COURSE: Spring 2020, FISH 7350, Meta-analysis, 3 credit hours

LECTURE: Two days TBD, 1.25 hrs/class TBD, Swingle 301

OFFICE HOURS: Fridays, 8-1030am; Also, available by appointment, as needed.

REQUIRED PREREQUISITES: Advanced graduate students, postdocs, faculty

INSTRUCTOR: Dr. Alan Wilson, Swingle 321, wilson@auburn.edu, 334-246-1120

ZOOM: We will use Zoom for remote course participants. You can access the Zoom room here - https://auburn.zoom.us/j/9922610946

FIELD OF STUDY:
Meta-analysis is a quantitative approach for synthesizing results from diverse research studies that address a similar hypothesis. Effect sizes calculated from individual studies are combined to elucidate general patterns across studies. Like most approaches, meta-analysis has limitations (e.g., file drawer problem, dealing with varying publication quality). However, the technique can be a powerful option for identifying patterns in disciplines where the availability of large, under-analyzed datasets is common, such as ecology, psychology, medicine, and education.

COURSE OBJECTIVES & STUDENT LEARNING PHILOSOPHY:
The course objectives represent a variety of tasks and skills that I expect students to have developed and mastered by the end of the course. Through participating in this course, you will (1) practice and develop your critical thinking skills (through in-class group discussions and presentations), (2) learn how to read and interpret the scientific literature, (3) broaden your understanding of meta-analysis, and (4) conduct your own meta-analysis.

REQUIRED MATERIALS (PROVIDED BY INSTRUCTOR AND STUDENTS VIA CANVAS):
(1) Articles from the peer-reviewed literature (see complete list at end of syllabus)
(2) R software (download it here https://www.r-project.org/)

GRADING:
Course grades are based on each student's cumulative performance for the following assignments:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
<th>Grading scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>20</td>
<td>A = 90-100%</td>
</tr>
<tr>
<td>Paper discussion</td>
<td>25</td>
<td>B = 80-89%</td>
</tr>
<tr>
<td>Project presentation</td>
<td>25</td>
<td>C = 70-79%</td>
</tr>
<tr>
<td>Paper</td>
<td>30</td>
<td>D = 60-69%</td>
</tr>
<tr>
<td>Total points</td>
<td>100</td>
<td>F = 0-59%</td>
</tr>
</tbody>
</table>

STUDENT EXPECTATIONS:
The course grade will be based on participation in lecture, discussion leading of important papers in meta-analysis, and a final project presentation as described below:

(1) PARTICIPATION: Participation is critical to success in this course. In order to participate, you need to be at class on-time and prepared (i.e., perused readings, practice with software). Discussion is vital to an effective learning environment and participation grades will reflect involvement during classroom activities.
Student need to think about papers and lectures critically and provide thoughtful questions and comments during each lecture.

(2) **PAPER DISCUSSION:** All students will be required to lead the discussion of a series of articles from the peer-reviewed literature during at least one class period. Group members will self-assess, and the entire class will evaluate each group.

(3) **PROJECT PRESENTATION:** All students will be required to present a 10-minute lecture describing a meta-analysis that they conduct during the course. Brief 1-page outlines of the project will be due by the fifth week of the course so that I can assist with project development. The students are expected to use the primary literature as references and data sources for this presentation.

4) **PAPER:** All students will be required to submit a ~10 page paper associated with their meta-analysis project. The paper should be prepared with submission to a journal in mind. Formatting should be specific to the target journal. Students are strongly encouraged to include their data and R code. Students producing successful projects will be strongly encouraged and supported to submit their papers to a peer-reviewed journal.

**FEEDBACK & EVALUATION:**
This course is for you to learn important fundamental concepts and ideas on which to build your understanding of meta-analysis. Course evaluations will be completed by students in the middle and at the end of the semester so that course changes can be made to enhance the learning experience for this class and future classes. Students are encouraged to use an anonymous online survey form as needed - [https://goo.gl/forms/ut92HzIhHOUtfxm62](https://goo.gl/forms/ut92HzIhHOUtfxm62) Finally, students are always welcome to schedule a meeting with me to talk more about topics discussed in class.

**COURSE CHANGES:**
Although I expect to cover all the topics described in the syllabus, course changes will likely occur - especially based on feedback from the students. Consequently, I reserve the right to modify the course to enhance the learning experience where I deem appropriate. Course changes will be described verbally during class and/or in writing via email and/or handouts.

**ACADEMIC HONESTY:**
The Auburn University Student Academic Honesty Code (available at [https://sites.auburn.edu/admin/universitypolicies/Policies/AcademicHonestyCode.pdf](https://sites.auburn.edu/admin/universitypolicies/Policies/AcademicHonestyCode.pdf)) clearly defines the university’s honesty code. I expect all students to conduct themselves in my class with this Code in mind.

**ACCOMMODATIONS FOR DISABILITIES:**
If you have a disability and/or a special need that requires accommodations, please inform me immediately so that I can develop a plan to work with you and arrange an appointment with a campus disabilities counselor.
PARTICIPANT LIST

Alan Wilson <wilson@auburn.edu>
## LECTURE SCHEDULE AND ASSOCIATED READINGS (CITATIONS FOLLOW):

<table>
<thead>
<tr>
<th>Day</th>
<th>Lecture topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1</strong></td>
<td>Introduction to meta-analysis; historical overview</td>
</tr>
<tr>
<td>Jan 8</td>
<td>Discussion leader – Alan</td>
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<tr>
<td><strong>Week 2</strong></td>
<td>Limitations of meta-analysis</td>
</tr>
<tr>
<td>Jan 13</td>
<td>Discussion leader – Alan</td>
</tr>
<tr>
<td></td>
<td>Glass 1976; Gurevitch et al. 2018, Vrieze 2018</td>
</tr>
<tr>
<td>Jan 15</td>
<td>Meta-analysis examples</td>
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<tr>
<td></td>
<td>Discussion leaders – 2 students</td>
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<tr>
<td></td>
<td>Bailar 1997; Guskin 1984; Arnqvist and Wooster 1995</td>
</tr>
<tr>
<td><strong>Week 3</strong></td>
<td>MLK HOLIDAY – NO CLASS</td>
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<tr>
<td>Jan 20</td>
<td>Where to find data?  How to choose data?</td>
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<tr>
<td></td>
<td>Discussion leader – Alan (ImageJ intro)</td>
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<tr>
<td></td>
<td>Install this program on laptop – ImageJ and BRING LAPTOP TO CLASS</td>
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<tr>
<td></td>
<td>Englund et al. 1999; Bown and Sutton 2010</td>
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<tr>
<td><strong>Week 4</strong></td>
<td>How to choose an effect size metric?  How to calculate an effect size?</td>
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<tr>
<td>Jan 27</td>
<td>Discussion leader – Alan (excel and effect sizes intros; upload data into R)</td>
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<tr>
<td></td>
<td>BRING LAPTOP TO CLASS; Install MS Excel and R on your laptop</td>
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<td></td>
<td>Gurevitch and Hedges 1999; Osenberg et al. 1999</td>
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<tr>
<td>Jan 29</td>
<td>Meta-analysis examples</td>
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<tr>
<td></td>
<td>Discussion leaders – 2 students</td>
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<tr>
<td></td>
<td>Breaugh (2003) and look over the pdf titled &quot;conversions&quot; in the week four reading folder; please bring two or three articles from your field that you are familiar with to class for in class activity</td>
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<tr>
<td><strong>Week 5</strong></td>
<td>Standard statistics and meta-analysis; (ir)relevance of null hypotheses &amp; P-values</td>
</tr>
<tr>
<td>Feb 3</td>
<td>Discussion leader – Alan (metafor intro)</td>
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<tr>
<td></td>
<td>BRING LAPTOP TO CLASS; Install this program on laptop – R (with metafor)</td>
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<tr>
<td></td>
<td>Borenstein et al. 2009 (chapter 16)</td>
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<tr>
<td>Feb 5</td>
<td>Brief project descriptions (1 minute with 1 PowerPoint slide)</td>
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<td></td>
<td>Presenters – all students</td>
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<tr>
<td></td>
<td><em>Student project outlines due and brief intro</em></td>
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<tr>
<td><strong>Week 6</strong></td>
<td>Meta-analysis examples</td>
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<tr>
<td>Feb 10</td>
<td>Discussion leaders – 2 students</td>
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<tr>
<td></td>
<td>Readings TBD</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
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</tbody>
</table>
| Feb 12     | In class example meta-analysis                                       | Discussion leader – Alan  
**BRING LAPTOP TO CLASS**  
Nakagawa et al. 2017 |
| Week 7     | Advice from past students who successfully published their meta-analysis project |                                                                                                                                           |
| Feb 17     | Discussion leaders – 3 past students lead discussion                  |                                                                                                                                           |
|            | **Readings TBD**                                                     |                                                                                                                                           |
| Feb 19     | Meta-analysis examples                                               | Discussion leaders – 2 students  
**Readings TBD** |
| Week 8     | Introduction to R for Meta-Analysis and advanced meta-analysis statistics | Discussion leader – Ash Abebe  
Normand 1999; van Houwelingen et al. 2002, Dobson et al. 2018  
*midterm course evaluation* |
| Feb 24     | **Readings TBD**                                                     |                                                                                                                                           |
| Feb 26     | Meta-analysis examples                                               | Discussion leaders – 2 students  
**Readings TBD** |
| Week 9     | **Readings TBD**                                                     |                                                                                                                                           |
| Mar 2      | Meta-analysis examples                                               | Discussion leaders – 2 students  
**Readings TBD** |
| Mar 4      | Meta-analysis examples                                               | Discussion leaders – 2 students  
**Readings TBD** |
| Week 10    | **SPRING BREAK - NO CLASS – HAVE FUN AND BE CAREFUL**                 |                                                                                                                                           |
| Week 11    | Tips for preparing a manuscript for a journal                        | Discussion leader – Alan  
Borja 2014; Gewin 2018; Hsieh 2018 and choose and appropriate journal, consider author guidelines, and develop a manuscript outline and draft manuscript |
| Mar 16     | **Student presentations (10 minute PowerPoint; recorded)**           | Presenters – 7 students  
**Readings TBD** |
| Week 12 | Mar 23 | Peer-review of manuscripts  
|         |       | BRING LAPTOP TO CLASS  
| Mar 25 | Student presentations (10 minute PowerPoint; recorded)  
|        | Presenters – 7 students  

| Week 13 | Mar 30 | Peer-review of manuscripts  
|         |       | BRING LAPTOP TO CLASS  
| Apr 1  | Student presentations (10 minute PowerPoint; recorded)  
|        | Presenters – 7 students  

| Week 14 | Apr 6  | Peer-review of manuscripts  
|         |       | BRING LAPTOP TO CLASS  
| Apr 8  | Meta-analysis examples  
|        | Discussion leaders – 2 students  
|        | Readings TBD  

| Week 15 | Apr 13 | Peer-review of manuscripts  
|         |       | BRING LAPTOP TO CLASS  
| Apr 15 | Meta-analysis examples  
|        | Discussion leaders – 2 students  
|        | Readings TBD  

| Week 16 | Apr 20 | Peer-review of manuscripts  
|         |       | BRING LAPTOP TO CLASS  
| Apr 22 | Meta-analysis examples  
|        | Discussion leaders – 2 students  
|        | Readings TBD  
|        | Final paper due; *final course evaluation*  

EXAMPLE READINGS (ALSO GO LOOK IN “READINGS” FOLDER IN CANVAS):


Hillebrand, H., and J. Gurevitch. 2014. Meta-analysis results are unlikely to be biased by differences in variance and replication between ecological lab and field studies. Oikos 123:794-799.


(student authors in bold; Google Scholar citations, where available, as of 5 June 2019)

   https://academic.oup.com/mbe/article/36/8/1624/5488200
   (Citations = 0) (Impact factor = 14.797)

   https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0216794
   (Citations = 0) (Impact factor = 2.776)

   (This paper has generated significant press - learn more at https://royalsociety.altmetric.com/details/59128063)
   (Citations = 0) (Impact factor = 3.323)

   (Citations = 0) (Impact factor = N/A)

   (Citations = 0) (Impact factor = 8.699)

   (Citations = 0) (Impact factor = 1.437)

   (Citations = 2) (Impact factor = 3.022)

   (Citations = 0) (Impact factor = 2.400)
http://rspb.royalsocietypublishing.org/content/285/1891/20182042  
(Citations = 0) (Impact factor = 4.304)

http://www.mdpi.com/2071-1050/10/6/1784  
(Citations = 1) (Impact factor = 2.592)

http://rdcu.be/EiCj  
(Citations = 8) (Impact factor = 11.880)

(Citations = 0) (Impact factor = N/A)

(Citations = 0) (Impact factor = 0.905)

https://doi.org/10.1093/biolinnean/blw040  
(Citations = 3) (Impact factor = 2.203)

(Citations = 9) (Impact factor = 3.468)

(Citations = 0) (Impact factor = 2.253)
(Citations = 3) (Impact factor = 1.044)

(Citations = 5) (Impact factor = 2.253)

[http://media.wix.com/ugd/c8fe6e_65448e5da9754a6c8676f179d07067d1.pdf](http://media.wix.com/ugd/c8fe6e_65448e5da9754a6c8676f179d07067d1.pdf)  
(Citations = 0) (Impact factor = N/A)

(Citations = 5) (Impact factor = 2.291)

(Citations = 5) (Impact factor = 4.451)

(Citations = 7) (Impact factor = 5.855)

(Citations = 23) (Impact factor = 5.030)

(Citations = 2) (Impact factor = 1.115)


