

## GEOL 440 Senior Seminar

**Instructor:** Dr. Sean Regan,  
**Where can you find me:** Hudson 127  
**When to find me:** Weds, 1:00 – 3:00 pm  
Tue, 9:00 – 11:00 am

**Class Location:** Hudson 0128

**Class Time:** 8:00A – 8:50 A MWF

**Email:** [sean.regan@plattsburgh.edu](mailto:sean.regan@plattsburgh.edu)

**Cell Phone policy:** Do not use cell phone unless otherwise instructed.

**Grading Policy:** There are 2 major projects that you will work on during the duration of the class. Not only will your work be evaluated, but the help you provide your fellow students in terms of peer-review will also be evaluated.

**Project 1:** 8 page report on a scholarly topic related to “deep time”. You will also provide a 5 – 8 minute powerpoint presentation. The writing assignment will undergo one round of peer review, and one rough draft with comments from me. The powerpoint will be evaluated by both myself, and fellow students.

**Project 2:** The second project will be a capstone experience focused on integrating most of geology subdisciplines to solve a modern geologic and environmental problem. As a class, we will evaluate the potential of an old graphite mine as a cause for Acid Mine drainage. In order to be thorough, we will prepare a full, phase 1 assessment of the bedrock geology, litho-geochemistry, and water chemistry of the area. Each individual will be expected to prepare their own report, with their own figures, and data tables. If all goes according to plan, we will write an abstract for the upcoming Northeast Geological Society of America Meeting in Burlington VT in March. All participants are encouraged to show up and talk beside a poster with our results to the broader geologic community.

The phase 1 report on the project 2 will be both peer reviewed and receive a round of revisions from the instructor.

**Participation:** This course is designed to encourage participation, collaboration, and critical thinking. Discussions will be the focus of most of the classes, and 10% of your grade will be determined based on class participation.



**Figure 1:** Partially melted and dismembered mafic dike hosted by 3.4 Ga tonalitic gneiss in northern Saskatchewan.



**Figure 2:** Granite gneiss exposed on the summit of Pharoah Mountain in the eastern Adirondack Mountains.

**Schedule:**

**Week 1:** Intro to Deep Time (Papers)

**Week 2:** Modern approaches to field work

**Due:** Abstracts

**Week 3:** Pick a topic for Project 1 (proposal)

**Due:** Google Earth file due with brief description

**Week 4:** Field work for Project 2

**Due:** Continue researching relevant literature to Project 1

**Week 5:** Example presentation on Plate tectonics and deep time

**Due:** Working bibliography due for Project 1

**Week 6:** Bedrock Geology of the Adirondack Mountains

**Due:** Abstract summary on Grenville Geology due

**Week 7:** Acid Mine drainage

**Due:** Rough draft of Project 1 due

**Week 8:** Peer Review for Project 1

**Week 9:** Summary of bedrock geology at Rock Pond

**Due:** Working bibliography for Project 2 due

**Week 10:** Powerpoint presentations for Project 1

**Week 11:** Making a good figure

**Due:** Final Project 1 due

**Week 12:** How to deal with chemistry data

**Due:** Continue working on Project 2

**Week 13:** Peer Review of Project 2

**Due:** Have rough draft of Project 2 done

**Week 14:** Whole class presentation on Rock Pond... grade yourself

**Due:** NEGSA abstract due (everyone works together on this)

Phase 1 assessment on Rock Pond completed by the end of Finals week (Every student 1 completed report with figures, tables, etc.).

**Grading Break-Down:****Project 1 (40% of grade)**

30% - bibliography, rough draft, timeliness.

40% - final report

20% - presentation

10% - peer review

**Project 2 (40% of grade)**

20% - bibliography, rough draft, timeliness

50% - final report

20% - final presentation

10% - peer review

**Other exercises (10% of grade):**

50% - completion

20% - neatness

30% - correctness

**Participation (10%)**



Pyritic gneiss in the eastern Adirondack Mountains, Graphite 7.5' quadrangle, Essex County, NY. Mined for graphite in early 1900s. Note the color of the water- very low pH resulting in high dissolved metal (Acid Mine drainage).

## **Potential Project 1 topics:**

Evidence for development of the hydrosphere

Earth's earliest Archean atmosphere

Emergence of the aerobic biosphere during the Archean-Proterozoic transition

Banded iron formations

Archean greenstone belts

Origin of the Moon

Early differentiation of the Earth – Formation of the core and magnetic field (?)

Evidence for Precambrian tectonics

Jack Hills detrital zircons – windows into the Hadean – Did liquid water exist?

Proterozoic Oklo natural fission reactors, Gabon, Africa

Archean MISS (Microbially Induced Sedimentary Structures) – clues to ancient life

Microfossils in the Gunflint and Fig Tree cherts

Oxygen metabolism and evolution of metazoans

Impact processes on the early Earth

Hyperthermophiles and the origin of life

Ediacaran and Burgess Shale fauna

Gowganda glaciation – Evidence and extent

The oldest zircon U-Pb ages for early continental crust - the Acasta gneiss complex,  
Northwestern Canada

Origin of the 3 billion-year-old gold in the Witwatersrand Basin in South Africa

Origin of North American Proterozoic (Grenville age) anorthosites - not just the Adirondacks

Comparison of lunar and terrestrial anorthosites