Phenotypic Plasticity Syllabus

Meets: MWF 12:55pm-1:45pm DISC Bot 0404; F 12:55-1:45 (DISC 404/BRGN/UA Front Lawn)
Lab: F 12:55-1:45pm, + guided independent research project
Instructor: Dr. Erica Westerman (ewesterm@uark.edu)
Office: SCEN 732 Office hours: Tues 3:30-4:30pm, Wed 2-3pm
TA: Jonas Amenyo (jamenyo@uark.edu)

Course Slack Account: https://phenotypicpla-dl42332.slack.com
A quick and easy way to communicate with Jonas (TA) and I, as well as with groupmates and classmates. Particularly useful for virtual problem solving.

Course Goals: Students will learn the molecular mechanisms, causes, and consequences of phenotypic plasticity, including an introduction to the theory underlying such concepts as seasonal polyphenisms, alternative developmental trajectories, and genetic accommodation. Students will learn how to conduct developmental plasticity research, enhance their ability to critically read scientific literature, and improve their written and spoken communication skills.

Learning Outcomes: Students will learn how to conduct developmental plasticity research, enhance their ability to critically read scientific literature, and improve their written and spoken communication skills. Students will learn how to work in groups to design, conduct, analyze, and present developmental plasticity research. They will also learn the basics of R programing.

Additional Learning Outcomes for Graduate Students: In addition to the above Learning Outcomes, graduate students will learn how to write a GRFP style 2-page grant proposal addressing questions associated with phenotypic plasticity. This proposal will utilize at least 2 techniques, and will include at least 1 conceptual figure.

Main Forms of Assessment:
4 lecture-based essay question answers (16%).
1 final exam (14%).
Discussion Leader (DL) for one Paper Discussion (15%).
Discussion Posts for 5 Paper Discussions (5%).
Participation in Paper Discussions (3%).
Oral presentation of independent research project and class butterfly data (rough draft presentation, final presentation, participation during question portions of research symposium) (15%).
Written report of independent research project, focusing on 3 sections (Hypotheses & Possible Outcomes, Results, Discussion Section rough draft, Discussion Section final draft) (20%).
Attendance (4%: 2% lecture, 2% lab).
Data collection for one class-wide experiment (3%).
Hypotheses and Possible Outcomes for caterpillar class-wide experiment (3%)
Introductory video (3%).

There is one grade for the course and lab. Note that there are 101% possible☺

For graduate students: GRFP style 2-page grant proposal addressing questions associated with phenotypic plasticity. This proposal will utilize at least 2 techniques, and will include at least 1 conceptual figure.
Graduate students will meet with Dr. Westerman outside of class and propose questions by the end of February (4%);
a rough draft will be due the end of March (6%);
and a final draft due the end of April (6%).
(16% total, this replaces the 4 lecture-based essay question answers for graduate students).

Attendance Considerations for Illness/Emergencies: This year we are conducting Phenotypic Plasticity lecture and lab in-person, but are prepared to flexibly adjust in response to adverse weather conditions, and will have temporary zoom available for those who are sick (COVID, flu, etc), or having an emergency. See "Notes about attendance" below for details on my virtual attendance policy. Empathy, patience, kindness, and communication are keys for success, both with others and with oneself.

Please let me know if a situation arises that you feel may substantially impact your ability to learn or participate in class. There are many things that fit in this category, it is not limited to illness. I am committed to working with you through these situations, and am acutely aware of how sudden, severe, and difficult COVID-19 (or other unexpected health issues) can be.

Notes about attendance:
Monday/Wednesday attendance: While all Monday Topic Introductions and Wednesday Paper Discussions will be recorded, in person/live is best! I will take in-person attendance, and if you are attending virtually, say something in the chat (which I will download) OR send me a question (e-mail or Slack) on the class material before the start of the next class (only works for 5 class periods). If you are sick or need to attend class virtually, that is 100% okay, for up to 5 MW classes (barring extreme circumstances). I now have many years experience fielding questions in-person and virtually simultaneously, so am sure I can make class an engaging experience for those attending virtually and in person.

Friday attendance: The first Friday class of the semester will be in person and simultaneously live streamed and recorded. However, after the first Friday lab, we will be doing a combination of hands-on activities, outside activities, and group activities that cannot be live streamed, so in-person attendance is required. We have back-up plans for those who are sick, but in general lab is in-person only. Unexcused absences will have a negative effect on course grades.

Text: Scientific Papers will be read and discussed weekly, papers will be posted on Blackboard at least two weeks before in-class discussion.

General Course Format: M Topic Introduction, W student led paper discussion, F lab experiments

Lecture Essay Questions are due Midnight on the Sunday after the Assigned Lecture

Schedule

Week 1 (1/13-1/17): **M** What is Phenotypic Plasticity **W** Overview of syllabus **F** How we study plasticity, Intro to Lab
Reading: R Chapter 1

Week 2 (1/20-1/24): **M** MLK Day, no class **W** Polyphenisms **F** Experimental design
Reading: 2 papers **Intro Video Due Wed, Jan 22**

Week 3 (1/27-1/31): **M** Developmental symbionts & disruptors **W** Paper Discussion: **F** Class Experiment/ Intro to R
Reading: Papers

Week 4 (2/3-2/7): **M** Plasticity of cell fates and cancer **W** Paper Discussion: **F** Measure Traits/Brainstorm Treatments
Reading: Papers

Week 5 (2/10-2/14): **M** Temperature Sex Determination (Experimental Treatments Due by Midnight) **W** Paper Discussion: **F** Start Experimental Treatments
Rough Draft of Hypotheses and Possible Outcomes Due 2/14 Midnight
Reading: Papers

Week 6 (2/17-2/21): **M** Predictive Adaptive Responses (Guest Lecturer: Dr. Dmitry Kutcherov) **W** R Tutorial II/Marine Observation Dets. **F** Check on Plants, Paper Discussion: (Guest Discussion mentor: Dr. Dmitry Kutcherov)
Reading: Papers

Week 7 (2/24-2/28): **M** Plasticity and Climate Change **W** Paper Discussion **F** Check on Plants/R Tutorial III
Marine Observation Data Due Feb 28th Midnight
Reading: Papers

Week 8 (3/3-3/7): **M** Molecular Mechanisms of Plasticity **W** Paper Discussion **F** Check on Plants/R tutorial IV
Revised Hypotheses and Possible Outcomes Due 3/7 Midnight
Reading: Papers

Week 9 (3/10-3/14): **M** Gene Expression Plasticity **W** Paper Discussion **F** Measure plants, VOTE! Jonas starts eggs/caterpillars on plants in chosen treatment
Data table for morphological measurements Due
Reading: Papers

Week 10 (3/17-3/21): **M** Sensory Plasticity **W** Paper Discussion: **F** Analyze Plant Data, Make Predictions for caterpillar experiment
Caterpillar Experiment Hypotheses and Possible Outcomes Due 3/21 Midnight

Reading: Papers

SPRING BREAK: 3/24-3/28

Week 11 (3/31-4/4): **M** Data Interpretation **W** How to Write Discussion Sections **F** Measure/weigh pupae/caterpillars (at BGRN!)
Reading: Papers

Week 12 (4/7-4/11): **M** Behavioral Plasticity **W** Paper Discussion **F** Annual butterfly behavior data collection (meet in front of Old Main)
Rough Results and Discussion Section due 4/11 midnight
Reading: Papers

Week 13 (4/15-4/19): **M** Plasticity and Speciation **W** Paper Discussion **F** Butterfly lab- measure traits (at BGRN!)
Reading: Papers

Week 14 (4/22-4/26): **M** Genetic Accommodation & Assimilation **W** Paper Discussion **F** Analyze results/talk prep
Practice presentation
Reading: Papers

Week 15 (4/29-5/2): **M W** Group Presentations of Lab EX results/cross-trophic effects

Final Draft of Possible Outcomes, Results, and Discussion Section Due Monday May 5th.
Final Exam: TBD (probably Monday, May 5, 12:45pm-2:45pm)

University of Arkansas Academic Honesty Statement (from https://honesty.uark.edu/faculty/index.php)

As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail.
Each University of Arkansas student is required to be familiar with and abide by the University's 'Academic Integrity Policy' at honesty.uark.edu/policy. Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.

Statement Regarding AI

Artificial Intelligence is, at its core, an algorithm written by programmers (people) that uses information on the internet (produced by people) to answer questions in a human sounding way. Since it is designed by people, it (at least in all versions available to date) has the biases of those who wrote it, for better or worse. Since it uses information provided by people on the internet to generate answers, and doesn't, as of yet, differentiate content produced by experts and content produced by non-experts, and builds a "best guess" answer, content provided by non-experts can swamp out content provided by experts, as there are, by definition, more non-experts than experts on the internet. This is particularly true when dealing with topics such as Phenotypic Plasticity. Thus, it is a good idea to take any information you get from AI for this class with a hefty grain of salt. Current versions of AI also have an interesting habit of making up sources and "hallucinating" (programmer speak for making things up). In addition, there are a number of pending copywrite issues associated with AI content. Please keep this in mind when writing your papers. Also, remember that I will be reading multiple drafts of your paper and giving you feedback, which you will need to address in subsequent drafts.

Statement Regarding Note Selling and Distributing

There are companies that will try to lure you into selling the notes you take in this class. Don't let these companies take advantage of you. Selling my notes to any commercial service I will consider a violation of my intellectual property rights and/or copyright law as well as a violation of the U of A's academic integrity policy. Continued enrollment in this class signifies intent to abide by the policy. Any violation will be reported to the Office of Academic Initiatives and Integrity.