



# Banff International Research Station for Mathematical Innovation and Discovery

## Coupled Mathematical Models for Physical and Biological Nanoscale Systems and Their Applications

### OPEN-PROBLEM STUDY GROUPS AND DISCUSSIONS

(Monday, Tuesday, Thursday)

#### BASIC GUIDELINES

The Study Groups and Discussions aim to identify and discuss some of the most important problems to solve in the near (and far) future within main topics of this workshop.

#### **I. The discussions can be centered on the following points:**

- (a) *Identify critical problems* [Open Problems] of major importance that require solution and prioritize them (or identify main obstacles in obtaining better physical and biological nanoscale systems).
- (b) *Summarize most recent experimental achievements* in the Open Problem area with associated physical effects and phenomena that require better understanding.
- (c) *Summarize the state-of-the-art models and computational techniques* for modeling physical and biological nanoscale systems that can assist further progress related to the Open Problem.
- (d) *Analyze feasibility of existing mathematical and computational methodologies* for the solution of the problem. Can new, more efficient methodologies be developed? Explore promising approaches in addressing identified challenges/Open Problems.

#### **II. General questions to address for Open Problems and networking:**

- (a) Define the problem. Why is this problem important?
- (b) Define possible schemes for attacking the problem. List your group's strong sides and weak sides in addressing the above problem. Define the necessary competencies needed to address the problem and distinguish whether these competencies are existent today (anywhere in the world? in your group or among present-day collaborators?)
- (c) Are there any participants present at this workshop that you believe can help provide the competencies you and your group miss? If yes, give their names and suggest possible collaboration activities on the identified problem.
- (d) *By the end of the workshop*: Did you, during the workshop, make contact with other workshop participants so as to enhance your group/network's list of competencies relevant for the problem?