

Syllabus: Geoscience 453/653 Palynology and Paleopalynology

Professor: Sarah J. Fowell **Office:** 326 Natural Sciences **Phone:** 474-7810 **E-mail:** ffsjf
Office Hours: Monday 10:30 AM -12:30 PM Wednesday 1:00-3:00 PM Or by appointment

Lectures and Discussions: Tues and Thurs 11:30 AM –1:00 PM 233 Natural Sciences

Laboratories: Tuesday 2:00-5:00 PM 229 Natural Sciences

Required Text: •Moore, P.D., Webb, J.A., and Collinson, M.E., 1991.
Pollen Analysis. Blackwell Scientific Publications, Boston, 216 p.

Recommended Text: •Faegri, K, Iversen, J, Kaland, P.E., and Krzywinsky, K, 1989.
Textbook of Pollen Analysis, IV Edition. Blackburn Press, 328 p.

Labs: Palynology is a field with diverse applications, which employ a wide variety of techniques. Fundamentally, however, all studies of climate change, biostratigraphy, or paleoecology rest upon the preparator's ability to process the sample and identify constituent palynomorphs. Consequently, this course will emphasize practical skills such as identification and sample preparation. Demonstrations of new techniques will be held at the beginning of the lab sessions. It is particularly essential that you attend demonstrations of laboratory procedures, as you will not be able to complete the exercise if you haven't first been introduced to the techniques. Demonstrations will take up to one hour. The remainder of the lab time is available for you to work on the week's exercises. However, it is likely that additional time will be required in order to complete the labs. The amount of extra time you spend in lab will depend on how excited you are about palynology, but plan to invest ~4 hours/week minimum in order to learn and understand the material. The bulk of the lab work can be done whenever you please, once you have attended the demonstration.

Final Project and Paper:

Graduate Students: Midway through the semester, you will have a choice of processing a suite of samples from your field area or an "unknown" rock sample from an unspecified location. Regardless of the sample type, your task will be to process the sample(s), make at least two strew slides of the palynomorphs, identify a minimum of 10 pollen species (if diversity permits), and photograph representative specimens of each taxon. Students with Pleistocene or Holocene projects will be expected to display their data in a pollen diagram. Students with pre-Quaternary samples (thesis data or unknowns) are required to date the rock(s) to the period and (if possible) age. At the end of the semester, you will turn in a paper describing your results. This paper will be a publication-quality document, including an introduction, methods, photographic plates, paleoclimatic and/or biostratigraphic interpretations, and a complete list of references. Your slides are to be submitted with the paper.

Disabilities Services: The Office of Disability Services implements the Americans with Disabilities Act (ADA) and ensures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (474-7043) to provide reasonable accommodation to students with disabilities. Please let me know at the beginning of the course if accommodations should be provided.

Grading: Grades will be weighted as follows: 40% class, 30% lab, and 30% final paper and/or project. The class grade will be determined by performance on a midterm exam and a final exam. These exams will cover both lecture and lab material. Lab grades are based on the quality of your lab notebook and sample preparations.

Midterm Exam: 20%
Final Exam: 20%

Laboratory Exercises: 30%
Final Paper and/or Project: 30%

Lecture and Lab Schedule

Day	Topic	Reading	Lab Exercise	Due
Thursday 8/31	Introduction: Why count pollen? Applications of palynology	MWC Ch. 1		
Tuesday 9/5	Palynomorph survey; Chemistry of sporopollenin and chitin	Handout	Lab #1: The Care and Feeding of Your Microscope	
Thursday 9/7	Pollen vs. spores: Form and function among palynomorphs	Handout		
Tuesday 9/12	Modern spore and pollen morphology I: Apertures	MWC Ch. 5 F&I Ch. 11	Lab #2: "Top 50" Modern Spores and Pollen	Lab #1
Thursday 9/14	Morphology II: Exine sculpture and structure	MWC Ch. 5 F&I Ch. 11		
Tuesday 9/19	Precambrian acritarchs: Marine! Cambrian spores: Terrestrial?	Handout	Lab #2: "Top 50" Modern Spores and Pollen Continued	
Thursday 9/21	Land ho! Silurian vegetation and spores	Handout		
Tuesday 9/26	Devonian vegetation and spores; Microspores, megaspores, and seeds	Handout	Lab #3: Acetolysis of Modern Spores and Pollen	
Thursday 9/28	Classification of organ fossils: Potonie's tural system	Handout		
Tuesday 10/3	Carboniferous and Permian wetlands: Plants and spores	Handout	Labs #2 and #3 Continued	
Thursday 10/5	Permian palynofloras and the Paleophytic/Mesophytic transition	Handout		
Tuesday 10/10	Permian faunal mass extinction and the fungal spore spike	Handout	Labs #2 and #3 Continued: Wrap-up Midterm Projects	Lab #3
Thursday 10/12	Stripes, bags, and colpi: Triassic and Jurassic pollen	Handout		Lab #2
Tuesday 10/17	Triassic/Jurassic extinction; Mesozoic dinoflagellates		Lab #4: Maceration I; Commence Semester Projects	
Thursday 10/19	Midterm Exam			
Tuesday 10/24	GSA Conference in Philadelphia No Class!!!!			
Thursday 10/26	Macrofossil and microfossil records of the angiosperm radiation	Handout	Lab #5: Maceration II: Gravity Separation and Sieving	

Tuesday 10/31	Cretaceous pollen: <i>Wodehouseia</i> , <i>Aquilapollenites</i> , and <i>Normapolles</i>	Handout	Lab #6: Silurian and Devonian Palynomorphs	
Thursday 11/2	Evidence for a K/T floral hiatus (and catastrophic extinction?)	Handout		
Tuesday 11/7	Paleogene climate and floral associations	Handout	Lab #7: Permo-Carboniferous Palynology; Photomicrography	
Thursday 11/9	Neogene grasslands and the steppe-forest index	Handout		
Tuesday 11/14	Pollen analysis I: Pollen production, dispersal, and deposition	MWC Ch. 2 F&I Ch. 2	Lab #8: Tr/J Palynology; Counting Techniques	
Thursday 11/16	Pollen analysis II: Collecting data in the field	MWC Ch. 3 F&I Ch. 3, 4		
Tuesday 11/21	Pollen analysis III: Constructing and interpreting pollen diagrams	MWC Ch. 7 F&I Ch. 6	Lab #9: Cretaceous Palynology Project Conferences	
Thursday 11/23	Thanksgiving Break No Class!!!!			
Tuesday 11/28	Pollen analysis IV: Reconstructing vegetation cover and paleoclimate	MWC Ch. 8 F&I Ch. 7	Lab #10: Cenozoic Palynomorphs	
Thursday 11/30	Mammoth diets: Pleistocene ice ages and the vegetation of Beringia	Handout		Labs 6-10
Tuesday 12/5	The Holocene epoch: A climatically stable and uneventful interglacial?	Handout	Final Projects Continued	
Thursday 12/7	Limitations: Recycling, sedimentation, and preparation			Final Project
Friday 12/15 10:15 AM – 12:15 PM	Final Written Exam and Laboratory Practicum			