

You should propose and then carry out a modeling project in an area that *genuinely interests you* (it may relate to something you have studied in some other class, extend on something that has been discussed in this class, or you may explore something which you have encountered in 'real life'):

1. The topic should be of general interest to the audience, and it should include a bit of all the key ingredients in modeling, i.e. problem formulation, mathematical description, analysis, and numerics.

By November 2, you should hand in a written 1-2 page project outline.

The project work should include

- Formulation of your own hypothesis and model, or it could be some adaptation (e.g. enhancement or simplification) of a published model,
- Computer experiments. These should be carried out in Matlab.

The data used in the modeling can be real (picked from some external source) or it may be computer generated (such as the CU-logo that has served as data for the development of tomographic techniques in the class).

The following are three project suggestions that I would be particularly interested in if they were studied:

- (i) Pattern formation in animals.
- (ii) The mathematics behind cardiac ablation (a procedure to diagnose and then to burn off abnormal nerve paths in the heart, so that it afterwards will not feature any other time dependent patterns than the desired regular pulsation).
- (iii). Create a 'mini-model' for radar reflection of objects by means of implementing the simplest finite difference scheme for the 3-D Maxwell's equations.

2. The results should be presented

- orally in class (presentations will held be during regular class time, starting Dec. 2, and also during the 'Finals' time 4.30-7 pm on Dec. 15),
- in a form that could be placed on the class web page (although it will not be placed there).

3. The requirements for the classroom presentation will be closer to what is required in an industrial setting. In particular:

- Your presentation time should be  $12 \pm 1$  minutes (with a firm cutoff at 13 minutes).
- The presentation style should be somewhat more 'formal' than for Assignment 1.
- Arrange for someone else in the class to introduce you (about one minute - the introducer should tell who you are, maybe what your interests are, how happy we are to hear you, etc. Each student in the class should do one introduction).

Give the presentation as if the audience is personally unfamiliar to you, and maybe even somewhat critical - they should become convinced that the project is truly significant. Imagine for example that you are trying to convince hard-nosed managers about investing scarce company resources into your project - maybe even in continuing to support your job.