MA110 - Mathematical Explorations – Fall 2012
Mathematics in Art and Sculpture

What is a poster? Poster Sessions are used to publicize, announce, and/or present the results of research investigations. They are widely used in professional conferences (including virtually all conferences for mathematicians and scientists), college and university courses, and meetings of all kinds. They are useful because many posters can be displayed without the time and space limitations that traditional presentations impose. Additionally, it makes it easier for participants to browse and find research of interest.

What are our posters about? For this assignment, you are to make a poster which describes a significant piece, collection, or movement in mathematical art or sculpture (broadly defined), as well as its relevance to our work in this course.

Art in Mathematics? Many (most) people think that art and mathematics are polar opposites. Nothing could be further from the truth. Mathematics is a creative, human art. Arts and sculptors through time have relied on mathematics as a fundamental part of their work. Don't believe me? How about some of these well-known folk:

> Science and art sometimes can touch one another, like two pieces of the jigsaw puzzle which is our human life, and that contact may be made across the boderline between the two respective domains. -- MC Escher

> When I am working on a problem, I never think about beauty. I only think of how to solve the problem. But when I am finished, if the solution is not beautiful, I know it is wrong. -- Buckminster Fuller

> Symmetry, as wide or as narrow as you define is meaning, is one idea by which man through the ages has tried to comprehend and create order, beauty and perfection. -- Hermann Weyl

> A mathematician, like a painter or poet, is a maker of patterns. If his patterns are more permanent than theirs, it is because they are made with ideas. -- G. H. Hardy

> Mathematics, rightly viewed, possesses not only truth, but supreme beauty - a beauty cold and austere, like that of sculpture, without appeal to any part of our weaker nature, without the gorgeous trappings of paintings or music, yet sublimely pure and capable of a stern perfection such as only the greatest art can show. The true spirit of delight, the exaltation, the sense of being more than man, which is the touchstone of the highest excellence, is to be found in mathematics as surely as in poetry. What is best in mathematics deserves not merely to be learned as a task but to be assimilated as a part of daily thought, and brought again and again before the mind with ever-renewed encouragement. Real life is, to most men, a long second-best, a perpetual compromise between the real and the possible; but the world of pure reason knows no compromise, no practical limitations, no barrier to the creative activity embodying in splendid edifices the passionate aspiration after the perfect from with all great work springs. Remote from human passions, remote even from the pitiful facts of nature, the generations have gradually created an ordered cosmos, where pure thought can dwell as in its natural home, and where one, at least, of our nobler impulses can escape from the dreary exile of the natural world. -- Bertrand Russell

Poster content. You should let your own interest and research guide your decisions on what to include in your poster, but each poster should include the following:

- A concise description of the piece, collection or movement in art and sculpture that is the focus of your poster.
- A description of the development of the piece, collection, or movement, information about the artist, and its relationship to other pieces of its period.
- Why you consider your topic interesting and important. Additionally, you must provide information on public reaction to the work(s) in question.
- Mathematical Art and Sculpture are the foci of this course. Describe, in detail, mathematical aspects of the work(s) that make it (them) an appropriate choice of topic for this course.
- You must give several references where the interested reader can find more information about the work(s), artist, reaction and mathematical aspects. This should include diverse references which are not limited only to Internet citations.
- You **cannot** use anything that we will be covering in detail in this course - Möbius bands, string art, flexagons, or spirograph.
- You cannot use a random piece of art/sculpture without putting it in an appropriate context. Moreover, I **do not** want you to piggyback on something that I have shown in class. For example, you were all taken by many of the images in Masters of Deception by Seckel that I brought in. It is not ok to simply choose something from there. I don't want posters of things that I have already shown you. Be original. A major part of your work on this project is the search for a good topic.

Purpose of the Posters - Our focus in this course is art and sculpture, broadly defined. We will study a number of specific topics. The relationships between art/sculpture and mathematics are timeless, deep and pervasive. I want you to gain an appreciation of the importance of this relationship, through your search for a topic and through your interactions with other people's posters. Moreover, I want all those that walk the fourth floor halls to appreciate these things as well.
What we are doing in creating a museum of Mathematics and Art.
If you are an artistic person I would encourage you to consider creating an original work of art. (You can see examples from previous students at http://artofmathematics.westfield.ma.edu/infinite/student/pictures.html and http://artofmathematics.westfield.ma.edu/geometry/pictures/main.html .)
If you wish to create your own piece of art/sculpture you **must** talk with me about it first.

Poster presentations. All posters will be hung in the 4th floor hallways of Wilson Hall. All posters are due on a Wednesday and will be displayed at least until the following Wednesday. You must either meet with me or make arrangements so your poster is displayed appropriately prior to the beginning of Wednesday's class. The posters will be hung from two screws that are exactly two feet apart using clips that I will provide for your posters. **All posters must have the author's name clearly on the front and must have a comment envelope on the front.**

Damage disclaimer. Because of the public nature of the display of the posters, they are vulnerable to vandalism. Students who are not willing to take the small risk that appropriate display of their posters entail must contact me well in advance about alternative arrangements.

Requirements. The due date for your poster will be announced early in the course.

- You must sign up for a subject for your poster, checking to insure that nobody else has chosen the same subject area. A list will be posted on the blackboard next to Prof. Fleron's office. This list will be posted on Friday, 5 October at 8:00 a.m.
- Two weeks prior to your due date you must submit, in writing, a brief proposal which identifies the subject of your poster. You should keep a copy of your proposal so you can keep working on your poster while I consider your proposal.
- One week prior to the due date you must submit, in writing, a more detailed proposal about your project. It should contain several references, layout and content ideas, and an outline or rough draft of the handout will accompany your poster.
- Your poster must include a list of references either on the front or the back. These references must be diverse, they cannot simply be a few obscure Internet sites. Internet sites should be reputable and you **must** include several references beyond the Internet.
- Normal rules regarding appropriate referencing and citation must be followed. I.e. **every passage you use that you have not written must be quoted and appropriately cited.**
- Your poster must be original. You cannot simply cut and paste passages from reference materials and glue them to posterboard.
- You must assess the posters of at least ten other students and these assessment reports must be submitted with your final report.
- Your final self-assessment report must include a tabulation of the scores you received and must conclude with a suggested letter grade (on the standard A+ - F scale) for your poster.

Assessment criteria. Assessment, on a scale of 1 - 5, will be used to reflect how well each poster achieved each of the following:

- An interesting, engaging, and/or important choice of significant piece, collection, or movement in mathematical art or sculpture.
- An informative and accessible description of the significant piece, collection, or movement in mathematical art or sculpture including: the history and context of the art/sculpture; the impact and importance of this art/sculpture; why this art/sculpture is of interest to you.
- An accessible survey of the connections between this art/sculpture and mathematics. This is the more mathematical part of the poster.
- An appropriate collection of additional information interested readers can use to pursue art/sculpture of this type in greater depth. These may include: book, journal, audio, video, and other media and multi-media citations; Internet resources; reviews; museum holdings; event dates; etc.
- A physical construction of a high quality poster and handout, including: appropriate design, pleasing visual layout, effectiveness, appropriate mix of media and information, effort, etc.

Suggestions. Choose art/sculpture that you find interesting. A major portion of this project is the search for an appropriate topic. I will not "give" anybody a topic for their poster – this is your job. But I have a very significant interaction with the mathematics and art communities which provides me with broad experience to help you if needed.

Assessment. Using the criteria above, your poster will be assessed by peers in your class, by your professor, and by yourself.

Peer Assessment - Each student is required to assess the posters of at least ten other students during the course of the semester. For each poster that you assess you must completely fill out an assessment form, including written comments. One copy of this assessment form is to be submitted to the author. Duplicate copies are to be kept by the assessor until the end of the semester when they will be turned in to Prof. Fleron. Peer reviews will be blind - the author of the poster will not know the identity of the reviewers.

Self Assessment - After your poster has been removed from the presentation you are to read all of the assessment forms and comments that have been submitted. You must tabulate all of the scores submitted on all of the assessment forms. Based on this feedback and your own evaluation of your work, you are then to write a brief one- to two-page report which critiques your poster, suggests a final grade for your poster (on the standard A+ - F scale), and provides rationale for your grade determination. Your poster report can be submitted at any time before the end of our regularly scheduled exam period at the end of the semester.

Assessment by Professor - Based on peer feedback and your report, your Prof. Fleron will assign a final grade for your poster. This grade will be included on your report when it is returned to you.

Peer assessment will not work unless everybody participates. Students who do not assess at least ten other posters and turn the corresponding assessment reports in to Prof. Fleron will receive a failing grade on their poster.

Information about Posters

For more information on posters, the following Internet sites may be useful:

http://writing.colostate.edu/guides/speaking/poster/
http://www.math.sunysb.edu/posterproject/www/index.html
http://www.awm-math.org/workshops/posters.html
http://www.kumc.edu/SAH/OTEd/jradel/Poster_Presentations/PstrStart.html

Poster Checklist

- ☐ I know the due date of my poster.
- ☐ I have signed up on the list and have checked that nobody else has chosen the same subject that I have.
- ☐ I handed in my poster proposal two weeks prior to the due date.
- ☐ I handed in a more detailed proposal one week prior to the due date.
- ☐ My name is on my poster.
- ☐ I put a comment envelope on my poster.
- ☐ There is a bibliography of references I used on the front or back of my poster.
- ☐ I found Prof. Fleron on the due-date and helped him hang up my poster.
- ☐ I reviewed at least ten other posters from our class.
- ☐ I submitted a poster report that included
    - Average scores in each of the five categories in my report.
    - A discussion of the feedback that I received on my poster.
    - A discussion of the grade that I believe I should receive on my poster.
    - A clear statement of the letter grade (A+ - F) that I should receive on my poster.
    - Both the 10 poster evaluations forms that I filled out and the 10 that were filled out by my peers for my poster.