

# Second Graduate Research Summit of the International Graduate Training Centre (IGTC) in Mathematical Biology

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The International Graduate Training Centre (IGTC) in Mathematical Biology is an initiative sponsored and funded by the Pacific Institute for the Mathematical Sciences (PIMS). Its focus is the training of graduate students of PIMS associated universities in the field of Mathematical Biology.

## **1 The IGTC Annual Research Summit Theme: Communicating Mathematical Biology**

The 2-days workshop served as one of the fundamental training elements of the IGTC programme, namely the Annual Graduate Research Summit. The main theme of the Summit was Communicating Mathematical Biology. Given the fact that Mathematical Biology is an interdisciplinary field, scientists in it face real challenges at the time of communicating research ideas and scientific findings to audiences whose specific research areas are solely in Mathematics or in Biology.

A mathematical biologist should be able to bridge these two scientific areas and make his/her research accessible to both mathematicians and biologists. The theme of the Summit aimed at training IGTC students to face successfully this particular communication challenge.

## **2 The Professional Development Seminars and Talks**

The workshop had three professional development talks/seminars focusing on the oral and written aspects of communication in mathematical biology.

Inspired by the book "Scientists must speak: bringing presentations to life" [1], Dr. Gerda de Vries (University of Alberta) gave a presentation on how to structure a good mathematical biology talk entitled "Mathematicians Must Speak: The DOs and DON'Ts of Giving Effective Mathematical Presentations". The talk not only gave a very positive tone to the rest of the workshop, but it also provided a fundamental analogy between a regular narrative "story" and a mathematical biology "story" that was practically followed by the rest of the speakers in the workshop. The story-like way of presenting a research topic to an audience is not conventional among mathematicians, but the participants seemed to agree that is an effective way of communicating mathematical biology.

The nature of the second professional development seminar given by Dr. Betty Moulton from the Department of Drama, University of Alberta was a unique experience for the audience. Everyone, including the graduate students and the Faculty participated in actual physical and vocal exercises that showed the importance of coordinating body and voice with the research messages needed to be conveyed.

A common experience among science graduate students is the difficulty they face when the time of writing their first paper comes. Questions such as how should the paper be structured? how long should it be? which title is appropriate? which Journal should I submit the paper to? Which order should be followed in a multiple author paper? are examples of questions that all IGTC students faced, are facing or will face. Dr. Eric Cytrynbaum from University of British Columbia presented a series of ideas [2] answering these relevant questions.

The real outcome of these series of professional seminars will be seen in the quality of future presentation given and papers written by the IGTC students. Also, having experienced IGTC faculty members interested in guiding graduate students in communicating mathematical biology effectively will have a positive effect on the image of Mathematical Biology in the scientific world.

### 3 The Mathematical Biology Presentations

IGTC graduate students were exposed to current mathematical biology research topics, ranging from research at the cellular level to research at the ecological level.

In particular, current models for influenza developed by Pauline van den Driessche (University of Victoria) and colleagues were introduced. The importance of calculating the basic reproduction number  $R_0$ , defined as the number of secondary infections caused by introducing one infective into a susceptible population, was stressed.

At the macro level, models concerning the spatio-temporal dynamics of predator-prey models were presented by Dr. Rebecca Tyson (University of British Columbia-Okanagan) and Dr. Jeremy Fox (University of Calgary). At the micro level, models in cellular biology were presented by Dr. Adriana Dawes (University of Alberta) leaving in evidence the incredibly wide range of research possibilities within the field of Mathematical Biology.

Also, there was a talk on data and statistical analysis for dynamical systems. This talk, presented by Dr. Dave Campbell (Simon Fraser University) was crucial for showing students how the link between real data and mathematical models can be carried out. This last talk gave a flavor of a course that Dr. Campbell will offer in the Summer. The interest in the topic had such an impact that it made the IGTC Steering Committee to consider this course as a Mathematical Biology course to be advertised and partially funded by the IGTC. This is a important outcome of having a valued visitor presenting a relevant topic during the IGTC Summit.

The wide range of talks was intended to satisfy the various research interests from IGTC students. Of course, productive discussions were generated after each presentation.

Students challenged the speakers by asking questions related to the real application of the models and more specific ones related to the mathematical techniques used.

### 4 The Poster Session

During the workshop the both the IGTC and invited students had the chance to present their current research in a poster format. There was a poster competition and the best two posters were awarded. The poster evaluation criterium was based on written communication skills, an oral presentation of the research, and mathematical biology content.

The first poster awarded was by Sandra Merchant, an IGTC student working under the supervision of Dr. Wayne Nagata. Her research is on wavetrains, periodic traveling waves exhibited by natural populations. She proposes that a possible mechanism for the generation of these patterns is predator invasion and her work has been submitted for publication. The second poster awarded was by Diana White (University of Alberta), who presented her previous work with Dr. Gerda de Vries on the effect that gender and ethnicity can have on body composition when there are changes in diet.

The poster judges felt that the quality of all poster were so high that they decided to give the third place in the competition to all the other posters.

The poster session allowed IGTC students not only to share their research knowledge and excitement but to experience the inspiring theme of the Summit: Communicating Mathematical Biology.

## References

- [1] D.E. Walters and G.C. Walters, *Scientists must speak: bringing presentations to life*, Taylor and Francis, 2002.
- [2] K. Sand-Jensen, How to write consistently boring scientific literature. *Oikos* **116** (2007), 723–727.