

Planetary Surface Processes Field School

PLANETSC 9605L



Centre for Planetary Science and Exploration (CPSX), Department of Earth Sciences, University of Western Ontario (<http://cpsx.uwo.ca>)

& NSERC CREATE Technologies and Techniques in Earth and Space Exploration (<http://create.uwo.ca>)

Instructor: Dr. Gordon Osinski (gosinski@uwo.ca; +1-519-661-4208; room 1050 B&G)

When: May 01 to May 12 2017. Note: a 3-hour introductory lecture will be held in January 2017 (date to be decided upon in discussion with registered students) and one of the main assignments (see below) must be completed *prior* to the field school.

Where: Arizona and Utah, USA (various locations).

Prerequisites: In order to participate in this field school knowledge of basic rock types and planetary surface processes are necessary. An undergraduate degree in an Earth Sciences-related field and/or PLANETSC 9603 (Planetary Science Short Course) or similar will provide the necessary background (contact Dr. Osinski to discuss).

Cost: \$1,600. A \$600 deposit is required by November 01 2016. Contact cpsx@uwo.ca for the link to pay online. The price includes travel to Arizona plus all accommodation, vehicle rental, park access, course material costs, and evening meals. **The full amount is payable by March 01 2017.** Note that for Western students, a limited number of \$1,000 – \$2,000 scholarships are available to students through the Global Opportunities Awards program (deadline November 15th 2016). In addition, CPSX will offer a limited number of \$1,000 awards to students registered in the Collaborative Graduate Program in Planetary Science and Exploration. To apply for the CPSX awards, students must have applied for the Global Opportunities Awards program. A copy of that application sent to cpsx@uwo.ca is considered application for the CPSX award.

Logistics: Travel details will be shared with participants once confirmed. Accommodation in the field will mainly be tents with one or two nights in shared motel rooms. Students should be prepared for camping, long days in the field and the potential for no showers or proper toilet facilities for up to 3 nights in a row. On some days there will be hikes of up to 18 km in length so students are encouraged to prepare accordingly. A limited amount of camping equipment is available for rent to those students who do not possess their own.

Course Objectives and Description:

The principal objective of this course is to provide participants with an interdisciplinary field studies experience with an emphasis on planetary surface processes. This course will introduce students from a wide range of backgrounds to processes that shape the surface of the Earth and other terrestrial planets. Emphasis will be placed on volcanism, impact cratering, tectonics, and fluvial and aeolian erosion. Students will learn the following skills: 1) the synthesis, understanding and presentation of "state of the art" knowledge on planetary surface processes; 2) an ability to draw together information from a wide variety of subject areas in planetary sciences to address issues relevant to the discipline; and 3) field training in the recognition and mapping of various different rock types and of the relationships between them.

One of the major areas of research in Earth and planetary science is in the acquisition and compilation of data from spacecraft in orbit around a particular planetary body and the subsequent interpretation of these images in a geological context. On Earth, this technique is typically called Remote Predictive Mapping (RPM) and is commonly used in regions of the world that are large, difficult to access and under-explored (e.g., Canadian Arctic). The "predictive maps" can be used to guide geologists during fieldwork, which is obviously not currently possible in planetary science. During this course, students will generate a map of a field area that will be submitted prior to the field section of this course. The site will then be visited in order to provide students with the important ground-truth data that invariably is lacking in planetary science studies.

At the end of the course, students will be able to: 1) assimilate information and data from a wide range of planetary science disciplines (astronomy, geochemistry, geography, geology, geophysics, and physics); 2) understand how complex problems in planetary sciences are tackled by scientists and determine the present flaws in our understandings; 3) prepare field guides on relevant topics; and 4) generate simple interpretive geological maps of planetary bodies.

Course Format:

The main focus of the course will be a 12-day residential field experience examining various localities in northern Arizona (AZ) and southern Utah (UT), to take place in May 2017. This region of the Midwestern United States is a world-renowned environment for comparative planetology. Field stops will focus on meteorite impact cratering (e.g., Meteor Crater, AZ; Upheaval Dome crater, UT), volcanism (e.g., Sunset Crater volcanic field, AZ), and canyon and valley formation (e.g., Canyonlands National Park, UT). Many of the locations to be visited are considered world-class terrestrial analogues for the Moon and Mars. Some images from previous field schools can be found here: <https://www.flickr.com/photos/gordonosinski/albums/72157644546108913>.

Course Materials:

Readings will be provided to students in the introductory lecture. A field guide will be provided for the course. Students will be responsible for compiling some of the content for the field guide (see below).

Course Evaluation (summary):

Students registered in the course will be evaluated as follows:

Course Participation	10%
Scientific Engagement	5%
Field Guide	20%
Image Interpretation Exercise	30%
Field Exercises	20%
Field Notebooks	15%
	<u>100%</u>

Course Evaluation (details):***Class Participation – 10%***

Each student is expected to actively contribute to all class discussions. Students are encouraged to read widely beyond the content of the field guide and prescribed readings and bring own readings and experiences into the class discussions. It is expected that each student will come prepared to debate, defend, and critique the readings and the field guide content. Participation also includes contributing to the daily life of the field school (e.g., cooking, cleaning dishes, putting up tents, etc.).

Scientific Engagement – 5%

One of the most rewarding and exciting aspects of Earth and planetary science is going into the field. In this class, students will visit some spectacular localities around Arizona and Utah. As part of this class, students will share their experiences in the field by “Tweeting”. Students can use their own personal account or may wish to create a new Twitter account for the purposes of this class. All Tweets must include the hashtag #PS9605 in order to be counted and ensure that all Tweets are public. A recommended minimum number of tweets is one per day; however, tweets will be graded according to quality rather than mere quantity. For students not comfortable using Twitter, an alternative must be discussed with Dr. Osinski.

Field Guide – 20%

Each student will be responsible for putting together a description for one site on the field course and for introducing that site to the entire group while in the field. A complete set of instructions for preparing this guide section will be provided during the introductory lecture. Proper spelling, grammar and sentence structure are required for guide. Any paper not handed in by the deadline will automatically be deducted 5% within the first 24 hours and 5% for each subsequent day late. The written field guide section will account for 15% of the final mark and the presentation in the field is worth 5%. The written field guide sections are due **5 pm March 31 2017**.

Image Interpretation Exercise – 30%

For this exercise, students will be provided with a suite of satellite images of a site in northern Arizona or southern Utah. Students will use these images to generate an interpretive geological map – a.k.a remote predictive map – and a simple geological history of the area. This map and geological history are due **5 pm May 02 2017 (i.e., the first day of the field school)**. Any work not handed in by the deadline will automatically be deducted 5% within the first 24 hours and 5% for each subsequent day late. The map and geological history will account for 20% of the final mark. During the course, the site will then be visited and students will be asked to provide a brief (2 page) report as to how their image-based map differed, or not, from their interpretations following fieldwork. This report will be worth 10% and is due

Field Exercises – 20%

A series of short exercises will be handed out in the field at the various stops. Together, these exercises will be worth 20% of the final mark.

Field Notebooks – 15%

Students will be expected to take detailed notes and sketches while in the field. These notebooks will be collected on the final day of the course and graded.

Academic Honesty Statements and Absences:

Assignments: Assignments must be submitted both by hardcopy and electronically on the assigned due date and will not be accepted late, except under medical or other compassionate circumstances (see below). Submitting a late assignment without appropriate documentation will result in a zero (0) grade.

Accessibility: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Absences/Missed Exams/Assignments: If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: <http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: https://studentservices.uwo.ca/secure/medical_document.pdf

Academic misconduct: Academic Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: <http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf>

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>). Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.