

ABEH-A 501, Techniques in Reproductive Diversity Fall 2022

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Background and Objectives: This course is a core part of the curriculum of the Common Themes in Reproductive Diversity training program that has been supported by a training grant from the National Institute of Child Health and Human Development (NICHD). The goal of the training grant is to advance understanding of reproductive mechanisms and behavior (<https://ctrd.indiana.edu/>). The goal of this course is to introduce students to methods from diverse fields and to enable them to integrate some of those methods into their own research related to the themes of the training grant.

The course faculty are almost all affiliated with the Center for the Integrative Study of Animal Behavior (CISAB) and conduct research in fields of behavioral neuroscience; bioengineering; reproduction and development; sex and sex differences; maternal effects; immune function; primate conservation; evo-devo, evolutionary plasticity and evolution of novel phenotypes; sexual behavior; genomics, and more: <https://ctrd.indiana.edu/who-we-are/>.

In this course you should plan to engage with the instructors and your classmates both to fully understand the techniques being taught and to consider how you might transfer the techniques you learn to your own model system.

Format

- The class will typically meet twice per week: Tuesdays, 9:30-10:45 am and Thursdays 9:30 am – 12:30 pm. Note that the schedule may change during some weeks, depending on scheduling constraints of the facilities used for the techniques and/or the schedules of the guest instructors. You will need to be flexible and accommodate the schedule adjustments.
- In the Tuesday class sessions, guest instructors will give a lecture to introduce techniques and the principles behind them. The Thursday class sessions will typically involve hands-on demonstrations and practical experience with the techniques.
- The Tuesday class will usually meet at CISAB. The location of the Thursday class will change; pay attention to announcements on Canvas and/or email messages from the guest instructors.
- Some labs will run past the scheduled time and/or require that you come in at other times. You will need to be flexible and commit to coming in for extra time if you are to get full benefit.
- **Changes to the schedule or venue for class sessions will be announced via Canvas.**
- At the end of the semester, you will be required to submit a research proposal that incorporates two or more techniques taught in the class.

Expectations of students

- To participate fully, be prepared, be present, have fun. Inform the course coordinators if you must miss class sessions, but the expectation is that you will be fully engaged every week.
- To engage the guest instructors and other students with questions and ideas.
- To complete assignments as made by the various faculty participants. The faculty are free to design homework, analytical problem, whatever. Some probably will and some may not.

Research Proposal

Your proposal should include a brief (~1-2 page) background section, including a statement of the research problem/question; an experimental plan (2-3 pages) describing 1-2 specific aims and how those aims will be addressed using techniques learned in the course; and a brief description of interpretation of anticipated results. The proposal should **employ at least two of the techniques** you will learn this semester, ideally more. Please choose techniques that are not ones regularly used in your research group. Stretch yourself.

Proposals will be graded on the quality of the writing (structure, succinctness, clarity, grammar, 25%), clear background and statement of the research question (25%), soundness/logic of the experimental design and interpretation (25%), and incorporation and clear description of at least two techniques from the course (25%).

Grades

30% of your course grade will be based on attendance, engagement, and participation in the course techniques as well as completion of any work assigned by the guest instructors
70% of your course grade will be based on your research proposal.

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Schedule of Topics

August 23-25: No meeting

Aug. 30-Sept. 1: Course Introduction (8/30 only): Hurley, Sengelaub, Smith, Demas

Sept 6-8: Ehren Newman: Optogenetics

Sept 13-15: Greg Lewis: Heart rate measurements

Sept 20-22: Ellen Ketterson/ Sarah Wanamaker: Collecting blood samples from wild birds

Sept 27-29: Greg Demas: Quantifying hormone concentrations

Oct 4-6: Dale Sengelaub/Cara Wellman: Stereology and 3D dendritic reconstruction

Oct 11-13: No class meeting - FALL BREAK

Oct 18-20: Armin Moczek: Functional and comparative analysis of candidate genes

Oct 25-27: Laura Hurley: Measuring brainwaves

Nov 1-3: Erik Ragsdale: Functional genetics in non-model systems

Nov 8-10: Cris Ledon-Rettig: Real-time PCR

Nov 15-17: Troy Smith: *In vitro* electrophysiology

Nov 22-24: No class meeting - THANKSGIVING

Nov 29-Dec 1: Justin Wood: Virtual environments

Dec 6-8: Mike Wasserman: Phytoestrogen assays