
Ashley Dobbins, Human Development & Family Studies
Faculty Mentor: April Kendrick, Human Development & Family Studies
*Mood, SES and Social Support Among Pregnant Black and White Women*

49B
Brittany Roth, Human Environmental Sciences
Faculty Mentor: Jen Nickelson, Human Environmental Sciences
*Improving the Quality of Life in College Students Using the Precede-Proceed Model*

50A
Kerry Noce, Health Sciences
Faculty Mentor: Lori Turner, Health Sciences
*Vaccination Myths and Facts*

50B
Kristen Haraway, Clothing, Textiles & Interior Design
Faculty Mentor: Stephanie Sickler, Clothing, Textiles & Interior Design
*Building a design research model: Using research opportunities to aid in informing future design while preparing for the work place*
51A
**Sydney Wallace**, Clothing, Textiles & Interior Design  
Faculty Mentor: Kristin Maki, Clothing, Textiles & Interior Design  
*The Forgotten Capital*

51B
**Elizabeth Shahid**, Human Development & Family Studies  
Faculty Mentor: Maria Hernandez-Reif Human Development & Family Studies  
*School Connectedness and Adolescent Outcomes*

52A
**Emmanuel Bor**, Health Sciences  
Faculty Mentor: Lori Turner, Health Sciences  
*Malaria and HIV/AIDS in Kenya*

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**School of Social Work**  
**Oral Presentations**

**Logan Room**

3:00  
**Jacquelyn Huey**, Social Work  
**Katie Rew**, Social Work  
**Elise Ezelle**, Social Work  
**Jessica Peoples**, Social Work  
**Lara Walker-Johnson**, Social Work  
Faculty Mentor: Javonda Williams, Social Work  
*From Damsel to Hero: A Study of Disney Princesses*

3:20  
**Hailah Saeed**, Social Work  
Faculty Mentor: Maha Marouan, Gender & Race Studies  
*What does it mean to be a Muslim woman in the South?*
School of Social Work
Poster Presentations

Sellers Auditorium

52B
Lauren Oliver, Social Work
LeCretia Crumpton, Social Work
Shamera Thomas, Social Work
Faculty Mentor: Javonda Williams, Social Work
Different Structures of Families

53A
Catherine Postell, Social Work
DeWayne Hamilton, Social Work
Sarah Warner, Social Work
Faculty Mentor: Javonda Williams, Social Work
Use of Service Animals as Therapy for Depressed

53B
Joycelyn Kennedy, Social Work
Faculty Mentor: Javonda Williams, Social Work
A New Look at Addiction and Intervention

54A
Kayla Magbie, Social Work
Ebenee Thomas, Social Work
Faculty Mentor: Javonda Williams, Social Work
African American Women in marriages and relationships.

54B
Kamilah Marks, Social Work
Jessica Scrivener, Social Work
Faculty Mentor: Javonda Williams, Social Work
Illicit Drug Abuse in the Social Welfare System

55A
Daniel MiJayla, Social Work
Hunter Lameka, Social Work
Faculty Mentor: Javonda Williams, Social Work
Retention Rate at The University of Alabama
College of Engineering
Poster Presentations

Sellers Auditorium

55B
Larry Summerville, Metallurgical & Materials Engineering
Junchi Wu, Metallurgical & Materials Engineering
Faculty Mentor: Nitin Chopra, Engineering
Gold nanoparticle formation and their morphological evolution at high temperatures

56A
Austin Starnes, Metallurgical & Materials Engineering
Wenwu Shi, Metallurgical & Materials Engineering
Faculty Mentor: Nitin Chopra, Metallurgical & Materials Engineering
ZnO nanowires for developing higher order architectures of nanostructures

56B
Elizabeth Williams, Computer Science
Andrea Torske, Computer Science
Melissa Bowman, Computer Science
Leah Boling, Computer Science
Faculty Mentor: Jeff Gray, Computer Science
Digital Eyes

57A
Jennifer Conway, Aerospace Engineering & Mechanics
Anthony Ortiz, Aerospace Engineering & Mechanics
Faculty Mentor: Stanley Jones, Engineering -Aerospace Engineering & Mechanics
High Velocity Impact Testing of an Anisotropic Aluminum Lithium Alloy

57B
Carina Herz, Chemical and Biological Engineering, Honors College
Faculty Mentor: Ryan Hartman, Chemical and Biological Engineering
Microfluidic Characterization of Dispersants used in the Gulf of Mexico Oil Spill

58A
Wesley Burkett, Chemical & Biological Engineering
Faculty Mentor: Ryan Hartman, Chemical and Biological Engineering
Understanding Methane Hydrate Formation in Microchemical Systems
58B
James Robinson, Chemical & Biological Engineering, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry
Potential energy surfaces of the reactions of hydrazine with models of spent fuel from ammonia borane dehydrogenation

59A
Ryan Flamerich, Chemical & Biological Engineering, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry
Structures and Hydrolysis Reactions of Actinide Oxide (AcO2)n Clusters in the Ground and Excited States

59B
Kurt Guynn, Chemical and Biological Engineering, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry
Prediction of the Thermodynamic Properties of Fuels and Chemical Intermediates from Biomass

60A
Matthew Outlaw, Chemical & Biological Engineering, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry
DFT Studies of the Hydration Reactions of H2O with Transition Group IVB Metal Oxide Nanoclusters

60B
Randall Warren, Aerospace Engineering & Mechanics, Computer Based Honors Program
Faculty Mentor: Semih Olcmen, Aerospace Engineering & Mechanics
Comparison of Turbulent Diffusion Models

61A
Bradley Langston, Chemical & Biological Engineering, Computer Based Honors Program
Faculty Mentor: Heath Turner, Chemical and Biological Engineering
Molecular Dynamics Simulations of Polylysine

61B
Samantha McPeak, Electrical and Computer Engineering, Honors College
Rachel Frazier, AIME
Faculty Mentor: Sushma Kotru, Electrical and Computer Engineering
Preparation and Testing of Electrochromic Devices

62A
Roger Rozanski, CBHP, Computer Based Honors Program
Faculty Mentor: Joseph Smith, Political Science
Creating and Analyzing a Legal Database
62B
Aaron Defourneaux, Electrical and Computer Engineering, Honors College
Faculty Mentor: Sushma Kotru, Electrical and Computer Engineering
Preparation and characterization of M-type hexaferrite ceramics and films

63A
Hisham Ali, Aerospace Engineering & Mechanics, Computer Based Honors Program
Faculty Mentor: James Paul Hubner, Aerospace Engineering & Mechanics
Measuring the Dynamic Response of a Luminescent Photoelastic Coating

63B
Tyler Campbell, Mechanical Engineering, Computer Based, Honors College
Faculty Mentor: Paulius Puzinaukas, Mechanical Engineering
Hybrid Engine Optimization

64A
Jill Hoover, Mechanical Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Kevin Chou, Mechanical Engineering
Diamond-Coated Cutting Tools – 3D Stress Analysis

64B
Emma Whitaker, Mechanical Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Kevin Chou, Mechanical Engineering
Processing and Analysis of Mechanical and Thermal Data from Cutting Experimentations in a Multi-Sensors Equipped Machining Testbed

65A
Kyle Thornton, Civil, Construction & Environmental Engineering
Faculty Mentor: Andrew Graettinger, Civil, Construction & Environmental Engineering
Intersection Node I.D.'s

65B
Kristopher Metcalf, Electrical and Computer Engineering, Computer Based Honors Program
Faculty Mentor: Edward Sazonov, Electrical and Computer Engineering
RF Hand Gesture and Proximity Sensor

66A
Sarah Johnson, Mechanical Engineering, Computer Based Honors Program, Honors College
Clay Burrows, Mechanical Engineering
Faculty Mentor: Marcus Ashford, Mechanical Engineering
Evaluating the Efficiency of Alcohol-Blended Fuels in Cold Starts
66B
Emily Jones, Aerospace Engineering & Mechanics, Computer Based Honors Program
Faculty Mentor: Amy Lang, Aerospace Engineering & Mechanics
An Experimental Study of Flow Separation Over 2D Transverse Grooves

67A
Nicholas Neveu, Electrical & Computer Engineering
David Gillespie, Electrical & Computer Engineering
Faculty Mentor: Yang-Ki Hong, Electrical and Computer Engineering
Miniaturized Ferrite PIFA Antenna for Wireless Communication Systems

67B
Amber Kaderbek, Aerospace Engineering & Mechanics, Computer Based Honors Program
Faculty Mentor: James Paul Hubner, Aerospace Engineering & Mechanics
Analysis of Periodic Cambered Airfoils for Application in Micro Air Vehicle Flight

68A
Kyle Redding, Computer Science, Computer Based Honors Program
Faculty Mentor: Edward Sazonov, Electrical and Computer Engineering
Diet Diary Android Application

68B
Ashley Allman, Electrical and Computer Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Jeff Jackson, Electrical and Computer Engineering
Microcomputer Software and Hardware Development Integrating a Microchip PIC24 Microcontroller with the National Instruments ELVIS Prototyping Platform

69A
Anika Kuczynski, Civil, Construction, & Environmental Engineering, Honors College
Faculty Mentor: Pauline Johnson, Civil, Construction, & Environmental Engineering
Optimizing Recovery and Growth of E. coli in a Novel Detection Method

69B
Luke Brechtelsbauer, Chemical & Biological Engineering, Honors College
Faculty Mentor: Kevin H. Shaughnessy, Chemistry
Syntheses of Tridentate and Tetradentate Oxo-Ligands used in Octahedral Titanium (IV) Complexes

70A
Blake Whitley, Metallurgical & Materials Engineering, Computer Based Honors Program
Faculty Mentor: Subhadra Gupta, Metallurgical & Materials Engineering
Advanced Nanosphere Lithography for Silicon Nanorod Formation in Solar Absorbers
70B
**Blake Whitley**, Metallurgical & Materials Engineering, Computer Based Honors Program
Faculty Mentor: Subhadra Gupta, Metallurgical and Materials Engineering
*Novel Nanopatterned Solar Absorber*

71A
**Daniel Preston**, Mechanical Engineering
Faculty Mentor: Leila Ladani, Mechanical Engineering
*Characterization of Tissue with a Micro-Bio-Electromechanical Combination Stress and Strain Gage*

71B
**Travis Midkiff**, Mechanical Engineering, Computer Based Honors Program
Faculty Mentor: Semih Olcmen, Aerospace Engineering & Mechanics
*Unsteady Flow Analysis Techniques*

72A
**Danielle Hicks**, Electrical & Computer Engineering
Faculty Mentor: Rachel Frazier, AIME
*The Effect of Thickness on Photovoltaic Device Electrical Properties*

72B
**Matthew Sims**, Civil, Construction & Environmental Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Andrew Graettinger, Civil, Construction & Environmental Engineering
*Wisconsin DOT Crash-Mapping Integration Using Geographic Information System Technology*

73A
**Aaron Coleman**, Chemical and Biological Engineering, Honors College
Faculty Mentor: Kevin H. Shaughnessy, Chemistry
*Suzuki Coupling Using Neopentylphosphine Palladium Dichloride Dimers*

73B
**Michael Robson**, Computer Science, Computer Based Honors Program, Honors College
Faculty Mentor: Felecia Wood, Nursing
*Creating an iPhone App for Diabetes Self-Management*

74A
**Christopher D Shaddix**, Computer Science
**Christopher Hodapp**, Computer Science
**Richard Bassett**, Computer Science
Faculty Mentor: Jeffery Gray, Computer Science
*UA Campus Tour - Android Application*
74B
Richard Bassett, Computer Science, Computer Based Honors Program
Faculty Mentor: Xiaoyan Hong, Computer Science
Fast Wireless Localization Algorithms

75A
Laura Mould, Chemical and Biological Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Peter Clark, Chemical and Biological Engineering
Viscometer Data Analysis

75B
C'Chi Payne, Mechanical Engineering
Faculty Mentor: Rachel Frazier, AIME
Solar Cells: Here Comes the Sun!

76A
Ryan Redding, Electrical & Computer Engineering, Computer Based Honors Program
Faculty Mentor: Jaber Abu-Qahouq, Electrical & Computer Engineering
Electrical Circuits Computer Game as an Educational Tool

76B
Melissa Hembree, Mechanical Engineering
Kelsey Dunn, Mechanical Engineering
Brynn Bralley, Mechanical Engineering
Faculty Mentor: John Baker, Mechanical Engineering
Highly Transient Fluid Flow Over a Protuberance

77A
Jesus Mares, Mechanical Engineering
Katie Martin, Mechanical Engineering
David Myres, Mechanical Engineering
Faculty Mentor: Jon Baker, Mechanical Engineering
Impact of Reduced Gravity on Gas-Liquid Flows in Fractal-Like Flow Networks

77B
Donald Paul, Aerospace Engineering & Mechanics
Faculty Mentor: Samit Roy, Aerospace Engineering & Mechanics
Processing and Mechanical Characterization of Nano Reinforced Carbon Thermoplastic Composites

78A
Nikolai Korchurov, Electrical & Computer Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Patrick Kung, Electrical & Computer Engineering
Advanced Scientific Data Processing Tool
Aeriel Murphy, Metallurgical & Materials Engineering, McNair Scholars Program
Paige Bochmcke, Metallurgical & Materials Engineering
Suzanne Kornegay, Metallurgical & Materials Engineering
Benjamin Strong, Metallurgical & Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical & Materials Engineering
Mechanically Stressed Out

Justin Bond, Electrical & Computer Engineering, Computer Based Honors Program
Faculty Mentor: Lisa Hooper, Psychology
Childhood Roles and Responsibilities and Adult Functioning (Project CHORES)

Aeriel Murphy, Metallurgical & Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical and Materials Engineering
Nanopatterned Perpendicular Media

Jason Hebert, Metallurgical and Materials Engineering, Computer Based Honors Program
Lyndon Smith, Metallurgical & Materials Engineering
Desrick Mitchell, Metallurgical & Materials Engineering
Laura Phillips, Metallurgical & Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical and Materials Engineering
Picture Perfect: Characterization at the Nanoscale

Kristin Tippey, Metallurgical & Materials Engineering, Computer Based Honors Program
Miller Wright, Metallurgical & Materials Engineering
Brett Hunter, Metallurgical & Materials Engineering
Kirk Legrone, Metallurgical & Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical & Materials Engineering
Thin Films: Lights, Camera, Action!

Agata Kargol, Computer Science, Computer Based Honors Program University Honors Program, International Honors Program, University Fellows Experience
Faculty Mentor: Monica Delaine Anderson, Computer Science
Using Robotics to Teach Computer Science: Transition from PREOP to Python

Thomas Bertalan, Chemical & Biological Engineering, Honors College
Faculty Mentor: Ryan Earley, Biological Sciences
Effect of Eavesdropping on the Emergence of Linear Dominance Hierarchies
Tobias Hackstedt, Management & Marketing
Darwin Witt, Computer Science
Faculty Mentor: Reata Strickland, OIT
Discovering Alabama

Capstone College of Nursing
Poster Presentation

Sellers Auditorium

Tracey Hydrick, Nursing
Faculty Mentor: Norma Cuellar, Nursing
Quality Improvement in Blood Glucose Procedure in Hospital Settings
Oral & Poster Presentation

Student Abstracts

Laura Abston, English, Honors College
Faculty Mentor: Amy Dayton-Wood, English

*Literacy and ESL in Alabama: A Survey of Adult ESL Education in Tuscaloosa*

My thesis provides a broad overview of the available adult English as a Second Language (ESL) programs in the Tuscaloosa area and the impact these programs have on the community, through reviewing ESL research and interviewing leaders involved in ESL outreach. I begin by addressing the need for ESL programs. Next, I explain the categories of ESL programs, defining the program characteristics I used, and summarize my interview questions and findings. Finally, I assess these results and propose options for expanding Tuscaloosa's ESL efforts. This research presents teachers, researchers, and community members with a constructive synopsis of local ESL efforts.

Maggie Adams, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Laura Busenlehner, Chemistry

*Using Hydrogen-Deuterium Exchange Mass Spectrometry to Study Conformational Changes in MutM*

MutM is an enzyme that initiates base excision repair in prokaryotes such as E. coli. It recognizes and removes 7, 8-dihydro-8-oxoguanine (8-oxoguanine) and other DNA base modifications. Our research has shown that apo-MutM is a target for heavy metal binding, a potential mechanism of heavy metal carcinogenesis. Using amide hydrogen-deuterium exchange mass spectrometry, we examine the relative conformations of the apo- and holo- forms of MutM to determine sites at which heavy metals may bind.

George Agee, Biological Sciences
Faculty Mentor: Janis O'Donnell, Biological Sciences

*Dissecting the Role of Catsup at the Synapse*

The membrane protein Catecholamines-up (Catsup) regulates the synthesis and synaptic function of the neurotransmitter dopamine, but the mechanisms are not well-understood. We analyzed whether Catsup mutations, which increase dopamine levels, also alter the function of vesicular monoamine transporter (VMAT) which transports dopamine into synaptic vesicles. We fed Catsup mutant and wild type flies a VMAT inhibitor and excess dopamine to determine whether dopamine could compete with the inhibitor or whether Catsup directly affects VMAT activity. We found that Catsup mutants are resistant to the inhibitor, but that excess dopamine alone does not cause this resistance.

Hisham Ali, Aerospace Engineering & Mechanics, Computer Based Honors Program
Faculty Mentor: James Paul Hubner, Aerospace Engineering & Mechanics

*Measuring the Dynamic Response of a Luminescent Photoelastic Coating*

Luminescent Photoelastic Coatings (LPCs) are a new technology for measuring the principal strains on a specimen. A LPC is comprised of a luminescent and absorptive dye placed in a photoelastic binder, which eliminates coating thickness dependence and allows for a more...
accurate optical strain response (OSR) at oblique angles. Although LPCs have been previously studied under static conditions, not much testing has been completed under dynamic strain states. The focus of this research is to verify LPC response under dynamic loadings, which will eventually allow for principal strain separation of a specimen under dynamic loading.

**Ashley Allman**, Electrical and Computer Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Jeff Jackson, Electrical and Computer Engineering
*Microcomputer Software and Hardware Development Integrating a Microchip PIC24 Microcontroller with the National Instruments ELVIS Prototyping Platform*
This project seeks to make an improvement in the undergraduate Electrical and Computer Engineering (ECE) curriculum by developing and testing new software and hardware laboratories for ECE 383 - Microcomputers using a Microchip PIC24 microcontroller and the National Instruments ELVIS platform. The goals include developing and testing new C and assembly language-based laboratories using the PIC24 microcontroller and multiple peripherals, including an LCD module, matrix keypad, PWM-based fan, ADC and DAC circuits, and temperature sensors.

**Evan Alvarez**, Anthropology, Emerging Scholars Program
**Micki Butler**, Telecommunications & Film
Faculty Mentor: Christopher Lynn, Anthropology
*The Effects of Self-Enhancing Self-Deception*
The purpose of this study is to examine the influences of self-enhancing self-deception on mating success. Measurements of participants pertaining to actual attractiveness (such as finger, waist-to-hip, and shoulder-to-hip ratios, as well as surveys to determine social or conversational attractiveness) are compared to self-assessments to create indexes of self-enhancing self-deception. We predict that self-enhancing self-deception is positively correlated to reproductive opportunities, which may have played a role in the evolution of the self-deceptive behavior we observe in humans today.

**Kirsten Ansorge**, Biological Sciences, Computer Based Honors Program
Faculty Mentor: Matthew Jenny, Biological Sciences
*Differential Expression of miRNAs mediated by Cadmium Exposure or Transcriptional Activation via Metal Regulatory Transcription Factor 1 (MTF-1)*
This study focused on identifying microRNAs (miRNAs) misregulated during the cellular stress response. We used a mouse embryonic fibroblast (MEF-KO) cell line lacking the metal-regulatory transcription factor 1 (MTF-1) to investigate MTF-1 regulation of miRNAs and potential miRNA roles in the stress response. MEF-KO and MEF-KO cells transfected with MTF-1 were exposed to high doses of Cd to induce cellular stress. Real-time PCR analysis confirmed MTF-1 activation of stress response genes. Real-time PCR array screening detected several significantly regulated miRNAs. Future studies aim to determine these miRNAs' functions, target genes, and role in mediating phenotypes associated with Cd toxicity.
Rebecca Ansorge, English, Computer Based Honors Program
Faculty Mentor: Robert Nelson, English

Adaptive Resonance Theory: Mapping Language Learning

The goal of this project is to create an Artificial Neural Network (ANN), using Adaptive Resonance Theory (ART) in C++ for linguistic research. The theory of universal grammar in linguistics argues that the learning processes of the brain cannot completely account for language acquisition, thus suggesting a genetic basis of this process. Unfortunately, the neural processes are impossible for linguists to observe directly, and computer simulations of these processes, ANNs, require knowledge outside the scope of linguistics. Neural networks incorporating ART simulate the neurodynamics of learning and memory, and could contribute significantly to research into language learning processes.

Awuri Asuru, Chemistry, Honors College

Use of Chemical Crosslinking to Determine the Interaction between the Mitochondrial Proteins Frataxin, Ferrochelatase, and Aconitase

Frataxin is a mitochondrial protein that participates in iron-sulfur cluster assembly, heme biosynthesis, and cellular iron homeostasis by functioning as a proposed iron chaperone to various iron-containing proteins such as ISU, ferrochelatase, and aconitase. Decreased levels of frataxin are responsible for the progressive neurodegenerative disease Friedreich's ataxia, which affects 1 in 30,000 Americans. Cells which do not have sufficient amounts of frataxin exhibit toxic buildup of iron, which causes free radical damage to nerve and muscle cells. However, the mechanism by which frataxin binds iron and associates with several unrelated proteins is still unclear. We will describe the use of photo-reactive chemical crosslinking to covalently trap interactions between frataxin and proteins that require iron for function such as ISU, ferrochelatase, and aconitase. These interactions were subsequently probed by mass spectrometry to identify regions responsible for the interactions. Chemical crosslinking experiments will provide a better understanding of the mechanism of iron transfer by the important iron chaperone frataxin.

Michelle Bailey, Psychology

Faculty Mentor: James Hamilton, Psychology

Femininity and Masculinity in the Sick Role

Likability, in terms of the sick role, in men and women may be determined by masculinity and femininity. Men that had feminine characteristics were viewed as less likable compared to men with more masculine characteristics. These characteristics were tested through an online survey in which participants were asked to view random profile of a man and woman who described their illness as either stoic or obsessive. Participants were asked question based on the Bem Sex Role Inventory. Masculinity and femininity did not play a role in likability.
Dorothy Baker, Human Development & Family Studies  
Faculty Mentor: Hyun-Joo Jeon, Human Development & Family Studies  
The Early Relationship Network of Young Children and Their Social Emotional Development  
This study will examine the qualitative challenges of parenting toddlers and how they deal with these challenges. The current study will use qualitative parent interview data collected from 25 parents. Particularly, this study will examine both parents. Qualitative interview method will provide the perspective of the parents. This study will help us gain an understanding of what parents find difficult and how they deal with these issues. This study will examine relations between parent’s background characteristics and their parenting behaviors.

Greg Banks, Music  
Faculty Mentor: Jennifer Caputo, Music, New College  
Demonstrating the Role of the Atsimevu in Ghanaian Drumming  
In Ghanaian drumming, the atsimevu (master drum) is the heart and soul of the ensemble. It controls how fast the ensemble plays, signals moves for the dancers, and which songs and sections to perform. The Azaguno (Master Drummer) is similar to the orchestral conductor. However, whereas the conductor simply leads the ensemble, while the Azaguno leads while playing. In my experience as a western percussionist I have learned the atsimevu through a hybrid learning method using both written notation and oral training, a process that I will explain. In this presentation I will demonstrate the atsimevu’s role in Ghanaian drumming.

Richard Bassett, Computer Science, Computer Based Honors Program  
Faculty Mentor: Xiaoyan Hong, Computer Science  
Fast Wireless Localization Algorithms  
Wireless localization is a useful technology for tracking the locations of wireless devices. In some applications, the measured wireless signal data can come to the localization system with very high frequency and in large volume, leading to situations such as the computing process not being able to keep pace with the input data rate, nor being able to meet real-time application’s requirement on response delay. It also creates problems in data buffering, etc. In this project we are seeking solutions to improve the algorithms in order to reduce the computing time of the localization system.

Thomas Bertalan, Chemical & Biological Engineering, Honors College  
Faculty Mentor: Ryan Earley, Biological Sciences  
Effect of Eavesdropping on the Emergence of Linear Dominance Hierarchies  
Eavesdroppers can watch aggressive contests and form perceptions about the fighting abilities of the observed individuals. While actual fighting abilities may not vary much within a population, eavesdropping could affect individuals’ future fighting performance, which in turn could influence perceptions about their fighting ability. We hypothesized that such positive feedback could structure social hierarchies. We developed a Matlab simulation to model sequential dyadic encounters between members of a group of 8 individuals, with and without eavesdropping effects. The results suggest that eavesdropping effects cause the population to more rapidly achieve a highly linear hierarchy, as determined by Landau’s linearity index.
Lindsey Blowers, Curriculum & Instruction, Computer Based Honors Program
Faculty Mentor: Kathryn Merritt, Honors College
Evaluating the Impact of University of Alabama Honors College Academic Outreach Initiatives
The Honors College at the University of Alabama sponsors many programs through which UA students interact with at-risk elementary, middle, or high school students in an attempt to encourage academic growth. In order to ensure the effectiveness of these programs, the Honors College must take a reflective and critical look at their goals, successes, and potential for growth. Focusing on two student-run initiatives supported by the Honors College, this research launches the evaluative process by gathering detailed information from program participants. The goal is to identify whether current programs are helping to fulfill the academic needs of local students.

Justin Bond, Electrical & Computer Engineering, Computer Based Honors Program
Faculty Mentor: Lisa Hooper, Psychology
Childhood Roles and Responsibilities and Adult Functioning (Project CHORES)
Project CHORES is an online survey study aimed at clarifying the strength of the association between childhood roles and responsibilities and adult functioning (operationalized as psychological health or distress). In addition to examining the link between parentification and psychological health and distress, we plan to disseminate empirical and clinical research by creating a website to serve as a repository of scholarly publications relevant to parentification (e.g., antecedents and outcomes). Lastly, we will develop and validate a culturally relevant instrument that will take ethnic factors into consideration when measuring the extent to which one has been parentified and the outcomes associated with the parentification process.

Emmanuel Bor, Health Sciences
Faculty Mentor: Lori Turner, Health Sciences
Malaria and HIV/AIDS in Kenya
Kenya is located in the sub Saharan region of Africa. This country faces a myriad of economic challenges that are further worsened by the prevalence of HIV/AIDS and malaria. About 90% of malaria cases occur in the sub Saharan Africa causing a death toll of 2.7 million per year. This study will investigate the factors that contribute to these widespread infections and determine strategies for coping them. A descriptive survey research design will be used. The findings of this study will be useful to the Kenyan government in the quest to address the challenges that result from these disease pandemics.

Akeem Borom, Biological Sciences
Faculty Mentor: Kimberlee Caldwell, 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.
Sarah Oyd, Biological Sciences, Honors College
Faculty Mentor: Janis O’Donnell, Biological Sciences

The Effects of Iron Oxide Nanoparticles on Drosophila Development
Iron oxide nanoparticles (Fe2O3 or Fe3O4) are widely used in biomedical fields, for purposes such as targeted drug delivery and contrast agents for magnetic resonance imaging. With the increase in use of nanoparticles in biomedical settings, there is a concern about the potential toxicity of these nanoparticles. In particular, the biological responses of whole organisms to these nanoparticles are not well studied; most studies employ single cell survival assays. Here, using polyacrylic acid-coated iron oxide nanoparticles to develop a whole organism toxicological model, we have tested for toxicity and other physiological effects of these particles in Drosophila.

Margaret Brandl, English, Honors College
Faculty Mentor: Emily Wittman, English

Selig sind: A Work of Translation and Requiem
I created a book-length, nonfictional work of translation that conveys how, one semester, I navigated the death of my aunt through singing the Brahms Requiem. Scraps—journal entries, emails, and pieces of the score—are interwoven with and justified by a personal essay. My aim, fueled by research of translation theorists like Walter Benjamin and Vladimir Nabokov, was to explore how awkwardly-translated German and Latin can become more poignant than correct English and how impossible it is to translate into words the experience of making music. This work is an investigation into the complexities of translation, mourning, and music.

Luke Brechtelsbauer, Chemical & Biological Engineering, Honors College
Faculty Mentor: Kevin Shaugnessy, Chemistry

Syntheses of Tridentate and Tetradentate Oxo-Ligands used in Octahedral Titanium (IV) Complexes
There are numerous commercially available 2 coordinate oxo-ligands but few 3 or 4 coordinate oxo-ligands. Here we describe the syntheses of bis (2-hydroxybenzyl) ether (1) and 1,3-bis(2-hydroxybenzyl)oxy propane (2). In an octahedral titanium centered complex the tridentate [O,O,O] ligand (1) in combination with a chelating ligand will ensure a single site remains open. While the tetradentate [O,O,O,O] ligand (2) forces the remaining open sites to have a cis stereochemistry. The octahedral titanium complexes are useful in modeling semiconductor interface TiO2 based solar cells.

Wesley Burkett, Chemical and Biological Engineering
Faculty Mentor: Ryan Hartman, Chemical and Biological Engineering

Understanding Methane Hydrate Formation in Microchemical Systems
Methane hydrates represent one of the largest untapped energy resources on earth – more than twice all other fossil fuel combined. Hydrates also pose serious problems to the oil and gas industry by plugging pipelines. Our focus is to better understand the formation of hydrates using microreactors. Microreactors allow us to simulate the actual conditions of methane hydrate formation that occur in nature, while revealing the underlying chemical and physical rate
processes. By gaining a better understanding of formation, we hope to find ways to harvest this large energy source and to also mitigate challenges in oil and natural gas production.

**Jasmin Bush**, Health Sciences, McNair Scholars  
Faculty Mentor: John Higginbotham, Community and Rural Medicine  
*The Relationship of Health Literacy and Participation in Screening for Breast, Prostate, and Colorectal Cancer*  
The current study examines the relationship between health literacy levels and a specific form of preventive health measure, cancer screenings. Forty-three participants were recruited from the Tuscaloosa area: 3 African American men, 3 Caucasian men, 17 African American women, and 20 Caucasian women. Participants’ health literacy levels and frequency of cancer health screenings were measured with the Rapid Estimate of Adult Literacy in Medicine questionnaire and a health questionnaire. The hypothesis states that individuals who are less literate about health matters are less likely to participate in preventive health measures, specifically, in screening for breast, prostate, and colorectal cancers.

**Tyler Campbell**, Mechanical Engineering, Computer Based, Honors College  
Faculty Mentor: Paulius Puzinaukas, Mechanical Engineering  
*Hybrid Engine Optimization*  
The goal of this research is to create a vehicle model of the 2005 Hybrid Ford Escape that accurately predicts the effects of design changes on emissions. The model is built given specific component information such as the electric motor capacity and fuel tank size in the computer program GT Suite. The program runs road tests modeling standard EPA tests, and information such as gasoline consumed and emissions produced are approximated. The model will then be optimized by measuring actual emissions from the engine connected to an engine dynamometer with the accurate engine load requirements found from the model.

**Alejandro Carrasquilla**, Biological Sciences, Honors College  
Faculty Mentor: Guy Caldwell, Biological Sciences  
*Novel Therapeutic Strategies for a More Effective Treatment of Dystonia*  
Movement disorders currently place a saddening burden on society. Dystonia is an example of such disorder known to be especially cruel because it can affect young children. The effects of dystonia are completely debilitating since it causes violent, involuntary muscle contractions. Current treatments are extremely limited. As a result, emerging therapeutic strategies with exceeding potential are of great interest to the medical community. Compounds have been identified which could have implications in ameliorating the effects of dystonia. Currently, we are exploring the underlying mechanism behind this effect to learn how to design better methods for the clinical treatment of dystonia.

**Amy Castleberry**, History  
Faculty Mentor: Kari Frederickson, History  
*Integration at the University of Alabama: An Oral History*  
George Wallace’s infamous stand in the schoolhouse door has become one of the iconic images of the integration of the University of Alabama. Utilizing oral history and primary research from the W.S. Hoole Special Collections Library, I seek to illustrate the stories and experiences of
what happened after integration was instituted. Focusing on their memories of integration and of their overall student experience at the University of Alabama, I will share oral accounts of how students felt and adapted to the changes on campus during the 1960s and 1970s at the University of Alabama.

**Emma Catt**, Chemistry, Honors College  
Faculty Mentor: Kevin H. Shaughnessy, Chemistry  
*Synthesis of New Water-Soluble Phosphine Ligands for use in Palladium-Catalyzed Coupling Reactions*  
Over the last decade, palladium-catalyzed coupling reactions have become increasingly utilized in organic synthesis for the formation of carbon-carbon or carbon-heteroatom bonds. New approaches are being pursued to minimize the use of traditional organic solvents, develop recyclable catalysts, and to limit the overall production of environmentally harmful waste material. One way that this can be achieved is through the synthesis of water soluble phosphine ligands by the addition of anionic groups for catalysis in water or biphasic systems. Our design of these water soluble ligands is based on the need for steric bulk and electron richness to promote the catalytic cycle. The design also utilizes the flexible coordinating ability of a benzyl moiety which may contain additional electron donating substituents. Once we have synthesized these ligands, we will be studying their activity in palladium-catalyzed coupling reactions. Further studies will help to elucidate the role of the different groups on the ligand in promoting catalysis.

**Jessica Cheek**, English, Honors College  
Faculty Mentor: Nikhil Bilwakesh, English  
*J.D. Salinger’s Glass Family: Religious Medley in 20th Century America*  
Eastern religion pervaded American popular culture during the mid-twentieth century. Devotion to Hinduism or Buddhism swept the nation as a fad among young people, but this fad was rooted in genuine seekers’ spiritual frustrations. J.D. Salinger was one such seeker, and this project examines how his writings—particularly the Glass family stories—expose his era’s religious confusion. Evaluating Salinger’s characters through the lens of William James’ The Varieties of Religious Experience and other sociological contexts reveals how the characters, along with many twentieth-century Americans, blend components from various faiths to create individualized paths to spiritual peace.

**Stephen Cheek**, Psychology  
Faculty Mentor: James Hamilton, Psychology  
*Research in Health Symptom Reporting and Social Exclusion*  
The purpose of the research is to understand the effect that fears of social exclusion may have on health symptom reporting. The researchers’ hypothesis is that participants led to anticipate social exclusion would report more physical health symptoms than those who are led to expect social acceptance. Participants were asked to complete a brief series of questionnaires and play a short “ice-breaker” game leading up to a group discussion about an issue of national importance, health care reform. The ice-breaker game was controlled to make some people feel rejected by their fellow group members while others were made to feel accepted. Afterward, all participants completed a self-report measure of their physical health. Analyses concerned the degree to which
the social exclusion manipulation, together with key personality vulnerabilities, predict excessive illness behavior.

**Grant Cochran**, Chemistry, Computer Based Honors Program, Honors College  
Faculty Mentor: John Yoder, Biological Sciences

*Post-Abdominal Reduction via Wingless Regulation*

In *D. melanogaster*, males and females exhibit a very distinct physical difference where males develop one less abdominal cuticle segment than females. During my work, I used several different mutants of *D. melanogaster* that express varying levels of Abdominal-B throughout the organism. I grew populations, prepared samples, imaged cuticle segments, and took a series of measurements on the last three cuticle segments of each adult. In all, roughly 30 measurements were taken per sample which resulted in a total of nearly 1500 measurements. This data will be used to support ideas about the development of the cuticle segments in *D. melanogaster*.

**Aaron Coleman**, Chemical and Biological Engineering, Honors College  
Faculty Mentor: Kevin H. Shaughnessy, Chemistry

*Suzuki Coupling Using Neopentylphosphine Palladium Dichloride Dimers*

The reactivity of air-stable trialkylphosphine palladium dichloride dimers as precatalysts for Suzuki coupling was investigated. The reactivity of precatalysts using the ligands tri-(tert-buty1)phosphine, di-(tert-butyl)neopentylphosphine, tert-butyl-dineopentylphosphine, and trineopentylphosphine for various Suzuki substrates were compared.

**Kali Coleman**, Chemistry, Emerging Scholars  
Faculty Mentor: Kevin H. Shaughnessy, Chemistry

*Synthesis of Neophyl Phosphine Ligands and Their Use in Palladium-Catalyzed Cross-Coupling Reactions*

Palladium catalysts supported by phosphine ligands are essential in carbon-carbon bond formations. Previously, it has been shown that neopentyl phosphines serve as efficient ligands in cross-coupling reactions. Herein, we will show the synthesis of a new neophyl phosphines, which are analogous to our neopentyl phosphines. These neophyl groups have the potential to interact with the palladium during coupling reactions and the phenyl group could be functionalized further. We will show a direct comparison to the neopentylligands in the palladium-catalyzed Heck and Kumada cross-coupling reactions.

**Austin Collins**, Economics, Finance & Legal Studies, Computer Based Honors Program, Honors College  
Faculty Mentor: Paan Jindapon

*Testing the Olson Paradox: A Public Goods Game*

Although the field of public good experimentation has received much focus in economics literature, few articles have definitively resolved the Olson (Group Size) Paradox - whether larger groups produce resources more efficiently. However, in this experiment currently underway, a lottery system is utilized to induce contribution to a group fund in order to receive a prize. The totality of individual awards is translated into monetary compensation to induce rational behavior. Forthcoming results, which compare single-member and multi-member group
contributions, hope to confirm the paradox, applying such findings to environmental and social areas.

**Jennifer Conway**, Aerospace Engineering & Mechanics  
**Anthony Ortiz**, Aerospace Engineering & Mechanics  
Faculty Mentor: Stanley Jones, Engineering -Aerospace Engineering & Mechanics  
*High Velocity Impact Testing of an Anisotropic Aluminum Lithium Alloy*

Taylor Cylinder testing of an Aluminum Lithium Alloy has been performed to analyze the anisotropic material behavior. In this experiment, cylindrical Aluminum Lithium Alloy specimens were cut from a rolled plate along the rolling and transverse directions, and 45° in between. Calibers of 164 and 215 were shot from a smooth bore gun tube against a hardened (RC 60) Astralloy target at velocities ranging from 130 m/s to 250 m/s. The projectiles impacted the target normally. Along the longitudinal and transverse directions of an anisotropic material, an elliptical deformation formed. The 45° angle simulation shows a kidney shaped deformation.

**Courtney Cooper**, Political Science, Honors College  
Faculty Mentor: Barbara Chotiner, Political Science  
*The Burden of History*

As Alabama citizens continue working towards improving their state, they need to be aware of the history that has contributed to the problems they face. Alabama's burden of history is recognizable in the racial discrimination and unwritten segregation that remain. It is also evident in the statistical data that continues to show Alabama as a state slow to catch up with the rest of the nation socially and economically. My research analyzes Alabama's history, emphasizing the importance of each state Constitution, to determine the impact it has on today's citizens.

**Nathaniel Corder**, Mathematics, Computer Based Honors Program  
 Faculty Mentor: Milton Overton, Intercollegiate Athletics  
*Modeling Donation Patterns of University of Alabama Athletic Ticket Holders*

The University of Alabama is one of only a handful of NCAA institutions whose athletic departments generate positive net revenue. A sizable portion of this comes from direct donations from boosters. With stadium capacities now unlikely to increase in the near future, revenue from tickets will remain fairly constant; therefore, transforming ticket holders into prospective donors is key. My research catalogs the current state of ticket-donor crossover as well as identifies key factors in predicting donor behavior. By studying past giving trends it is possible to not only raise ROI by identifying which individuals not to solicit but also increases the average gift of those nearing the next segment of giving.

**Will Cotton**, Theatre & Dance  
Faculty Mentor: Andy Fitch, Theatre & Dance  
*Lighting Design for Moby Dick*

For a recent production of Moby Dick, I brought together elements from the story and my own ideas mixed with state of the art technology to implement a successful lighting design. Breaking down the script, I explored the contrast between dream and memory from real life, took an abstract approach to the many action sequences, and the sanctification of Captain Ahab. Lighting also helped define many locations throughout the production, while still allowing the audience to
imagine the world of the play. The design relied heavily on state of the art technology to tell this classic story with modern elegance.

Charlotte Cover, History
Faculty Mentor: Renee Raphael, History
*The Universities of Early Modern Italy*
Italian universities were transformed by the humanist movement and the development of the new science in the sixteenth and seventeenth centuries. Galileo taught at the universities of Pisa and Padua and received many requests for letters of recommendation for various university positions. My project involved analyzing letters written to Galileo to learn about the selection process for hiring professors. The letters emphasize intellectual quality and the quality of written work as well as good connections and fame. These findings will add to understanding of early modern universities and how they were both agents and recipients of change in the period.

Carolyne Craig, Biological Sciences
Amelia Nuwer, Biological Sciences
Faculty Mentor: Julie Olson, Biological Sciences
*Where do sponges get their bacteria from?*
Sponges are a dominant component of coral reef environments. Many of these filter-feeding organisms have been shown to support bacterial communities that are distinct from those in the surrounding water column. We compared the resident bacterial communities from three Caribbean bacteriosponges (*Xestospongia muta*, *Agelas conifera*, and *Plakortis angulospiculatus*) collected from the same depth using clone libraries. In order to maximize sequencing efforts towards novel organisms, we examined banding patterns generated via restriction enzyme digestion of the resulting clones. Each sponge species supports a distinct bacterial community, suggesting that they are selecting their own bacterial associates.

Madeline Creekmore, Chemistry, Honors College
Faculty Mentor: Silas Blackstock, Chemistry
*A Search for Ball & Socket Complexes of Buckminsterfullerene and Polyarylamines*
There are a few documented cases of electron donor/acceptor complexations of Buckminsterfullerene (C60) with cup-shaped molecules to form stable cocrystalline slids. We are investigating the potential intermolecular binding of C60 and Polyarylamines (PAA) such as metaphenylenediamines, tri(p-phenylenediamines), and p-phenylenetetramines. Because of its curved pi-bonded surface, C60 is electron poor and thus has an affinity for electron rich compounds. We hypothesize that the flexible shape of the electron rich PAA structure may allow them to wrap around the C60 sphere for tight binding. This poster presents our experiments to test for the complexation and cocrystallization of C60 with the PAA structures.
Matthew Cuellar, Psychology
Paige Bussanich, Psychology
Faculty Mentor: Fran Connors, Psychology

*Predictors of Language Impairment in Developing Adolescents*

This ongoing study focuses on predictors of language impairment in typically developing (TD), intellectually disabled (ID), and Down's Syndrome (DS) individuals. One of the constructs being investigated is implicit learning, the unconscious learning used to learn grammar and social skills. The study is using five implicit learning tasks. We are focusing here on the Artificial Auditory Grammar Task also called the Silly Alien Sounds Task, which tests how well the participants learn the grammar of a made-up language. Our hypothesis is that the DS participants will do significantly worse on this task than will the TD or ID participants.

Claire Davis, Chemistry, Computer Based Honors Program
Faculty Mentor: Patrick Frantom, Chemistry

*Characterization of Enzymes Involved in the Biodegradation of t-Butanol*

Methyl t-butyl ether (MTBE) is a gasoline additive with pollutant qualities. Bacterial strains have been isolated that can degrade MTBE. Microbiological evidence has identified a pair of enzymes (MdpJ/MdpK) that oxidatively degrade t-butanol, a step in MTBE biodegradation. MdpJ is predicted to shuttle electrons from NAD(P)H to MdpK, to activate molecular oxygen. Our objective is to confirm the in vitro activity of MdpJ and characterize its biochemical properties. We have developed a soluble, isolatable form of MdpJ, and we are in the process of answering biochemical questions involving flavin content, the presence of an iron sulfur cluster, and quaternary structure.

Ryan Davis, Art, Honor College
Faculty Mentor: Andrew Dewar, Art

*Hip Hop and Graphic Novels: Fulfillment of Kandinsky's Artistic Composition Theory?*

In many ways, Wassily Kandinsky revolutionized artistic and aesthetic thought in his attempt to create a purely "spiritual" experience with his work. While many see the emergence of jazz as a fulfillment of his theories, one must examine modern art forms in order to truly understand the impact that Kandinskian ideas have had on creative expression. This paper briefly discusses ways that Hip Hop and Graphic Novels fulfill Kandinsky's descriptions of artistic composition.

Aaron Defourneaux, Electrical and Computer Engineering, Honors College
Faculty Mentor: Sushma Kotru, Electrical and Computer Engineering

*Preparation and characterization of M-type hexaferrite ceramics and films*

Hexaferrites possess high permeability, low permittivity, and low magnetic losses, which makes them useful for a wide variety of applications in communication devices. This work focuses on preparing ceramic samples of M-type hexaferrite using conventional ceramic preparation methods. These ceramic samples were characterized by X-ray diffractometry (XRD) and vibrating sample magnetometry (VSM). The ceramics were then used as target material for growing thin films on Si and Al2O3 substrates. Process parameters such as O2 pressure during deposition, substrate temperature, and laser energy were varied to achieve desired films with desired properties. The films were then characterized by XRD and VSM.
Evelyn Dempsey, Health Sciences
Faculty Mentor: Lori Turner, Health Sciences

*Health Hut Wellness Education Program*

The Health Hut Wellness Education Program is a health promotion program designed to encourage healthy behaviors among college students. Implemented by Student Wellness Educators, health topics are presented daily to the student body. A range of health-related activities specifically designed for the students including financial health, cold and flu prevention, nutrition, and fitness will be provided. This poster presentation will show the types of health messages that are disseminated and the number of students who receive these health messages. Information regarding the way that the Health Hut benefits the campus by encouraging healthy habits among students will be displayed.

Paige Dexter, Biological Sciences
Faculty Mentor: Guy Caldwell, Biological Sciences

*Genetic Analysis of MicroRNAs to Identify Regulators of Neurodegeneration in Parkinson’s Disease Models*

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.

Johnna Dominguez, Anthropology, Honors College
Faculty Mentor: Christopher Lynn, Anthropology

*Performances of Power: Crossing the Boundaries of Aggression and Sexuality in American Football and Burlesque*

Many people place football and neo-burlesque shows on opposite sides of a spectrum, where the former represents masculinity and aggression while the latter represents femininity and sexuality. In my current studies of these events, however, I have found a great deal of similarities among the groups of people involved with each. These similarities reveal that both events are performances of power as played in a community, and are useful events in societies with strict social boundaries. These similarities reflect characteristics of rituals and cults in other ancient societies, most notably the Greek cult of Dionysus.

Jessica Duke, Chemistry, Computer Based Honors Program
Faculty Mentor: David Dixon, Chemistry

*Modeling Water in Supercritical CO2 and Reactions at Mineral Surfaces for the Geological Sequestration of CO2*

The storage of CO2 in deep geologic formations represents a promising option for mitigating the impacts of greenhouse gases on global warming due to the large capacity of these formations and their broad regional availability. A critical issue is to demonstrate that CO2 will remain stored
over the long-term in the geological formation where it is injected. There is little known about
the properties of wet CO2 so they are being modeled using electronic structure theory. The
decomposition reactions of metal silicates are also being modeled to understand how minerals
can be transformed in the presence of CO2 and water.

Amanda Echols, Kinesiology
Faculty Mentor: Oleg Sinelnikov, Kinesiology
Pre-service teachers’ perceptions and actual student participation in a Sport Education season
Sport Education is a contemporary curriculum and instructional model in physical education
(Siedentop, et al., 2011). The purpose of the study is tri-fold: (a) to examine pre-service teachers’
perceptions of student participation in a season of Sport Education, (b) to measure student
participation, and (c) to investigate the degree of congruence between the two. The data will be
collected using critical incident reports (Flanagan, 1964) and physical education teacher
assessment instrument (Phillips, 1986). The data will be analyzed using open and axial coding
(Denzin and Lincoln, 1994) to develop themes. Descriptive statistics on student participation will
be reported.

Lisa Elizondo, American Studies Honors College, McNair Scholars,
Faculty Mentor: Michael Innis-Jiménez American Studies
Off the Border: Mexican Americans in Washington State
Two distinct communities in Western and Eastern Washington were active during the 1960s and
1970s. Students in Western Washington took the lead as activists in the greater Seattle
community, and the organizations they created are still important fixtures in the state. Eastern
Washington activists were tuned into the plight of the farmworker, especially in the agriculture-rich
Yakima Valley. Oral histories collected from members of the community, as well as from
activists involved in both the student and farmworker movements, help expand public knowledge
of organization, activism, and the legacies of the movement that continue to impact the state of
Washington

Morgan Embry, New College, Honors College
Faculty Mentor: Jennifer Caputo, Music, New College
Benefits of Dance
The physical and mental benefits of dancing are a relatively new field of study and dance therapy
is the intentional use of dance to help people. I will explore the similarities and differences
between traditional dance teaching methods and those used by dance therapists. I will compare
the two by teaching dance classes while observing the work of a local dance therapist. I
anticipate similarities between the two methods. However, I also expect that there will be a strict
structure in the typical dance classes and the structure will be more conceptual and organic in the
dance therapy session.
to be a physician in a rural area, but also what it means to be a patient under the care of a country doctor. Following the conclusion of the literature review, interviews will be conducted with patients and physicians in rural Alabama.

**Graham Gillespie**, Political Science  
Faculty Mentor: Barbara Chotineer, Political Science  
**Lawlessness in Central Europe: The Impact of Corruption on the Democratization of Former Soviet States**  
This research constructs a theoretical framework for analysis of the impact of corruption on the democratization efforts of post-Soviet governments. Corruption was rampant among government officials in the Soviet Union, and corruption has continued to thrive in Central Europe during the post-Soviet era. Most prior research focused on the corrupt practices of Soviet officials or on the current levels of corruption in democratic regimes of former Soviet States. This focus ignores the continuity of past and present corruption and how this corruption negatively impacts regimes' abilities to establish strong democracies in former Soviet States.

**Michael Gleason**, Biological Sciences, Honors College  
Faculty Mentor: Gregory Starr  
**The Effects of Soil Moisture Availability on Methane Fluxes from a Short-Hydroperiod Marsh within Everglades National Park**  
The Florida Everglades are wetlands with the potential for significant methane (CH4) production. The marl-based freshwater marshes of the Everglades experience short-hydroperiods (<6 months of inundation). This experiment determined the effect soil water availability had on CH4 production through a simulated drought cycle. Average CH4 fluxes were observed to be variable for both ‘inundated/wet’ and ‘dry’ sods. However, with an increase in temperature and decrease in soil moisture, methane flux from the ‘dry’ monolith decreased, while the ‘wet’ monolith increased over time. This suggests that restoration of sheet flow to parts of the Everglades may increase CH4 production.

**Emmalea Gomberg**, Anthropology  
**Elizabeth Hunt**, Anthropology  
Faculty Mentor: Vernon Knight, Anthropology  
**Pottery Vessel Uses in Native Cuban Foodways**  
This study concerns the correlation between shape/size categories of Native Cuban pottery vessels and their uses in foodways. The sample consists of rim sherds from pottery vessels found in the archaeological site of El Chorro de Maita, northeastern Cuba. Using digitized profiles of 111 sherds, we categorized them into 12 basic shapes. Vessel sizes were determined by estimating rim diameters using a dial indicator. Most sherds in the sample represent wide-mouth bowls, restricted or unrestricted, with an average diameter of 23 centimeters. Many of these shapes and sizes are suitable for cooking cassareep, a staple food derived from manioc.
Syriac Research Portal

The Syriac Reference Portal will be an online database concerning Syriac manuscripts. Syriac, a dialect of Aramaic, was widely used throughout the Middle East and Asia in the middle ages. Around 10,000 Syriac manuscripts are thought to survive today. As no digitized catalogue of these manuscripts exist, our team had undertaken the process of uploading documents online, converting them via OCR, proofreading, and formatting them for a database. The Portal will allow researchers a single, consolidated online catalogue of manuscripts, facilitating research. It will also include data about Syriac authors and texts.

The Relation Between Children's and Adolescents' Self-Esteem, Social Support, and Health Appraisals

The purpose of this study is to examine the relationship between self-esteem, friendship quality, parental illness behavior encouragement, and self-reported physical health in children and adolescents. The broad goal of the study is to better understand unexplained illness behavior in older children and adolescents. This study is designed to test whether illness behavior encouragement and rejection sensitivity are risk factors for reporting excessive illness behaviors in children.

Prediction of the Thermodynamic Properties of Fuels and Chemical Intermediates from Biomass

There is a substantial need to provide clean energy to power the US that is from renewable resources and is carbon neutral, for example biomass. Reliable electronic structure methods have been used to predict the thermodynamic properties and reactions of biomass and biomass-derived compounds to produce fuels and critical feedstocks for the chemical industry. The thermodynamics for the reactions starting from oxygenated species such as glucose, sorbitol, 5-hydroxy-methyl furfural, glycerol, hydroxymethyl glyoxal, levulinic acid, succinic acid, and gamma-valerolactone have been predicted in the gas phase and in the liquid phase. The results can be used to determine optimal pathways.

Discovering Alabama

This online virtual field trip, hosted by Dr. Doug Phillips of Discovering Alabama, allows viewers to float down a meandering Alabama River or enter a darkened cave filled with bats. The purpose of this virtual field trip was to allow everyone the opportunity to experience the wonders and richness of the state of Alabama. This four month long project incorporates the use of JavaScript, HTML, CSS, graphics and QuickTime movies. A database called "Ask the
Experts was developed to allow users the opportunity to submit photos of plants, trees and wildlife to be identified and included in an online searchable database.

Natalie Hallmark, Psychology
Caitlyn Hearn, Communicative Disorders
Faculty Mentor: Marcia Hay-McCutcheon, Communicative Disorders

Adult Cochlear Implant Recipients and Speech Timing Cues
The goal of this research is to determine if older adults using cochlear implants have greater difficulty processing speech timing cues than younger implant recipients. Speech timing cues will be tested through the use of vowels. We will assess vowel discrimination by varying two frequencies within each vowel. Data collection will be based on the length of time it takes the participants to discriminate the different frequencies that they are hearing and also the accuracy of their discrimination.

Ellyn Hamm, Music, Honors College
Lelia Huber, Music
Kiemel Lamb, Music
Faculty Mentor: Andrea Cevasco, Music

The Effects of Multimodal Stimulation on the Heart Rate of Premature Infants
This research study investigates the effect of multimodal stimulation on the heart rate of premature infants currently being treated in a NICU. Multimodal stimulation was administered to infants > 31 weeks PCA and with the approval of a registered nurse. Each session lasted 15 minutes and data was recorded three minutes prior to, during, and after the session. Data was collected for 57 babies. Results indicated a significant difference, p < .05; infants’ heart rate decreased from before to after music therapy.

Ellyn Hamm, Music, Honors College
Faculty Mentor: Andrea Cevasco, Music

Evaluation of Parents’ Use of a Music CD Combined with Developmentally Appropriate Activities as a Cost-Effective Music Extension Program for Premature Infants After Being Discharged from the Hospital
“Baby Beats” is a CD of songs for infants and young children given to parents upon their infant’s discharge from the neonatal intensive care unit (NICU). Along with the recording parents were given a booklet of developmentally appropriate activities to use with their infants while listening to the CD. This research study investigates parent’s use of the CD “Baby Beats.” Two weeks after discharge the parents were called and asked to answer a follow-up survey regarding

Kimberly Hamrick, Mathematics, Computer Based Honors Program, Honors College
Faculty Mentor: John Wait, Family Medicine

Web 2.0 Use in Primary Care Medical Education
Web 2.0 is changing the face of the online experience, focusing more on a user-centered approach. The purpose of our study is to evaluate the use of Web 2.0 technologies in medical and resident education programs, focusing particularly on family medicine and primary care. We created and are sending out an online survey aiming to explore current perceptions of Web 2.0
and its potential use in medical and resident education, what technologies are currently being used in this context, as well as exactly how they are being used and future plans for Web 2.0 tools within these programs.

Kristen Haraway, Clothing, Textiles & Interior Design
Faculty Mentor: Stephanie Sickler, Clothing, Textiles & Interior Design
Building a design research model: Using research opportunities to aid in informing future design while preparing for the workplace
This research seeks to determine the student satisfaction rates in campus housing and how their personalization of the space plays a key role in their perceived privacy and comfort. Data was collected by questionnaires sent to residents, photo documentation, and literature review. The implication of this research is two-fold. First, the findings of the study may help inform the design of future campus housing and help officials better understand the needs of occupants. Secondly, this research serves as a model for my future research in the healthcare design field which is evidence based and always informed by research.

John Harris, Psychology, Honors College, Psychology Honors
Faculty Mentor: Rosanna Guadagno, Psychology
Social Influence Online: The Impact of Social Proof and Likeability on Compliance
McKenna and Bargh (2000) reported four main ways computer-mediated communication (CMC) differs from face-to-face (FtF) communication and these four aspects likely affect how influence tactics are perceived online. This study examined the influence principles of likeability and social proof on individuals' willingness to volunteer in an online setting. Participants read fictitious blogs asking them to volunteer time for a pro-social cause. These blogs varied in communicator likeability and availability of social proof confirmation. Results revealed social proof affected compliance but communicator likeability did not. Thus, our results suggest that some influence principles are not successful in online contexts.

Markus Harris, African American Studies
Faculty Mentor: Maha Marouan, African American Studies
Black Success at Bama
The purpose of this research is to investigate the potential for success of black minds at The University of Alabama. I will conduct interviews with particular black students on campus in an effort to understand the academic environment with regards to African Americans on campus. I am particularly interested in the ways in which black intellectual thought is understood on campus, and furthermore, how the university facilitates in this process. I will use other students' interviews, and my own personal journey to analyze current conditions on campus. Furthermore, I will seek suggestions from the interviewees on ways in which the campus may improve on its efforts with African American students.
Meredith Hawkins, Advertising & Public Relations
Haley Clayton, Advertising & Public Relations
Faculty Mentor: Teri Henley, Advertising & Public Relations

How Women Ages 25-34 Shop
The University of Alabama Advertising Team collected primary and secondary research to understand how women ages 25-34 shop. The research formed the basis for a creative JCPenney advertising and public relations campaign. The campaign utilizes strategic retail research to target these women and appeal to their shopping senses to therefore the target market’s wallet share at JCPenney.

Caitlyn Hearn, Communicative Disorders, Emerging Scholars Program
Faculty Mentor: Marcia Hay-McCutcheon

Adult Cochlear Implant Recipients and Speech Timing Cues
The goal of this research is to determine if older adults using cochlear implants have greater difficulty processing speech timing cues than younger implant recipients. Speech timing cues will be tested through the use of vowels. We will assess vowel discrimination by varying two frequencies within each vowel. Data collection will be based on the length of time it takes the participants to discriminate the different frequencies that they are hearing and also the accuracy of their discrimination.

Jason Hebert, Metallurgical and Materials Engineering, Computer Based Honors Program
Lyndon Smith, Metallurgical and Materials Engineering
Desrick Mitchell, Metallurgical and Materials Engineering
Laura Phillips, Metallurgical and Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical and Materials Engineering

Picture Perfect: Characterization at the Nanoscale
We will compare our results of imaging the micro- and nanostructure of various low carbon steels, ductile iron and aluminum samples, using optical microscopy and scanning electron microscopy. The microstructure will be related to the phase diagram, and the effect of heat treatment on the mechanical properties will be discussed. Grain structure and size of bulk materials will be compared with those of thin films. The formation of a gold-silicon eutectic will be described and imaged, using a thin film of gold evaporated onto a silicon wafer.

John Heflin, History, Computer Based Honors Program
Faculty Mentor: Lowell Davis, CBHP

From Plessy v. Ferguson to Brown v. Board of Education
The Fourteenth Amendment to the United States Constitution hasn’t changed since its adoption in 1868. However, between 1896 and 1954, the Supreme Court’s interpretation of the amendment did change as evidenced by the court’s rulings in the cases of Plessy v. Ferguson (1896) and Brown v. Board of Education (1954). These two cases offer vastly different interpretations of the Fourteenth Amendment, and they lead to the question of how over the course of fifty-eight years could such a vast difference in interpretation occur? My research over the last year seeks to answer this question.
Melissa Hembree, Mechanical Engineering  
Kelsey Dunn, Mechanical Engineering  
Brynn Bralley, Mechanical Engineering  
Faculty Mentor: John Baker, Mechanical Engineering  

*Highly Transient Fluid Flow Over a Protuberance*  
Results of a study of highly transient fluid flow over a protuberance are presented. When a vehicle, such as a ship or aircraft, travels through a fluid, the flow of the fluid around the vehicle affects its performance. If the flow is turbulent, its behavior is more difficult to predict mathematically, so the flow is best characterized experimentally. A protuberance was constructed on the surface of a high power rocket to induce separation in the flow downstream of the protuberance. Details of the experimental configuration and methods are presented. Insight to be gained from the results will also be discussed.

Bryan Herren, Biological Sciences, Computer Based Honors Program, Honors College  
Faculty Mentor: Guy Caldwell, Biological Sciences  

*Investigating the VPS-C Complex in a C. Elegans model of Alzheimer's*  
Alzheimer's disease (AD) is the most prevalent neurodegenerative disease in the world. However, the mechanism by which it presents itself has not yet been completely determined. The misfolding of the protein beta-amyloid 42 (Abeta 42) and misfolding-associated toxicity have been implicated as the possible "culprit" for AD. This research focuses on the associated protein folding defect. Using C. elegans to model the expression of Abeta 42 and RNA interference, we were able to identify several gene products that modulate the toxicity of this aggregated protein. These genes could serve as therapeutic targets for the treatment of AD.

Carina Herz, Chemical and Biological Engineering, Honors College  
Faculty Mentor: Ryan Hartman, Chemical and Biological Engineering  

*Microfluidic Characterization of Dispersants used in the Gulf of Mexico Oil Spill*  
The events leading to the Gulf of Mexico oil spill were catastrophic and many unanswered questions remain. Our research focuses on understanding the chemical and physical interactions of dispersant on oil and seawater at the ocean surface. The agglomeration effect of clay particles on the dispersion is considered given that colloidal fines are known to stabilize emulsions. We have applied microfluidic devices to characterize the role of dispersant on oil-water-colloid mixtures. This multiphase flow has been analyzed with a UV-vis spectrometer in attempt to understand the flow characteristics and evaluate the solid-to-liquid interactions that take place.

Danielle Hicks, Electrical and Computer Engineering  
Faculty Mentor: Rachel Frazier, AIME  

*The Effect of Thickness on Photovoltaic Device Electrical Properties*  
The United States consumes 18.7 million barrels of oil per day and aides in 36 percent of the world’s greenhouse emissions. By using the light from the sun solar cells can be used to transfer light in to electricity needed to make power and eliminate dependency on pollutants. Using indium-tin oxide for the devices substrate instead of aluminum and adding an acceptor to our current solutions caused improvements in output values and sustainability. Obtaining change in short circuit current, open circuit voltage, shunt resistance, and fill factor aided in choosing the optimal concentration and solution for the device’s active layer.
Matthew Hicks, Biological Sciences, Honors College, McNair Scholars
Bwarenaba Kautu, Biological Sciences
Faculty Mentor: Kimberly Caldwell, Biological Sciences
*Investigating the Role of Heterotrimeric G-protein Signaling in a C. elegans Parkinson’s Disease Model*

Two hallmarks of Parkinson’s disease are the degeneration of dopamine neurons and the aggregation of α-synuclein. It has been shown that α-synuclein overexpression in dopamine neurons elevates intracellular dopamine levels, leading to neurodegeneration. Heterotrimeric G-protein signaling mediated by GOA-1 and EGL-30 regulates dopamine signaling in C. elegans. We hypothesize altering this pathway may impact the integrity of dopamine neurons. Preliminary findings suggest loss of GOA-1 and EGL-30 causes neuroprotection and neurodegeneration, respectively, when α-synuclein is overexpressed. These data suggest this heterotrimeric G-protein signaling pathway regulates the integrity of dopamine neurons and could represent a novel therapeutic target for Parkinson’s disease.

Matthew Hill, Advertising/Public Relations
Faculty Mentor: Phillip Bishop, Education-Kinesiology
*Effects of exercise and heat on caffeine’s diuresis: implications for military operations in the heat*

To examine effects of exercise and heat on caffeine’s diuresis, eight participants exercised to lose 2.5% body mass in a hot environment in four separate conditions: 1) with caffeine during exercise and fluid replenishment during recovery; 2) without caffeine during exercise and fluid replenishment during recovery; 3) with caffeine during exercise and no fluid replenishment during recovery; 4) without caffeine during exercise and no fluid replenishment during recovery. Urine volume was not different throughout. It is concluded that there was no evidence that caffeine ingestion in moderation would impair fluid balance during prolonged exercise in the heat and recovery period.

Whitney Hobson, Political Science, Honors College
Faculty Mentor: Barbara Chotiner, Political Science
*Exploring the Technological Possibilities of Participatory Democracy*

The Internet has emerged as a direct connection point between people all over the world, regardless of class, race or education. Advances are made daily that would allow for software and organization to set up a working participatory democracy, which is a government in which each citizen is welcome to provide their voice and vote on each issue presented. This project will attempt to explore the possibilities that are now open in the arena of democracy by looking at cases in Brazil and the United Kingdom, the pros and cons of participatory government, and technological advancement necessary for its existence.

Grace Hoover, Chemical & Biological Engineering, Computer Based Honors Program
Landon Mueller, Biological Sciences
Faculty Mentor: Jennifer Edmonds, Biological Sciences
*Analysis of the Fluorescence of Stream Dissolved Organic Matter*

The goal of this project was to test the hypothesis that energy availability constrains productivity in cave ecosystems. To do so, a northern Alabama cave stream has been amended with corn
litter, a material rich in organic compounds, since February 2010. We used fluorescence spectroscopy to identify the changes in the components of dissolved organic matter in stream water and test the importance of the additional organic matter to food web dynamics. Fluorescence data were analyzed as excitation-emission matrices (EEMs), and EEM comparisons showed temporal variability due to changes in stream discharge, and spatial variability due to experimental treatment.

**Jill Hoover**, Mechanical Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Kevin Chou, Mechanical Engineering

*Diamond-Coated Cutting Tools – 3D Stress Analysis*

The coating of cutting tools with diamond is used within industry to increase the life of the tool, which reduces production costs and minimizes environmental impact. It is important to obtain quantitative information of tool stresses (especially along the coating-substrate interface) which correlate to the tool performance. This study attempts an analysis of the three dimensional (3D) stresses along the interface, focusing specifically at the corner of a cutting tool. ABAQUS software has been used for the tool stress analysis and a MATLAB algorithm has been developed to analyze and transform the 3D stresses along a user defined plane.

**Rebecca Howard**, Theater & Dance, Honors College
Faculty Mentor: Sarah Barry, Theater & Dance

*Transitioning from Dancer to Dancemaker*

I began my research on Paul Taylor the Dancemaker by reading his autobiography "Private Domain" and gained a much better understanding of his developmental process. I continued researching Paul Taylor’s technique and choreography style by examining his repertory. Through written reviews, accounts by critics, dancers and himself, I was able to see the process by which Taylor left an impression among the dance community. After researching I began to compile the material, process, and translate it into my own observations to create my own choreographic work as Paul Taylor would.

**Hayley Howard**, Human Development & Family Studies, Honors College
**Ashley Dobbins**, Human Development & Family Studies
Faculty Mentor: April Kendrick, Human Development & Family Studies

*Mood, SES and Social Support Among Pregnant Black and White Women*

The present study examined depression and anxiety levels in 51 pregnant women attending the University Obstetric clinic. In addition, the relationship between depression, anxiety, socioeconomic status (SES), social support and race were examined. Surprisingly, 45% of the women met criteria for depression and 49% for anxiety disorder. Higher depression scores related to higher anxiety scores, and higher anxiety scores related to higher SES. Significantly more Black than White pregnant women lived alone. Black women also reported fewer psychosomatic symptoms than White women. These findings suggest a high incidence of mood disorders among pregnant women, irrespective of race.
Jacquelyn Huey, Social Work
Katie Rew, Social Work
Elise Ezelle, Social Work
Jessica Peoples, Social Work
Lara Walker-Johnson, Social Work
Faculty Mentor: Javonda Williams, Social Work

From Damsel to Hero: A Study of Disney Princesses
The media plays a big role in socialization in young children. In Disney movies, young girls are drawn to princess characters that pose as potential role models that emphasize that dreams do come true. Disney has changed from 'old Disney,' where the princess's goal was to be saved by her "white knight", and live happily ever after, to the ‘new Disney,’ where their duty is that they can reach their goals themselves. In this project, we will explore how Disney characters have revolutionized how girls socialize, and instead of being a damsel in distress they can become strong independent women.

Lauren Huffman, Psychology, Computer Based Honors Program, Honors College
Faculty Mentor: Lisa Hooper, Counselor Education
Project ACTS: The Assessment of Culturally-Tailored Mental Health Treatments and Services
Patients often report that a physician's knowledge and skill of culturally tailored and responsive practices is vital to receiving the best mental health and medical care. Project ACTS hopes to decrease cultural and minority health disparities by studying three target groups, patients, practitioners, and researchers, as well as providing resources relevant to these issues. Our newly launched online survey study seeks to explore what cultural factors patients and community members find important when receiving services from their health providers, how practitioners are currently integrating cultural competency into their daily practice, and what critical issues related to cultural competency are being explored by researchers.

Mitchell Hughes, Physics & Astronomy, Computer Based Honors Program, Honors College
Faculty Mentor: Andreas Piepke, Physics & Astronomy
Monte Carlo Simulation and Data Analysis for the EXO Muon Veto System
The cosmic ray muon veto system for the EXO-200 experiment, a search for extremely rare nuclear decays in Xenon, has been installed underground at the project site near Carlsbad, NM. Besides background reduction for the Xenon detector, the veto system will be used to measure the angular correlation of the muon flux underground. A Monte Carlo simulation of the system is being developed in parallel with the collection of experimental data. Comparative analysis of the two will aid in the EXO commissioning process. This presentation will provide an overview of the experiment and current analysis of simulation and data.

Tracey Hydrick, Nursing
Faculty Mentor: Norma Cuellar, Nursing
Quality Improvement in Blood Glucose Procedure in Hospital Settings
Blood glucose monitoring is a necessary intervention for disease prevention and management. Variation in procedures from institution to institution leads to inconsistent readings among patients. Five commonly used policies and procedures were compared to determine accuracy and practically. Based on literary review, a policy and procedure was chosen and tested that
obtains the most accurate blood glucose reading. This presentation demonstrates the most accurate blood glucose procedure. Health care providers must remain au courant on blood glucose monitoring to provide optimal health care and also to improve health outcomes.

**Carlyn James, Anthropology, Honors College**
Faculty Mentor: Christopher Lynn, Anthropology

*What Are Friends For? : Understanding How Social Networks Impact West African Female Immigrant Livelihood*

A marked aspect of today’s globalizing world is the high amount of mobility in terms of goods, information, and people. Decisions to immigrate are often motivated by family and friends who may be living in the non-native country, and most ostensibly, the need for employment. My interest in this study is West African women’s livelihood practices upon entering the United States as immigrants, and to understand how these practices relate to personal social networks. Beyond library-based research, informal interviews with immigrants in the Greater Washington D.C. have yielded compelling results with significant implications for international development agencies and microfinance institutions.

**Emberly Jay, Psychology**
Faculty Mentor: Beverly Thorn

*Spiritual/Religious Values and Attitudes Regarding Complementary and Alternative Medicine*

Complementary and Alternative Medicine (CAM) refers to any treatment or practice that is not typically used in conventional Western medical settings. There is much debate about the efficacy and safety of a number of these treatments; however, use of CAM continues to increase. The current study examines spiritual and religious values as possible factors that might influence whether a person is open to using CAM treatments. Three questionnaires were administered to participants recruited from the Psychology 101 subject pool. Two questionnaires measured spiritual and religious values and the other measured CAM use.

**Sarah Johnson, Mechanical Engineering, Computer Based Honors Program, Honors College**

**Clay Burrows, Mechanical Engineering**
Faculty Mentor: Marcus Ashford, Mechanical Engineering

*Evaluating the Efficiency of Alcohol-Blended Fuels in Cold Starts*

We are working to mitigate some of the difficulties of using alcohol-gasoline blended motor fuels. Alcohol fuels suffer from difficult startability due to high boiling points. Fuels will be tested in two separate direct injection engines, one of which has been modified from its original state as a carbureted engine, and both the emissions and power output will be measured. We will explore methods to facilitate the use of alcohol-blended alternative motor fuels in the US Fleet.

**Andrew Jones, Biological Sciences**

**Brandon Hill, Biological Sciences**
Faculty Mentor: Carol Duffy, Biological Sciences

*Attachment of proteins to magnetic iron oxide nanoparticles via a novel coiled-coil mechanism: expression and purification of engineered coil fusion proteins*

Magnetic nanoparticles possess great potential for use in cancer therapy as drug delivery platforms and in cancer diagnostics as magnetic resonance imaging (MRI) contrast agents.
Attachment of protein ligands that bind receptors uniquely located on cancerous cells will provide a mechanism for cell-specific nanoparticle uptake and, thus, will greatly improve both the safety and efficacy of nanoparticle-based therapies and diagnostics. Using coiled-coil interactions and red fluorescent protein as a model protein, we are developing a novel mechanism for the attachment of proteins to iron oxide nanoparticles. We present the purification of two fusion proteins engineered for use in these studies.

**Emily Jones**, Aerospace Engineering & Mechanics, Computer Based Honors Program  
Faculty Mentor: Amy Lang, Aerospace Engineering & Mechanics

*An Experimental Study of Flow Separation Over 2D Transverse Grooves*

It is theorized that a shark's scales bristle when encountering a reversing flow, thereby trapping vortices between the scales, creating a partial slip condition over the surface and inducing turbulence augmentation in the boundary layer. To replicate and study these effects, a spinning cylinder was used in a water tunnel to induce separation over a flat plate with 2 millimeter square 2D transverse grooves. The results were compared to separation occurring over a flat plate without grooves using DPIV. The observed effects in vortex shedding frequency and other effects upon the boundary layer are discussed.

**Jessica Jones**, Chemistry  
Faculty Mentor: Kevin Shaughnessy, Chemistry

*Ligand Steric Effects in Palladium Catalyzed α-Arylation of Ketones*

Palladium catalyzed coupling reactions are powerful ways to create carbon-carbon bonds. Phosphine ligands have a range of steric properties, which can have significant effects on the efficiency of a reaction. Neopentyl phosphine ligands have been shown to be effective ligands in various palladium-catalyzed cross-coupling reactions. Using di-tert-butylneopentylphosphine in a reaction of aryl bromides and chlorides with various ketones, with palladium acetate at 50 °C-80 °C, moderate to high yields were obtained of the α-arylated products. With our protocol an efficient synthesis of benzofurans is also presented.

**Matthew Jones**, Psychology, Honors College  
Faculty Mentor: Rosanna Guadagno, Psychology

*Good vs. Evil: A Study of Gender in Avatar Selection and Alignment*

Self-presentation among online avatars (online virtual representations of individuals) is a well-documented phenomenon, but is it also related to how we act in real life? We examine whether people self-represent their moral alignment and personality as well when creating an avatar while playing a role-playing video game.

**Amber Kaderbek**, Aerospace Engineering & Mechanics, Computer Based Honors Program  
Faculty Mentor: James Paul Hubner, Aerospace Engineering & Mechanics

*Analysis of Periodic Cambered Airfoils for Application in Micro Air Vehicle Flight*

To understand the aerodynamics of micro air vehicles (MAVs), small aircraft no bigger than birds, research is investigating the designs of Nature, which suggest that optimal MAV design features flexible membranes because of their improved aerodynamic efficiency. However, membrane inflation and vibration increases the difficulty of flow analysis compared to a rigid wing. Research in this area aims to determine whether the improved performance of membrane
wings is due to the inflation or the vibration of the membrane by decoupling the static and dynamic effects.

**Agata Kargol**, Computer Science, Computer Based Honors Program University Honors Program, International Honors Program, University Fellows Experience  
Faculty Mentor: Monica Delaine Anderson, Computer Science

*Using Robotics to Teach Computer Science: Transition from PREOP to Python*

In the search of the best method to teach introductory Computer Science courses, this university transitioned to using robots and teaching in Python. Current research is focusing on exploring the effectiveness of various Python environments with regards to programming ease and assimilation of core Computer Science concepts. Initial data suggests a significant difference between command line programming, using IDLE, and using PyScripter. This study intends to present a case study exploring possible reasons for this difference, and to identify areas of further study.

**Koushik Kasanagottu**, Biological Sciences, Honors College  
**Josh Kim**, Biological Sciences  
Faculty Mentor: Janis O'Donnell, Biological Sciences

*Zinc and lithium in dopamine neuron disorders*

Parkinson’s Disease (PD) is a neurodegenerative disorder characterized by dopamine neuron death. Recently, zinc has been implicated in PD pathology, but the role of this metal is unknown. Therefore, we aim to examine zinc function in dopamine neurons, and the possible involvement of Catecholamines-up (Catsup), a zinc-transporter protein and negative regulator of dopamine synthesis. We find that Catsup mutants are zinc sensitive, while over-expressing Catsup in dopaminergic neurons increases zinc tolerance. Ingestion of lithium, used as a therapeutic agent in mood disorders, protects against zinc toxicity, providing a system for the study of zinc and lithium roles in the brain.

**Kayla Kelley**, Human Development & Family Studies  
Faculty Mentor: Hyun-Joo Jeon, Human Development & Family Studies

*Preschoolers Attitudes Towards Disabilities*

This study examines the perceptions that preschoolers have towards their peers who have disabilities and how this is affected by their parents’ attitudes towards disabilities. The current study includes 33 parents and children. The study uses qualitative data of child interviews to determine each child’s attitudes towards peers with disabilities. The study uses quantitative data of parent questionnaires to gain an understanding of the parents’ attitudes towards people with disabilities. This study examines the relation between the parents’ attitudes and the children’s attitudes towards people with disabilities.

**Matthew Kelley**, Chemistry, Computer Based Honors Program  
Faculty Mentor: David Dixon, Chemistry

*Potential Energy Surfaces for Oxidative Dehydrogenation on Group VI Transition Metal Oxide Nanoclusters*

Catalysis provides the means of changing the rates at which chemical bonds are formed and broken and of controlling the yields of desired products over undesired ones. Transition metal oxides (TMO) form an important class of materials widely used in industry as heterogeneous
catalysts and catalyst supports. A range of reactions on TMO nanoclusters have been studied using electronic structure theory. The hydrolysis reactions of TMO nanoclusters will be described as will the dehydration of alcohols. The intermolecular dehydration reaction of alcohols to produce ethers will be described. The accuracy of the various computational approaches will be discussed.

Joycelyn Kennedy, Social Work  
Faculty Mentor: Javonda Williams, Social Work  
*A New Look at Addiction and Intervention*  
A case study will be used in this presentation to propose that Choice Theory and Attachment Theory can explain addiction in adults and include a potential method of intervention. Glasser’s Choice Theory will be explained and related to how adults may become addicted. Then Bowlby’s Attachment Theory will be used to explain a method of intervention without using forms of detoxifications that may cause physical harm to an individual.

Stephen Killen, Anthropology  
Faculty Mentor: Chris Lynn, Anthropology  
*Working on the Railroad: How Work Songs Have Shaped the Human Brain*  
My experiment seeks to explain why work songs are present in every culture. Work songs where used to synchronize manual labor and keep up group moral and were sung Gandy Dancer’s of America and also include the Waulking songs of Scotland. Such a cultural phenomenon could be the result of an evolutionary adaptation in the way the human brain. I will be using a pedometer and stopwatch to measure the extent to which participants will adapt their walking speeds when presented with music as well as a survey to approximate the effect of the music on their disposition.

Nikolai Korchurov, Electrical & Computer Engineering, Computer Based Honors Program, Honors College  
Faculty Mentor: Patrick Kung, Electrical & Computer Engineering  
*Advanced Scientific Data Processing Tool*  
Data collected in many scientific experiments is often saved in a format that is not easily readable or processable. This project consisted of carrying out measurement experiments on semiconductor materials, collecting data, and developing a software application that can automate the conversion of gathered data into a usable format for further processing. The created application is able to read in several types of measurement files, extract required variables, tabulate, and plot data - all with minimal user interaction. Future plans include integrating the application with MATLAB and automating further data analysis and handling.

Anika Kuczynski, Civil, Construction, & Environmental Engineering, Honors College  
Faculty Mentor: Pauline Johnson, Civil, Construction, & Environmental Engineering  
*Optimizing Recovery and Growth of E. coli in a Novel Detection Method*  
Current methods used to detect E. coli, an important indicator organism, in drinking water require a minimum 12-hour incubation period. There is great need for the development a new method of rapid detection of E. coli in water. One technique couples the standard membrane filtration (MF) technique with subsequent recovery and rapid growth in order to enhance
bacterial concentrations to achieve earlier detection. The growth optimization of E. coli recovered from membrane filters directly contributes to the development of an inexpensive and rapid water quality test. Experiments demonstrated that efficient recovery was not necessary for rapid growth.

**Bradley Langston**, Chemical & Biological Engineering, Computer BasedHonors Program  
Faculty Mentor: Heath Turner, Chemical and Biological Engineering  
*Molecular Dynamics Simulations of Polylysine*  
Studying the folding of polypeptides can provide broad insight into the behavior of proteins in the body and can potentially open doors to further understand diseases of protein malfunction such as Alzheimer’s. In the lab, polylysine has shown a transition from an alpha-helix conformation to a beta-sheet conformation at 58°C. This research uses molecular dynamics simulations to reproduce this transition in order to better understand how the transition occurs. Polylysine molecules are constructed with molecular visualization software, solvated in a simulated water box, and then allowed to relax to the appropriate temperature for study.

**Micah Larsen**, Geography  
Faculty Mentor: Lisa Davis, Geography  
*Natural vs. Controlled Stream Data*  
Through my research, I will compare and contrast the differences of a natural river flow verses a controlled river flow and the lasting effects it has on the geology and ecology of the area. Interfering with the natural hydrology of a stream can be severely harmful to the aquatic species and vegetation which reside in the area. My source of data will come from the Tallapoosa River and R.L. Harris Dam located in Wadley, Alabama.

**Elizabeth Lee**, Biological Sciences  
**Griff Hall**, Biological Sciences  
Faculty Mentor: Ryan Earley, Biological Sciences  
*The Stages of Embryological Development of Kryptolebias marmoratus*  
We generated a developmental series for mangrove rivulus, Kryptolebias marmoratus, the only self-fertilizing hermaphroditic vertebrate capable of producing lineages of genetically identical animals. Because little is known about rivulus development, we defined and timed different stages of embryogenesis by examining morphological features of the embryo with a dissecting stereomicroscope. We gathered eggs at varying times post-fertilization and fixed them in 10% formalin, followed by dechorionation to better resolve developmental stage. This study will provide the foundation for exploring whether developmental trajectories differ among isogenic lineages, perhaps reflective of local selection pressures acting on developmental timing across the species’ geographical range.

**Hayley Leuch**, Biological Sciences  
Faculty Mentor: Janis O’Donnell, Biological Sciences  
*Gene interactions in genetic models of Parkinson’s disease and autism*  
Parkinson’s disease, a neurodegenerative disorder, and autism, a complex disorder that affects behavior, have genetic components that influence the severity of symptoms and responses to therapies. While some specific genes involved in these disorders are
known, it is thought that many others may be important. Genetic interaction assays are an effective means of identifying other candidate genes. We employ disease models in the fruit fly as the basis for gene interaction assays. We are screening progeny from genetic crosses to find chromosomal regions that modify mutant phenotypes of our disease models using genes related to autism and Parkinson's disease.

Shannon Lindamood, Theater & Dance, Honors College
Faculty Mentor: Sarah Barry, Theater & Dance

*Creative Being*

The term “creative” is often used to describe the unusual, but such broad application muddles its specific meaning. Creativity is best defined when analyzing its impulse, process, and motivation. In a critical investigation, I chose to analyze each defining facet by studying artists and individuals considered to be creative within their disciplines. By researching and synthesizing each person’s views and habits, I clearly establish the creative act. I then applied these theories of creativity to my work in dance choreography. A deeper understanding of creativity helped produce more successful work efficiently and develop original methods in my creative process.

Lindsay Lindsey, Art, Computer Based Honors Program, Honors College
Faculty Mentor: Craig Wedderspoon, Art

*The Fibonacci Project*

In 1202, Leonardo Pisardo introduced his Fibonacci sequence, a sequence which plays a huge role in science, nature, music and art; bridging the divide between science and art. The Fibonacci Project acts as a tangible example of this bridge. There are two aspects to the project. The first is a 6 ½ foot tall, three dimensional representation of a Fibonacci Spiral constructed from stainless steel. The second aspect is the Fibonacci Field Day that will provide an opportunity for young students to get a taste of science, math, music, and art in an environment that is exciting and educationally beneficial.

Lindsay Lindsey, Biological Sciences, Computer Based Honors Program, Honors College
Faculty Mentor: Matthew Jenny, Biological Sciences

*MTF-1 and NRF2 Regulatory Interactions in Response to Metal and Oxidative Stress*

To investigate the role of two transcription factors (MTF-1 and NRF2) in the co-regulation of stress response genes such as heme oxygenase 1 (HO-1), biliverdin reductase (BVR) and metallothionein (MT) in response to metal or oxidative stress, a zebra fish liver (ZFL) cell line was dosed with tert-Butylhydroquinone (tBHQ) or Cadmium (Cd). Changes in expression levels of the stress response genes were measured by real-time PCR. Preliminary data shows that HO-1 is up-regulated by tBHQ while MT is up-regulated by Cd. Future experiments will involve morpholino knockdowns to determine the role of MTF-1 and NRF2 in co-regulating differentially expressed genes.
Rodney Littlejohn, Chemistry, Honors College
Faculty Mentor: Franchessa Maddox, Chemistry
Metallic solution infiltration methods for creation of high surface area metal replicas of silica monoliths with multimodal porosity
The creation of metal replicas of silica monoliths exhibiting multimodal porosity has been achieved by impregnation with various metallic solutions. The desired end is the creation of highly conductive high surface area replicas. Several methods have been explored to achieve such high surface area and we have successfully been able to increase the surface area of the metal replicas. These successes enable us to make headway in the development of supercapacitors and information storage media.

Zac Lovoy, CBHP, Computer Based Honors Program, Honors College
Faculty Mentor: John Clark, Biological Sciences
The Gesneriaceae Image Library – A Tool For Field Biologists
Recognizing plant diversity is a major obstacle for field biologists when working in areas of high diversity such as tropical rainforests. We developed an image library of the flowering plant family Gesneriaceae that is easily downloaded to an iPod with the goal of creating a tool for biologists to use in the field for rapid identification. This project made use of digital images of field collections from the flowering plant family Gesneriaceae. We used pre-existing file storage applications that can hold the entirety of our image library on an iPod Touch, which can also be used on other iDevices.

Ayla Luers, Political Science
Faculty Mentor: Barbara Chotiner, Political Science
How Hitler's policy of aggression became Stalin's political advantages during World War II
This project shows how Joseph Stalin used Adolf Hitler’s rise to power during WWII to solidify political control and territorial gains for the USSR. The goal is to analyze how Stalin's supremacy grew before and during the war by capitalizing on political opportunities. First Stalin signed a non-aggression pact with Hitler in the 1930's then allied with the West to defeat Hitler on the Eastern Front; and finally, Stalin gained total command over the Eastern Bloc and established a Soviet sphere of control. This research demonstrates a political leader’s ability to manipulate policy for personal gain and temporary state advantage.

Kayla Magbie, Social Work
Ebenee Thomas, Social Work
Faculty Mentor: Javonda Williams, Social Work
African American Women in marriages and relationships.
Our group plans to discuss, African American Women in marriages and relationships. We will examine five main topics which are: The percentage rates of African American women who are married compared to other races, how economic status plays a role in why or why not African American women get married, How African American relationships and women are portrayed in the media and how society sets African American women up for failure in relationships. With our research we plan to support our hypotheses that African American women have lower marital rates in comparison to other races.
Impact of Reduced Gravity on Gas-Liquid Flows in Fractal-Like Flow Networks

This study examines the effects of gravity on gas-liquid flows in a fractal-like flow network. Fractals are geometric shapes that exhibit self-similarity at increasingly smaller scales. Fractal-like flow networks have gained attention for the use of thermal management of compact microelectronics. This design is proposed over current micro channel networks due to the ability to provide a more uniform temperature distribution while maintaining a lesser pressure drop. Because fractal-like flow networks consist of multiple flow scales, gravitational effects will vary at these different flow scales. A greater understanding of these effects will enable greater use of these network flow systems.

Illicit Drug Abuse in the Social Welfare System

The issue of illegal drug usage among welfare recipients is a social issue that many people are discussing. To better understand, we are planning to not only look into the policies, but the individuals. We plan to conduct interviews with peers, community members, and community leaders. Through an analysis of each we hope to figure out what methods work and what methods need to be revised. It is our goal to help people suffering from drug addictions, break down negative stigmas, and find a way for policy to decrease the amount of welfare recipients using illicit drugs.

iHelp for Autism: Using iPads to Teach Communication Skills to Children with Autism

Since its unveiling in 2010, the iPad has been widely used by counselors, teachers, and parents to teach communication skills to children with autism. Since then, developers have already created numerous "apps" tailored to the needs of children with autism. We are actively studying the effectiveness of these apps in teaching communication skills to children with autism while using techniques of applied behavioral analysis (ABA) to aide in the assessment of each app's effectiveness. In addition to studying the effectiveness of these apps, we are also creating our own apps to better teach communication skills to children with autism.

Relationship of nonverbal ability to receptive syntax and vocabulary

The current study focused on language development in children with Down's syndrome, intellectual disability, and typical development. We examined the relations between receptive syntax and receptive vocabulary to nonverbal ability. The Test for Reception of Grammar, which measures children's ability to understanding of grammar, was used to measure receptive syntax;
the Peabody Picture Vocabulary Test, which measures children’s knowledge of vocabulary, was used to measure receptive vocabulary. The Leiter International Performance Test, will be used to measure nonverbal intelligence.

**William McCarty**, CBHP, Computer Based Honors Program, Honors College
Faculty Mentor: Amy Holmes-Tagchungdarpa History
*Revolutionizing Jonang Buddhism Research: Digital Mapping for the Jonang Foundation*

The Jonang tradition is one of the numerous traditions of Buddhism in Tibet. As with each institutionalized form of Tibetan religion, a vital aspect of the Jonang is its historical and active sites. However, there is no comprehensive geo-spatial depiction of such locations. This project attempts to meet this need by creating an interactive satellite map of Jonang sites derived from the database of the Jonang Foundation, an NGO dedicated to preserving and promoting research about the Jonang tradition in Tibet. This project marks a development in digital Himalayan studies and provides an invaluable tool for both scholars and non-specialists.

**Margaret McCormick**, History, Computer Based Honors Program
Faculty Mentor: David Michelson, History
*Ancient Documents in a Digital Age: The Syriac Reference Portal*

The goal of this project is to create an online and user-friendly research database for the study and preservation of Syriac manuscripts. My research has been to develop a standardized encoding to be used to put the information into an online searchable format. This XML encoding will be used in cataloguing the manuscripts and linking the digital tools to be used on the site (www.syriac.ua.edu). Specific research objectives have included developing the mark up tags and vocabulary used in searching.

**Samantha McPeak**, Electrical and Computer Engineering, Honors College
Rachel Frazier, AIME
Faculty Mentor: Sushma Kotru, Electrical and Computer Engineering
*Preparation and Testing of Electrochromic Devices*

Electrochromic devices (ECD) darken when a voltage is applied and bleach when the opposite voltage is applied. Their applications include windows, camera displays, and rearview mirrors. In this project, we made ECDs and optimized their properties using indium tin oxide (ITO) films as their electrodes because ITO is clear and highly conductive. The absorption, resistivity, and thickness of the devices as well as the time and voltage required to switch between states have been taken. The ideal ECD would have the darkest film able to quickly and completely bleach. Through this experiment, optimization will enable a comparison to market ECDs.

**Kristopher Metcalf**, Electrical and Computer Engineering, Computer Based Honors Program
Faculty Mentor: Edward Sazonov, Electrical and Computer Engineering
*RF Hand Gesture and Proximity Sensor*

Movement of the hands and arms is key to the execution of most common tasks. Direct measurement of these movements can provide an accurate way to recognize and record both voluntary and involuntary gestures. Our research details the design of a wearable radio-frequency proximity sensor which measures the distance between an individual’s wrist and chest in real-time. Our sensor uses radio-frequency identification (RFID) standards to verify the
identity of the transmitting circuit, reducing false positives and improving reliability. Gestures detected with this device allow for accurate quantitative data which can be used for analysis of specific activities and behavioral patterns.

**Travis Midkiff**, Mechanical Engineering, Computer Based Honors Program
Faculty Mentor: Semih Olcmen, Aerospace Engineering & Mechanics

*Unsteady Flow Analysis Techniques*

Fuel consumption and pollutant emission of a spark ignition engine may be reduced by minimizing the cyclic variability of combustion. To reduce cycle-to-cycle combustion variation, which is caused in part by variation in the mixture velocity, better insight must be gained by quantifying the variability. A fiber-optic LDV probe was used to measure velocities near the spark-plug of an internal combustion engine under fired and motored conditions. Velocity data obtained during engine start and engine run were analyzed using high-pass filtering, wavelet decomposition, proper orthogonal decomposition, and wavelet decomposition with proper orthogonal decomposition techniques to identify the fluctuating velocity components.

**Daniel MiJayla**, Social Work

**Hunter Lamela**, Social Work

Faculty Mentor: Javonda Williams, Social Work

*Retention Rate at The University of Alabama*

The purpose of this research is to show the impact of psychosocial development and college completion. We will show differences in the experiences of students who started freshman year at a community college versus students who started freshman year at the University of Alabama. We will use our personal experiences along with published texts including articles, journals and psychosocial theory to explain why transfer students have a higher retention rate at the university. Implications for more innovative teaching techniques are identified in order to prepare educators to improve retention rates with future freshman level students.

**Theresa Mince**, Clothing, Textiles & Interior Design, Computer Based Honors Program, Honors College

Faculty Mentor: Virginia Wimberly, Clothing, Textiles & Interior Design

*Clothing Choices of Preschool Females as Symbols of Sex Roles*

This study explores the development of sex role stereotyping in preschool females. Using a pool of 300+ preschool-aged females from four urban daycares in Texas, a verbal survey was administered and results recorded. The questions ranged from what clothing choices they would choose for various activities to how their parents would feel if they wore certain items. They were given four clothing options, two stereotypically masculine and two stereotypically feminine. The results are to be evaluated, trends recorded, and the test is to be replicated in Alabama. Those results will then be compared with those from Texas.

**Jenna Montgomery**, Psychology

Faculty Mentor: Jason Scofield, Human Development & Family Studies

*Preschoolers Ability to Distinguish between Lying and Ignorance*

Learning through others’ testimony is vital to a human’s learning experience because there is an abundance of information an individual may never see or experience firsthand. In order to keep
from learning false information preschoolers must develop selective trust in informants based on history of accuracy or inaccuracy, informant’s intentions and knowledge state. Once mistrust is established, how easy or difficult is it for the speaker to regain the preschoolers trust again? This study is investigating how trust is reversed after mistrust has already been established with two different types of speakers: one being a liar and one being ignorant.

Isabela Morales, History, Honors College, McNair Scholars
Faculty Mentor: Jenny Shaw, History

Abuse and Influence: Reconstructing the Lives of Seven Enslaved Women, 1830-1856
In 1856, Alabama planter Samuel Townsend died, naming as heirs his nine biological children and their mothers—seven enslaved mistresses. This research attempts to piece together the paradoxical roles of these Townsend women. Between Samuel’s death in 1856 and his will’s probation in 1860, the Townsend women were under the law both legal heirs and legal property. The tenuous positions they occupied opened them to danger—sexual vulnerability in the private plantation house, legal vulnerability in the public courtroom, and social vulnerability as individuals who confused racial divisions in the wider population—even while providing opportunities for socio-economic advancement.

Reed Morgan, Biological Sciences, McNair Scholars
Faculty Mentor: Ansley Gilpin, Psychology

Exploring Trustworthiness through Accuracy and Conventionality
Anecdotal and empirical evidence has highlighted that young children depend on the testimony of others for learning about the world and to judge trustworthiness. In this experiment, 3- and 4-year-olds (n = 48) completed four trials in which they saw two actors performing 3 familiar actions followed by 1 novel action. Children were then asked to: a) endorse the actor who had performed the action correctly (e.g., “Who biked?”) and b) to perform the action themselves (e.g., “Can you bik?”). Both 3- and 4-year-olds endorsed and performed the unconventional-accurate actor significantly more often than the conventional-inaccurate actor.

Laura Mould, Chemical and Biological Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Peter Clark, Chemical and Biological Engineering

Viscometer Data Analysis
Experimental data is seldom perfect. The signals often contain noise, both random and systematic. Analog and digital methods have been developed to remove noise from noisy signals and many instrument manufacturers make use of these techniques to improve the accuracy and reproducibility of their instruments. We have an early version of a viscometer that does not do a good job of filtering the raw data so we have to develop techniques to improve the output signal. This project explores digital filtering and smoothing techniques that can be used to extract the best possible data from the viscometer signal.
Aeriel Murphy, Metallurgical and Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical and Materials Engineering

Nanopatterned Perpendicular Media
The goal for next generation hard disk drives is to achieve storage densities of 10 Terabits per square inch by 2018. The focus of most of the research is aimed at nanopatterned perpendicular anisotropy media for the highest storage densities. We report our results on nanopatterned perpendicular anisotropy CoPt films using nanosphere lithography. In this technique, polystyrene spheres are coated onto a CoPt-coated silicon wafer, shrunk in size using an oxygen plasma, then used as masks for nanopatterning the CoPt film. Scanning electron microscopy and magnetic measurements show the effect of patterning the magnetic film.

Aeriel Murphy, Metallurgical & Materials Engineering, McNair Scholars Program
Paige Boehmcke, Metallurgical & Materials Engineering
Suzanne Kornegay, Metallurgical & Materials Engineering
Benjamin Strong, Metallurgical & Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical & Materials Engineering

Mechanically Stressed Out
Knowledge of the mechanical properties of materials is fundamental in engineering the world around us. This experiment explores three different mechanical properties of metals: tensile strength, ductile to brittle transformation, and hardness. The purpose of this experiment is to compare the mechanical properties of different metals in order to understand how materials are selected for different engineering applications. We will also discuss how mechanical stress in thin films can be tailored to specific applications by varying materials and processing conditions, and some of the exciting emerging applications of this method.

Nicholas Neveu, Electrical & Computer Engineering
David Gillespie, Electrical & Computer Engineering
Faculty Mentor: Yang-Ki Hong, Electrical and Computer Engineering

Miniaturized Ferrite PIFA Antenna for Wireless Communication Systems
Electrically small antenna underpins rapidly advancing wireless communication systems. Therefore, we have proposed and simulated PIFA (planar inverted F) antenna with HFSS (high frequency structure simulation) software for its performance. The simulated PIFA antennas with and without ferrite were compared for size and performance. It was found that the ferrite reduced the antenna’s radiator length by over 14%, while maintaining 3.38 dB antenna gain and omnidirectional radiation pattern at 2.45 GHz.

Kerry Noce, Health Sciences
Faculty Mentor: Lori Turner, Health Sciences

Vaccination Myths and Facts
The purpose of this literature review is to present current research about vaccinations and to share information regarding safety and effectiveness. It addresses issues regarding benefits and risks of not vaccinating. With all the negative (false) press about vaccinations in recent years, this study will dispel the myths that have frightened parents into not having their children vaccinated. This presentation discusses strategies that Health Care Professionals can adopt to reassure the public regarding the benefits of vaccinations.
**Lauren Oliver**, Social Work  
**LeCretia Crumpton**, Social Work  
**Shamera Thomas**, Social Work  
Faculty Mentor: Javonda Williams, Social Work  

**Different Structures of Families**  
We will be discussing how different structures of families affect people in society. There is no longer just the "mom and dad" structures in homes but "mom and mom" and "dad and dad" and etc. We must make people aware of this because this can determine how we perceive individuals.

**Darryl (DJ) Outlaw**, Chemical & Biological Engineering, Computer Based Honors Program  
Faculty Mentor: David Dixon, Chemistry  

**Structure Predictions of the Properties of Metal Ammonia Borane 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.

**Matthew Outlaw**, Chemical & Biological Engineering, Computer Based Honors Program  
Faculty Mentor: David Dixon, Chemistry  

**DFT Studies of the Hydration Reactions of H2O with Transition Group IVB Metal Oxide Nanoclusters**  
The transition metal oxide TiO2 is a photocatalyst for the control of chemical transformations. TiO2 can split water to form hydrogen and oxygen. Electronic structure theory is used to study the initial steps of water activation on the heavier element ZrO2 and HfO2 nanoclusters in the ground and excited state to understand these reactions as the solids have a very different band gap from TiO2. The goal is to design new materials which can use solar energy to split water efficiently so that hydrogen can be used as an energy carrier to minimize atmospheric carbon emissions.

**Katherine Overton**, Anthropology, Honors College  
Faculty Mentor: Christopher Lynn, Anthropology  

**Flickering Light Phenomena: The Influence of Visual Stimuli on Relaxation**  
The relaxing effect of fires is a belief supported by an abundance of anecdotal evidence; however, a deficit exists of empirical data to authenticate this claim. Furthermore, might such a relaxation response have been extrapolated to such ubiquitous modern flickering visual stimuli as television? This study explores the relationship between flickering light phenomena, in the form of a digital fire with or without sound, and the measured stress levels of participants, through the assessment of multiple forms of biofeedback, such as heart rate, blood pressure, and brain activity. Preliminary results suggest an influence on blood pressure for visual stimuli alone.
Chelsea Page, Health Sciences  
Faculty Mentor: Lori Turner, Health Sciences  
Reducing Motor Vehicle Accidents Among College Students: Utilization of the PRECEDE-PROCEED Model  
The leading cause of unintentional injury death among 15-24 year-olds is motor vehicle accidents. National Health Objectives outline the need to reduce the percentage of fatal motor vehicle accidents among young people by 50%. Experts recommend using health planning models to develop behavior-change programs. The purpose of this project is to develop an intervention utilizing the PRECEDE-PROCEED planning model. This program focuses on alcohol consumption and driving. By educating students regarding the consequences this high-risk behavior, enhancing their perceived susceptibility and severity, and recommending actions, this program has the potential for behavior change and enhancement of quality of life.

Austin Parrish, Economics, Finance & Legal Studies, Computer Based Honors Program, Honors College  
Faculty Mentor: Gary Hoover, Economics, Finance & Legal Studies  
Democrats, Republicans, and Economic Freedom: Analyzing the Effects of Political Control  
Within the field of public economics, an increasing amount of literature examines the link between state-level party effects on political outcomes such as the size of government, taxes, and labor laws. We add to this literature by considering another popular area of public economics, economic freedom, and how it might be influenced by party politics. Using data from 1981-2005, we find changes in economic freedom are not strongly tied to either political party, although these results vary among certain sub-components of the economic freedom index.

Donald Paul, Aerospace Engineering & Mechanics  
Faculty Mentor: Samit Roy, Aerospace Engineering & Mechanics  
Processing and Mechanical Characterization of Nano Reinforced Carbon Thermoplastic Composites  
Polyether ether ketone (PEEK) and polyphenylene sulfide (PPS) resin with the additions of surfactant modified cloisite 20A and cloisite 30B nanoclays are used in conjunction with unsized unidirectional carbon fiber to create a thermoplastic nanocomposite laminate. Initially, either PEEK or PPS resin is mix intercalated with either surfactant modified cloisite 20A or cloisite 30B nanoclays. The resulting mixture is then taken through a ribbon pulverizer and converted to a fine dust. This dust is then combined with unsized unidirectional carbon fiber in a compression mold machine to construct a laminate. Mechanical characterizations are performed on specimens being machined from these laminates and compared with baseline specimens. In addition, the nanocomposites are characterized using optical micrographs (OPM), scanning electron micrographs (SEM), transmitting electron micrographs (TEM), and x-ray diffraction (XRD). As shown in figures 1 and 2, it is observed that PEEK specimens containing only a 2 weight % addition of nanoclay exhibit a substantial increase in both compressive strength and short beam shear strength.
C'Chi Payne, Mechanical Engineering
Faculty Mentor: Rachel Frazier, AIME

Solar Cells: Here Comes the Sun!

Solar cells, or Organic Photovoltaic Cells (OPV) are commonly used to convert light into electricity. The active layer of a solar cell absorbs light and generates current and voltage. Astrazon Orange (dye), Crystal Violet (dye), Porphyrin, and Perylene Tetracarboxylic Dianhydride (PTCDA) were used as derivatives for the composition of new materials and as the active layer of the solar cell. An Infrared Spectroscopy (IR), pH, and Ultraviolet-visible Spectroscopy (UV-Vis) were used to characterize these new materials. The molar absorption coefficients of each material were used to develop new materials for efficient solar cells.

Taylor Payne, Anthropology, Honors College
Faculty Mentor: Lisa LeCount, Anthropology

An Analysis of Tempers in Ceramics from the Archaeological Site of the Asphalt Plant, AL

The Asphalt Plant site (1TU50) is located approximately 0.5 miles from Moundville, a large prehistoric Mississippian town. During the fall 2009 archaeological field school, the mound and surrounding area were tested. By comparing ceramics on and off the mound, it is possible to determine if the occupation of these areas were contemporaneous. Around 600 sherds are analyzed by temper type. Grog tempered ceramics date to the Woodland period, while shell tempered pottery dates to the Mississippian period. Although both areas contain shell tempered pottery, the presence of grog tempered pottery off the mound would indicate earlier occupation in this area.

Mikell Pearce, Biological Sciences, Honors College
Alexander Thompson, Biological Sciences
Faculty Mentor: Ryan Earley, Biological Sciences

The True Cost of Combat: Exploring the Effects of Physical Damage on Fighting Using Fluorescein Dye

The mangrove rivulus is an aggressive fish that engages in territorial contests for limited resources. No study has quantified the effect of physical damage on fighting decisions during a contest. Our research team developed a novel approach that entailed pitting two size-matched individuals against each other followed by post-combat immersion in a fluorescent chemical (fluorescein) to identify topical lesions sustained. We quantified behavior and pigment percentage relative to total body area for each fish. By comparing behavioral data to pigment percentages we aim to reveal how physical damage incurred during contests affects the decisions of animals to persist or flee.

Coston Perkins, Modern Languages & Classics
Faculty Mentor: Ignacio Rodeño, Modern Languages & Classics

Macho Man: Representations of Masculinity in Puerto Rican Cultural Production

The paper aims to discover how masculinity is represented in Puerto Rico. Using Rafael L. Ramírez's book Dime Capitán, the paper compares his reflexions of masculinity growing up in Puerto Rico to what is presented in fictional sources. Ramírez's work is compared to representations of masculinity in the works of Luis Rafael Sánchez: La guaracha del Macho Camacho and La importancia de llamarse Daniel Santos, Edgardo Sanabria Santaliz's De Rosas y
Espinas, and the music of reggaeton artists Yaga & Mackie. Through this analysis I hope to demonstrate how masculinity is represented in Puerto Rican cultural production.

Camille Perrett, Geography, Honors College
Faculty Mentor: John Clark, Biological Sciences
*Molecular Phylogeny of Adiantopsis rupicola*
Dr. Clark has collected the only recent specimen of Adiantopsis rupicola, a fern species endemic to Cuba. My research consists of using cycle sequencing to determine the nucleotide order in a molecule of the fern’s DNA. First, the DNA was extracted using the DNeasy Plant Mini Kit, yielding two elutions of DNA material. The first elution was then amplified by polymerase chain reaction, cleaned with ethanol, and cycle sequenced, yielding a chromatogram of the nucleotides. The resulting sequence is then compared to existing molecular data for the Adiantopsis genus, helping to reveal their phylogenetic relationship.

Forrest Phillips, English, Honors College
Faculty Mentor: Albert Pionke, English
*Navigating the Image: Interpretation and Meaning in the Self-Reflexive Film*
Taking a semiotics-based approach to cinema studies (an approach in which the "how" of a text supersedes the more obvious "what" in analysis), this presentation explores the complex interpretive relationship that exists between screen and spectator. Topics for examination include the duality of the frame, the hermeneutic “dangers” of viewing, and the evasive logic of the image. Diverse critical theories will be applied in this effort, including those of Walter Benjamin, Roland Barthes and Umberto Eco. Director Michael Powell’s self-reflexive "Peeping Tom" (1960) will serve as the principal text for analysis, though several other films may also receive brief consideration.

Kyle Pierce, Journalism, Computer Based Honors Program, Honors College
Faculty Mentor: Chip Brantley
*Empowering Storytellers*
The aim of this project is to provide a step-by-step guide of Consumer Reports-style best practices for small media outlets and citizen journalists interested in using free, cloud-based and/or open-source packages and software to set up a sustainable community news site.

Mark Pinkerton, Biological Sciences, Computer Based Honors Program
Faculty Mentor, Matthew Jenny, Biological Sciences
*Characterization of the Oxidative Stress Response in Zebrafish Embryos via in situ Hybridization*
The heme oxygenase 1 (HO1) enzyme is responsible for the catabolism of heme and production of the bile pigment biliverdin. Together with the two isozymes of biliverdin reductase (BVRa and BVRb), these enzymes form an antioxidant cycling pathway that protects cellular components from reactive oxygen species. In situ hybridization was performed on developing zebrafish embryos to visualize tissue specific expression of the mRNA transcripts of these genes. Current results indicate separate expression patterns of BVRa and BVRb along the yolk sac extension and early gut of 24 hour embryos. Further characterization of gene expression in older embryos is currently underway.
Tavio Pirocchi, Biological Sciences, Honors College
Faculty Mentor: Kim Caldwell, Biological Sciences
*Therapeutic drug discovery in an animal model for Alzheimer’s disease*
Alzheimer's disease is the most prevalent neurodegenerative disease affecting approximately 2.5 million Americans. While symptomatic treatments are available, there is no cure. Therefore, we have taken advantage of the attributes of the nematode, *Caenorhabitis elegans*, to examine a paralysis phenotype induced by the human amyloid-beta peptide associated with Alzheimer's disease. This new model is now being exploited in to identify both small molecules and genetic factors that inhibit paralysis caused by the amyloid-beta peptide. These experiments are designed to accelerate the translational path for therapeutic discovery and advancement.

Catherine Postell, Social Work
DeWanye Hamilton, Social Work
Sarah Warner, Social Work
Faculty Mentor: Javonda Williams, Social Work
*Use of Service Animals as Therapy for Depressed*
We plan on using Erik Erikson's Psychosocial Theory to help explain how service animals can effectively be used in a treatment plan for people who are suffering from depression.

Melissa Powell, Communicative Disorders
Heather Bell, Communicative Disorders
Kim Sanders, Human Development & Family Studies
Faculty Mentor: Jason Scofield, Social Sciences-Human Development & Family Studies
*Screen Media Use in Rural Children*
This study examined the possible relationship between young children’s exposure to screen media (e.g., television and videos) and household income and maternal education. Parents of preschool-aged children between the ages of 3 and 5 years were recruited from two vastly different populations, one rural and one not. Findings indicate that rural children come from households with significantly lower incomes, have mothers who are less likely to have earned a college degree, and are exposed to higher amounts of screen media than their non-rural peers. Findings suggest a strong relationship between income, education, and screen media use.

Melissa Powell, Communicative Disorders
Heather Bell, Communicative Disorders
Kim Sanders, Human Development & Family Studies
Faculty Mentor: Jason Scofield, Social Sciences-Human Development & Family Studies
*Video Word Learning in Rural Children*
This study examined the possible relationship between young children’s ability to learn words from video and receptive language as measured by the Peabody Picture Vocabulary Test-III. Preschool-aged children between the ages of 3 and 5 years were recruited from two vastly different populations, one rural and one not. Findings indicate that children from both populations were equally good at learning words from video despite dramatic differences in their receptive language. In addition, receptive language did not predict video word learning. Findings
suggest that rural children are capable of learning words from video and do so despite having a limited vocabulary.

**Jake Powers**, Biological Sciences  
**Kay Rainey**, Biological Sciences  
Faculty Mentor: Ryan Earley, Biological Sciences  
*Males in a Hermaphrodite’s World: What Does Temperature have to do with it?*  
Phenotypes are remarkably sensitive to environmental stimuli experienced during development; this is illustrated by temperature dependent sex determination. The mangrove rivulus is a self-fertilizing hermaphroditic fish capable of creating genetically identical offspring. Theory indicates that clones would do poorly in harsh environments, and any mechanism for increasing genetic diversity, such as the generation of males, would be favored. We explored temperature-dependent sex determination in rivulus by incubating eggs of several clonal lineages from different geographical locations at three temperatures. We report the results of this study, and implications for understanding the persistence of self-fertilization in turbulent mangrove habitats.

**Daniel Preston**, Mechanical Engineering, Computer Based Honors Program, Honors College  
Faculty Mentor: Leila Ladani, Mechanical Engineering  
*Characterization of Tissue with a Micro-Bio-Electromechanical Combination Stress and Strain Gage*  
As cancer develops or recurs, cells within the human body stiffen. Periodic measurement of the stiffness of these cells could give patients early warning of developing cancer. The goal of this project is to develop a combination stress and strain gage to measure the stiffness of tissue in a quasi-equilibrium situation, for use in vivo. The gage utilizes an actuator and capacitive sensor surrounding the tissue sample in a linear configuration. Current work is at the macro scale for proof of concept, with an emphasis on a specialized capacitive sensor developed for this application.

**Kay Rainey**, Biological Sciences, Honors College  
**Jake Powers**, Biological Sciences  
Faculty Mentor: Ryan Earley, Biological Sciences  
*Plasticity for plasticity’s sake: a new perspective on gender roles in Kryptolebias marmoratus*  
Kryptolebias marmoratus is the only known self-fertilizing hermaphroditic vertebrate, a reproductive tactic that greatly minimizes genetic variability within lineages. Experimentally lowering temperatures causes these fish to develop as males. Cross-fertilization between males and hermaphrodites may increase genetic diversity and allow for evolutionary adaptation in extreme environments. Because males result from sexual plasticity during embryonic development, we hypothesize that they will be more plastic in response to environmental challenges as adults. Expanding upon our previous work on developmental plasticity, we present experiments that compare behavioral plasticity of hermaphrodites and males, specifically how learning and aggression change under varying predation pressures.
**Chelsea Raulerson**, Biological Sciences, Computer Based Honors Program, Honors College Faculty Mentor: Ryan Earley, Biological Sciences

*Is Infinite Strength Achievable? Implications for Dominance Hierarchy Formation in Animals*

Linear dominance hierarchies form in many animals, but the behavioral mechanisms promoting rigid social structure remain unclear. Simulation models have focused on winner and loser effects – increases and decreases in perceived fighting ability (FA) following wins or losses – as agents of hierarchy formation. To date, all models assume no upper limit on FA. However, animals experience numerous constraints on FA, suggesting that bounded systems are more realistic. We simulated the contributions of winner and loser effects to hierarchy formation under bounded and unbounded conditions, which generated considerably different predictions about the behavioral mechanisms driving hierarchy linearity.

**Kyle Redding**, Computer Science, Computer Based Honors Program Faculty Mentor: Edward Sazonov, Electrical and Computer Engineering

*Diet Diary Android Application*

According to the World Health Organization one billion adults are overweight, with a staggering 300 million qualifying as obese. Without remediation this figure is expected to reach 1.5 billion by the year 2015. This project intends to provide an easy way of tracking calorie consumption on the android smart-phone platform in an effort to understand and provide knowledge that will aid in the prevention of this estimation from becoming a reality. This “diet diary” tracks users self-reported food consumption and provides caloric information to both users and researchers for the benefit of both the individual’s health and biomedical research.

**Ryan Redding**, Electrical & Computer Engineering, Computer Based Honors Program Faculty Mentor: Jaber Abu-Qahouq, Electrical & Computer Engineering

*Electrical Circuits Computer Game as an Educational Tool*

The goal of this ongoing project is to develop and subsequently test an electric circuits computer game for low-level electrical engineering majors to provide an alternative learning method which is easier and more entertaining than previous methods. The game is comprised of various "themes" of grouped content, divided into different levels or subtopics per theme. The game will have both single and multiplayer modes, with multiple different game mechanics implemented amongst the themes.

**Lindsay Reynolds**, Biological Sciences Faculty Mentor: Kim Caldwell, Biological Sciences

*A genetic screen to identify genes associated with both Parkinson's disease and aging*

A hallmark of Parkinson’s disease (PD) is the progressive loss of dopamine neurons in an age-related manner. Dopamine neuron degeneration often occurs from the misfolding of the alpha-synuclein protein. In C. elegans, a model organism often used to study PD because of its transparent anatomy and short generation time, genes affecting both aging and protein misfolding have been identified. Using genetic manipulation that reduces protein levels, we have found several genes associated with aging that cause enhanced alpha-synuclein protein misfolding and dopamine neurodegeneration in C. elegans. These genes will now be further studied for their relationship to PD.
James Robinson, Chemical & Biological Engineering, Computer Based Honors Program  
Faculty Mentor: David Dixon, Chemistry  
Potential energy surfaces of the reactions of hydrazine with models of spent fuel from ammonia borane dehydrogenation  
A critical issue for the use of chemical hydrogen storage systems for transportation is the regeneration of the spent fuel so that hydrogen can be added back cheaply and with minimal energy input. In conjunction with Los Alamos National Laboratory, a single pot approach to the regeneration of spent fuel based on using hydrazine as the hydrogenation reagent has been developed yet little is known about the reaction mechanism. Electronic structure theory has been used to predict the thermodynamics for a wide range of reactions in order to develop a mechanism to improve the process.

Michael Robson, Computer Science, Computer Based Honors Program, Honors College  
Faculty Mentor: Felecia Wood, Nursing  
Creating an iPhone App for Diabetes Self-Management  
Diabetes is a growing problem in America, particularly in rural areas. Because it is primarily a self-managed disease, patient knowledge is crucial. The purpose of this research is to “measure” type 2 diabetes self-management in an ethnically diverse sample, using iPod Touch® technology for delivery and evaluation of self-management concepts. Specifically, the application has a dictionary, an interactive quiz with informative videos, a fitness assessment, and general health reminders with response tracking, all geared to individuals experiencing low health literacy. The process of identifying a site for data collection and obtaining IRB approval to conduct research will be highlighted.

Brittany Roth, Human Environmental Sciences  
Faculty Mentor: Jen Nickelson, Human Environmental Sciences  
Improving the Quality of Life in College Students Using the Precede-Proceed Model  
Suicide is the third leading cause of death in college-aged individuals. The PRECEDE-PROCEED program-planning model was used to design a suicide prevention program for University of Alabama students. Phases 1-3 of the model assessed students’ quality of life, suicide rates, suicide risk factors and their correlates. Phase 4 involved intervention planning. RESULTS: One important suicide risk factor among college students is alcohol abuse. A major influence on alcohol abuse is perceived social norms about its use. A social norms intervention was planned. A decrease in perceived social norms about alcohol use should reduce suicides among college students.

Coston Rowe, Biological Sciences  
Yi Chen, Biological Sciences  
Paul Strickland, Chemistry  
Faculty Mentor: Jason Parton, Community & Rural Medicine  
Trauma vs. Medical Emergency Call Disparities in Rural and Urban Areas  
Much research has examined the issue of health disparities in rural and urban areas; however, few studies have examined trends of emergency calls when considering trauma vs. medical call percentages in these areas. Therefore, the purpose of this study is to determine which geographic
locations in the state of Alabama demonstrate the highest percentages of trauma and medical EMS calls. Data collected from the Alabama Office of EMS and Trauma database of EMS call reports from 2008 to 2010 will be analyzed using the CARE (Critical Analysis Reporting Environment) data analysis program and chi squared analysis.

**Kim Roy**, Anthropology, Honors College  
Faculty Mentor: Ian Brown, Anthropology  
*Society’s Say: Influences on the Placement of Women’s Burials in Evergreen Cemetery*  
This study explores the factors that played into the selection of a female's final resting place in Evergreen Cemetery in Tuscaloosa, Alabama. In observing plots that contained at least one second-generation female grave, collecting birth and death dates from those plots, and referencing works to analyze trends, four major influences affecting where women were interred appeared. These included death locality, cemetery trends over time, socioeconomic status, and cultural factors. From these results, one may better ascertain the social values highly regarded throughout the 19th and 20th centuries and how they combined to ultimately influence where someone was laid to rest.

**Roger Rozanski**, CBHP, Computer Based Honors Program  
Faculty Mentor: Joseph Smith, Political Science  
*Creating and Analyzing a Legal Database*  
The goal of this research is to understand why judges choose particular legal bases for their judicial opinions. To answer this question, legal brief submitted by litigants in administrative law disputes will be downloaded and analyzed using the Python computer language. After searching for and recording textual characteristics of these legal briefs it will be determined how the legal briefs influence the opinion ultimately written by the judge. This will aid in helping explain the judge’s choices of legal groundings in administrative law.

**Hailah Saeed**, Social Work  
Faculty Mentor: Maha Marouan, Gender & Race Studies  
*What does it mean to be a Muslim woman in the South?*  
When we think about the cultural and religious landscape of the American South, we hardly think of Islam or Muslim women, despite the fact that Muslim women also form part of that landscape. As a Muslim Arab-American who lives in the South, I would like to demonstrate the experiences of Muslim women in the South, particularly at the University of Alabama, and how Muslim women navigate their identity. I plan to conduct interviews with Muslim women from different backgrounds and professions to show that Muslim women form part of the religious mosaic of the South in very diverse ways that demonstrate that there is more than one way of being a Muslim woman in the South.

**Ethan Sales**, Biological Sciences, Honors College  
Faculty Mentor: Kim Caldwell, Asian Studies  
*Association between Alzheimer’s disease and the insulin-signaling pathways*  
While progress has been made in understanding some of the genetic factors influencing Alzheimer’s disease (AD), the cellular pathways associated with this disease have not been elucidated. In C. elegans, by expressing the human amyloid-beta peptide associated
with AD, a paralysis phenotype can be induced. We are systematically knocking down the function of genes associated with the insulin-signaling pathway to determine if they reverse this paralysis phenotype. Results of the screen, and their relationship to a specific cellular pathway, will be presented.

**Erica Schwalm**, Chemistry, Computer Based Honors Program  
Faculty Mentor: Patrick Frantom, Chemistry  
*Allosteric Regulation of -isopropylmalate Synthase*  
A better understanding of allosteric regulation mechanisms is important for the creation of industrial synthetic enzymes and for use as a possible drug target for new medical treatments. Using the enzyme -isopropylmalate synthase (IPMS) with the inhibitor leucine as a model enzyme system, insight can be gained into allosteric mechanisms. The goal of this portion of the project is to determine the rate limiting step of the reaction of IPMS using viscosity studies. In addition, we will look to determine if leucine increases the rate limiting effect of this step or changes the rate limiting step of the mechanism.

**Taylor Scruggs**, Biological Sciences  
**Elyse Love**, Biological Sciences  
Faculty Mentor: Laura Reed, Biological Sciences  
*Bioinformatic Metabolic Phenotype Database*  
The goal of this project was to create a dynamic (update-able) interactive online database of phenotypic data collected from several hundred Drosophila melanogaster genetic lines. This data includes genomic, metabolomic, gene expression, and gross phenotypic measurements. We created a website that linked to a mySQL database and searched the various lines that were given by the instructor. The code that was used to create the website was PHP. The website was made secure to protect it from outside users accessing the data.

**Christopher D Shaddix**, Computer Science  
**Christopher Hodapp**, Computer Science  
**Richard Bassett**, Computer Science  
Faculty Mentor: Jeff Gray, Computer Science  
*UA Campus Tour - Android Application*  
We are developing an application for Android phones to serve as a Campus Tour. The Application uses Location Based Services and Google Maps to guide users around campus displaying useful information such as classes offered, labs + libraries available, building history and more in text, picture, audio, and video formats. We also desire to build this project into an open framework so that other campuses can create a similar tour experience by filling in their own information, locations, videos and more for their campus.

**Elizabeth Shahid**, Human Development & Family Studies  
Faculty Mentor: Maria Hernandez-Reif, Human Development & Family Studies  
*School Connectedness and Adolescent Outcomes*  
Feeling disconnected or alienated is often related to deleterious outcomes. Unfortunately, many adolescents feel disconnected to school. Here, I explore school connectedness among adolescents using data from over 3,100 youths growing up in economically impoverished neighborhoods. I
first document its prevalence and stability by age, gender, and family structure. Then I examine its correlates and try to predict its fluctuations. My findings suggest that school connectedness is associated with risk-related outcomes, but that much more work is required to understand its development.

Matthew Shea, Art  
Faculty Mentor: Christina Frantom, Art  
*Graphic Design at OIT*  
The purpose of my poster is to explore the process of graphic design in the position I hold at the Office of Information Technology at The University of Alabama.

Erin Shirley, Management & Marketing  
Faculty Mentor: Philip Westbrook, Gender & Race Studies  
*Pre-School Intervention for ESL Hispanic Students*  
The accelerating influx of Hispanics into Alabama has strained public schools to meet this population’s educational needs. It is evident that some schools have not created sufficient programming to ensure that these students reach an academic success equivalent to that of their white English-speaking peers. The language barrier that exists between English as a Second Language (ESL) students and their educators has disadvantaged Hispanic students by limiting the quality of education that the state of Alabama can provide. Dropout rates illustrate that ESL students are falling behind. Since 1990, the number of Hispanic dropouts has consistently more than tripled that of their white counterparts and more than doubled that of their black counterparts. We believe that pre-kindergarten intervention is paramount to developing language skills in students at their most receptive age and precluding educational delays. We developed the Hispanic Jumpstart Program in an attempt to accelerate the education of the language-learning Hispanic students in the Tuscaloosa City School System by exposing them to both the primary language and social practices of their society’s formal schooling. The Hispanic Jumpstart is a program designed for entering kindergarten students who have had little or no exposure to the English language. The findings of our research after two sequential years of this program provide insight into the impacts of a pre-kindergarten English language learning program on the cultural awareness, cognitive development, and academic success of native Spanish speakers in their kindergarten and first grade experiences. All students showed growth as measured by the DAIL-3 and DIBELS assessments.

David Sikes, Telecommunications & Film  
Faculty Mentor: Rick Dowling, Telecommunications & Film  
*Multimedia Services Video Crew: A High Definition Team*  
As a student worker in the Multimedia Services Department of the Office of Information Technology, I work in a team environment to produce creative, high-quality video content for faculty and programs at The University of Alabama. We take great effort to go above and beyond what our clients expect, incorporating high production value in both videography and post-production work. Our work ranges from event videography to promotional videos and animations.
Matthew Sims, Civil, Construction & Environmental Engineering, Computer Based Honors Program, Honors College
Faculty Mentor: Andrew Graettinger, Civil, Construction & Environmental Engineering
Wisconsin DOT Crash-Mapping Integration Using Geographic Information System Technology
Our goal is to develop a systematic means of recording and analyzing crash data from two computer-generated road networks. The State Trunk Network is a linear system that includes only major state routes. The Wisconsin Information System for Local Roads is a cartographic system that includes all Wisconsin roads. We are developing a “link_link table” to provide a means to refer between STN and WISLR. My specific role has been to develop QA/QC data mining tools to increase data accuracy and streamline analysis of the data. My current tool will check the accuracy of points flagged as “gores” in the link_link table.

Katlin Snow, Anthropology
Elizabeth Wilson, Anthropology
Faculty Mentor: Christopher Lynn, Anthropology
The Inking of Immunity: Investigating the Health Benefits of Tattooing
This study investigates the link between tattooing and immune system strength. Local participants are providing saliva samples immediately before and after undergoing a tattoo session, allowing researchers to assess the influence of tattooing on levels of immunoglobulin A, an immune agent which combats common respiratory and gastrointestinal ailments. We hypothesize that participants will exhibit a decrease in levels of immunoglobulin A in response to their inking sessions. We further expect that participants with extensive tattooing experience will show less of an immune response with each additional session, demonstrating a relationship between the effects of tattooing and human health.

Zoe Stamateles, Chemistry, Emerging Scholars Program, Emerging Scholars Program
Charles McGahey, Biological Sciences
Faculty Mentor: Janis O’Donnell, Biological Sciences
Mechanisms for Dopamine Function in Torsin Dystonia
Dystonia represents the third most common movement disorder in humans. DYT1 is the gene responsible for one type of dystonia and encodes the protein TorsinA. However, the function of TorsinA has yet to be fully understood. We have characterized dtorsin, the Drosophila homolog of DYT1, by analyzing a complete loss-of-function mutant. We found that the mutant has dopamine deficient phenotypes, which include movement deficits. Moreover, heterozygous dtorsin mutants had significantly reduced dopamine levels. We also observe severe loss of GTPcyclohydrolase (GTPCH) activity in torsin mutants. Since GTPCH regulates dopamine synthesis, this result indicates a possible mechanism for dtorsin mutant defects.

Austin Starnes, Metallurgical & Materials Engineering
Wenwu Shi, Metallurgical & Materials Engineering
Faculty Mentor: Nitin Chopra, Metallurgical & Materials Engineering
ZnO nanowires for developing higher order architectures of nanostructures
For developing novel nanoscale heterostructures, it is critical to fundamentally understand the growth of single component nanostructures. Here, we report a novel synthetic approach to synthesize ZnO nanowires. The nanowire growth is fundamentally understood by studying the
CVD reactor design. These nanowires are further utilized as a substrate to nucleate and grow gold nanoparticles onto them. The developed heterostructures were thoroughly studied for their structure and properties. These heterostructures hold great promise for future analytical and sensing devices.

Paul Strickland, Chemistry, Computer Based Honors Program, Honors College
Trauma vs. Medical Emergency Call Disparities in Rural and Urban Areas
Faculty Mentor: Jason Parton, Community & Rural Medicine
Much research has examined the issue of health disparities in rural and urban areas; however, few studies have examined trends of emergency calls when considering trauma vs. medical call percentages in these areas. Therefore, the purpose of this study is to determine which geographic locations in the state of Alabama demonstrate the highest percentages of trauma and medical EMS calls. Data collected from the Alabama Office of EMS and Trauma database of EMS call reports from 2008 to 2010 will be analyzed using the CARE (Critical Analysis Reporting Environment) data analysis program and chi squared analysis.

Larry Summerville, Metallurgical & Materials Engineering
Junchi Wu, Metallurgical & Materials Engineering
Faculty Mentor: Nitin Chopra, Engineering
Gold nanoparticle formation and their morphological evolution at high temperatures
In order to develop novel as well as efficient sensing and analytical devices, it is critical to study the role of nanoparticle shape and size. Here, we report a detailed fundamental study concerning the morphological control of gold nanoparticles on a variety of substrates under different conditions. It was observed that smallest possible size of gold nanoparticles (<30 nm) and different shapes of gold nanoparticles could be obtained by this technique. The surface migration results showed interesting behavior under high temperatures and growth durations. The samples were characterized using SEM, EDS, XRD, and UV-vis-DRS methods to understand various aspects of formed gold nanoparticles.

Kayla Terry, Advertising & Public Relations
Faculty Mentor: Teresa Golson, Advertising/Public Relations
Through My Lens: Exploring the campus of the University of Alabama through Photography.
Exploring creativity through the lens of a camera on the campus of the University of Alabama. In partnership with the Office of Information Technology and the Faculty Resource Center.

Darrow Thomas, Biological Sciences
Faculty Mentor: Scott Spear, AIME
Environmentally Responsive Drug Release Matrix
Controlled drug delivery remains a research focus for public health to enhance patient compliance, drug efficiency and to reduce the side effects of drugs. Pectin, an edible plant polysaccharide, has been shown to be useful for the construction of drug delivery systems for specific drugs. Several derivations of esterified pectin have had their solubility tested in pseudo-gastric environment, as well as in a pseudo-intestinal solution, in order to determine its ability to dissolve in the human body. Studies in this project designate the flexibility and usefulness of pectin as a means for drug delivery.
Rebecca Thompson, Psychology, Honors College
Faculty Mentor: James Hamilton, Psychology

*The Psychology of Vicarious Victimization*

This study concerned exaggerated victimization, specifically false victimization/vicarious victimization (FV/VV) phenomena wherein people exaggerate their connection to negative events. These phenomena could be motivated by desires to secure benefits associated with the victim role, or they could serve a self-handicapping function. Participants’ task performance expectations were manipulated. They were then provided a story about a (fictitious) death on campus and asked about their closeness to him, and the effects his death had on them. Results support the viability of our method of studying FV/VV, and suggest that it is related to a combination of situation and personality factors.

Joel Thorn, Geography
Faculty Mentor: Mary Pitts, Geography

*A Comparative Assessment of Satellite Data Analysis Techniques in Remote Sensing*

This project presents research results related to the NASA-funded Sediment Analysis Network for Decision Support (SANDS) project which focuses on enhancements of suspended sediment plumes in satellite data before and after tropical cyclones in the Gulf of Mexico. The research was conducted at the Geological Survey of Alabama in partnership with the University of Alabama at Huntsville. Satellite data includes Landsat scenes in the north-central Gulf from 2000 to 2009. A comparative analysis was conducted of spectral techniques for identifying suspended sediment. Techniques included spectral band ratios, supervised classification, and ISODATA. The most successful techniques include a developed spectrally-focused algorithm and ISODATA.

Kyle Thornton, Civil, Construction & Environmental Engineering
Faculty Mentor: Andrew Graettinger, Civil, Construction & Environmental Engineering

*Intersection Node I.D.'s*

The state of Alabama identifies each roadway intersection in the state by a unique node ID. This node identification system is used to record crash locations. In the past, the nodes were recorded on paper. Recently, the paper node maps were made digital. By making the nodes digital, the realization that there were multiple nodes per intersection in some places was realized. The purpose of this project is to uncover the reason for the errors: was the error a fault in the transfer to digital, or is there another problem. Errors could make intersections appear worse than the intersections actually are by combining the number of crashes of two intersections with the same node number. This has the potential to make a safe intersection look less safe and a dangerous intersection look safe.
**Kristin Tippey**, Metallurgical & Materials Engineering, Computer Based Honors Program
**Miller Wright**, Metallurgical & Materials Engineering
**Brett Hunter**, Metallurgical & Materials Engineering
**Kirk Legrone**, Metallurgical & Materials Engineering

Faculty Mentor: Subhadra Gupta, Metallurgical & Materials Engineering

*Thin Films: Lights, Camera, Action!*

Thin films or nanolayers of different materials are used in almost everything around us -- anti-glare windshields, sunglasses, decorative coatings on watches and other jewelry, not to speak of “high tech” applications such as microprocessors and data storage. In this poster, we will describe our experimental results on some of the electrical and mechanical properties of metallic thin films, namely resistivity and stress, and explain how stress can affect resistivity in certain cases. We will discuss how materials and processes can be tailored to match the resistivity and stress requirements of various applications.

**Ryan Tucker**, Physics & Astronomy, Computer Based Honors Program
Faculty Mentor: Patrick Leclair, Physics & Astronomy

*3D Physics Simulation Program for Educational Use*

The goal of this project is to help students (primarily high school students) visualize 3D physics problems they encounter in class by creating a program that allows the user to rapidly create 3D physics simulations. This program can either be used by professors to create high fidelity simulations prior to a lecture, or by students to create real-time simulations during class. It is designed to be as user friendly as possible such that it is very easy to learn and use in a short amount of time. The program will be cross-platform and efficient, usable even on old computers.

**Andrew Tuggle**, Physics & Astronomy, Computer Based Honors Program
Faculty Mentor: Claudia Mewes, MINT

*Spinlogic -- the logic of the future?*

Based on successes in spintronics, where information is stored in electron spins, one can ask how to achieve more energy-efficient information processing through spinlogic. One promising technology is a 3-terminal device which utilizes spin-polarized currents to perform logic operations. Understanding quantitatively the device dynamics presents a key challenge in demonstrating device function, in giving theoretical guidance for device design, and in developing a dynamical switching model. We have studied material systems for spinlogic devices using SpinFlow 3D, a finite-element code capable of self-consistently solving both electron transport and magnetization dynamics. We present initial results for a 3-terminal spinlogic device using SpinFlow 3D.

**Lindsey Tulkoff**, Anthropology
**Magen Kacharos**, Anthropology

Faculty Mentor: Christopher Lynn, Anthropology

*Getting it On (line): A Study of Sexually Compulsive Behaviors on the Internet*

This study surveys anonymity and security provided by the internet in conjunction with pornographic websites, cybersex fantasy chat rooms, and online relationships which are creating new sources of infatuation. These clandestine relationships are relatively inexpensive, easily accessible, and easily terminated, correlating with an increased amount of sexually compulsory
behaviors on the Internet. These neurotic behaviors affect personal lives and dating patterns, calling into question the definition of infidelity. However, few studies have provided concrete empirical data. Methods include interviewing online participants about their behavioral patterns and providing in-depth questionnaires to a university student population.

**Mason Volk, Physics & Astronomy**  
*Faculty Mentor: Andreas Piepke, Physics & Astronomy*  
*WIPP Detector Simulation*  
The Enriched Xenon Observatory utilizes a detector that measures emissions from bombarded Xe-136 in order to detect evidence of double beta decay. This is in the hopes of observing the currently undocumented phenomenon known as neutrinoless double beta decay, which would suggest that the neutrino was its own anti-particle and would also provide a means for better estimating its mass. The goal of this research project is to reproduce the conditions inside of the Xenon detector, in order to investigate the causes of unknown background observed and hopefully aid in its isolation.

**Stephen Walker, Chemistry, Computer Based Honors Program**  
*Faculty Mentor: David Dixon, Chemistry*  
*Computational Studies of Metal Ion Complexation Reactions in Aqueous Solution*  
Metal ion aggregation is a substantial issue in the formulation of new nuclear fuels and in the behavior of actinides in the environment. The initial steps in metal ion aggregation in water often involve olation and/or oxolation reactions but little is known about the fundamentals of these reactions. The initial reactions have been studied for the metal cations Be2+, Mg2+, Ca2+, Sr2+, Zn2+, Cd2+, Cu2+, Ni2+, Co2+, Fe2+, and Mn2+, as well as UO22+ using electronic structure theory. This information is critical to understanding metal ion speciation and transport in the environment as well as for separations system design.

**Sydney Wallace, Clothing, Textiles & Interior Design**  
*Faculty Mentor: Kristin Maki, Clothing, Textiles & Interior Design*  
*The Forgotten Capital*  
Located 40 miles west of Selma, The town of Cahaba is an essential part of Alabama’s history in its government and civilization. I have conducted a case study to provide an understanding of the historical buildings that once formed the town and, through pictures and research; Cahaba may return to life. Research has been obtained through sanborn maps, photographs, sketches, letters, diaries, HAB’s, archives of history, and additional documents that have aided in each understanding and recreating the historic buildings. This research can provide a unique insight into the ancient town and will be given to Alabama Historical Commission.

**Randall Warren, Aerospace Engineering & Mechanics, Computer Based Honors Program**  
*Faculty Mentor: Semih Olcmen, Aerospace Engineering & Mechanics*  
*Comparison of Turbulent Diffusion Models*  
This research project is focused on comparing existing turbulent-diffusion model estimations to experimental turbulent diffusion data obtained in a wing-body junction flow. The governing equations of fluid mechanics are currently not solvable and require approximations. The approximations made on the equations require additional equations to be written for
mathematical closure of the problem, which is also known as "turbulence modeling". For this purpose I have been re-writing previously written programs using Matlab, and trying to find new models to include. After the program is written I will compare existing model estimations to actual data to determine the best turbulent-diffusion model.

**Emily Wayman**, Chemistry, Computer Based Honors Program, Honors College
Faculty Mentor: Patrick Francon, Chemistry

*Biochemical characterization of glucosyl-3-phosphoglycerate synthase from Mycobacterium tuberculosis*
Glucosyl-3-phosphoglycerate synthase (GpgS) is a glycosyltransferase enzyme that catalyzes the first step of the biosynthesis of methylglucose lipopolysaccharides (MGLPs) in Mycobacterium tuberculosis. MGLPs are believed to be essential for the growth of Mycobacterium tuberculosis. Previous research has shown that GpgS can be expressed and purified using recombinant E. coli. However, more rigorous biochemical characterization is necessary for further studies of GpgS. The focus of this project is to obtain and purify GpgS using standard molecular biology techniques and to characterize the enzyme using substrate studies, temperature studies, pH rate profile, and/or kinetic assays.

**Douglas Weathers**, Mathematics, Honors College
Faculty Mentor: Roger Sidje, Mathematics

*Computing the Exponential Function with Laguerre Polynomials*
The exponential function arises in the modeling of many physical and biological systems, most notably when such systems are modeled with Markov chains. This study will demonstrate a method by which to numerically compute the exponential using a modified Laguerre exponential series based on the three-term recurrence of Laguerre polynomials. It is shown that this method is more accurate than the Taylor method for scalar quantities and converges where the Taylor series diverges in finite precision arithmetic, as is the case when modeling real-world systems with computers.

**Kyle Weeks**, Finance, Computer Based Honors Program
Faculty Mentor: Kyle Fondren, Information Systems, Statistics & Management

*Online Resource for the Culverhouse Investment Management Group*
My project is the creation of an online resource for the Culverhouse Investment Management Group. The student-run group manages money (currently over $400,000) donated by an Alabama business school alumni. The finished product will be an addition to the existing Culverhouse College of Commerce and Business Administration website. A list of group members, current portfolio holdings, annual and monthly reports, and other group specifics will serve as the content. The goal of the site is to raise awareness about the existence of the group and to enable it to continue to expand and flourish.

**Eric Wenzinger**, Chemistry, Emerging Scholars Program,
Faculty Mentor: Silas Blackstock, Chemistry

*Determining the X-ray Crystal Structures of a Recyclable Solar Fuel System*
An organic compound, p-phenylenediamine norobornadiene tosylate (PD-N-Ts), is capable of the recyclable storage and release of energy produced by the sun. PD-N-Ts undergoes photoisomerization to an isomer of higher energy, p-phenylenediamine quadracyclane tosylate
(PD-Q-Ts). Facilitated by a catalytic oxidant, PD-Q-Ts can be readily converted back to PD-N-Ts, releasing its stored thermal energy. Thus, PD-N-Ts is a potential recyclable solar fuel. My role in the development of this system is to obtain the x-ray crystal structures of the PD-N-Ts and PD-Q-Ts valence isomers to determine the geometric features of the energy storage molecules.

**Katherine Werner**, Special Education & Multiple Abilities, Computer Based Honors Program  
Faculty Mentor: Andrea Mixon, Social Work  
*Juvenile Justice Database*  
This semester I have built a database using Microsoft Access for the Juvenile Justice Department of the Alabama Disabilities Advocacy Program. The database is needed for storing information related to abuse and neglect investigations conducted by ADAP in Juvenile Justice facilities. Upon completion, the database will serve as a valuable tool to effectively monitor all of the facilities and patients that fall under the scope of ADAP’s concern and care.

**Emma Whitaker**, Mechanical Engineering, Computer Based Honors Program, Honors College  
Faculty Mentor: Kevin Chou, Mechanical Engineering  
*Processing and Analysis of Mechanical and Thermal Data from Cutting Experimentations in a Multi-Sensors Equipped Machining Testbed*  
This research focuses on diamond-coated cutting tools, hardest material in the world, to machine new and stronger materials increasingly used in automotive and aerospace industries. This particular project, collaborated with National Institute of Standards and Technology, is about the processing and analyzing of force and infrared-measured temperature data from the machine testing. A typical temperature data set is a 120 by 160 by ~600 matrix. The processed data, using MATLAB, will be used to validate the developed diamond-tool cutting simulations. In addition, by having the processed data and resultant plots, comparisons of the test parameter effects can be made.

**Joshua White**, Economics, Finance & Legal Studies, Computer Based Honors Program  
Faculty Mentor: Ronald Dulek, Management & Marketing  
*Evaluating the Effectiveness of Service Learning*  
Over the past several decades, within the field of higher education, there has been a growing movement toward “engaged education.” Today’s educational climate is not biased when declaring “engaged” activities. Everything from service-learning to professional internships is considered beneficial to students. My research challenges this notion, exploring the history of engaged education and service learning; tracing it throughout its origin to its current application. What began as a literature review, ended with a working model for evaluating this growing field. My presentation will explore the world of “engaged education” and examine the beneficial, and not so beneficial, aspects of it.
Parker White, English, Honors College

Lauren Adams, English
Faculty Mentor: Patti White, English
Go Outside: The Poetics of Space

Contemporary poetry is often presented in printed collections or in lecture spaces. When poetry is taken off the page and out of quiet space, what changes? As interns of the university-based Slash Pine Press, we have facilitated events wherein poetry has moved outside—outside of classrooms, outside of campus, outside of city limits. Our experience, along with further research, will support a paper concerning the poetics of space/place, the scholarly and unscholarly tendencies of poetry and poets, and the accepted formalities of art presentations and galleries.

Blake Whitely, Metallurgical & Materials Engineering
Faculty Mentor: Subhadra Gupta, Metallurgical & Materials Engineering

Advanced Nanosphere Lithography for Silicon Nanorod Formation in Solar Absorbers

Solar absorption has been realized through strategically located geometries, including closely spaced nanorods. For this research, polystyrene nanospheres have been used as masking agents in the top-down formation of nanorods through nanosphere lithography (NSL). Monolayers are the initial requirement for NSL, and have been successfully created over select areas of the wafer through spin-coating. The effects of ashing on polystyrene spheres were then studied in detail. The Bosch process was carried out in an inductively coupled plasma deep reactive ion etcher (ICP-DRIE) to etch several microns into the silicon substrate, producing nanorods of aspect ratios exceeding 20.

Blake Whitely, Metallurgical & Materials Engineering, Computer Based Honors Program
Faculty Mentor: Subhadra Gupta, Metallurgical and Materials Engineering

Novel Nanopatterned Solar Absorber

We present our results on a novel nanopatterned solar absorber composed of closely spaced nanorods of silicon dioxide. Polystyrene spheres are coated onto a tantalum-coated oxidized silicon wafer. The polystyrene spheres are shrunk slightly in an oxygen plasma, followed by ion milling through the tantalum layer to create nano-masks of tantalum. The oxide layer is then etched in a deep reactive ion etcher, creating tall, narrow spikes of silicon dioxide that effectively absorb incident light.

Daniel Whittelsey, Biological Sciences, Honors College
Candice Hovell, Biological Sciences
Faculty Mentor: Ryan Earley, Biological Sciences

An Examination of the Neurobiology of Social Stress and its Implications for Memory Acquisition and Retention in Cichlid Fish

Cortisol binds to brain mineralocorticoid receptors (bMR), and affects memory function. We identified the bMR gene sequence in cichlid fish, and evaluated how social stress affects bMR expression. We hypothesized that aggressive contests would increase bMR expression, which could facilitate memory and social responsiveness. We found no significant status effect on bMR expression. Recent studies indicate that MR:GR (glucocorticoid receptor) ratio better predicts memory function than MR levels alone. We identified the cichlid brain GR (bGR) gene sequence
and will determine expression levels. We will evaluate relationships among MR and GR levels, MR/GR ratio, behavior, and stress hormone concentrations.

Lauren Wiggins, Anthropology, Emerging Scholars Programs, Honors College
Faculty Mentor: Ian Brown, Anthropology
The Spatial Distribution of Check and Rocker Stamped Ceramics at the Armory Site in Dallas County, Alabama
The Armory site is a Late Middle Woodland (A.D. 300-500) mound center and village located in Dallas County, Alabama. Previous excavations at this site uncovered pottery with two dominate modes of surface finish. The first, check stamping, is common in central Alabama while the second, rocker stamping, is more common along the Gulf Coast, making its sizeable presence at Armory atypical. Through a quantitative analysis of these ceramics, this study will examine Armory’s spatial distribution in an attempt to determine whether or not the site had bipartite organization, which may be indicative of migration or pilgrimage from the Gulf Coast.

Elizabeth Williams, Computer Science
Andrea Torske, Computer Science
Melissa Bowman, Computer Science
Leah Boling, Computer Science
Faculty Mentor: Jeff Gray, Computer Science
Digital Eyes
“Digital Eyes” is an application on the Windows Phone 7 platform tailored to those who are visually impaired or blind. Our product utilizes Microsoft Tag technology, which are placed on doors, exits and entrances, restrooms, and other points of interest within a building. Users are able to scan tags with their phone’s camera, triggering information about the area such as room numbers, etc. to be read aloud. In addition, users are able to speak a location into their phone’s microphone, and our application will read directions to that location aloud.

Jonathan Williams, Political Science, Honors College
Faculty Mentor: Barbara Chotiner, Political Science
Factors in the Rise of Radicalism in Conflict
Radicalism, both political and religious, has appeared in many places around the world. Various countries have experienced the rise of different forms of radical groups. The development of such radicalism generally exhibits a set of common factors. These include atrocities by an occupying or dominant force, foreign influences, the removal of moderate powers, social and economic isolation of the indigenous population, power vacuums, and the length of the conflict which allows radicals to potentially gain influence. These factors are common enough to form a model which allows for general comparison of radical development which can be adapted to study specific conflicts.
David Wilson, Economics, Finance & Legal Studies, Honors College
Alex Clark, Advertising & Public Relations
Elisabeth Burns, Curriculum & Instruction
Faculty Mentor: Elizabeth Wilson, Curriculum & Instruction

The Think Program: Creativity. Communication. Community.
The Think Program was started by a current UA Sophomore three years ago. Since then, The Think Program has become The Think Company Inc., a 501c3 non-profit and has grown with many UA students are involved as volunteers and paid workers. The Program serves to foster creativity, critical thinking, teamwork, public speaking, and community involvement in fifth grade classrooms.

James Yerby, History, Computer Based Honors Program
Faculty Mentor: Andrew Huebner, History

Mae and Lige
Mae and Lige Dees were a World War 1 couple separated by Lige’s service in that war. This project is the completion of a searchable, web-accessed database that allows the user to delve into this archive of letters between husband and wife. This website is being created using ASP.net and the C# programming language.

Mike Zhang, Biological Sciences
Faculty Mentor: Guy Caldwell, 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.
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