

**Erika D. Womack, PhD, MSc**  
Curriculum vitae

**CONTACT INFORMATION**

Office

University of Alabama at Birmingham  
Department of Physical Medicine and Rehabilitation  
571 Shelby Biomedical Research Building  
1825 University Blvd  
Birmingham, AL 35233  
Phone: (205) 975-0618  
[ewomack@uabmc.edu](mailto:ewomack@uabmc.edu)

Home

6027 Cathwick Dr.  
Mc Calla, AL 35111  
Phone: (662) 418-9339  
[erikawomack@msn.com](mailto:erikawomack@msn.com)

**EDUCATION**

- Mississippi State University, Mississippi State, MS  
**Ph.D., Molecular Biology (minors: Biochemistry and Statistics)** **2015**  
Advisors: Dr. Darrell L. Sparks, Jr. and Dr. Ashli E. Brown
- Mississippi College, Clinton, MS  
**M.Sc. Biomedical Science** **2008**  
Advisor: Dr. Theodore Snazelle
- Mississippi State University, Mississippi State, MS  
**B.Sc. Biological Science** **2007**

**PROFESSIONAL APPOINTMENTS AND RELATIVE RESEARCH EXPERIENCE**

University of Alabama at Birmingham

**2019-present**

**Research Laboratory Manager (Researcher IV), Physical Medicine & Rehabilitation**

- Conduct research to analyze the impact of traumatic spinal cord injury on skeletal muscle metabolism, metabolic health, and microbiome composition in the acute and chronic stages with the purpose of improving metabolic function, neuro-recovery, and microbiome composition
- Manage Biosafety Level 2 (BSL-2) laboratory to ensure adherence to laws, regulations, and safety
- Coordinate schedules and meetings, procure supplies, and maintain chemical, biological, and equipment inventories
- Work with auditors, regulatory authorities, and UAB's Environmental Health and Safety Division to assure compliance
- Maintain budgets for multi-million dollar general ledger and grant accounts
- Demonstrate expertise in capital equipment acquisitions and maintenance, procuring equipment and laboratory supplies as well as paying contractors, study participants, and vendors
- Responsible for equipment training, laboratory safety plans, and project management
- Conducted clinical and various biochemical and molecular biological techniques (tissue culture, immunohistochemistry, Western Blot, utilize cryostat for histological slides, macromolecule extraction, etc)

- Supervise, mentor, and train undergraduates, graduates (physical therapy, medical, and doctoral), scientists and medical residents
- Designed, developed, and manage a secure web application, REDCap database, used as a secure data collection tool and optimized and created experimental protocols and standard operating procedures (SOPs)
- Assist with literature review search, data analysis, writing and editing manuscripts
- Currently working towards CLIA requirements to take director's exam

Supervisor: Dr. Ceren Yayar-Fisher

USDA-ARS

2016-2019

**Post-Doctoral Research Geneticist, Corn Host Plant Resistance Research Unit**

- Conducted independent research for crop improvement by finding maize quantitative trait loci (QTL) that confer resistance to fall armyworm leaf-feeding damage and the carcinogenic compound, aflatoxin produced by the fungus *Aspergillus flavus*
- Phenotyped fall armyworm leaf-feeding damage and genotyped inbred maize lines to identify molecular markers linked to loci along the maize genome
- Assisted in genome-wide association study (GWAS) of corn earworm (CEW) that identified biological pathways and associated genes that contributed to CEW leaf-feeding resistance
- Designed primers for sequencing; qPCR and real-time PCR experience
- Studied maize-herbivore interactions using proteomic, lipidomic, and metabolomic approaches to complement genomic analyses
- Assisted with agriculture techniques including preparing silking notes, pollinating maize from tassel to silk, identifying phase transition, preparing seed packets for planting, preparing seed inventory, and harvested maize
- Instructed and mentored undergraduate students

Supervisor: Dr. W. Paul Williams

Mississippi State University

2010-2015

**Graduate Research Assistant, Dept. of Molecular Biology, Biochemistry, Entomology, and Plant Pathology**

- Designed and conducted research to evaluate the utilization of adsorbents for the removal of aflatoxin M<sub>1</sub> from contaminated milk
- Validated an extraction method to quantify aflatoxin M<sub>1</sub> in milk
- Utilized analytical, chemical techniques (Soxhlet, QuEChERS, Solid phase extraction, LECO Nitrogen/Protein Analyzer, HPLC-UV, MS/MS, DAD, ELISA, FLD, etc.), and statistical designs
- Met with the director of FAO, US Secretary of Agriculture, and Mississippi Senator to discuss Food Security, Farm Bill, and Advocate for the Food, Farm, and Jobs Bill, respectively
- Instructed, taught classes as an assistant, and mentored undergraduate students

Major Advisors: Dr. Darrell Sparks and Dr. Ashli Brown

University of Mississippi Medical Center, Jackson, MS **2008-2016**  
**Researcher II, Orthopedic Surgery (part-time)**

- Studied idiopathic scoliosis in the pediatric population
- Designed experiments, prepared documents for IRB, data analysis, project management
- Wrote internal grants and collaborated with other centers to help write NIH grants
- Collaborated with residents and other doctors on projects

Supervisor: Dr. Lawrence L. Haber

Mississippi College **2007-2008**  
**Graduate Research Assistant and Microbiology technician, Dept. of Biomedical Sciences**

- Utilized microbiological techniques to identify unknown gram-negative bacteria in human urine via assays
- Prepared media and agar for the isolation of bacteria

Major Advisor: Dr. Theodore Snazelle

## TEACHING EXPERIENCE

University of Alabama at Birmingham, Birmingham, AL **2021**  
**Mentor, Zoe Evans (Undergraduate student from Lawson State Community College, CORD Intern)**

Project: "Exercise activates skeletal muscle nuclear factor-kappa B in individuals with acute spinal cord injury"

- Guided Ms. Evans in inflammatory marker pathway research, trained the student in tissue cutting for microscopy sectioning and immunohistochemistry staining, and Western Blot experiment
- Ms. Evans was so encouraged by the experience that she is currently pursuing a cancer biology degree at UAB to continue a research career track in which, initially, she had no interest in a research career

USDA-ARS, Mississippi State, MS **2016-2017**  
**Mentor, Roger Davis (Undergraduate DIS)**

DIS Project: "QTL mapping of chromosome 9 in the maize population Mp705 x Mp719 for the identification of resistance to fall armyworm" – 1<sup>st</sup> place MSU Undergraduate Research Symposium

- Guided Mr. Davis DNA extraction, marker selection, genotyping, and software analysis

Mississippi State University, Mississippi State, MS **2014-2016**  
**Teacher's Assistant (TA), Principles of Biochemistry**

- Teaching, lecture preparation, assist with syllabus and exam preparation, quiz preparation, grading quizzes and exams

Professor: Dr. Darrell L. Sparks

Mississippi State University, Mississippi State, MS, USA **2014-2015**  
**Mentor, Kaylin Chaney (Undergraduate Honors DIS)**

Honors Thesis: "Removing Aflatoxin M<sub>1</sub> from milk using activated carbon and its effects on protein concentration"

- Completed honors research under my direction
- Guided her through experiment statistical design, experiments, data analysis, presentation, and undergraduate thesis

Mississippi State University, Mississippi State, MS, USA  
**Appointed Tutor, Biochemistry I and II** **2011-2014**

Mississippi State University, Mississippi State, MS  
**Guest Lecturer, Intermediary Metabolism** **2014**  
 "Electron Transport Chain and Oxidative Phosphorylation"  
 Professors: Dr. Ashli Brown, Dr. Xueyan Shan

Mississippi State University, Mississippi State, MS  
**Guest Lecturer, General Biochemistry I** **2013**  
 "Fatty Acid Metabolism"  
 Professor: Dr. Ashli Brown

#### TEACHING INTEREST

Principles of Biochemistry, Intermediary Metabolism

#### PROFESSIONAL DEVELOPMENT

University of Birmingham at Alabama  
 Microbiome Symposium **2022**  
 UAB Microbiome Center

Virtual Meeting  
 ISB Virtual Microbiome Series **2021**  
 Analyzing microbiome data (Using QIIME) - from amplicon sequences to ecological insights

University of Alabama at Birmingham, Birmingham, AL  
 Specific Aims for NIH grant application **2020**  
 UAB CCTS

Virtual Meeting  
Rehabilitation Research 2020: Envisioning a Functional Future Conference **2020**  
 UAB Department of Environmental Health and Safety

University of Alabama at Birmingham, Birmingham, AL  
 Laboratory Safety Workshop **2020**  
 UAB Department of Environmental Health and Safety

Mississippi State University, Mississippi State, MS  
**Preparing Future Faculty** **2014-2015**

**RELATED PROFESSION ORGANIZATIONS**

American Chemical Society (ACS)  
 American Dairy Science Association (ADSA)  
 American Society for Biochemistry and Molecular Biology (ASBMB)  
 Association of Official Analytical Collaboration (AOAC) International  
 Association of Southern Feed Fertilizer and Pesticide Control Officials (ASFFPCO)  
 Genetics of Maize-Microbe Interactions (GMMI)

**SERVICE**

Special Emphasis Program Committee (USDA-ARS)	<b>2016-2019</b>
Judge for Undergraduate Research Symposium (MSU)	<b>2015-2019</b>
Search committee member for faculty in the Dept. of BCH-EPP (MSU)	<b>2015</b>
Reviewer for Journal of Agriculture and Food Science	<b>2015</b>
Founder and former President of Biochemistry Graduate Student Association	<b>2014-2015</b>

**AWARDS AND GRANTS**

Manage five-year, Start-up award (awarded to Ceren-Yarar Fisher)	<b>2019-present</b>
Manage five-year, \$2 million R01 grant funded through the NIH (awarded to Ceren-Yarar Fisher)	<b>2019-present</b>
Manage five-year, NIH/NICHHD K01 (awarded to Ceren-Yarar Fisher)	<b>2019-present</b>
Manage two-year, Pittman award (awarded to Ceren-Yarar Fisher)	<b>2020-present</b>
CALS/MAFES Diversity Award, MSU	<b>2015</b>
National ADSA Dairy Oral Competition (Finalist)	<b>2014</b>
Travel Assistance Grants for Graduate Students, MSU (\$625)	<b>2014</b>
Graduate Student Association, MSU (\$400)	<b>2014</b>
Alliance for Graduate Education in Mississippi, MSU (\$919)	<b>2012</b>

## PUBLICATIONS

1. Li J, Morrow C, McClain A, Womack E, Yarar-Fisher, C. Effects of a Low-carbohydrate/High-protein Diet on Gut Microbiome Composition in Insulin Resistant Individuals with Chronic Spinal Cord Injury: Preliminary Results from a Randomized Controlled Trial (submitted for publication).
2. Li J, Demirel A, Azuiro, Andres, Womack ED, Kroeger, EN, McLain A, and Fisher, CY (2021). Limited Association between the Total Healthy Eating Index-2015 score and Cardiovascular Risk Factors in Individuals with Long-Standing Spinal Cord Injury: An Exploratory Study. *Journal of the Academy of Nutrition and Dietetics* <https://doi.org/10.1016/j.jand.2021.04.010>.
3. Li J, Morrow C, Barnes S, Wilson, L, Womack ED, McLain A, and Fisher CY, (2021). Gut microbiome composition and serum metabolome profile among individuals with spinal cord injury and normal glucose tolerance or prediabetes/type 2 diabetes. *Archives of Physical Medicine and Rehabilitation* [10.1016/j.apmr.2021.03.043](https://doi.org/10.1016/j.apmr.2021.03.043).
4. Fisher CY, Li J, Womack ED, Alharbi A, Seira O, Kolehmainen KL, Plunet WT, Alaeiikhchi N, Tetzlaff W (2021). Ketogenic regimens for acute neurotraumatic events. *Opinion in Biotechnology* 70: 68-74 <https://doi.org/10.1016/j.copbio.2020.12.009>.
5. Womack ED, Williams WP, Williams GL, and Xu W (2020). Mapping quantitative trait loci associated with resistance to aflatoxin accumulation in maize inbred Mp719. *Frontiers in Microbiology* 11:45 <https://doi.org/10.3389/fmicb.2020.00045>.
6. Womack ED, Williams WP, Smith JS, Warburton ML, and Bhatramakki D (2020). Mapping of quantitative trait loci for resistance to fall armyworm (Lepidoptera: Noctuidae) leaf-feeding damage in maize inbred Mp705. *Journal of Economic Entomology* 113 (2): 956-963 <https://doi.org/10.1093/jee/toz357>.
7. Windham GL, Williams WP, Mylroie E, Reid C, Womack ED (2018). *Aspergillus flavus* colonization of wound inoculated maize kernels of resistant and susceptible maize hybrids in the field. *Frontiers in Microbiology* 9: 799 <https://doi.org/10.3389/fmicb.2018.00799>.
8. Womack ED, Warburton ML, and Williams WP (2018). Mapping of quantitative trait loci for resistance to fall armyworm and southwestern corn borer leaf-feeding damage in maize. *Crop Science* 58(2):529-539 <https://doi.org/10.2135/cropsci2017.03.0155>.
9. Warburton ML, Womack ED, Tang JD, Thrash A, Smith JS, Xu W, Murray SC, and Williams, WP. (2018). Genome-wide association and metabolic pathway analysis of corn earworm resistance in maize. *The Plant Genome* 11(1): 170069 <https://doi.org/10.3835/plantgenome2017.08.0069>.
10. Haber LL, Womack ED, Sathyamoorthy M, Moss JA, and Shrader MW (2019). Who Needs a Pediatric Intensive Care Unit After Posterior Spinal Fusion for Adolescent Idiopathic Scoliosis? *Spine Deformity* 6(2):137-140 <https://doi.org/10.1016/j.jspd.2017.08.006>.
11. Shields-Menard SA, Sadeghi MA, Green M, Womack ED, Sparks DL, Blake J, Edelmann M, Ding X, Sukhbaatar, B, Hernandez R, Donaldson JR (2017). The effects of model aromatic lignin components on growth and lipid accumulation of *Rhodococcus rhodochrous*. *International Biodeterioration & Biodegradation* 121: 79-90 [10.1016/j.ibiod.2017.03.023](https://doi.org/10.1016/j.ibiod.2017.03.023).
12. Womack ED, Brown AE, and Sparks DL (2016). Aflatoxin M<sub>1</sub> in milk and milk products: A short review. *World Mycotoxin Journal* 9 (2): 305-315 <https://doi.org/10.3920/WMJ2014.1867>.
13. Haber LL, Womack ED, Sathyamoorthy M, Wright PB, Moss JA, Penman AD (2018). Predicting postoperative hypotension in adolescent idiopathic scoliosis patients that underwent posterior spinal fusion. *Journal of Pediatric Orthopedic*.

14. Womack ED, Brown AE, and Sparks DL (2014). A recent review of non-biological remediation of aflatoxin-contaminated crops. *Journal of the Science of Food and Agriculture* 94: 1706-1714.
15. Haber LL, Hughes JD, Womack ED (2014). Screw vs. hybrid constructs for flexible thoracic curves in adolescent idiopathic scoliosis: a prospective, randomized study. *Spinal Deformity* 2: 367-373.
16. Haber LL, Hughes JD, Thompson, GH, and Womack, ED (2012). Long term retrospective review of the Kaneda anterior scoliosis system (KASS) in thoracic adolescent idiopathic scoliosis (AIS). *Journal of Pediatric Orthopedics*. 32(4): 362-367.
17. Haber LL, Hughes JD, and Womack ED (2011). Thoracoscopic revision of staple dislodgment in an adolescent with scoliosis: A case report. *Journal of Bone and Joint Surgery*. 1(02): e7 1-5.
18. Womack ED, Sparks DL, Brown AE, Ward, SH, Pechanova, O. (in preparation). Evaluation of adsorbents for the removal of aflatoxin M<sub>1</sub> from contaminated milk. *Food Control*.

#### BOOK CHAPTERS

Haber LL, Womack ED, Zimmerman C, Hughes J. (2010). Clinical manifestations and treatment of the pediatric rheumatoid patient. Ed: Didomenico L. *Clinics in Podiatric Medicine and Surgery*. 27(2):219-233.

#### ABSTRACTS AND PRESENTATIONS

2021 ACRM. Amal Alharbi, Erika D Womack, R. Marguerite Marquez, Ceren Yayar-Fisher. The Effect of Lower Limb Neuromuscular Electrical Stimulation on Glucose Utilization and Systemic Inflammatory Blood Markers after Acute Spinal Cord Injury. (\*presented by Amal Alharbi)

2020 American Society for Nutrition (Live Online). Jia Li, PhD, Aynur Demirel, PT, PhD, Andres Azuero, PhD, MBA, Erika D Womack, PhD, Amie McLain, MD, Ceren Yayar-Fisher, PT, PhD. Limited Association between Healthy Eating Index-2015 and Cardiovascular Risk Factors in Individuals with Long-Standing Spinal Cord Injury: A Pilot Study

2018 Corn Utilization and Technology Conference, St. Louis Missouri. Womack ED, Brown AE, Sparks DL, Williams, WP. Non-biological, post-harvest management strategies for aflatoxin in maize (\*presented by Darrell Sparks).

\*2018 15<sup>th</sup> Genomics and Big Data (MCBIOS) Conference, Mississippi State University. Warburton ML, Womack ED, Williams PW, Tang J. A pathway-based method to interpret GWAS results (\*presented by Marilyn Warburton).

\*2016 23rd International Meeting on Advanced Spine Techniques (IMAST), Washington, D. C. Long-Term Results of Spine Stapling for AIS (\*2<sup>nd</sup> author; oral presentation).

\*2016 Society for Pain Practice Management. Peripheral Nerve Blocks in Pediatric Orthopedic Patients: Are There Any Post Recovery Benefits?—A Prospective Randomized Study (nominated for Outstanding Research Award; \*5<sup>th</sup> author).

\*2016 SPA/AAP Pediatric Anesthesiology, Colorado Springs, CO. Peripheral Nerve Blocks in Pediatric Orthopedic Patients: Are There Any Post Recovery Benefits?—A Prospective Randomized Study. (\*5<sup>th</sup> author)

\*2015 Society for Industrial Microbiology and Biotechnology (SIMB), Conversion of waste and nontraditional carbon sources for lipid production by *Rhodococcus rhodochrous* (\*5<sup>th</sup> author).

2014 American Chemical Society (ACS), San Francisco, CA. Validation of aflatoxin M<sub>1</sub> in raw milk using QuEChERS as an extraction method.



- \*2014 International Union of Pure Applied Chemistry (IUPAC), San Francisco, CA. Validation of aflatoxin M<sub>1</sub> in raw milk using QuEChERS as an extraction method. (\*Invited presenter)
- \*2014 American Dairy Society Association (ADSA), Kansas City, MO. Evaluation of adsorbents for the removal of aflatoxin M<sub>1</sub> from contaminated milk using QuEChERS as an extraction method (\*invited speaker).
- \*2014 Association of Southern Feed, Fertilizer, and Pesticide Control Officials (ASFFPCO), Montgomery, AL. Aflatoxin check sample program (\*invited speaker).
- 2014 Graduate Research Symposium, Mississippi State University, MS. Evaluation of adsorbents for the removal of aflatoxin M<sub>1</sub> from contaminated milk using QuEChERS as an extraction method.
- 2013 Association of Official Agricultural Chemistry (AOAC), Atlanta, GA. Evaluation of adsorbents for the removal of aflatoxin M<sub>1</sub> from contaminated milk using QuEChERS as an extraction method.
- 2013 American Chemical Society (ACS), New Orleans, LA. Evaluation of adsorbents for the removal of aflatoxin M<sub>1</sub> from contaminated milk using QuEChERS as an extraction method.
- 2012 AOAC, Atlanta, GA. Evaluation of adsorbents for the removal of aflatoxin M<sub>1</sub> from contaminated milk.
- 2011 Scoliosis Research Society (SRS) Louisville, KY. Results for a computer randomized prospective study comparing thoracic screws versus thoracic hooks for fixation in Adolescent Scoliosis. Presented by Dr. L. Haber
- 2011 Spine Journal. Results for a randomized, prospective study comparing thoracic screws versus thoracic hooks for fixation in adolescent scoliosis. Paper #91: Spine Journal Meeting
- 2009 Pediatric Orthopaedic Society of North America (POSNA), Boston. Early Results for a computer randomized prospective study comparing thoracic screws versus thoracic hooks for fixation in Adolescent Scoliosis. Presented by Dr. L. Haber
- 2009 International Meeting on Advanced Spine Techniques (IMAST) Vienna, Austria. Early Results for a computer randomized prospective study comparing thoracic screws versus thoracic hooks for fixation in Adolescent Scoliosis, podium. Presented by Dr. L. Haber
- 2009 IMAST, Vienna, Austria. Long-term retrospective review of Kaneda anterior spinal fusion for scoliosis, e-poster.
- 2009 Scoliosis Research Society Annual Meeting. Early Results for a computer randomized prospective study comparing thoracic screws versus thoracic hooks for fixation in Adolescent Scoliosis. Presented by Dr. L. Haber

## PANEL DISCUSSIONS

- 2015 Roundtable discussion led by Dr. Ajay Markanday of the FAO
- 2014 Roundtable discussion. "Farm Bill" Panel led by Senator Thad Cochran. Mississippi State
- 2013 Roundtable discussion. "Advocate for the Food, Farm, and Jobs Bill" Panel led By Secretary of Agriculture Tom Vilsack. Mississippi State, MS

## TRAINING

- Clinical Research Support Program (CRSP) -- Research Orientation Program 4-hour training  
08/27/2020 CCTS, 4 AMAPRA Category 1 CME credits
- Laboratory Safety Training – University of Alabama at Birmingham 03/2020