

Models of Motion, 2014-15  
**Winter Quarter Seminar**

*Reading and writing about the culture, history, and nature of mathematics and physics.*

**Texts**

- Simonyi, *A Cultural History of Physics*
- Strogatz, *The Elements of Math*, articles available at [http://topics.nytimes.com/top/opinion/series/steven\\_strogatz\\_on\\_the\\_elements\\_of\\_math/index.html](http://topics.nytimes.com/top/opinion/series/steven_strogatz_on_the_elements_of_math/index.html)
- Ascher, *Mathematics Elsewhere*

**Overview of the work:**

- In Weeks 1 and 2 we will read and seminar on Chapter 5 of Simonyi. You will write one 1-2 page (double spaced) paper on some aspect of this chapter (as you did Fall quarter for the earlier chapters); a peer-reviewed version of that paper will be submitted for faculty review in Week 2.
- In Week 1 and Weeks 3-9 on Tuesdays we will focus on discussing a series of articles that appeared in the New York Times by mathematician Steve Strogatz. Over the course of the quarter, you will complete a structured writing assignment in which you will explain an idea from calculus or physics with a general audience in mind. The final paper (due Week 9) will be 4-5 pages (double-spaced) and should be coauthored by two students. The authors will give a short presentation on their work in Week 9.
- In Weeks 3-9 on Thursdays we will seminar on Ascher's *Mathematics Elsewhere*. Each week, a few students will have particular responsibility for leading small group discussions about the reading (they will post a discussion plan online on Monday). These small groups will then transition into large group seminar. You won't write essays about Ascher; rather, you will bring one or more questions on the text to class, and during your week to lead seminar you will bring a 1 page plan for focused discussion within your small group.

**Assignments:**

- 1) Your Simonyi essay should conform to our expectations from Fall quarter. Briefly, you should formulate (and write down) a specific question and use the essay to answer the question. Your essay should also address the author's purpose in including the individual/diagram/concept that you have chosen to write about. See Fall syllabus for details.
- 2) Your final Strogatz-type essay should be 4-5 pages in length and be written for a general audience. It should include whatever historical, cultural, or scientific background you deem to be useful in conveying the complex idea you are covering. The paper should be polished, organized, and free of editing errors. You will build up to this final product in several steps:
  - a. Your prospectus should be a one paragraph summary of your plan, including the topic from calculus or physics that you will cover; why you have chosen this topic; and any initial idea you have about how you will communicate this topic to a broad audience.
  - b. Your outline should be up to 1 page single-spaced, and should clearly convey the major sections and subsections that will serve to organize the information you have amassed for your final paper. The final paper itself does not need to identify these sections explicitly.
  - c. Your paper draft that is peer reviewed should be nearly complete, and at least 4 pages double-spaced.
  - d. Your final presentation will be based on your essay and in most cases should focus on the supplementary material and strategies that you used to communicate your math or physics idea to a general audience, such as elements of the historical, cultural, or scientific context.
- 3) Each week that we discuss *Mathematics Elsewhere* you should bring a question to discuss in seminar. The question should be as specific as possible, and refer to a particular section of the text.
- 4) You will sign up to be a group leader for our discussion of Ascher during one week of the quarter. That week, you should write (and post on our web forum) a 1-page plan for how your small group might discuss and work through a particular section of Ascher's material. Your writing should summarize the mathematical and cultural ideas, and propose a small group activity (e.g. creating a design, discussing key questions, solving key math problems) that will help to illuminate that section of the reading. When we transition into a large group discussion after the small group time, you and your small group will share your learning on this math (and culture) topic. *You will need to coordinate with other Group leaders in advance of seminar to ensure broad coverage of the chapter.*

**Weekly schedule of activities, reading, and assignments (tentative)**

Week	Tuesday 10:45-12:00 D2105	Thursday 9-11 D3105	Writing deadlines
11	Read: Strogatz #1  In-class: Introduction to seminar plan and expectations; Seminar on Strogatz #1	Read: Simonyi 5.1-5.4.  In-class: Seminar discussion.	
12	Writing due: Bring 3 copies of Simonyi draft to class.  In-class: Peer review.	Read: Simonyi 5.5-5.6  In-class: Seminar discussion.	Bring Simonyi essay draft to class on Tuesday.  Submit revised Simonyi essay on Thursday.
13	Read: Strogatz #2-#4  In-class: Discuss Strogatz; Discuss paper topic ideas and form project partnerships.	Read: Ascher Ch.1 and prepare seminar question.  In-class: Group 1 leads small group discussions, transition to large group.	Group 1 posts discussion plan online by Monday 6pm.
14	Read Strogatz #5-#8;  In-class: Submit paper prospectus (1 paragraph). In small groups, create outline of one or more Strogatz articles.	Read: Ascher Ch.2 and prepare seminar question.  In-class: Group 2 leads small group discussions, transition to large group.	Submit paper prospectus  Group 2 posts discussion plan online by Monday 6pm.
15	Read Strogatz #9-#11.  In-class: Seminar on Strogatz, with focus on his strategies as a writer.	Read: Ascher Ch.3 and prepare seminar question.  In-class: Group 3 leads small group discussions, transition to large group.	Group 3 posts discussion plan online by Monday 6pm.
16	Read Strogatz #12-#13.  In-class: Bring detailed outline. Peer review outline.	Read: Ascher Ch.4 and prepare seminar question.  In-class: Group 4 leads small group discussions, transition to large group.	Bring draft outline on Tuesday; submit revised outline on Thursday.  Group 4 posts discussion plan online by Monday 6pm.
17	Strogatz #14-#15.  In-class: Seminar on Strogatz articles; Pairwise work on writing final paper.	Read: Ascher Ch.5 and prepare seminar question.  In-class: Group 5 leads small group discussions, transition to large group.	Group 5 posts discussion plan online by Monday 6pm.
18	In-class: Bring 3 copies of final paper draft; Peer review of paper drafts.	Read: Ascher Ch.6&7 and prepare seminar question.  In-class: Group 6 leads small group discussions, transition to large group.	Bring paper draft Tuesday for peer review.  Group 6 posts discussion plan online by Monday 6pm.
19	Final presentations  Submit paper in class today.	Final presentations	Submit final paper in class on Tuesday.
20	--	--	--