Madison Adams

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Research interests

I was most recently an NSF funded post-bacc scholar identifying genetic and metabolic mechanisms that drive natural fin regeneration in Igor Schneider's lab. Currently, I am a graduate student and teaching assistant in the Joshua Currie lab at Wake Forest University studying axolotl limb regeneration.

Academic History

August 2026 - May 2031

***Ph.D. Student**: Wake Forest University, Advisor: Professor Dr. Joshua Currie*
-Dean's Scholarship

August 2021 - May 2025

***B.S. Biological Sciences**: Louisiana State University*
-GPA: 3.747, Cum Laude, President's Honor Roll, Dean's list

Relevant coursework: Vertebrate Physiology lecture and laboratory, Biochemistry, Principles of Genetics, Evolution, Marine Communities lecture and laboratory, Reproducible Research

Research Experience

July 2025 - June 2026

NSF Post-baccalaureate Researcher, *Advisor: Dr. Igor Schneider- Louisiana State University, Baton Rouge*

- Mentor matching at LSU and a year-long research project (August 2025-July 2026) funded by the National Science Foundation LAGNiAppE fellowship
- Evaluating the gene expression and functional role of duplicated myoglobin genes during regeneration in *Polypterus,* lungfish, and zebrafish fins. Investigating metabolic mechanisms behind fin regeneration.
    - Analysis of gene expression data using Loupe Browser, Trailmaker, R and RStudio Seurat package (spatial transcriptomics, snRNA seq, bulk RNA seq)
    - Evaluation of candidate gene expression using Hybridization Chain Reaction-fluorescent *in situ* Hybridization (HCR-FISH): tissue sections on slides and whole mount
    - Fin amputation and tissue processing, Cryostat sectioning
    - Genomic DNA extraction
    - Histological staining (Hematoxylin & Eosin)
    - Fluorescence microscopy and imaging
    - Building protein trees of mb genes using MAFT and IQ-TREE
    - Performing a regeneration assay in zebrafish fin
    - Animal husbandry
- LAGNiAppE Bootcamp (July 2025)
    - Basics of Evolution

    - Coding skills with R (RStudio) and Unix command line
    - Science communication, project management, personal development
- LAGNiAppE Weekly Seminar Sessions (Aug 25-Jun 26)
    - GRFP Workshop (Sept 25)
    - Protein Structure Analysis Workshop (Nov 13)
    - Scientific Publishing Workshop (April 28)
    - Manuscript writing Workshop
    - Bioinformatics Workshop (March 4)
    - Graduate School Application Workshop (August 28)

April 2023 - June 2025

***Undergraduate Researcher**, Aquatic Germplasm and Genetic Resources Center, Advisor: Nicholas Coxe, Director: Dr. Terrence Tiersch- LSU Agricultural Center, Baton Rouge*

- Non-lethal sperm extraction, cryopreservation, and in vitro fertilization in salamanders
- Sperm quality analysis using a compound light microscope and hemocytometer
- Animal husbandry, handling, and health evaluations in amphibian model organisms
- Designed a 3D printed sperm collection device, *Inclined Salamander Positioning Device* (https://3d.nih.gov/entries/20948/1.01)
- Developed an online project management information system for the creation of a cryopreservation kit: Notion productivity software
- Developed a data management app through shinyApp and R (RStudio) for data storage and analysis (https://gitlab.com/MadisonA_2025/sperm-data-collection-and-analysis-app)
- Created a website-based informational concept map tool for axolotl development and conservation: Notion productivity software (https://tinyurl.com/Ambystoma-Concept-Map)
- Data management and interpretation: Microsoft Excel and R programming
- Presentation of findings to the director and staff of the Ambystoma Genetic Stock Center (AGSC)

Awards and Stipends

August 2026-August 2027

Dean's Scholarship - Wake Forest University Graduate School of Arts and Sciences - $5,000

Support in addition to my PhD stipend. Renewable for one additional year, based on satisfactory progress in the program.

July 2025-June 2026

Louisiana Graduate Network in Applied Evolution (LAGNiAppE) - *National Science Foundation (#2216631) - $44,050*

Research and Mentoring for Post-baccalaureates (RaMP) program focused on developing strong research skills and comprehensive laboratory experience to prepare participants for successful careers in STEM.

Includes a stipend ($34,050) and research funding ($10,000).

August 2021-Jan 2025

Tiger Marching Band and Bengal Brass Member Stipend- *Louisiana State University Athletics, Baton Rouge- $7,000*

Stipend received as a member of both the LSU Tiger Marching Band and the Bengal Brass Basketball band as an undergraduate student.

Course for Professional Development

July 12th-22nd, 2026

Emerging Leaders in Regenerative Biology and Development (ReBilD)- *MDI Biological Laboratory. Bar Harbor, Maine*

This course featured concurrent experiments in regeneration and development, using an array of models and led by a cohort of experienced teaching faculty. Lessons and hands-on lab work were complemented by round table discussions and informal dinners with multiple keynote lecturers, seminars and other training activities.
Seminars, classes, and lab experience of interest include:

- History of Regeneration Research lecture- Dr. Karen Crawford (MDIBL)
- Planaria regeneration lecture and laboratory experience performing Planaria body grafting and axolotl limb grafting surgery- Dr. Longua Guo (University of Michigan) and Dr. Karen Crawford (MDIBL)
- Zebrafish spinal cord and muscle regeneration lectures and laboratory experience severing the spinal cord of zebrafish embryos and monitoring regeneration success- Dr. Karen Mruk (East Carolina University, NC) and Dr. Romain Madelaine (MDIBL)
- Zebrafish and axolotl transgenesis lectures and laboratory experience dejellying axolotl eggs and microinjection-Dr. Ian Drummond and Dr. Prayag Murawala (MDIBL)
- Zebrafish kidney regeneration lecture and laboratory experience injuring adult zebrafish kidneys via chemical injection and dissecting out kidneys for further analysis-Dr. Ian Drummond (MDIBL)
- Bioinformatics and data analysis lab: Introduction to single-cell omics analysis, SC Scape pipeline overview- Joel Graber (MDIBL)
- Tissue culture and light sheet microscopy lecture, Axolotl limb and tail regeneration lecture, and Demo of mesoSPIM microscope-Dr. Prayag Murawala (MDIBL)
- Role of immune cells in digit tip regeneration in mouse lecture- Dr. James Godwin (MDIBL and JAX)
- Hydra regeneration lecture and laboratory experience performing Hydra body grafting and monitoring regeneration-Dr. Celina Juliano (UC Davis)
- Axolotl Accessory Limb Model (ALM) lecture and laboratory experience performing the ALM surgery-Dr. Catherine McCusker (UMASS Boston)
- Career counseling panel and meeting with NIH program officer Dr Joyce Stamm

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Presentations

July 2026

ReBilD Course student symposium- *MDIBL Bar Harbor, Maine*

- “Divergent Oxygen Strategies of Aquatic Vertebrate Regenerators” (Talk)

June 2026

Evolution 2026 Conference- *Cleveland, OH*

- "Divergent Oxygen Strategies of Aquatic Vertebrate Regenerators" (Poster)

April 2026

LSU Biograds (Grad Student) Conference- *Baton Rouge, LA*

- "Divergent Oxygen Strategies of Aquatic Vertebrate Regenerators" (Talk)

April 2026

LSU Discover Day Research and Creativity Conference- *Baton Rouge, LA*

- "Divergent Oxygen Strategies of Aquatic Vertebrate Regenerators" (Talk)

January 2026

Society of Systematic Biologists Breakout Meeting- *Baton Rouge, LA*

- "Divergent Oxygen Strategies of Aquatic Vertebrates During Regeneration" (Lightning talk)

May 2025

American Fisheries Society Conference- *Baton Rouge, LA*

- "Developing a life cycle and research concept map for community-level activities addressing genetic resource preservation of aquatic species: *Ambystoma mexicanum.*" (Poster presentation)

April 2025

LSU Discover Day Research and Creativity Conference- *Baton Rouge, LA*

- "Developing an *Ambystoma* life cycle and research concept map for community-level activities." (Poster presentation)

Outreach and Science Communication

March 2024, March 2025

LSU Ag Magic - *Baton Rouge*

Informational conference for K-12 students and the general public hosted by the LSU Agricultural Center.

- Assisted in running an informational and interactive booth hosted by the Aquatic Germplasm and Genetic Resources Center
- Developed science communication skills for general audiences

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Skills

Computer and Software Skills

- R and RStudio
    - shinyApp package (format R scripts into a website user interface)
    - Seurat package (analyze and generate visualizations for single-cell RNA sequencing data and spatial transcriptomics data)
- Loupe Browser (spatial transcriptomics), Trailmaker (snRNAseq)
- Data management and organization
    - Automated data management system developed through shinyApp
- Microsoft 365
- Notion Productivity Software
- Adobe Creative Cloud
    - Adobe Illustrator
- 3D printing
    - Fusion CAD software
    - Ultimaker Cura
- Video Editing
    - Adobe Premiere Pro
    - Davinci Resolve

Laboratory Skills

- Analysis of gene function
    - Bulk RNA-seq data
    - Spatial transcriptomic data
    - Single-nucleus RNA-seq data
- Fin amputation and tissue processing
- Alphafold2 protein structure generation and analysis
- Tissue sample freezing and cryostat sectioning
- Histological staining (Hematoxylin & Eosin)
- DNA extraction
- HCR-fish (tissue sections on slides and whole mount)
- Fluorescent microscopy and imaging
- Screening transgenic zebrafish for mCherry and GFP expression
- Sperm cryopreservation using liquid nitrogen and 3D printed freezing devices
- Lethal and non-lethal sperm extraction in salamanders
- Light microscopy, Fluorescent microscopy
- Operation of a handheld ultrasound
- Aquatic animal husbandry and health evaluation (axolotls, zebrafish, African-clawed frog, West-African lungfish, Senegal bichir)

Certifications

August 2025

CITI Program - Basic Online Training in Responsible Conduct of Research (RCR) certificate

LSU EHS - Basic Biosafety certificate

LSU EHS - Basic Lab Safety certificate

Affiliations

August 2025-August 2026

Society of Systematic Biologists - *Member*

February 2022-Present

National Society of Leadership and Success - *Inducted Member*

References

Dr. Igor Schneider - *Principal Investigator, Louisiana State University*

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Dr. Ana Lucia Salgado - *LAGNiAppE Program Coordinator, Louisiana State University*

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Dr. Emily Kane - *LAGNiAppE Program Co-mentor, University of Louisiana Lafayette*

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Nicholas Coxe - *Research Associate, Aquatic Germplasm and Genetic Resources Center*

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