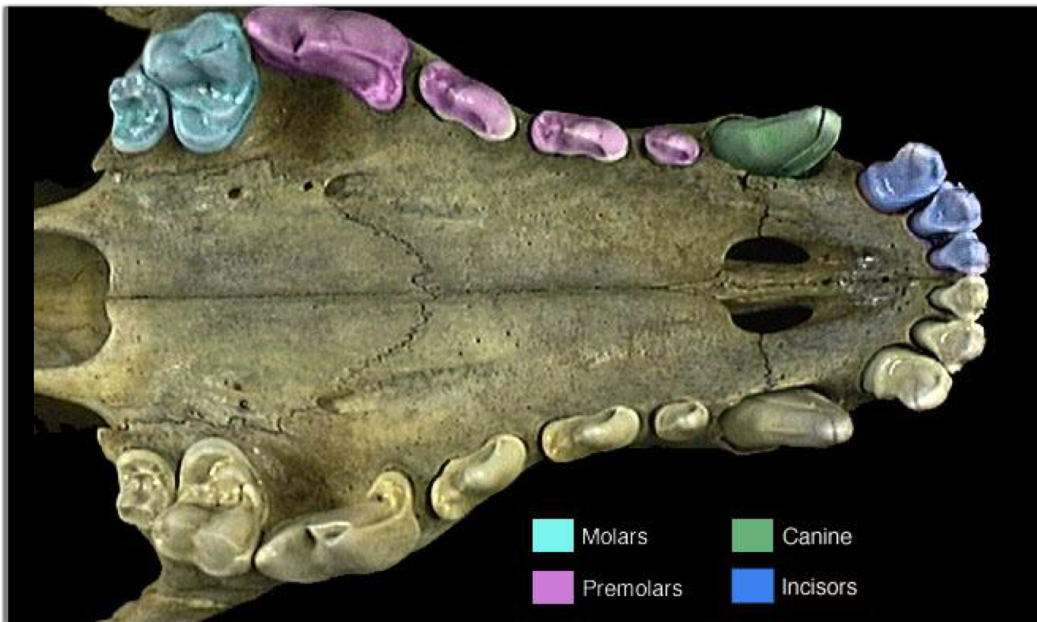


# Teeth

Biology 490; Senior Seminar

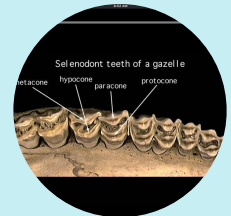


**Chris Yahnke**

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**When: Monday  
1:00 - 2:50**



**Where: CBB 190**

## 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 third 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

1

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

2

Critique their own and others' writing/oral presentations to provide effective and useful feedback to improve their communication.

3

Collaborate on researching and writing a scientific paper.

introduction to the paper and the paper's authors, as well as any relevant background information on the topic. You will also be working on a research project and writing a paper on that project. Finally, we will try something new using Big Interview to practice your interviewing skills.

## Grading

The format of the course will include four components. Component 1 (worth 50 points):

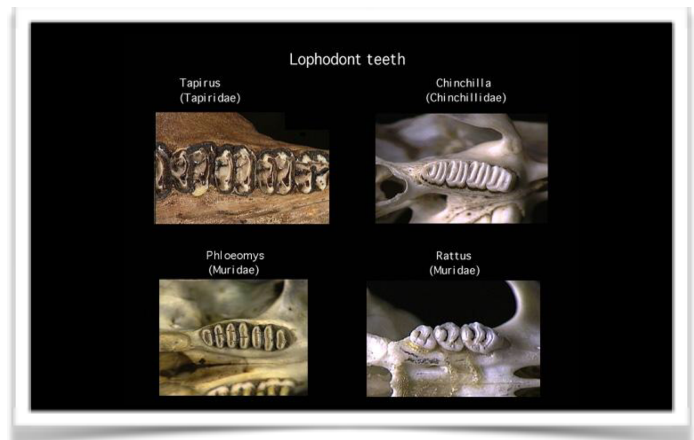
Each week we will discuss a primary literature. Each

student will be assigned a paper and will be responsible for leading the discussion. Component 2 (worth 100 points) will be a team research and writing project. Component 3 will be using the new web tool Big Interview to practice your interviewing skills. Specifically, you will translate the skills you are working on during this course to skills that employers are looking for. This will be worth 50 points. Component 4 (worth 50 points) will writing a series of 10 difficulty papers (see below).

There are 250 possible points to be earned in this course.

## 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



## DIFFICULTY PAPERS

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. *What was the paper about (in a sentence or two)? What didn't you understand about the paper and why do you think you found that part of the paper difficult?*



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?

**“She laughs at everything you say. Why? Because she has fine teeth”** **Benjamin Franklin**

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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).

## **Research project and paper**

We will be using an exercise developed by 2 former students in this class that are both dentists now. I challenged Ben Waselske and Sylvia Baustista to come up with an activity that used the skull image library at the University of Michigan’s Animal Diversity Web that could be done for free by anyone with a computer and an internet connection. This is what they came up with. You can query the image database to see what other animals are available or you could even use our research collections for this. We will devote half of the class to working on this, although you will need to devote time outside class as well. You will work in teams of 3 on this project. The final paper should be 8-10 double-spaced pages with a minimum of 5 references from the primary literature.



## Date Paper

Jan 28th Introduction and assignment of papers

Feb 4th Jheon et al. (2013) – From molecules to mastication: the development and evolution of teeth.

Feb 11th Huysseune et al. (2009) – Evolutionary and developmental origins of the vertebrate dentition.

Feb 18th Witten et al. (2014) - Old, new and new-old concepts about the evolution of teeth.

Feb 25th Zahradnicek et al. (2014) – The development of complex tooth shapes in reptiles.

Mar 4th Williams and Kay (2001) – A comparative test of adaptive explanations for hypsodonty in ungulates and rodents.

Mar 11th Beatty et al. (2012) – Osteological associations with unique tooth development in manatees.

Mar 18th Spring Break!!!

Mar 25th Nweeia et al. (2014) – Sensory ability in the narwhal tooth organ system.

April 1st Demere et al. (2008) – Morphological and molecular evidence in stepwise evolutionary transition from teeth to baleen in Mysticete whales.

Apr 8<sup>th</sup> Patterson et al. (2003) – Tooth breakage and dental disease as causes of carnivore-human conflicts.

Apr 15th Damasceno et al. (2012) – Bite force and encephalization in the Canidae.

Apr 22nd Eng et al. (2013) – Bite force and occlusal stress production in Hominin evolution.

Apr 29th Teaford and Ungar (2000) – Diet and the evolution of the earliest human ancestors.

