

Scaling up eDNA Surveillance for Aquatic Invasive Species in the Southeast U.S.A.

Jessica Rieder, Ph.D.

Research Fellow IV & Principal Investigator

Auburn University

Aquatic Conservation & Molecular Ecology (ACME) Lab

MOU Agreement with U.S.F.W.S. (Warm Springs, GA)



Aquatic Conservation & Molecular Ecology (ACME) Lab

+1 NOW HIRING

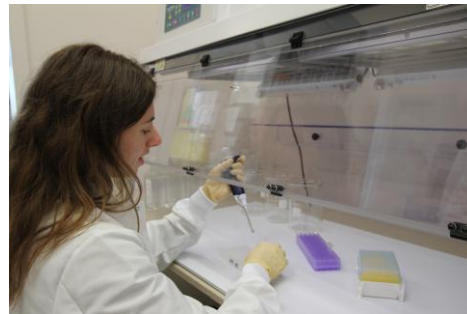
1

Research Fellow IV & PI



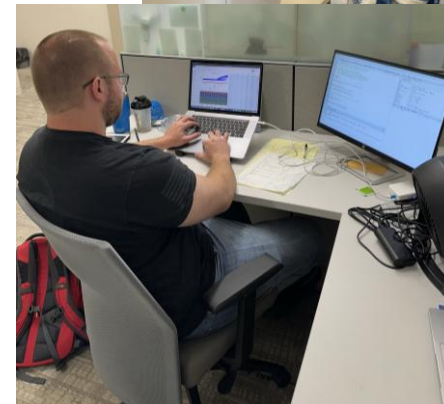
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Graduate Research Assistants



2

Molecular Lab
Network (MLN) Staff



2

Research Scientists



NOW HIRING



Infrastructure & Capabilities

Contamination-controlled workflows and field-to-bench capacity for eDNA processing



Pre-amplification lab
Contamination-controlled clean room workstations

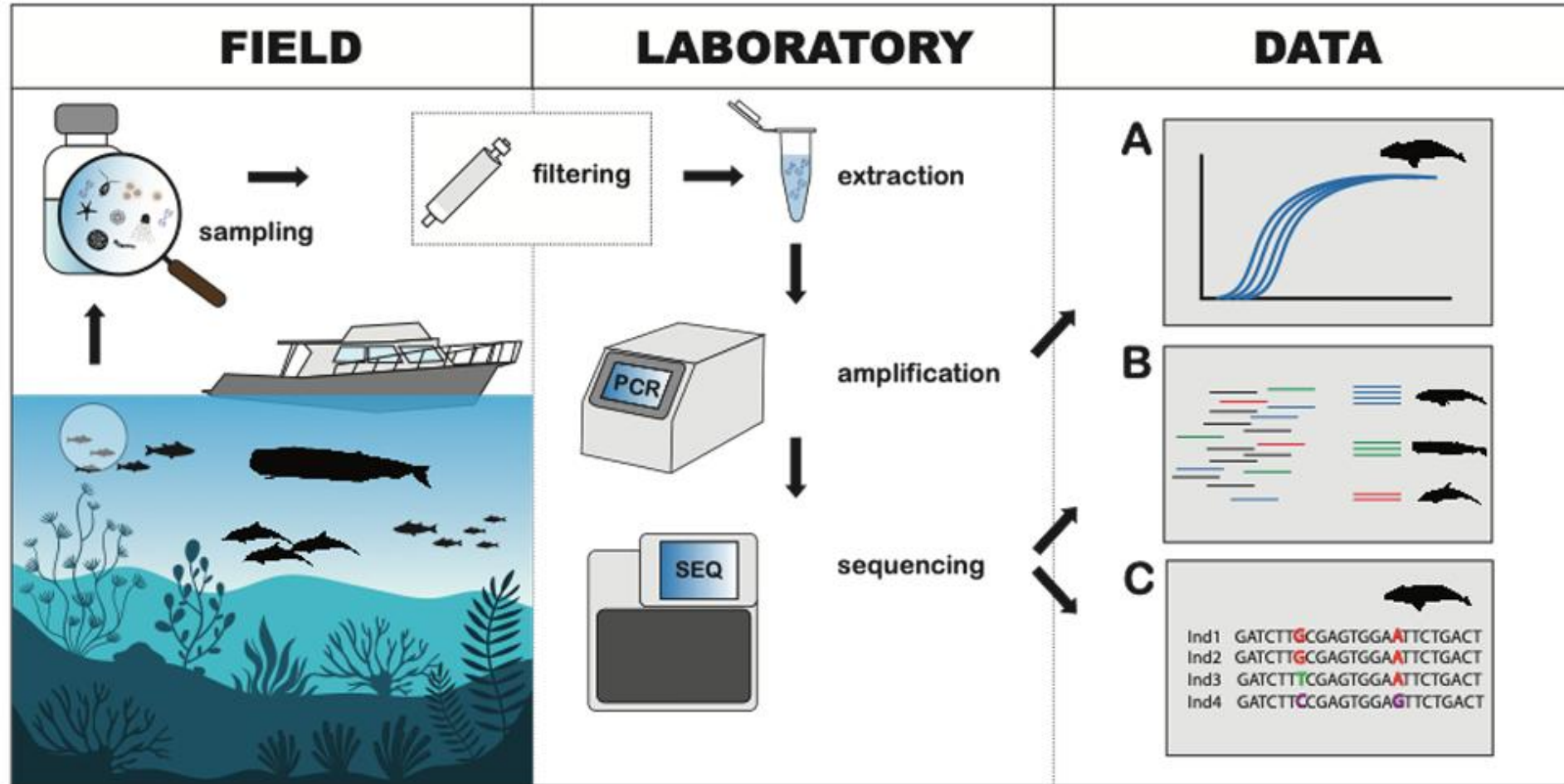


Amplification & Post-amplification lab
Extraction, qPCR & sequencing instrumentation



eDNA Sampling Equipment
Smith-Root eDNA backpack samplers

What is environmental DNA?

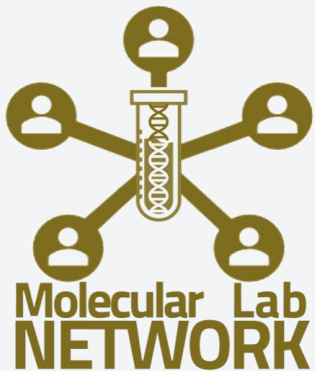


Székely et al. (2022)

Research & Partners

1

Molecular Lab Network



2

**U.S. Fish and Wildlife
Service**



3

**Aquatic Animal Health
eDNA/eRNA &
transcriptomics**



4

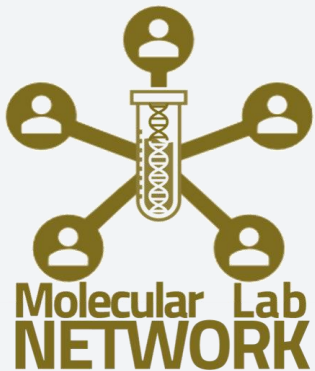
**Fee for Service
(with consulting help)**

**Could
be
YOU**

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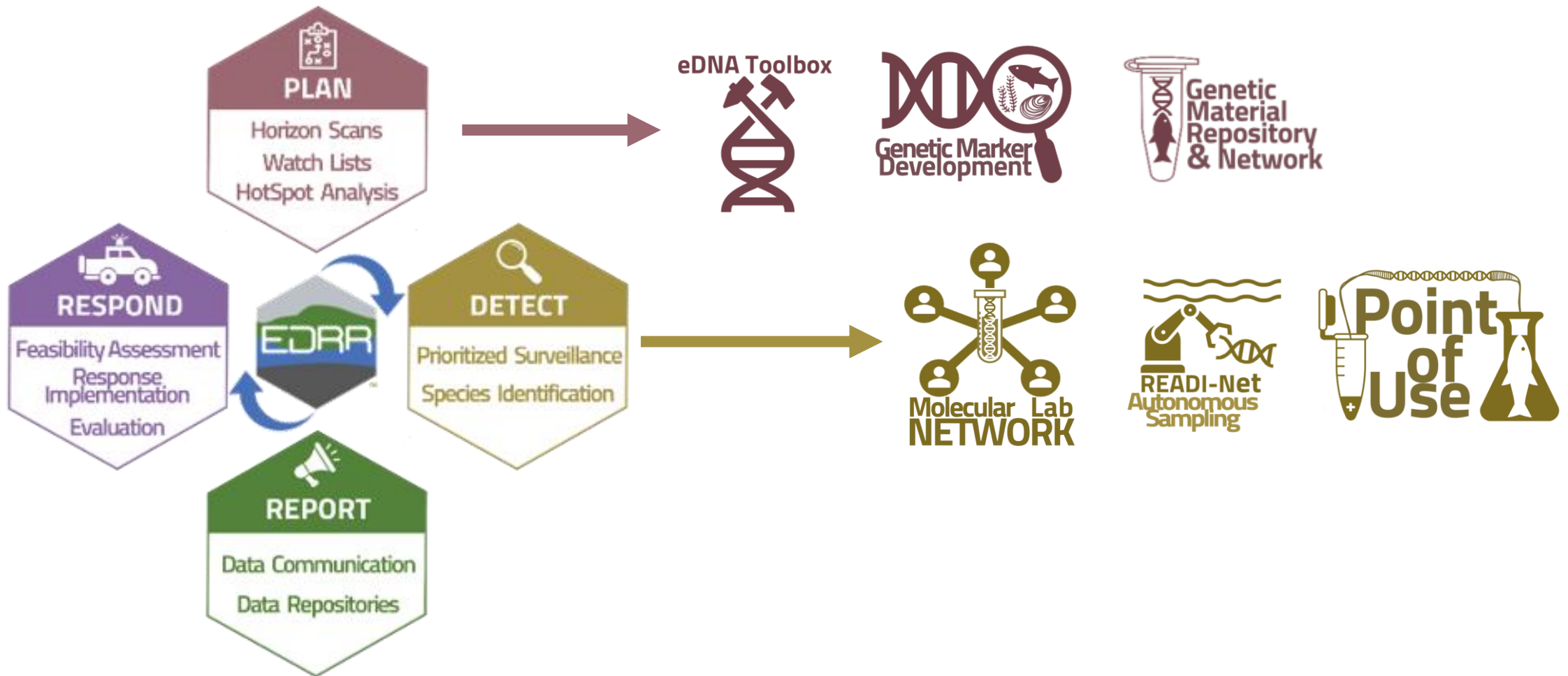


4

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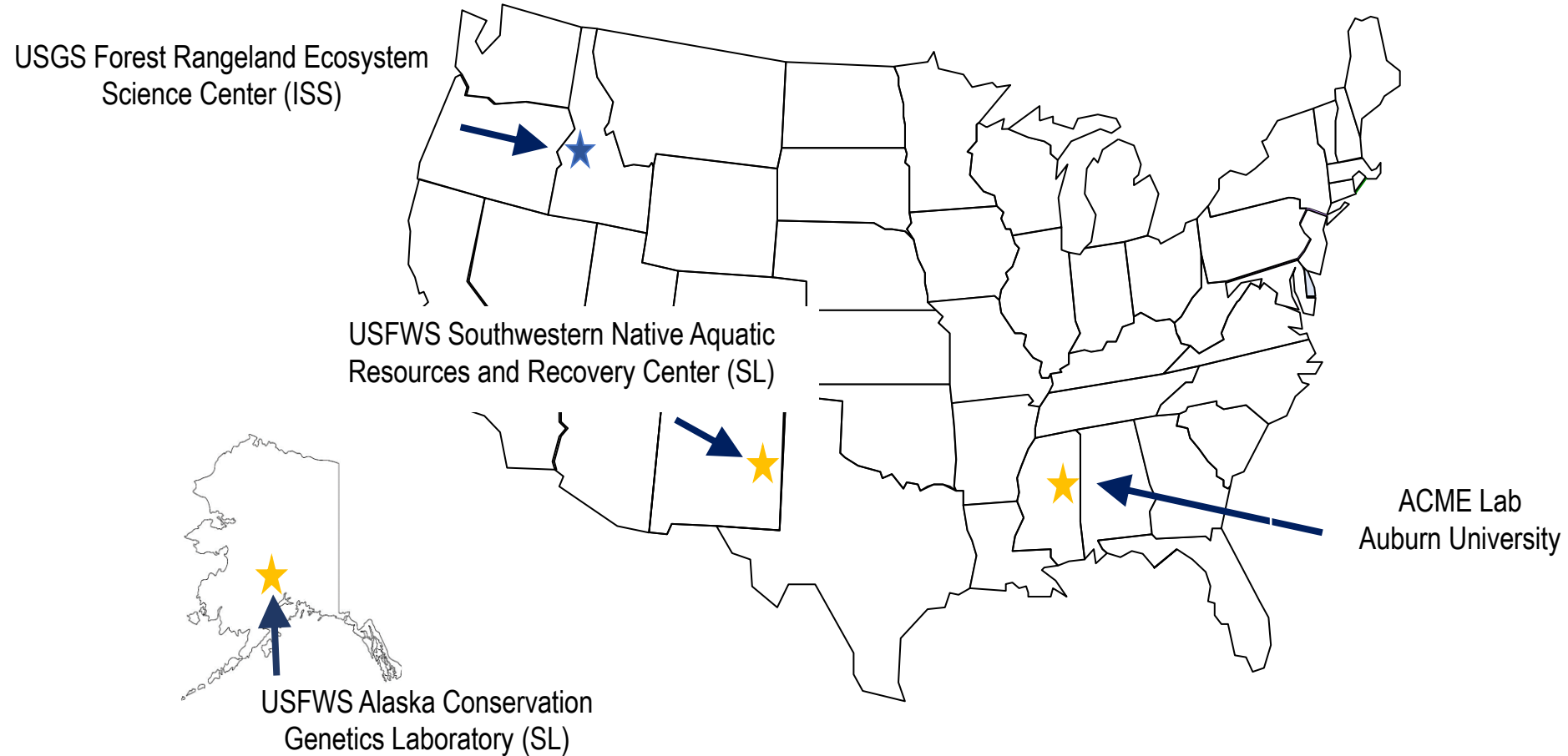
**Could
be
YOU**

Early Detection and Rapid Response Framework (DOI)



INVASIVE SPECIES MONITORING AT A NATIONWIDE SCALE

Participating Labs in the Molecular Lab Network (MLN)



INVASIVE SPECIES MONITORING AT A NATIONWIDE SCALE

Aims of the MLN



Standardized field and lab protocols



Training events & materials



Validated qPCR markers



Support partners (equipment, study plan design, and data analysis)

MLN Pilot Studies with Partners



MLN Sequencing Approach: Quantitative PCR (qPCR)

STRENGTHS

- Highly sensitive method
- Highly specific
- Quick results

NUMBER OF TARGETS PER SAMPLE

5 ASSAYS PER SAMPLE

Multiple assays run in parallel per sample.

eDNA Sampling



qPCR Amplification



Data Analysis

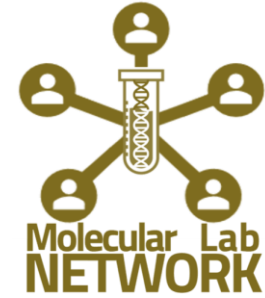
Assay Development Pipeline



Lamar, PA
La Crosse, WI



Boise, ID



Prioritize



Validate
(Specificity + LOD)



Cross-Validate



Deploy

MLN Validated Assays

- **Northern Snakehead**

Channa argus

- **Northern Pike**

Esox lucius

- **Quagga Mussel**

Dreissena bugensis



- **Brown Trout**

Salmo trutta

- **Walleye**

Sander vitreus

- **Silver Carp**

Hypophthalmichthys molitrix



- **New Zealand Mudsnail**

Potamopyrgus antipodarum

- **Zebra Mussel**

Dreissena polymorpha

- **Bighead Carp**

Hypophthalmichthys nobilis



Assays in Development

Asian Swamp Eel

Monopterus albus



Pond Loach

*Misgurnus
anguillicaudatus*



Prussian Carp

Carassius gibelio



Red Shiner

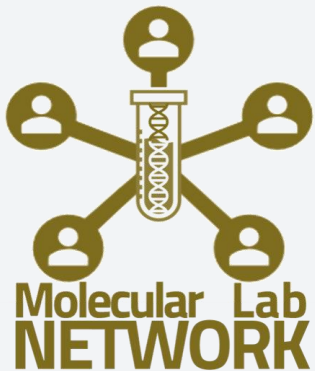
Cyprinella lutrensis



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Aquatic Animal Health
*(eDNA/eRNA &
transcriptomics)*



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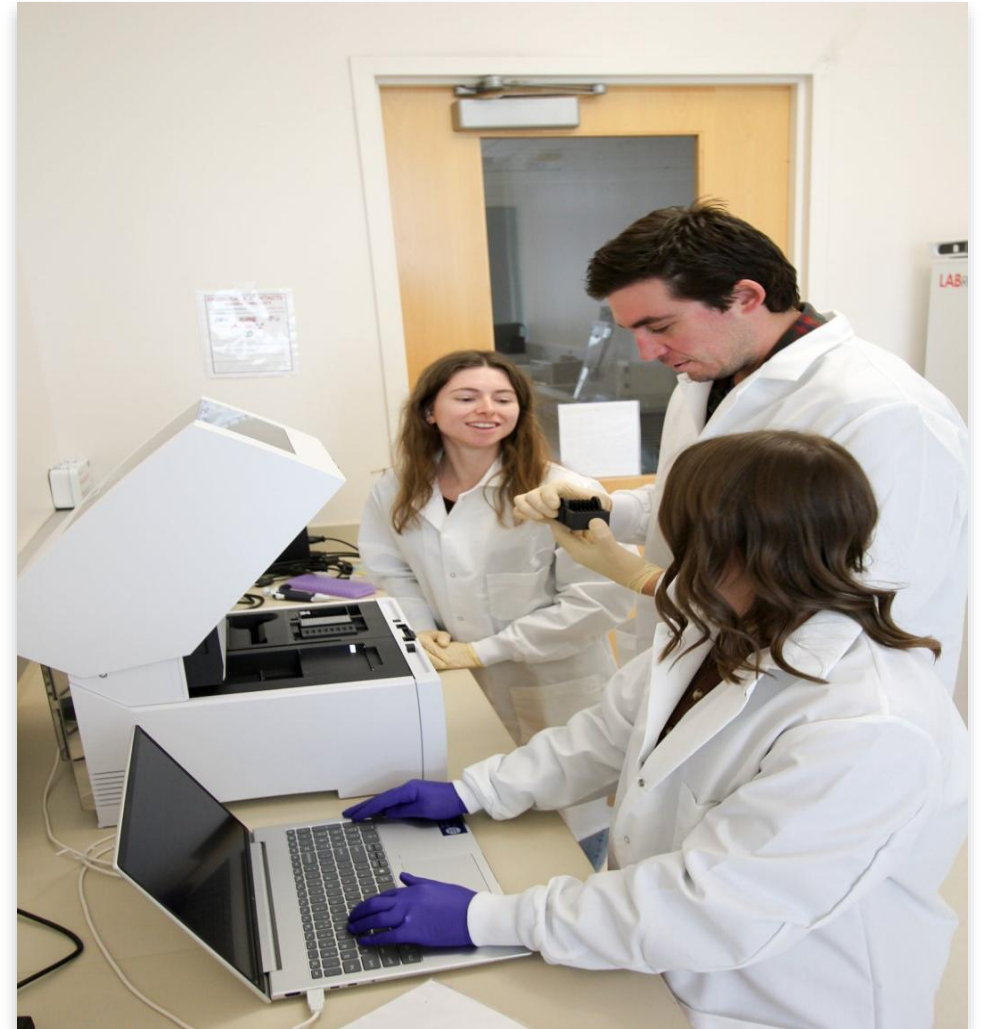
Assay Development for Endangered Species

In addition to the MLN's invasive-species mission, ACME Lab's Cooperative Agreement with USFWS extends eDNA services for detecting endangered and at-risk species across the Southeast.

Alabama Pearlshell Mussel (metabarcoding)

Trispot and Slackwater Darter (qPCR)

Alabama Spring Pygmy Sunfish (qPCR / ddPCR)



Growing Our Capacity

*Coming
Soon*



Partner With Us

Have an eDNA project in mind? The ACME lab is here to help **YOU!**



AUBURN

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jrieder@auburn.edu