

Curriculum Vitae

MICHAEL W. SANDEL

PERSONAL INFORMATION

Date of birth: Hometown	13 August, 1980: Mansfield, Ohio
Military service	Air National Guard (17 years)
Current residence	Tuscaloosa, Alabama
Spouse	Dawn Marie (DeKrell) Sandel, MT-BC, M.Ed.

CURRENT POSITIONS

Assistant Professor Biological and Environmental Sciences College of Natural Sciences and Mathematics The University of West Alabama Station 7 Bibb Graves Hall Livingston, Alabama 35470 msandel@uwa.edu	Public Health Specialist (4E071) U.S. Air National Guard 117 th Air Refueling Wing Medical Group 5401 East Lake Blvd Birmingham, AL 35217
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ACADEMIC PREPARATION

- 2014 **NIH, National Heart, Lung, and Blood Institute T-32 Postdoctoral Research Training Fellowship: UAB School of Public Health (2.7 years)**
The University of Alabama at Birmingham, Birmingham, AL
- 2012 **Doctor of Philosophy: Biological Sciences**
The University of Alabama, Tuscaloosa, AL
- ABD **Master of Science (candidate): Physical Geography**
The University of Alabama, Tuscaloosa, AL
- 2004 **Bachelor of Science: Zoology**
The Ohio State University, Columbus, OH
- 2003 **Associate of Applied Science: Aerospace Technology**
The Community College of the Air Force, Montgomery, AL

HONORS AND AWARDS

- 2016 Outstanding Performance Award - 117th Air Refueling Wing Medical Group, April 2016
Second place, Health Sciences paper competition, Alabama Academy of Science
- 2015 Faculty of 1000 Associate Faculty induction: Diabetes and Endocrinology
Travel Award: International Society for Evolution, Medicine, and Public Health, Arizona State University
- 2014 Most Creative Proposal Presentation: New Energetics Ideas Round II. Nutrition and Obesity Research Center, University of Alabama at Birmingham
Travel Award: Mathematical Biosciences Institute, The Ohio State University
Travel Award: NIMBioS, The University of Tennessee
Program for Excellence in Science Award: American Association for the Advancement of Science
- 2013 Naomi Fineberg Distinguished New Researcher Award: UAB Dept. of Biostatistics
Creativity is a Decision Prize: UAB Nutrition and Obesity Research Center
Career Development Award: UAB Office of Postdoctoral Education
- 2012 Statistical Genetics and Genomics Bursary Award: NIH NIGMS
Comparative Genomics Tuition Stipend: Cold Spring Harbor Laboratory

- 2009 McNair Scholars Honor Society Induction
2007 Second Runner-up Student Oral Presentation Competition: SFC Annual Conference
Joab L. Thomas Endowed Fellowship: UA School of Arts and Sciences
2006 Best Student Presentation Award: Southeastern Division ASIH
Golden Key International Honor Society Induction
2005 Air University Achievement Medal: United States Air Force
2004 Student Advisory Committee Appointment: OSU Department of EEOB
2003 Mad Collector Award: Stone Laboratories, The Ohio State Univeristy

POST-SECONDARY TEACHING EXPERIENCE

Assistant Professor

The University of West Alabama, Livingston, AL

Viruses in the environment: BY307

Vertebrate Zoology: BY428

General Zoology: BY222

Principles of Biology: BY101

Principles of Biology: BY102

Instructor

Stillman College, Tuscaloosa, AL

Environmental Science: BIO433

Guest Lecturer

The University of Alabama, Tuscaloosa, AL

Outdoor Action: University Honors Program: UH173

Discover Alabama: Field Biology for Educators: BSC595

Graduate Teaching Assistant

The University of Alabama, Tuscaloosa, AL

Biology of Fishes Laboratory (with lectures): BSC428/528

Vertebrate Zoology Laboratory (with lectures): BSC373

Introduction to Biology Laboratory I and II (Majors and Non-Majors): BSC108-117

Natural Resource Management: BSC444

Vertebrate Functional Morphology Laboratory: BSC400/500

Vertebrate Anatomy and Physiology Laboratory: BSC215

SPECIALIZED TRAINING

- 2016 **SEA-PHAGES Bioinformatics Workshop**
Howard Hughes Medical Institute, Chevy Chase, MD
SEA-PHAGES Phage Discovery Workshop: HHMI
University of Maryland Baltimore County, Baltimore, MD
- 2014 **Phylogeographic Inference using Approximated Likelihoods (PHRAPL): NSF**
Mathematical Biosciences Institute, The Ohio State University, Columbus, OH
Mathematical Sciences in Obesity Research: NIH-NIDDK
The University of Alabama at Birmingham, Birmingham, AL
Predictive Models for Ecological Risk Assessment Workshop: EPA
National Institute for Mathematical and Biological Synthesis (NIMBioS), Knoxville, TN
- 2013 **Quantitative Evolutionary Genetics Course: NSF**
National Evolutionary Synthesis Center, Durham, NC
Metabolomics Workshop: NIH-NHLBI
The University of Alabama at Birmingham, Birmingham, AL
Population Studies Workshop: NIH-NHLBI
National Institutes of Health, Bethesda, MD

- 2012 **Statistical Genetics and Genomics short course: NIH-NIGMS**
The University of Alabama at Birmingham, Birmingham, AL
Computational and Comparative Genomics Course
Cold Spring Harbor Laboratory, Cold Spring Harbor, NY
Next Generation Sequencing Technology and Statistical Methods: NIH-NHGRI
The University of Alabama at Birmingham, Birmingham, AL

RESEARCH EXPERIENCE

Tenure-track Faculty 2015-Present

Biological and Environmental Sciences, The University of West Alabama

Research Concentration: My laboratory is focused on finding the molecular sources of phenotypic variation in vertebrate animals, including fishes and humans. Focal research areas include adaptive radiation of species flocks in ancient lakes (Baikal), mitochondrial risk factors for metabolic disease, and viral protection against mucosal infection, including tuberculosis and necrotizing enterocolitis. Most of my work uses fish as a model organism, but results of this work translate directly to solutions for human public health.

Post-Doctoral Research Fellow 2012-2014

Department of Biostatistics, The University of Alabama at Birmingham

Research Concentration: Mitochondrial health and associated determinants of metabolic disease susceptibility. I led research projects that identified genetic variants associated with colorectal cancer and metabolic disease. I also contributed statistical support to projects dealing with atrial fibrillation (heart disease) and obesity.

Doctoral Dissertation Research 2005-2012

Department of Biological Sciences, The University of Alabama, Tuscaloosa, AL

Research Concentration: Molecular Genetics of Aquatic Animals

UAIC Curatorial Research Assistant 2005-2006

The University of Alabama Ichthyological Collection, Tuscaloosa, AL

Aquatic Biology Consultant 2003-2004

The Ohio State University Museum of Biological Diversity, Columbus, OH

Assistant Field Biologist 2003

Ohio River Valley Water Sanitation Commission (ORSANCO), Cincinnati, OH

CURRENT RESEARCH FUNDING

CAREER TOTAL \$551,622

- 2016 **UWA Office of Sponsored Programs** Seed Grant \$1,500, through 28 February, 2017.
USFWS Section 6: Status Survey of Frecklebelly Madtom (*Noturus munitus*) \$15,000, through 31 September, 2016.
- 2015 **NSF DEB 1533692:** DEB Biodiversity Discovery and Analysis. Sink or Swim: Phenomic and Transcriptomic Diversification of Sculpins (Teleostei: Cottidae) Endemic to Lake Baikal, Siberia. 15 September, 2016 through 15 August, 2019. \$455,822

PAST FUNDING

- 2013 **UAB Department of Biostatistics:** \$500
Naomi Fineberg Distinguished New Researcher award
Monkeys, cancer, and the self-similarity of genomic coevolution
UAB Nutrition and Obesity Research Center: \$2,500
Genomic determinants of metabolic diversification among Baikal sculpins
UAB Office of Postdoctoral Education: \$1,500
Genomic determinants of metabolic diversification among Baikal sculpins

- 2012 **NIGMS:** Statistical Genetics and Genomics Bursary Award: \$1,500
Mitochondrial SNPs Associated with Longevity in Humans: A Multiethnic Approach
- 2010 **USFWS:** ADWFF Section 6 Conservation Grant: \$13,155
*Population genetics of the Mud Sunfish (*Acantharchus pomotis*)*
- 2009 **USFWS:** Flexible Funds for Conservation Research: \$20,000
Population genetics and Conservation Status Update of the Spring Pygmy Sunfish
- 2006 **USFWS:** ADWFF Section 6 Conservation Grant: \$27,345
*Population genetics and Conservation Status Update of the Spring Pygmy Sunfish (*Elassoma alabamae*).*
- 2005 **American Museum of Natural History:** Theodore Roosevelt Memorial Grant: \$1,500
Comparative Phylogeography of Elassomatidae
North American Native Fishes Association: Conservation Research Grant: \$500 &
Birmingham Audubon Society: Walter Coxe Research Award: \$800
*Conservation Genetics and Inbreeding Depression in the Critically Imperiled Spring Pygmy Sunfish (*Elassoma alabamae*)*

PENDING APPLICATIONS

NIH AREA R15 Phage Therapy Prospects for the 21st Century, \$300,000.
NSF Research Experience for Undergraduates (REU), \$12,500.

PUBLICATIONS AND REPORTS SINCE 2007 CAREER TOTAL, 15 <http://orcid.org/0000-0001-9083-9202>

- Allison D, Antoine L, Ballinger S, Bamman M, Biga P, Darley-Usmar V, Fisher G, Gohlke J, Halade G, Hartman J, Hunter G, Messina J, Nagy T, Plaisance E, Roth K, **Sandel M**, Schwartz T, Smith D, Sweatt JD, Tollefsbol T, Watts S, Yang Y, Zhang J, Austad S. 2014. Aging and energetics' 'Top 40' future research opportunities 2010-2013. *F1000Research*. 3:219.
- Harris PM, Hubbard GK, and **Sandel M**. 2014. Catostomidae (book chapter). pp. 451-502. *In: Freshwater Fishes of North America: Volume 1: Petromyzontidae to Catostomidae*. M Warren and BM Burr, eds. John Hopkins Press.
- Sandel M**, Rohde F, Harris P. 2014. Interspecific relationships and the evolution of sexual dimorphism in pygmy sunfishes. *Molecular Phylogenetics and Evolution*. 77: 166-176.
- Sandel M***, Dunham-Snary K, Westbrook D, Ballinger S. 2014. A method for assessing mitochondrial bioenergetics in whole white adipose tissues. *Redox Biology*. 2(14): 656-660. *Shared first authorship with Dunham-Snary.
- Bagley J, **Sandel M**, Wooten J, Travis J, de Lourdes Lozano-Vilano M, Johnson J. 2013. Testing biogeographic hypotheses of Plio-Pleistocene history and diversification along the North American Gulf-Atlantic Coastal Plain in least killifish (*Heterandria formosa*). *BMC Evolutionary Biology*. 13: 223.
- Near TJ, **Sandel M**, Kuhn K, Unmack PJ, Wainwright PC, Smith WL. 2012. Nuclear gene inferred phylogenies resolve the relationships of the enigmatic pygmy sunfishes, *Elassoma* (Teleostei: Percomorpha). *Mol. Phylogenetics and Evolution*. 63: 388-395.
- Makowsky R, Yan Q, **Sandel M**, Wiener HW, Aissani B, Kaslow RA, Tiwari HK, Shrestha S. 2012. A comparison of principal component analysis using autosomal variants with phylogeny based on Y-chromosome and mtDNA markers. *Frontiers in Genetics* 3:301.
- Sandel M**. 2012. Phylogeographic diagnosis of a newly discovered population of Mud Sunfish (*Acantharchus pomotis*) in Southern Alabama. Final Report submitted to Alabama Division of Wildlife and Freshwater Fisheries. 21 pp.
- Sandel M**. 2011. *Elassoma alabamae*: Southeastern Fishes Council Imperiled Species Conservation Plans. Special publication *Southeastern Fishes Council Proceedings*.
- Sandel M**. 2011. United States Fish and Wildlife Service: Interim Report on the Conservation Status of *Elassoma alabamae*, a Species in Rapid Decline. 13 pp.

- Sandel M.** 2009. The Desperate Dozen: *Elassoma alabamae* (Mayden 1993). *Southeastern Fishes Council Proceedings*. 52(1): 15.
- Sandel M,** Greenwald N. 2009. United States Fish and Wildlife Service: Petition to List the Spring Pygmy Sunfish (*Elassoma alabamae*) as an Endangered Species. 36 pp. Proposed rule (petition successful) released in the Federal Register, 1 October, 2012.
- Sandel M.** 2008. Final Report to the Alabama Division of Wildlife and Freshwater Fisheries: Conservation Genetics and Population Status Update of *Elassoma alabamae*. 45 pp.

SUBMITTED AND PREPARED PUBLICATIONS

"*" DENOTES UNDERGRADUATE COAUTHOR

- Dunham-Snary KJ, **Sandel M,** Westbrook DG, Sammy MJ, Ratcliffe WF, Young ME, Ballinger SW. The Mitochondrial Genome Influences Body Composition, Energy Balance and Mitochondrial Bioenergetics in Mice. Submitted to *Science*.
- Srinivasagendra V, **Sandel M,** Tiwari HK, Singh KK. Increased numtogenesis of mitochondrial DNA in the nuclear genome of colorectal adenocarcinoma. Submitted to *Genome Medicine*.
- Sandel M,** Teterina V, Kirilchik S, Lapidus A, Allison D, Tiwari H, O'brien S. Complete mitochondrial genomes of the genus *Comephorus* (Teleostei: Cottidae) reveal genetic associations with obesity related phenotypes. Prepared for *Mitochondrial DNA*.
- Sandel M,** Aguilar A, Buonnacorsi V, Herstein J, Allison D, Austad S, Evgrafov O. Complete mitochondrial genomes of the genus *Sebastes* (Teleostei: Scorpaenidae) reveal genetic associations with extreme longevity. Prepared for *Aging*.
- Srinivasagendra V, **Sandel M,** Tiwari HK, Singh KK. Increased numtogenesis of mitochondrial DNA in the nuclear genome of colorectal adenocarcinoma. Submitted to *Genome Medicine*.
- Sandel M,** Harris PM. Phylogeography of *Elassoma zonatum* concords with geology and paleohydrography of the Gulf-Atlantic Coastal Plain. Prepared for *Molecular Ecology*.

INVITED PRESENTATIONS

- Sandel M. March 13th 2015 Career Opportunities in Science and Engineering with the United States Armed Forces. Alabama Junior Academy of Science, Livingston, AL.
- Sandel M. August 22nd 2015 The Causes and Consequences of mtDNA Convergence: A Case Study on the Phylogeny of Fishes. Georgia Southern University, Statesboro, GA.
- Sandel M. November 18th 2013 Don't call it a comeback: Mitochondrial DNA in the Next Generation of Comparative Genomics. Jackson Heart Study Group, Jackson, MS.
- Sandel M. September 2nd 2013 Evolutionary Ecology of Freshwater Sculpins. Russian Academy of Sciences Limnological Institute, Irkutsk Oblast.
- Sandel M. April 13th 2013 Evolutionary Relationships of Pygmy Sunfishes (*Elassoma*): Characterization of an Optimal Model for Historical Biogeography. Dobzhansky Genome Bioinformatics Center, St. Petersburg, Russia.
- Sandel M. 2013 A Hard NUMT to Crack: Characterizing Mitochondrial Pseudogenes in Healthy and Malignant Human Cells. Evolutionary Studies Program of The University of Alabama, Tuscaloosa, AL.
- Sandel M. 2012 Evolutionary Origins and Conservation Implications of the Aquatic Biodiversity Hotspot in the Southeastern United States. University of West Alabama, Department of Mathematics and Natural Sciences.
- Sandel M. 2012 Aquatic Biodiversity Conservation and Implications for Human Health. North American Native Fishes Association Annual Convention, Cambridge, OH.
- Sandel M. September 30th 2010 Extraordinary mtDNA Substitution Rates within Pygmy Sunfishes (Elassomatidae): A Multi-scale Analysis of Molecular Divergence within North America's Most Ambiguous Fishes. University of Alabama at Birmingham, Section on Statistical Genetics Seminar Series.

- Sandel M. 2008 The Desperate Dozen: *Elassoma alabamae*. Southeastern Fishes Council Annual Symposium, Chattanooga, TN.
- Sandel M. November 2007 [oral presentation] Comparative Phylogeography of Elassomatidae: A Test of the Interglacial Refugia Hypothesis. Science Seminar Series: Valdosta State University, Valdosta, GA.

CONTRIBUTED PRESENTATIONS SINCE 2007

CAREER TOTAL, 22

- Odom TJ, Sandel M, Toms R. February 18th 2016 [oral presentation] Bacteriophage as Keystones of the Breastmilk Microbiome. Alabama Academy of Science 2016 Annual Meeting. Florence AL. *Second place, Health Sciences paper competition.*
- Newburn J, Sandel M. February 18th 2016 [poster presentation] Preliminary characterization of the dermal mucosal microbiome of Redfish (*Sciaenops ocellatus*). Alabama Academy of Science 2016 Annual Meeting. Florence AL.
- Newburn J, Sandel M. November 12th 2015 [poster presentation] Preliminary characterization of the dermal mucosal microbiome of Redfish (*Sciaenops ocellatus*). Southeastern Fishes Council Annual Meeting. Gainesville, FL.
- Dunham-Snary KJ, Westbrook DG, Sammy MJ, Sandel M, Ratcliffe WF, Young ME, Ballinger SW. November 22nd 2013 [oral presentation] The Mitochondrial Genome Influence Body Composition, Energy Balance and Mitochondrial Bioenergetics in Mice. 20th Annual Society for Free Radical Biology and Medicine Meeting. San Antonio, TX.
- Sandel M. November 17th 2013 [oral presentation] New hypotheses regarding the generation of aquatic biodiversity in the southeastern United States. Southeastern Fishes Council, Guntersville, AL.
- Dunham-Snary KJ, Westbrook DG, Sammy MJ, Sandel M, Ratcliffe WF, Young ME, Ballinger SW. November 13th 2013 [oral presentation] The Mitochondrial Genome Influence Body Composition, Energy Balance and Mitochondrial Bioenergetics in Mice. UAB Graduate Biomedical Student Outreach Annual Fall Seminar. Birmingham, AL.
- Dunham-Snary KJ, Westbrook DG, Sammy MJ, Sandel M, Ratcliffe WF, Young ME, Ballinger SW. May 7th 2013 [oral presentation] The Role of Mitochondrial Genetic Background on Body Composition and Energy Balance. 4th Annual UAB Diabetes Research Day, May 7, 2012. Birmingham, AL. (Eliezer S. Award – Best Diabetes Abstract)
- Bagley JC, Sandel M, June 26th 2013 [poster presentation] Testing biogeographic hypotheses of Plio-Pleistocene history and diversification along the North American Gulf-Atlantic Coastal Plain in least killifish (*Heterandria formosa*). Evolution Joint Meeting, Snowbird, UT.
- Sandel M, Holliman C, Tiwari H, Singh K. [oral presentation] A Hard NUMT to Crack: Characterizing Mitochondrial Pseudogenes in Healthy and Malignant Human Cells UAB Postdoctoral Research Symposium, Birmingham, AL.
- Sandel M. July 2011 [oral presentation] Comparative Phylogeography of Fishes and Amphibians of the Gulf-Atlantic Coastal Plain. Joint Meeting of Ichthyologists and Herpetologists, Minneapolis, MN.
- Kuhajda BR, Sandel M. November 2011 [oral presentation] Response of a fish community to stream restoration after a coal slurry spill in a tributary to the North River (Black Warrior Drainage, Mobile Basin) in Alabama. Southeastern Fishes Council Annual Meeting, Chattanooga, TN.
- Sandel M. July 2010 [oral presentation] Phylogenetic Affinities and Interrelationships of Centrarchidae and Elassomatidae: A Synthesis of Molecules, Morphology, and Biogeography. Joint Meeting of Ichthyologists and Herpetologists, Providence, RI.
- Sandel M. 2009 [oral presentation] Plight of the Pygmies: Coastal Plain Vicariance and Comparative Phylogeography of the Pygmy Sunfishes. American Fisheries Society, Nashville, TN.

- Sandel M. 2009 [oral presentation] Plight of the Pygmies: Coastal Plain Vicariance and Comparative Phylogeography of the Pygmy Sunfishes. Alabama Fisheries Association, Auburn, AL.
- Sandel M. March 2009 [oral presentation] Plight of the Pygmies: Coastal Plain Vicariance and Comparative Phylogeography of the Pygmy Sunfishes. Association of Southeastern Biologists, Birmingham, AL.
- Sandel M. 2008 [oral presentation] Comparative Phylogeography of Elasmobranchs: A Test of the Interglacial Refugia Hypothesis. Joint Evolution Meeting, Minneapolis, MN.
- Sandel M, Ott B. January 2008 [poster presentation] Comparative Bioenergetics of Endangered Freshwater Fishes and Widespread Relatives: A Case Study of Crenophiles from the Tennessee River Basin. Society for Integrative and Comparative Bio., San Antonio, TX.
- Sandel M. July 2008 [oral presentation] Comparative phylogeography of Elasmobranchs: A higher resolution test of the interglacial refugia hypothesis. Joint Meeting of Ichthyologists and Herpetologists, St. Louis, MO.

OUTREACH

Girls Engaged in Math and Science (GEMS), Oak Park Middle School, Decatur, Alabama. This is my most recent outreach project, in which I aim to demonstrate the importance of wetland ecosystem services in reducing the risk of infectious disease, such as Zika and Malaria. This project involves both field and classroom exercises, which require lesson plan development and coordination with collaborators at the Wetlands Edge Environmental Center in Decatur, Alabama.

Hands-on-Herps Program, 2008-Present. Over the past five years, I have developed an introduction to reptile and amphibian diversity for children, aged 3-16. This program draws attention to anthropogenic impacts on wildlife communities, while providing an interactive experience with a wide range of live animals. This program has been especially well received at the RISE school of Tuscaloosa, which serves pre-kindergarten children with special needs.

Discover Alabama Television Series “Ask the Experts” program:

From 2006 to 2009 I served as an expert naturalist for a free-to-the-public, online reference service.

Roll Tide Fish Show, University of Alabama. I participated in an interactive exhibit of UAIC fishes before homecoming football games.

4-H of Tuscaloosa County: NatureWorks Lecture Series. In 2006 and 2007 I was a guest lecturer for Tuscaloosa 4-H. I used fieldwork to expose students to the diversity of career options in the biological sciences.

SERVICE

- 2015 **Treasurer:** Southeastern Fishes Council
- 2012 **Petitioner to United States Fish and Wildlife Service:** My collaborative federal petition to protect the Spring Pygmy Sunfish under the Endangered Species Act received a positive rule on 1 October, 2013.
- 2011 **Symposium Co-host:** Joint Meeting of Ichthyologists and Herpetologists, Minneapolis
Symposium title: "Comparative Phylogeography of the Gulf-Atlantic Coastal Plain"
Interview: Huntsville Times Newspaper: “Feds may protect rare sunfish found only in Limestone County's Beaverdam Creek”
- 2009 **Interview: Decatur Daily Newspaper:** “Rock Quarry vs. Pygmy Sunfish”

2006 **Conference Co-host:** Southeastern Evolution and Ecology Conference: University of Alabama

Guest Editor: Southeastern Naturalist

Reviewer: PLoS One, Behaviour, Biological Journal of the Linnean Society, Biomed Research International, Fisheries, Journal of Cell and Animal Biology, Southeastern Fishes Council Proceedings

PAST UNDERGRADUATE MENTEES -11 OF 15 BELONG TO AN UNDERREPRESENTED GROUP IN SCIENCE

Matthew Bush, MSc student (nursing) – Auburn University Montgomery
Eduardo Cortez-Garcia, DO – Philadelphia College of Osteopathic Medicine
Lauren Evans, MSc student (English) – University of North Carolina Wilmington
Seth Garrett, MD – St. George’s University School of Medicine
Philip Hegji, BSc – Biologist with United States Fish and Wildlife Service
Danielle Kelly, MSc – U.S. Public Health Service
Sherry Le, MSc – Baxter Healthcare
Luis Mestre, M.Sc. student (biostatistics) – University of Puerto Rico
Jessica Pearson, MD student – St. Jude Children’s Hospital
John Person, MSc – SCAD Atlanta and Wellstar Health System
Meganne (Rockman) Price, MSc – GIS specialist with Alagasco
Beth (Gonstad) Stevens, BSc – Science Applications International Corporation
Alicia Waggoner, MD student – University of South Alabama
Amy (Dunlap) Wilson, DMD – Independent dental practice in Morris, AL
Roberta (Thompson) Wrighten, DVM – Veterinarian with Banfield Pet Hospital

PROFESSIONAL ORGANIZATIONS AND HONOR SOCIETIES

Alabama Academy of Science
Southeastern Fishes Council
Faculty of 1000 Diabetes and Endocrinology (associate member)
Genetics Society of America
Golden Key Honor Society
McNair Honor Society
Society for Redox Biology and Medicine
Society of Systematic Biologists

01 JANUARY, 2017
