

**SUBMISSION TO THE LONG RANGE PLAN COMMITTEE:  
THE MATHEMATICAL BIOLOGY COMMUNITY AT  
THE UNIVERSITY OF ALBERTA**

1. BACKGROUND

This submission is the result of discussion among members and guests of the Centre for Mathematical Biology (CMB) at the University of Alberta. The views summarized here represent a wide diversity of academic backgrounds and levels, from graduate students to senior faculty members.

2. OVERALL COMMENTS

- Allow for flexibility in the long range plan.
- Institutes are good value for money.

3. SCIENCE

- There is a great deal of active research in math biology at U of A and across Canada encompassing areas such as health research, ecology and forestry.
- The accumulation of large data sets and improved experimental methods in both the ecological and health sciences field will require the development of statistical and mathematical tools and computational resources to better understand the mechanisms underlying the processes of interest.
- Cross-disciplinary collaboration with health sciences, biology and ecology will further increase.
- Major funding barriers exist through strict distinction between health research and NSERC research. Health related research which relies on mathematical methods falls between the cracks (for example optimization of radiation treatment of cancer).

4. RESEARCH FUNDING

- Research funding for interdisciplinary research can be tricky: mathematical institutes lack infrastructure to perform biological experiments and biologists may not be willing to perform

experiments needed for modelling. However, providing funding to mathematicians to perform experiments may duplicate funding and discourage cross-departmental collaborations.

- More post doc funding is needed. Small seed grants with a short time line to fund high risk projects headed by post docs could address a current gap in research funding and potentially give post docs more independence.
- Discovery grants must keep their flexibility, and small grants can be very valuable for theoretical work.
- MITACS carried lots of research funding for Mathematics. How can this be compensated for when MITACS ends?
- Institutes are important source of funding: BIRS for funding of conferences, and PIMS for funding of research centers and training centers, summer schools.

## 5. INSTITUTES

- Research institutes are crucial in facilitating the communication and collaboration among fields.
- Members of our group really enjoyed and learned tremendously from their participation in both workshops from BIRS and the summer school from PIMS. However, we believe that more coordination between the centers could help limit the overlap in programs.
- PIMS has been positive (i.e., PIMS has funded more post-doc positions), but perhaps a nation-wide institute would be beneficial.
- PIMS-IGTC has been a great forum for bringing together students from different universities and sharing ideas, as well as funding students.
- Institutes have more flexibility with the funds, such as the freedom to grant scholarships to international students.
- BIRS is tremendously successful: it holds targeted meetings, it brings world leaders to Canada, it puts us onto the international map, BIRS is mentioned in one breath with “Oberwolfach” or “Lumiy”.
- BIRS should try to set a target for activity, such as at least 40 operational weeks/year.
- Since Institutes are leveraged, they are very important to attract additional funding.
- Institutes should keep their geographic identity to allow for provincial funding.

- The Institutes helped to put Canadian mathematical research on the international map, and in the words of one colleague: “research was moribund before the institutes were established”.

## 6. TRAINING

- The NSERC Undergraduate Student Research Awards are very successful at encouraging undergrads to pursue research and should be continued.
- Graduate awards at the masters and PhD level have declined in value over the years and should be topped back up, to a level that covers tuition.
- Masters’ awards should cover a 2 yr masters. In mathematics, especially, a two-year masters is still a very common and valid stepping stone into a PhD.
- We recommend adding a “research fund” part of graduate awards reserved for attending conferences etc. as these expenses are not always covered by supervisors.
- We believe there should be a greater number of NSERC post-doctoral awards. Currently, the competition is extremely high although additional post-doc awards are available from institutes such as PIMS.
- To facilitate research, we believe that a software support person, as well as a biological support person is needed in the math department. We also believe that a statistical support person is needed in all departments.
- A broader science curriculum in the first year of science undergrad is needed to make all scientists more knowledgeable about other fields.

## 7. INTERNATIONAL

- Global coordination of databases is really useful and helpful for fast advances in science (e.g., Human genome project). Broad projects which involves the collaboration between many different countries are important for political and scientific purposes.
- The funding situation in other countries is changing and becoming more competitive. For instance, NSF has more money for fewer people.
- The institutes have drastically increased Canada’s international stature.

## 8. CONTRIBUTORS

The following people from the University of Alberta contributed the ideas and viewpoints presented above.

*Graduate students:* Marie Auger-Methe, Jiafen Gong, Harun Kalacyi, Stephanie Peacock, Ulrike Schlaegel, Silogini Thanarajah

*Postdoctoral fellows:* Yu Jin, Mario Pineda-Krch, Alex Potapov

*Faculty members:* Adriana Dawes, Thomas Hillen, Mark Lewis, Gerda de Vries

*Visitors:* Karine Gagnon (Université Laval), Josie Hughes (University of Toronto)