Location & time: MWF 1-2, 873 DESE Bldg

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Usually, I will talk for 1 hr/wk, students will review/discuss articles 1 hr/wk, and we will devote
1 hr/wk to work on modeling or hear results from the projects.

Topic and Objectives: The topic of Biogeochemistry is far too broad to cover in a single class.
My approach towards narrowing the topic often is to focus on a topic or an environment in which
I currently am working or in which the enrolled students are working, and to examine the
interplay of biogeochemical processes in that environment. Alternatively, the choice of a text
book can impose a structure and limit the scope of class. This year, I have chosen to use the text
book listed above; however, should the class have clear and common interests, we can adapt the
course content appropriately. We will definitely spend time on carbon and water cycling, and we
will likely choose a trace element as well (Hg or Pb).

I have three specific objectives for the class. First, through the class you will gain a
better understanding of some biogeochemical cycles and processes both on global and local
scales. Second, you will gain practice in reading the current literature even on topics with
which you are not well acquainted. Two skills that we will focus on are (1) understanding the
conclusions even when you don't understand all of the methods or theory, and (2) critically
evaluating methods and conclusions. Finally, the class projects are intended to keep your
mathematical and modeling skills alive and to show you how to use these to learn about new
processes.

Course format and philosophy: Learning consists of asking questions and seeking and
evaluating the information that will help us to answer those questions. In most undergraduate
courses, the questions are asked for us, and the information required to answer the questions is
provided by either the text or the instructor. Once we leave graduate school, we must both ask
the questions ourselves and find and evaluate the required information on our own. Graduate
school and graduate courses represent an intermediate step, a step in which we get to assume much more of the responsibility for asking the questions, seeking the information, and evaluating or synthesizing the information to reach an answer. Accordingly, in this course, most of the traditional carrots (graded homework) and sticks (exams) are thrown away, and your own curiosity and peer pressure are the primary motivators.

My main functions are to organize the sequence of topics so as to make them more readily understandable, to direct you to some of the sources of information, to facilitate discussions, and to explain some of the theoretical information. My role as instructor is not as a repository of facts that will be dished out to you each day. I am teaching this course because I am excited about learning the material, not because I feel that I know it all.

In my opinion, reading the scientific literature on current research is one of the most important and effective means of learning. It is inevitable that you will not understand much of what you read when you begin. However, the more literature you read, the more you understand. Science grows by a gradual accumulation of many small facts; major advances are extremely rare. I believe that our understanding of science grows in the same fashion.

The class period is a time to discuss the material that was read and to clarify points that are not understood. I will lecture and give an overview of each major topic as well as highlight new issues of interest. However, considerable class time will be devoted to discussion of the reading material and projects, and of where we can find answers to questions that remain. Class is not a time to come and sit like sponges absorbing facts.

**Grading:** Grades will be based on contributions to the group learning process (questions, in-class discussion - 17%; presentations of literature - 33%), projects (30%), and an oral final (20%).

**Useful Reading Material**
Drever, J.I., 1996, *The Geochemistry of Natural Waters*, Prentice Hall, Chap. 4
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<td>Define problem, scope of project, conceptual model</td>
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**Week 1:**
Monday – introductions, history of BGC, contemporary issues
Wednesday – Discuss Chap. 1, Modeling exercise
Friday – Discuss project topics, Modeling exercise

**Week 2:**
Monday – Discuss Chap. 2, Lecture on Origins
Wednesday – Review of 3 articles
Friday – Choose project topic(s), modeling exercise