Professor: Dr. Matt Tocheri  
Office hours: By appointment  
Email: tocherim@si.edu

When: Thursdays 5:30 - 8:00 PM  
Where: Carolyn Rose Room NHB 339  
(Department of Anthropology, NMNH, Smithsonian Institution)

Course Description: A survey of methods for data collection and analysis in Biological Anthropology, including theoretical approaches and hands-on training in methods for collecting, managing, and using data to test hypotheses. Topics include collecting and using data from human and non-human primate skeletal material using traditional and more advanced technologies, including calipers, laser scanning, CT scanning, and morphometric, isotopic and molecular analyses, as well as creating and managing of databases.

IMPORTANT DATES TO REMEMBER

LAST DAY OF CLASSES: Monday, April 28, 2014  
MAKE-UP DAY: Tuesday, April 29, 2014.  
DESIGNATED MONDAY: Wednesday, April 30, 2014.  
READING DAYS: Thursday, May 1 - Friday, May 2, 2014.  

COURSE GRADING
Attendance/Participation: 50 points  
In-Class Assignment #1: 25 points  
Homework Assignment #1: 25 points  
Homework Assignment #2: 50 points  
Homework Assignment #3: 50 points  
Midterm Quiz: 200 points  
Homework Assignment #4: 100 points  
Final Exam: 500 points  
TOTAL: 1,000 points
Course Schedule (subject to change):


   INTRODUCTION. A summary of the class schedule. What are methods and why do we use them? How are methods used in biological anthropology? What is hypothesis testing?


   IN-CLASS ASSIGNMENT. Collecting metric and non-metric data from skeletal elements using calipers, osteometric board, and inspection (25 points)


   SKELETAL METHODS AND ANALYSIS II. Determination of sex from skeletal remains: metrics, non-metrics, other skeletal indicators. The importance of skeletal landmarks for measurement consistency and comparison. Using skeletal measurements to test hypotheses.

   HOMEWORK ASSIGNMENT #1 (due at beginning of class, Feb. 6th, 2014). Using MeshLab to collect osteometric measurements from digitized cranial and postcranial elements. (25 points)


SKELETAL METHODS AND ANALYSIS III. Using skeletal measurements to test hypotheses (cont'd). Statistical analyses using PAST and MS Excel.

HOMEWORK ASSIGNMENT #2 (due at beginning of class, Feb. 13th, 2014). Using MeshLab to collect six standard osteometric cranial measurements from museum specimens. (50 points)

ASSIGNED READINGS FOR FOLLOWING WEEK:


PHOTOGRAMMETRY METHODS AND ANALYSIS. Introduction to and demonstration of photogrammetry. Creating a model using photogrammetry.

HOMEWORK ASSIGNMENT #3 (due at beginning of class, Feb. 27th, 2014). Create your own 3D model using the photogrammetry techniques and software learned in class. (50 points)

7. February 27, 2014.

PHOTOGRAMMETRY METHODS AND ANALYSIS II. Photogrammetry continued.

REVIEW FOR MIDTERM QUIZ.

MIDTERM QUIZ. **(200 points)**

HOMEWORK ASSIGNMENT #4 (due at beginning of class, Mar. 20th, 2014). As discussed during our previous classes, use PAST and MS Excel to explore the cranial measurement dataset that we have compiled. **(100 points)**

ASSIGNED READINGS FOR FOLLOWING CLASS. Selected portions of: Zollikofer and Ponce de Leon (2005) "Virtual Reconstruction: A Primer in Computer-Assisted Paleontology and Biomedicine".


SPRING BREAK (no class).


CT SCANNING METHODS AND ANALYSIS. Introduction to and demonstration of CT scanning. Advantages and disadvantages. Types of CT scanners and related software. Slices/images. Density. 3D model generation: thresholding and cleaning scans. Collecting data from CT scans: linear measurements, densities, volumes, areas, angles, curvatures, other shape measures.

ASSIGNED READINGS FOR FOLLOWING WEEK:


STABLE ISOTOPE METHODS AND ANALYSIS I. What are stable isotopes? Why are they used to study animal diet? Collagen and hydroxyapatite. Carbon, nitrogen, and oxygen.

ASSIGNED READINGS FOR FOLLOWING WEEK:


STABLE ISOTOPE METHODS AND ANALYSIS II. Discussion and examples of stable isotope analysis in Biological Anthropology.

ANTH 3491/6491 Methods in Biological Anthropology


MOLECULAR METHODS AND ANALYSIS I. Blood types and World War I. Genotypes and phenotypes. The discoveries of genomic and mitochondrial DNA. DNA hybridization and the origins of molecular clocks. The polymerase chain reaction (PCR) technique and electrophoresis gels. DNA sequencing.


MOLECULAR METHODS AND ANALYSIS II. Discussion and examples of molecular analysis in Biological Anthropology.

15. April 24, 2014 (FINAL CLASS).


FINAL EXAM (500 points)