

## Biology 490 Senior Seminar Teeth

### Instructor information

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### Course information

When: Friday 10:00-11:40

Where: TNR 460

### **Course Description and Objectives:**

Faculty may have a variety of ideas regarding what to emphasize in a 2-credit senior seminar course. My approach is to do something different every year depending on what is current and what I'm interested in learning more about. This is the second time I've done a seminar on Teeth, and most of the papers I've selected I will be reading for the first time along with the rest of you. This means the lecture could drag on if nobody comes prepared. Each week one student will lead a paper. This should include preparing an introduction to the paper and the paper's authors, as well as any relevant background information on the topic.

This is a University General Education Program Communication in the Major course. As such, this course has the following GEP learning objectives.

*Upon completing this requirement, students will be able to:*

- Apply discipline-specific standards of oral and written communication to compose an articulate, grammatically correct, and organized presentation/piece of writing with properly documented and supported ideas, evidence, and information suitable to the topic, purpose, and audience.
- Critique their own and others' writing/oral presentations to provide effective and useful feedback to improve their communication.

### **Grading**

The format of the course will include four components. Component 1 (worth 50 points): Each week we will discuss a primary literature. Each student will be assigned a paper and will be responsible for leading the discussion. Component 2 (worth 100 points): In addition to leading a paper, each student will write a species account on an animal for Animal Diversity Web. UWSP students in my courses have written more than 250 accounts for this online encyclopedia of animals. My publication rate is somewhere around 60%, which means that 40% of students that write an account never get it published. Let's shoot for 100%. These accounts serve as a writing sample for future employment or graduate school applications. There is incentive for you to do a good job. Bring laptops or tablets if you have them as we can use a portion of the class time to work on research and writing. Online instructions can be found at [http://animaldiversity.ummz.umich.edu/teach/contributor\\_guidelines/](http://animaldiversity.ummz.umich.edu/teach/contributor_guidelines/). Component 3 will be a peer evaluation of writing. This will ensure that you are all on task to do a good job on your species accounts. This is worth 30 points. Component 4 is professionalism. I

expect students to show up and participate in class. To ensure this you will write a series of difficulty papers to demonstrate that you have read the paper for the week. Difficulty papers (see Yahnke et al. 2013) are worth 5 points each and address three basic questions. They should be written as a short paragraph and uploaded to the appropriate dropbox. If they are not uploaded prior to class you will receive zero points for the assignment.

1. What was the paper about (in a sentence or two)?
2. What didn't you understand about the paper and why do you think you found that part of the paper difficult?
3. What information (if any) could be extracted for an ADW species account, and which section would it pertain to?

### **Hints for Presenters**

Critical reading of primary literature is not an easy thing to master, and the only way to get good at it is to do it often. It is a skill that many of you will carry on into your professional careers. If you go on to graduate school, you may find yourself in a journal club with faculty and other graduate students doing exactly what we're doing in this seminar – reading and discussing current research in our field. If you work for a government agency, you will be expected to keep abreast of current research in your field of expertise, and you should be able to identify how these studies fit into your study, what are the strengths and weaknesses of the study, and how you might even improve or add to the study.

The most challenging part of reading primary literature is identifying the important points in the paper. As a presenter, it is your task to more or less summarize the paper and prioritize what should be discussed. Below is a rough sketch of how to go about this, but every paper is different so you want to keep an open mind. Summarizing can be approached by taking notes on the following points:

1. *What questions (hypotheses) are being asked in the paper? What is the paper about?* This information is typically found in the introduction.
2. *How did the authors go about answering these questions? What is the experimental design?* This is found in the methods section. The biggest problem students have is figuring out how much time and effort to spend here. The short answer is don't focus too much time here. You do want to mention what they did (modeling, field studies, lab studies) and a bit of detail regarding design and statistics. As a presenter you don't need to go into too much detail on the model or statistics. However, this may be an important area of discussion later on if you identify flaws in the methodology, so all students should do their best to understand the experimental design.
3. *What were the findings of the paper? What are the broader implications of this research?* This information is found in the results and discussion section.

To summarize the paper for the class you want to spend about 15-20 minutes. You should assume that all other students read the paper and have a copy of the paper in front of them. However, it is still beneficial to use overheads of the tables and figures you'd

like to incorporate into your summary. Many students like to prepare a powerpoint presentation to organize this information.

Leading the discussion involves preparing a list of discussion questions and topics for the rest of the class. Ideally, the class will run the discussion, because each person will have read the paper and will have written notes and questions they have regarding the paper. Nevertheless, it is on the presenter to fill in the lulls with new discussion topics. Broad topics include:

- Was the methodology appropriate for the questions being asked? How could the experimental design be improved?
- Did the conclusions follow from the data clearly? Could other conclusions be drawn from the data that the authors did not mention?
- What are the backgrounds of the authors? How could this impact the study?

*Satisfactory completion of this 490 course requires the completion of the Biology Department's comprehensive exam. **Test scores are used to compare class averages among various populations of biology majors to assess general student learning. Scores will not be made available to you nor your instructor and will have no bearing on grades.** However, your 490 grade will be withheld until the exam is taken. The exam **will take approximately 60 minutes** and will be offered two evenings later in the semester (TBD).*

Date	Paper
Jan 27 <sup>th</sup>	Introduction and assignment of papers
Feb 3 <sup>rd</sup>	Jheon et al. (2013) – From molecules to mastication: the development and evolution of teeth. Chris Yahnke
Feb 10 <sup>th</sup>	Huyseune et al. (2009) – Evolutionary and developmental origins of the vertebrate dentition. Matt Duzell
Feb 17 <sup>th</sup>	Witten et al. (2014) - Old, new and new-old concepts about the evolution of teeth. Melissa Miller
Feb 24 <sup>th</sup>	Zahradnicek et al. (2014) – The development of complex tooth shapes in reptiles. Zak Schaefer
Mar 3 <sup>rd</sup>	Williams and Kay (2001) – A comparative test of adaptive explanations for hypsodonty in ungulates and rodents. Mary Harman
Mar 10 <sup>th</sup>	Beatty et al. (2012) – Osteological associations with unique tooth development in manatees. Heather Hendricks

Mar 17 <sup>th</sup>	Nweeia et al. (2014) – Sensory ability in the narwhal tooth organ system. Mackenzie Purvis
Mar 24 <sup>th</sup>	Spring Break!!!
Mar 31 <sup>st</sup>	Bolivia – No class
April 7 <sup>th</sup>	Demere et al. (2008) – Morphological and molecular evidence in stepwise evolutionary transition from teeth to baleen in Mysticete whales. Brittany Reschke
April 14 <sup>th</sup>	Patterson et al. (2003) – Tooth breakage and dental disease as causes of carnivore-human conflicts. Megan Flanagan
April 21 <sup>st</sup>	Damasceno et al. (2012) – Bite force and encephalization in the Canidae. Alex Thompson
April 28 <sup>th</sup>	Eng et al. (2013) – Bite force and occlusal stress production in Hominin evolution. Megan Buddenhagen
May 5 <sup>th</sup>	Teaford and Ungar (2000) – Diet and the evolution of the earliest human ancestors. Caitlin Shaw