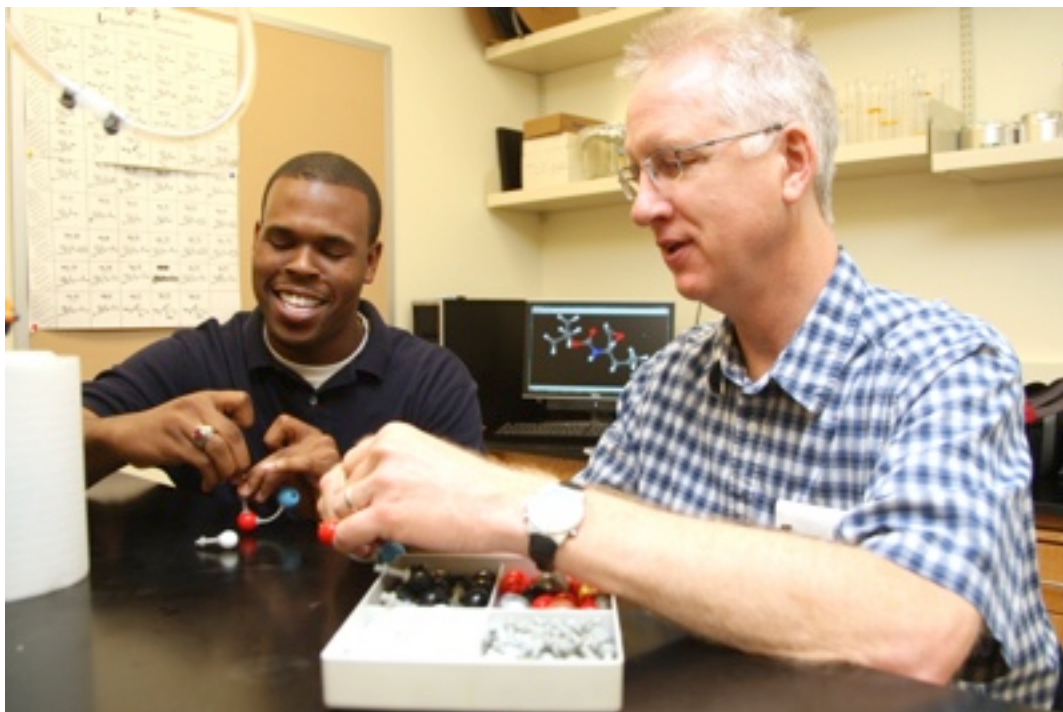


A L A B A M A P O W E R  
F O U N D A T I O N  
S U M M E R R E S E A R C H  
F E L L O W S H I P S

*"Research Excellence Across the Disciplines"*



## FOUR-YEAR REPORT

DR. CHRISTOPHER METRESS  
DIRECTOR, UNIVERSITY FELLOWS PROGRAM  
205-908-6574

# Alabama Power Foundation Summer Research Program

## Four Years, at a glance:

- Twenty-one student and faculty participants
- Eleven projects in nine disciplines
- Seven presentations at regional or national conferences
- Four projects published in professional journals
- Four APF students awarded subsequent research fellowships (at Samford, Texas Tech, Baylor University Medical School, and the University of Georgia)
- Program alumni enrolled in graduate programs at Georgetown University (European Studies), the University of Georgia (Biochemistry), and Vanderbilt University (Sociology).
- APF gift attracted more than \$42,000 in direct and in-kind contributions from other Samford resources

## Fellows and Mentors

- Summer 2008:**
- Joshua Driver (Chemistry, '10) and Dr. Brian Gregory (Associate Professor of Biochemistry)
  - Jenna Edwards (International Relations & French, '09) and Dr. Andy Konitzer (Associate Professor of Political Science)
- Summer 2009:**
- Aaron Carr (Religion and Classics, '12) and Dr. James Strange (Associate Professor of Religion)
  - Jonathan Coley (Political Science, '10) and Dr. Fred Shepherd (Professor of Religion)
  - Anna Worth (Biochemistry, '12) and Dr. Andy Lampkins (Associate Professor of Pharmacy and Biochemistry)
- Summer 2010:**
- Chris Walling (Mathematics and Computer Science, '12) and Dr. Steve Donaldson (Associate Professor of Computer Science)
  - Jesse Kawell (Computer Science, '12) and Dr. Steve Donaldson (Associate Professor of Computer Science)
  - Larry McCutcheon (Classics and Religion, '12) and Dr. Randy Todd (Professor of Classics)
  - Walter Turner (Chemistry, '12) and Dr. Morgan Ponder (Professor of Biochemistry)
- Summer 2011:**
- Kley Sippel (Business, '12) and Dr. Chad Carson (Associate Dean, Brock School of Business)
  - Steven Thomas (English, '13) and Dr. Bryan Johnson (Associate Professor of English)



Chris Walling and Jesse Kawell explore the nature of artificial intelligence.



Anna Worth conducts base research in order to develop a new drug for Alzheimer's.



Dr. Randy Todd and Larry McCutcheon question whether Jesus taught in Greek.

## The Projects

### Summer 2008

**Joshua Driver and Dr. Brian Gregory:** *"Quantitative Detection of n-Alkanethiols as Alkanesulfonates by Negative-Ion Electrospray-Ionization Mass Spectrometry"*

Josh and Dr. Gregory worked to generate calibration curves on alkanethiols using the liquid chromatograph-mass spectrometer (LC-MS). This research on calibration will allow scientists to extract information from the LC-MS data. Dr. Gregory and Josh also worked on defining conditions under which one can find accurate data even in micromolar concentrations.

**Jenna Edwards and Dr. Andy Konitzer:** *"Party Systems and Cooperation with War Crimes Tribunals: The Croatian and Serbian Experiences"*

Jenna and Dr. Konitzer researched the cooperation of the Serbian and Croatian governments with the International Criminal Tribunal for the Former Yugoslavia (ICTY). In order to gain entrance into the European Union, each state must cooperate with the ICTY. As part of her research, Jenna spent three weeks in Belgrade, Serbia and Zagreb, Croatia in order to conduct interviews, obtain public opinion data, and gather other information in order to help explain the possible contributors to each government's cooperativeness with the ICTY.

### Summer 2009

**Aaron Carr and Dr. James Strange:** *"Excavating the Roman Basilica at Sepphoris: Determining the Occupational Layers of a 5 x 5 m. Square"*

Aaron and Dr. Strange worked on the excavation of a Roman basilica in the ancient city of Sepphoris in Israel. The city, just three miles from the town of Nazareth, was once a bustling metropolis. Despite its beauty, the city was destroyed and rebuilt many times over the centuries, complicating the archaeological research ongoing at the site. The goals of the expedition were to uncover a portion of the southern wall of the original basilica. Besides being trained in field methods, Aaron was also trained in the use of CAD software. He used these skills to produce computer drawings of pottery fragments for publication in future dig reports, and to develop an accurate reconstruction of the basilica in three dimensions.

**Jonathan Coley and Dr. Fred Shepherd:** *"The Anti-Genocide Movement as a Transnational Network"*

Jonathan and Dr. Shepherd researched the impact of the new transnational anti-genocide movement, consisting of international NGOs, domestic NGOs, religious organizations, and sympathetic government officials, on recent efforts to prevent and respond to genocide in the Darfur region of Sudan. Jonathan had previously researched the impact of NGOs and took courses on human rights and genocide. For this project, Jonathan and Dr. Shepherd traveled to Washington, D.C., to take part in a conference hosted by the International Association of Genocide Scholars before interviewing individuals from Genocide Watch, Save Darfur, Enough Project, Genocide Intervention Network, the United States Holocaust Memorial Museum, the Friends Committee on National Legislation, and Oxfam America.

**Anna Worth and Dr. Andy Lampkins:** *"Facile Synthesis of Lipophilic-Amino Acid Conjugates from 4-Alkoxy-Dithionaphthoic Acids"*

Anna and Dr. Lampkins worked on a project to successfully design, synthesize, and evaluate "druggable" inhibitors of a key enzyme in the pathology of Alzheimer's disease. This research project also supported by funding from both the Research Corporation for Science Advancement and the American Foundation for Pharmaceutical Education. The specific part of the project Anna and Dr. Lampkins researched was a structure-activity-relationship (SAR) study. Anna synthetically modified the backbone of the core inhibitor

design with chemical groups of varying properties and evaluated the effect(s) of these drug modifications on enzyme inhibitory potency, specificity, and physiological stability.

#### **Summer 2010**

**Chris Walling, Jesse Kawell, and Dr. Steve Donaldson:** *"Machine Consciousness and the Advent of Narcissistic Computers"*

Chris and Jesse worked with Dr. Donaldson to build a computer that is aware of itself. They delved into new areas in the growing field of artificial intelligence as they attempted to understand and duplicate the complex systems of self-awareness. Jesse and Chris tried to build machines that can watch facial expressions displayed on a screen and assess if those expressions are similar to those that the machine is trying to make. This models the "mirror test," which is used to test animals' self-awareness. As they researched in psychology, cognitive science, programming and other fields, Jesse and Chris had the chance to contribute to the latest work in artificial intelligence.

**Larry McCutcheon and Dr. Randy Todd:** *"The Languages of Jesus"*

Larry and Dr. Todd researched the question of whether or not Jesus spoke Greek. Larry studied the words of Jesus in the original Greek of the New Testament and compared them with words written in a vast number of other ancient texts. He also investigated oral traditions of the time to explore how the words of Jesus were handed down through the generations. This project required an in depth study of Hellenistic society and its influences in the ancient east during the life of Jesus.

**Walter Turner and Dr. Morgan Ponder:** *"Computational Studies of Potential Drugs to Treat Alzheimer's Disease"*

Walter and Dr. Morgan Ponder using computational methods to support Samford Professor Andy Lampkins' synthesis of drug molecules designed to combat Alzheimer's disease and other central nervous system disorders. Walter employed computational methods to determine the lowest-energy conformation of each drug candidate in aqueous solution and docked these molecules into the  $\beta$ -secretase enzyme active site (the intended binding pocket of the drug). He then analyzed the specific chemical interactions between each drug candidate and the enzymatic pocket to determine the most promising leads for this drug discovery initiative.

#### **Summer 2011**

**Steven Thomas and Dr. Bryan Johnson:** "The Excellent English Tobacco": An Imperium of Commerce in *Heart of Darkness*."

**Kley Sippel and Dr. Chad Carson:** "Stages of Entrepreneur Development: Insights from a South African Township"

### Publications Resulting from Alabama Power Foundation research:

**Joshua Driver and Dr. Brian Gregory:** Rachel Roberts, Joshua A. Driver, Danielle M. Brown, Sagar H. Amin, and Brian W. Gregory, "Hydrogen Peroxide-Induced Oxidation of Mixtures of Alkanethiols and Their Quantitative Detection as Alkanesulfonates by Electrospray Ionization Mass Spectrometry," *Analytical Chemistry*, forthcoming, 2012.

**Aaron Carr and Dr. James Strange:** Aaron's drawings of the dig are forthcoming in two volumes: *The Excavations at Sepphoris, Volume II: The Theater* and *The Excavations at Sepphoris, volume III: The Basilica* (Brill Publishers).

**Anna Worth and Dr. Andy Lampkins:** Worth, A. C.; Needham, C. E.; Franklin, D. B.; Lampkins, A. J. "Facile Synthesis of Lipophilic  $\alpha$ -Amino Acid Conjugates from 4-Alkoxy-Dithionaphthoic Acids," *Synthetic Communications*, in press, forthcoming 2012.

**Chris Walling, Jesse Kawell, and Dr. Steve Donaldson:** "Machine Consciousness and the Advent of Narcissistic Computers."

### Regional and National Conference Presentations:

**Joshua Driver and Dr. Brian Gregory:** "Quantitative Detection of n-Alkanethiols as Alkanesulfonates by Negative-Ion Electrospray-Ionization Mass Spectrometry." Poster presentation at Southeastern Regional Meeting of the American Chemical Society, Nashville, TN, November 12-15, 2008.

**Jenna Edwards and Dr. Andy Konitzer:** "Party Systems and Cooperation with War Crimes Tribunals: The Croatian and Serbian Experiences," The Southern Political Science Association, New Orleans, LA, Jan 7-11, 2009.

**Jenna Edwards and Dr. Andy Konitzer:** "Party systems and the EU Accession Process in Serbia and Croatia" at the Woodrow Wilson International Center for Scholars in Washington DC. ," Woodrow Wilson International Center for Scholars, Washington, D.C., February 25, 2009.

**Jenna Edwards and Dr. Andy Konitzer:** "Median Parties and Cooperation with War Crimes Tribunals: Comparing the Serbian and Croatian Experiences," American Association for the Advancement of Slavic Studies National Conference, November 12-15, 2009

**Chris Walling, Jesse Kawell, and Dr. Steve Donaldson:** "Machine Consciousness and the Advent of Narcissistic Computers." They plan to present their work at the southeastern conference of the Association for Computing Machinery (ACM) this fall.

**Walter Turner and Dr. Morgan Ponder:** "Computational Studies of Potential Drugs to Treat Alzheimer's Disease" He plans to present his research at the 2010 Southeastern Regional Meeting of the American Chemical Society.

**Kley Sippel and Dr. Chad Carson:** "Stages of Entrepreneur Development: Insights from a South African Township." Submitted for presentation at the Baylor University Entrepreneurial Student Case Writing Competition, Waco, TX, January 2012.

**Kley Sippel and Dr. Chad Carson:** "Stages of Entrepreneur Development: Insights from a South African Township." Submitted for presentation at the National Conference on Undergraduate Research, Ogden, UT, March 29-31, 2012.

### Post-Fellowship Accomplishments of Summer Research Fellows:

**Joshua Driver** (Fellow '08): 2010 graduate. Pursuing a Ph.D. in Analytical Chemistry, University of Georgia.

**Jenna Edwards** (Fellow '08): 2009 graduate. Received an M.A. in German and European Studies, Georgetown University.

**Jonathan Coley** (Fellow '09): 2010 graduate. Pursuing a Ph.D. in Sociology, Vanderbilt University. Finalist for the Truman Scholarship, 2009.

**Aaron Carr** (Fellow '09): Senior. Samford's 2011-12 nominee for the Rhodes, Marshall, and Lilly Scholarships. Recipient of 2011 Summer Fellowship from the Fund for Theological Education. Applying for Ph.D. programs in religion at Duke, Yale, Emory, Vanderbilt, and Princeton universities.

**Anna Worth** (Fellow '08): Senior. Applying to UAB Medical School. Planning a career in Oncology.

**Chris Walling** (Fellow '10): Senior. Applying to Ph.D. programs in Computer Science at UAB and Georgia Tech.

**Jesse Kawell** (Fellow '10): Senior. Honorable Mention, 2010-11 Goldwater Scholarship Competition (the most prestigious national award for Math and Science undergraduates). Applying to the Ph.D. program in Computer Science at Georgia Tech.

**Larry McCutcheon** (Fellow '10): Senior. Applying to seminary programs at Duke, Emory, and Mercer universities.

**Walter Turner** (Fellow '10): Senior. Applying for the Ford Foundation Minority STEM Fellowship. Applying for Ph.D. Programs in Chemistry at UC-Berkeley, University of Wisconsin, and the University of Chicago.

**Kley Sippel** (Fellow '11): Senior. Graduating in the spring. Seeking a job in industry, with a focus on Social Entrepreneurship.

**Steven Thomas** (Fellow '11): Junior. Has already presented two papers at academic conferences, with another presentation coming this fall and two more in the spring. Plans to pursue a Ph.D. in English.