# SCIE1000, Tutorial Week 1, Semester 1, 2011.

## Aims

The aims of this introductory tutorial are for you to:

- get to know your classmates and tutors; these people will play important roles helping you with your SCIE1000 studies; and
- practise some modelling skills, in the context of a large, multidisciplinary issue.

## 1 Introductions

Everyone (including tutors), in about 30 seconds each, tell the class:

- your preferred name;
- where you are from;
- in what degree program are you enrolled;
- what is your intended major (if appropriate);
- what sort of job would you like, and why; and
- something which interests you, or is a hobby, or at which you are good.

## 2 Goals and Organisation of Tutorials

Tutors briefly explain the goals, rationale and organisation of tutorials throughout semester, including: how will they be organised, what is appropriate and inappropriate, and so on. Allow time for questions.

## 3 Questions

1. Briefly discuss the following.

   **(a)** What is science, and what is it not?

   **(b)** Is mathematics a science?

   **(c)** Many of you may have been in an arts faculty building or have some experience of the arts. In what ways does an arts student work like a scientist? In what ways would their work be unacceptable as science? In what ways might a scientist's work be unacceptable in a discipline in arts?

   **(d)** In your Uni science studies, what should be the balance between learning *facts* and learning *how* to do things? Is either more important?

2. Consider the following quote from the American Physical Society (www.aps.org/policy/statements/99_6.cfm):

"Science extends and enriches our lives, expands our imagination and liberates us from the bonds of ignorance and superstition…

Science is the systematic enterprise of gathering knowledge about the universe and organising and condensing that knowledge into testable laws and theories.

The success and credibility of science are anchored in the willingness of scientists to:

- Expose their ideas and results to independent testing and replication by others. This requires the open exchange of data, procedures and materials.
- Abandon or modify previously accepted conclusions when confronted with more complete or reliable experimental or observational evidence.

Adherence to these principles provides a mechanism for self-correction that is the foundation of the credibility of science."

Briefly discuss the quote. Do you agree? Are any key points missing?

3. In early 2011, there was a large, damaging earthquake in Christchurch, New Zealand. In order to prepare for events such as this, governments and emergency service bodies commission research groups to develop comprehensive models of earthquakes and their impacts, including risks, likely frequency, potential locations, rate and severity of casualties, and potential responses and mitigating factors. These research groups can include human biologists, geologists, mathematicians, computer scientists, psychologists, medical researchers, medical practitioners, environmental scientists and physicists. (Later in semester we will see that catastrophe modelling is a much broader, although secretive, activity.)

   **(a)** How would you go about modelling possible earthquakes in a large city? What factors are important, what data would you need, and how effective would your model be?

   To answer these questions:

   - First think about the answers by yourself, writing down some key points.
   - Next, discuss your answers with other people sitting near you. What factors did you have in common, and what variations were there? Was there evidence of different approaches from people with different areas of scientific interest?
   - Finally, discuss the answers as a whole class. Also discuss variations in approaches suggested by people with different interests.

   **(b)** What roles could scientists in each of the above discipline areas play in developing comprehensive models? Be specific.

**The end**