Lawana Adcock-Downey, Ph.D.
Lawana.Adcock@uah.edu
256.824.6784
ld0004@uah.net

Education:

Ph.D.	**Alabama Agricultural and Mechanical University, Normal, AL. 2007.**
Major:	Plant Cell and Molecular Biology
Dissertation:	**Characterization of *Populus canescens x Populus grandidentata***
M.S. Degree	**University of Alabama in Huntsville, Huntsville, AL. 2000**
Major:	Cell and Molecular Biology
Thesis:	Natural Product Inhibitors of p21 H-*ras* Farnesyl Transferase
B.S. / B.S.	**University of Alabama in Huntsville, 1985**
Major(s):	Chemistry (ACS certified) and Biology

Additional Education:

Education 1987-1989.	**University of Alabama in Tuscaloosa, Tuscaloosa, AL.**
Major:	Education (Secondary Education-Class B); **32 hours** completed. Directly involved with a review of the 1989 State of Alabama Science Curriculum Vita for Secondary Education. Taught one semester of Special Topics in Biology for Advanced Students at Northport Junior High School (12 students); five months student teaching at Northport High School under Dr. Thomas Welker.
Ecological Science AL. 1987-1989.	**University of Alabama in Tuscaloosa, Tuscaloosa,**
Major:	**22 hours** completed in Ecological Science.

Research Interests:

Root systems of plants develop in the dark and are responsible for the uptake of minerals and water as well as serving to anchor and establish the plant to a site. Yet, we find that root systems have many unique and poorly understood features. For example, root cells express photoreceptors. In fact, much of a plant's root establishment, adaptive stress responses and overall physiology are dependent upon light sensitivity or *phototropism*. In addition, the growth of root systems changes and adapts to environmental conditions throughout a plant's life cycle. Numerous questions arise pertaining to the mechanisms, the hormones and the stress pathways that are involved in these unique responses to a plant's environment. Are there genetic responses that can be enhanced to provide for greater growth and establishment of plants for agricultural purposes etc.…? A more in-depth understanding of root system development and the multi-faceted response mechanisms in plants overall will help provide information to enhance growth conditions as well as in developing stronger cultivars for agricultural purposes.

Additional Training:

LabView for Instruments Training Course (Austin, Texas, 1994): Attended the National Instrument's LabView training program for use on NASA's EXPRESS Rack.

NASA Project Management Training Program (1994): Received training from NASA Science Directorate for laboratory and personnel management at the Marshall Space Flight Center.

Fields of Specialization:

Management

Hardware Design
Payload Management
Flight Systems Integration and Management
Laboratory Management

Laboratory Skills

Signal transduction pathways
Molecular genetics
Tissue Culture (Mammalian/Plant)
Protein Chemistry/Purification/Analysis (HPLC/FPLC)
Atomic force microscopy (AFM) / Scanning electron microscopy (SEM)

Protein Crystallization techniques

Other:

Grant/Scientific Writing
Public Speaking
Educational Outreach
Translate French/Spanish

Professional Experience:

2017 – current **Lecturer (Full time)/Department of Biological Sciences** Responsible for: BYS 417 Principles of Plant Physiology (2020 - current); Human Anatomy and Physiology I/II (BYS 215/216) Lecture/Laboratories 2013- current; Case Studies in Pathophysiology (BYS 491/691); Elementary Biochemistry (BYS 301); Anatomy and Physiology I (BYS 313) and II (BYS 314) Lecture/Laboratories 2007-2013; Genetics (BYS 319); Organismal Biology (BYS 120); People, Plants and the Environment (BYS 302/ESS 302) lecture; and Special Topics (BYS 491/691). Sponsor for: Sally Ride Festival, UAH Science Olympiad and Girls' Science and Engineering Day (STEM Day). UAH Greenhouse Supervisor. Graduate Committee: Masters level student (Mrs. Lorraine Smallwood, Mrs. Shelby Kaup McClellan). Coordinate two graduate teaching assistants; two undergraduate assistants (UAH Greenhouse). Committee Member for Laboratory Biosafety at Alabama Agricultural and Mechanical University. Research interests: Propagation, Root Analysis and Re-establishment of *Torreya taxifolia* (AAMU Winfred Thomas Research Station), *Hellianthis verticillatus* sm*, Sarracenia oreophila* and *Symphyotrichum georgianum*. Collaborator with the Huntsville Botanical Garden and Davis Arboretum (Auburn University) for propagation of rare and endangered native species. Oversee undergraduate projects for Honor's College credit.

2007- 2019 **Lecturer/Department of Biological Sciences.** Responsible for: Human Anatomy and Physiology I/II (BYS 215/216) Lecture/Laboratories 2012- current; Principles of Plant Physiology (BYS 417); Case Studies in Pathophysiology (BYS 491/691); Elementary Biochemistry (BYS 301); Anatomy and Physiology I (BYS 313 and 314) Lecture/Laboratories 2007-2012; Genetics (BYS 319); Organismal Biology (BYS 120); People, Plants and the

Environment (BYS 302/ESS 302) lecture; and Special Topics (BYS 491/691). Sponsor for: Sally Ride Festival, UAH Science Olympiad and Girls' Science and Engineering Day (STEM Day). Graduate Committee: Masters level student (Thomas Bryant, Mrs. Lorraine Smallwood). Coordinate two graduate teaching assistants; two undergraduate assistants. Committee for Laboratory Biosafety at Alabama Agricultural and Mechanical University. Research interests: Propagation, Root Analysis and Re-establishment of *Torreya taxifolia* (AAMU Winfred Thomas Research Station). Collaborator with the Huntsville Botanical Garden and Davis Arboretum (Auburn University) for propagation of rare and endangered native species (Sarracenia, Quercus boyntanii, Helianthus). Oversee undergraduate projects for Honor's College credit.

Research Activities:

Submitted UAH RCEU / Summer 2021:

Awarded UAH RCEU /Summer 2019: Project title: Enhanced Stimulation of Plant Root Growth in Hydroponic Systems Using Blue and Red Fluorescent Light (Student: Aaron Stiles);

Awarded UAH RCEU /Summer 2019 Project Title: Alteration in Capsaicin Levels in Peppers Using Gibberellin, Cytokinin and Auxin Plant Growth Regulators (Student: Jordan Szabat).

2003-2007 **Doctorate in Molecular Genetics/Department of Plant and Soil Science/ Alabama A & M University. (May 2007)** Conduct research in plant physiology of vascular tissue with respect to alterations in auxin levels, morphological changes and signal transduction pathway involvement. Assist in Scientific Writing (SPS 502); Phytophysiology (SPS 541), providing support in lecture, course planning and management. Conduct laboratory lecture and experimentation to reinforce concepts presented in the classroom.

2003 **Part-Time Instructor at the University of Alabama in Huntsville**. Instructor in General Genetics (BYS 319) lecture and laboratory class. Responsible for approximately 25 students.

2001-2002 **Research Associate, Integriderm/Invitrogen Corporation Huntsville, AL.**
Conducted research into melanin blocking compounds, assaying for toxicity and mutagenicity (Ames testing). Worked in the development of microarray to test for the presence of key proteins to serve as disease specific biomarkers for IBS/Krohn's disease.

Professional Experience:

1989-2000 **Research Scientist/Flight Management (Contractor) NASA/MSFC**
Center for Structural Biology

Maintained **proprietary systems** (prokaryotic/eukaryotic) for (Merck, Eli Lilly), and universities (domestic and foreign) for protein expression, purification and crystallization. Collaborations resulted in obtaining the first crystal structure of human respiratory syncytial virus, first structures of HIV-1's *rev* and *tat* proteins, as well as several albumins. Responsible for payload **operations management** in protein crystal growth. Responsible for management of **international co-investigator flight-readiness reviews** in protein crystal growth and flight hardware at Kennedy Space Flight Center for MSL-1, 2 and LMS. Worked in **design of flight hardware** containers for protein crystal growth, which both received patents. Served, as **Biotechnology Science Advisor for the EXPRESS Rack with NASA/Boeing** with responsibility for determining requirements for biological payload needs. Developed diffusion technique to study kinetics of protein crystal growth. Applied atomic force microscopy to study addition of protein aggregates to crystal faces and obtained first AFM images of hemoglobin C in collaboration with Dr. Rhoda Hirsch at the Albert Einstein College of Medicine in New York. Served as a **NASA HEADQUARTER'S Biotechnology spokesperson** for four years.

1988-89 **Teaching Assistant/Department of Biology. The University of Alabama in Tuscaloosa.** Taught "Introduction to Biology" for nonscience majors including both laboratory and lecture class. Was responsible for approximately 40 students. Program coordinator was Dr. Thomas Graham.

Taught for two consecutive semesters (Spring 1988 and Fall 1988).

1987-1989 **Research Assistant/University of Alabama in Tuscaloosa.** Conducted research involving levels of Beta-Hydroxybutyrate dehydrogenase in experimental rats as indicators for hepatocarcinoma.

1988 **Summer Internship at UAB/DCH Hospital in Oncology** (supervisor Dr. Ronald Lindahl).

1982-1987 **Physician's Assistant/Operating Room Assistant (Huntsville Hospital and Fox Army Hospital /Redstone Arsenal):** Maintained surgical tray for special procedural requirements. Escorted patients pre and post op. Dr. Charles Selah and Dr. Fred Smith (supervisors).

Professional Presentations:

2006 Consortium for Plant Biotechnology Research, Washington, D.C. Invited speaker for "Writing a Winning Proposal" (February 28th – March 2nd).

2005 University of Alabama in Huntsville/Partnership for Biotechnology Research BioRetreat. Presented talk entitled " Root Characteristics of Transgenic Aspen."

2005 Consortium for Plant Biotechnology Research, Washington, D.C. Presented talk and poster entitled "Characteristics of Root Morphology in Transgenic Aspen."

Professional Affiliations:

American Physiological Society

Association of Southeastern Biologists

Alabama Academy of Science

Huntsville Botanical Garden Propagation of Rare and Endangered Species

Alabama Museum of Natural History (Avery Bird Collection)

Partnership for Biotechnology Research for Alabama

American Crystallographic Society

Alabama Consortium for Plant Biotechnology Research

Kappa Delta Pi Educational Honorary Society

Honors and Awards

UA Huntsville's Student Government Association's Outstanding Faculty Award for 2011.

2006 DOE Scholarship from the Consortium for Plant Biotechnology Research, St. Simon's Island, Georgia. ($20,000.00)

American Chemical Society's Congressional Fellowship, Washington, D.C. 1999.

NASA Achievement Award for Excellence for Significant Contribution to a Mission for both MSL-1and 2. 1998.

NASA Achievement Award for EXPRESS Rack, 1996.

Publications:

Wilson, L.J., Adcock, L. and M.L. Pusey (1993). A Non-Optical Technique for Determining Aggregate Size Distributions in Crystallizing Protein Solutions. *Journal of Physics D: Applied Physics* **26**: B113-B117.

Wilson, L.J., Adcock, L. and M.L. Pusey (1996). Monomer Concentrations and Dimerization Constants in Crystallizing Protein Solutions*. Biophysical Journal* **71**: 126-135.

Carter, D.C., Wright, B, Miller, T., Adcock-Downey, L., Keeling, K., and Joseph Ho (1999) PCAM: A Multi-User Facility Based Protein Crystal Apparatus for Microgravity. *Journal of Crystal Growth* **196**: 610-622.

Carter, D.C., Wright, B., Miller, T., Adcock-Downey, L., Twigg, P., Keeling, K., and Joseph Ho (1999) DCAM: Diffusion-Controlled Crystallization Apparatus for Microgravity Flight and Ground-Based Applications*. Journal of Crystal Growth* **196**: 602-609.

Professional References:

Caula A. Beyl, Ph.D. (advisor)
Dean of the School of Agriculture and Environmental Science
2621 Morgan Circle
125 Morgan Hall
Knoxville, TN 37996
The University of Tennessee in Knoxville
cbeyl@tennessee.edu
(865) 974-7303

Debra Moriarty, Ph.D.
(Chair) Department of Biological Sciences
Shelby Center for Research and Technology, Rm 369
University of Alabama in Huntsville
(256) 824-6260.

Martha Verghese, Ph.D.
(Chair) Department of Food Science
Alabama Agricultural and Mechanical University
(256) 372-4175

Joseph D. Ng, Ph.D.
Professor Department of Biological Sciences /Coordinator for Biotechnology Science Program
UAH/Material Science Building
(256) 824-3715

Attendance of Professional Conferences:

Material Science Association Convention. Boston, MA. December 1st – 5th 2014.