# Tristan Henderson

*Interactive CV* • tch318@msstate.edu • 018 Harned Hall • Mississippi State University

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## 1. Research Interests

**Field protistology**
*Exploration, characterization, and interpretation of microbial eukaryotic diversity.*
**Model organism development**
*Isolating, culturing, and characterizing novel protist lineages.*

There is a significant gap between the actual number of described protist species and the total number of protist species on Earth. Fieldwork with protists is usually performed by environmental metabarcoding, highlighting novel OTU existence and broad phylogenetic diversity. However, these methods kill the cells and leave them unable to work with by experimentation. The past few decades of the metabarcoding revolution have certainly proved that there is an unfathomable amount of untapped biodiversity worldwide. Thus arises a new paradigm in microbiology: with so much microbial diversity everywhere, what is their functional importance and what unseen biological phenomena could they possess?

**My goal is to capture and culture novel organisms faster than anyone in history to enhance the likelihood of serendipitous discoveries.** To achieve this goal, I devised a framework of questions and experiments. Here are the questions: Where are protists exactly? How can we move single cells from their environment to a well in a dish systematically? What *is* culturing exactly? How can you mass characterize several thousand novel organisms?

*Co-interests:* Science communication and teaching. Photomicrography. Culturing microbes. Field research and simulating environments in the lab.
*Biological subdisciplines:* Eukaryotic microbiology. Method development. Field protistology. Molecular biology and biochemistry. Philosophical paleomicrobioecogeography.

## 2. Education

### The Brown Lab | Website: amoeba.msstate.edu

◉ **Mississippi State University** [Starkville, Mississippi, United States] ***Current ~ First year***
PhD in Biology ~ Specialization: Eukaryotic Microbiology ~ PI: Matthew Brown

Funded by NSF Award Number 2100888 and Teaching Assistantships
*Sampling amoeboid protists as a reservoir of unknown/undescribed eukaryotic diversity*

◉ **Houston Baptist University** [Houston, Texas, United States] *Graduated: 05/2021*
Bachelor of Science - Biochemistry/Molecular Biology (BCMB) | GPA ~ *3.9*

- Honors in BCMB – Origin of animal multicellularity and microbe discovery (project).
- ASBMB Certified with Distinction [Certification]
- Awarded The Outstanding Student in Biochemistry/Molecular Biology (2021)
- Additional coursework in physics and music.
- Researcher, Lab Tech, Mentor, Teaching Assistant, and Tutor

## 3. Active Educational Initiatives (2022)

*~ Updating soon ~*

## 4. Briefs of Research Experience

**(Current)** Currently exploring the diversity of amoebae in the Brown Lab at Mississippi State University. Head over to amoeba.msstate.edu for the lab website.

*Independent research projects*:

*(Past)* Hunted potentially novel unicellular relatives of animals in the Gulf of Mexico, which involves isolating parasitic protists from the intestines of marine invertebrates. Short findings involve a potentially new species of antibiotic resistant *Vibrio* Harveyi Clade bacteria isolated from polychaetes in the Galveston Bay, Texas. Not what I wanted.

Developed a crude tool to explore the locations of ancient Chordates through time and space on Earth by tracing coastlines plotted with extant locations of all amphioxi in the world. Paleobiogeography of cephalochordates. Used R programing and GIS software.

Exploration of natural amphioxus GFP in reproductive behaviors and partially cloned bfGFP genes. Potential discovery of two GFP splicotype products. Amphioxi encode the largest known family of fluorescent proteins with some having near perfect quantum yield.

Found potential sexual dimorphisms in amphioxi dependent on fluorescent proteins.

*Collaborative and mentored projects*:

Houston Baptist University | Agnieszka Czopik, Ph.D. | (2017-2019)

Developed the amphioxus into an immunological model organism for ancient chordates and the evolution of adaptive immunity. Husbandry and breeding protocols for the amphioxus and two saltwater algae species. Protocol development to culture and transfect amphioxus tissues with the goal to make immortal cell lines. Lots of cloning. Fluorescent and qPCR experiments geared to locate a site in the gut dedicated to immune system activity.

Baylor College of Medicine | Children's Nutrition Research Center | Davis Lab
United States Department of Agriculture | Texas Children's Hospital | (Summer 2019)

*One goal of the Davis lab is to figure out how to enhance muscle growth in preterm infants to prevent developmental problems and metabolic disease. I was involved in analyzing muscle samples of preterm piglets from a study regarding how feeding schedules affect growth. Here I did immunohistochemistry at all stages (cryotomy, staining, confocal microscopy).*

## 5. Employment at Houston Baptist University

***Teaching Assistantship*** (7 semesters) – Frequently bringing real life into the classroom and experimented with new teaching methods. Created lecture videos on multiple taxa across the tree of life. Involved in training new professors about the labs and use of equipment.

- General Biology 1 Lab (5 Semesters)
- General Biology 2 Lab (1 Semester)
- Immunology Lab (1 Semester)

***Tutoring*** (3.5 yrs) – *CRLA International Certified*

- Chemistry (Introductory, General, Organic)
- Biology (Introductory, General, Cellular, Genetics, RNA, Immunology, Molecular)
- Physics (Calculus based: Mechanics, E&M, Optics)
- Mathematics (Algebra, Calculus)
- Some music and history classes

*Babysitter of nematode worms* (Dec. 2019)

*Stockroom and Chemical Organizer. Lab technician.* – Involved in training students and faculty molecular techniques or the use of equipment, such as fluorescent microscopes. (2019-2021)

## 6. Relevant Awards and Honors

◉*National Science Foundation, Graduate Research Fellowship Program* (03/23/2021)
-**Honorable mention**-

◉*Grace Hopper Scholarship:* (Twice: 05/06/2019 and 04/25/2020)
An award of $5,000 per year for high achieving students in STEM-related academic programs.

◉*Texas TRIO Association's 2019 Walter O' Mason Scholarship:* (05/10/2019)
$1,500 scholarship based on strong academic performance, leadership ability, and community involvement for disadvantaged students and TRIO scholars.

## 7. Research Presentations

2021 May – Houston Baptist University, (Houston, Texas) *A philosophical journey into the study of microbes. An unconventional thesis presentation.* – Oral

2021 April – Houston Baptist University, (Houston, Texas) *Man versus microbe: Is it really a competition?* – Oral

2021 April – South-Regional Tri-Beta Convention, Virtual, *The neglect of microbes (and a potentially novel species of antibiotic resistant marine bacteria isolated from blood worms).* – Oral

2020 October – Gulf Coast Undergraduate Research Symposium, Virtual, Rice University (Houston, Texas) *Hunting Novel Unicellular Relatives of Animals.* – Oral [**International Conference**]

2020 September – Baylor McNair Research Conference, Virtual, Baylor University (Waco, Texas) *What did the first animal look like? Finding novel holozoan protist lineages.* – Oral

2019 September – Under the Microscope Series, Houston Baptist University (Houston, Texas), *Feeding schedules and prematurity. Working with pigs and developing muscle immunohistochemistry protocols.* **Invited lecture**, Oral

2019 September – TRIO McNair Research Conference, Baylor University (Waco, Texas), *Localization of immune responsive cells in Floridian amphioxi* - Poster

2019 September – TRIO McNair Research Conference, Baylor University (Waco, Texas), *Four dimensional ancient chordates. Paleobiogeography of amphioxi.* – Oral

2019 September - Capital of Texas Undergraduate Research Conference, University of Texas (Austin, Texas) *Four dimensional ancient chordates. Paleobiogeography of amphioxi.* – Oral

2019 July – Baylor College of Medicine, Texas Children's Hospital, Children's Nutrition Research Center, USDA ARS (Houston Medical Center, Texas) - *Determining if myonuclear accretion and satellite cell abundance are impacted by feeding modality in premature pigs* – Oral

2019 April - Houston Baptist University (Houston, Texas), *Localization of immune responsive cells in Floridian amphioxi* - Poster

2019 April – Regional Tri-Beta Convention (Dallas, Texas), *Localization of immune responsive cells in floridian amphioxi* - Poster

2019 April – Texas Undergraduate Research Day at the Capitol (Capitol building, Austin, Texas), *Localization of immune responsive cells in floridian amphioxi* – Poster **Invited**

2018 October - Representative at a **Nature** Careers Expo booth for Biomed Careers®

2018 March - Regional Tri-Beta Convention (Dallas, Texas), *Creating tools to study amphioxi as model organisms for the emergence of adaptive immunity* - Poster

2018 March - Houston Baptist University (Houston, Texas), *Creating tools to study amphioxi as model organisms for the emergence of adaptive immunity* – Poster

## 8. Membership in Academic Societies

*International Society of Protistologists (ISOP) – Student member*

*American Society of Biochemistry and Molecular Biology – Graduate Member*

## 9. Relevant Coursework *Available upon request*: message.tristanhenderson.info