The University of Alberta

is a world leader in national and international research that hosts 31,000 undergraduate students and 6,000 graduate students.

Located in Edmonton, Alberta, Canada, the University is situated in the beautiful North Saskatchewan River Valley. The City of Edmonton is a cosmopolitan centre that includes a diverse cultural community that encourages stimulating arts, sport, study, and leisure.

Applications

Interested students and postdoctoral fellows can apply as follows:

Prospective Graduate Students

We welcome applications from individuals who have completed a bachelor degree in the areas of applied and pure mathematics, statistics, biology, and other related areas. Visit the following websites for application procedures and information on funding and awards:

The Department of Mathematical and Statistical Sciences
http://www.math.ualberta.ca/Graduate/Applicants.htm

The Department of Biological Sciences
http://www.biology.ualberta.ca/programs/graduate/

The Faculty of Graduate Studies and Research (FGSR)
http://www.gradstudies.ualberta.ca/

Prospective Postdoctoral Fellows

Visit the Postdoctoral Fellow site:
http://www.postdoc.ualberta.ca/

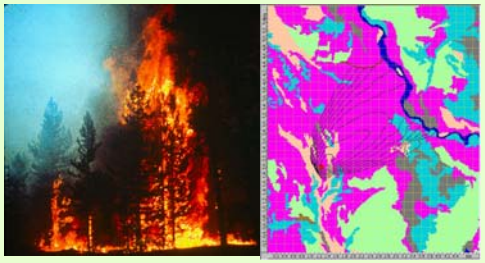
Centre for Mathematical Biology
545 Central Academic Building
University of Alberta
Edmonton, AB, Canada, T6G 2G1

http://www.math.ualberta.ca/~mathbio/

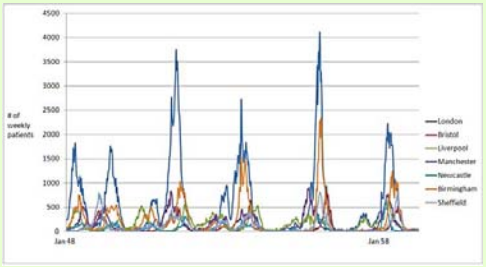
Phone: 780-492-1047; Fax: 780-492-8373

What is Mathematical Biology?

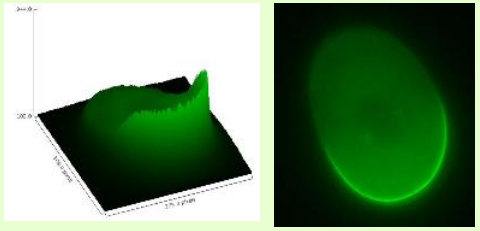
Biology seems too complex to study using mathematical models when, in fact, it is too complex *not* to study using mathematical models. Applications of mathematics in biology have already generated a substantial amount of new mathematics, and they are believed to be one pivotal driving force of new mathematics during this century.



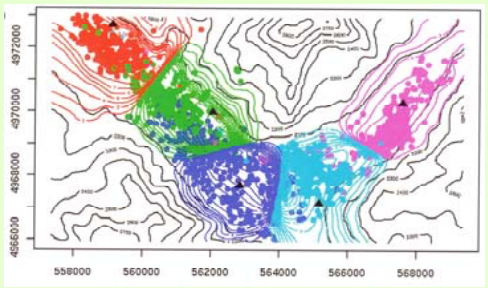
Forest Fire Modelling *Hillen*



Infectious Disease Modelling *Wang*



Cell Movement Modelling *Dawes*



Moorcroft, Lewis & Crabtree

Animal Movement Modelling

CMB

The Centre for Mathematical Biology

Department of Mathematical & Statistical Sciences

***Mathematics is biology's next microscope, only better. Biology is mathematics' next physics, only better.* - Joel Cohen**

www.math.ualberta.ca/~mathbio/

UNIVERSITY OF ALBERTA

About the Centre

Situated in the Department of Mathematical and Statistical Sciences at the University of Alberta, the Centre seeks to bridge the gap between life scientists and mathematicians in solving problems of significance to Canadians. Its activities fall into three categories:

(i) facilitation of multidisciplinary connections between life scientists and mathematicians, and between academics and government/industry;
(ii) training of a new generation of researchers; and
(iii) development of interdisciplinary mathematical biology, locally, nationally and internationally.

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Our Goal

is to provide a campus-wide resource for interdisciplinary and multidisciplinary research and training in mathematical biology.

Our Approach

is to promote research in mathematical biology at the University of Alberta through interdisciplinary research collaboration, a visitor program, a seminar series, a summer school, and postdoctoral and graduate education.

Centre Trainees

include *Master's Students, PhD Candidates* and *Postdoctoral Fellows* who are active members of the Centre's research activities.

http://www.math.ualberta.ca/~mathbio/

Core Faculty

Adriana Dawes is the Max Wyman Assistant Professor in Mathematical Biology. She uses mathematical modelling to better understand phenomena in cell and developmental biology, and closely couples her work to experimental biology.

Gerda de Vries is a Professor in the Department of Mathematical and Statistical Sciences. She has research expertise in the area of mathematical physiology and cell biology.

Thomas Hillen is a Professor in the Department of Mathematical and Statistical Sciences. His expertise includes mathematical models for cell movement, modelling and optimization of cancer growth and treatment, and the modelling of forest fires.

Mark Lewis is a Canada Research Chair in Mathematical Biology and the Centre's Director. His research focuses on ecology and animal movement.

Hao Wang is an Assistant Professor in the Department of Mathematical and Statistical Sciences. His research is primarily in differential equations, as well as modeling stoichiometry-based ecological interactions, microbiology, infectious diseases and immune responses.

Centre Events

Mathematical Biology Summer Workshop

This ten-day workshop, held in early May each year, is designed to introduce approximately 20 undergraduates to the subject of mathematical biology and to give them the tools needed to continue research in mathematical biology. It is the only workshop of its kind in Canada and attracts students from across Canada and America. Many of the summer workshop alumni have continued in mathematical biology as graduate students.

Seminar/Visitor Program

Each year, top national and international researchers visit the Centre to collaborate on research and to present seminar/colloquium talks. The Centre hosts short-term visitors who stay for a maximum of one week and long-term visitors who stay for periods spanning one week to one year.

Research

Ecology and Environmental Biology: What are the effects of environmental change on species diversity and distribution? How can we model the spread and impact of invasive species? And how do human activities impact the health of river and ocean ecosystems? We answer these questions using a mixture of mathematical models, and statistical analysis. New mathematics arise from the biological problems, and new biological insights arise from analysis of the models.

Forest Fire Modelling: PROMETHEUS is a state of the art of fire prediction tool used in the field to help make real-time decisions about fire control measures. However, many practical and theoretical questions remain open, such as following a fire backwards to find its ignition site, the feedback of fire onto the wind profile, and the development of alternative models based on a full physical description of the fire. Forest fire modelling uses partial differential equation methods for curve evolutions and level set methods.

Cellular biology: How do molecular interactions give rise to cells with distinct structures and functions, and how do these cellular building blocks coordinate to form specialized tissues that can be either crucial for survival or harmful to an organism? Mathematical and computational approaches are employed to model cell architecture and development, analysis of cellular movement and emergent properties of cellular structures.

Infectious disease modelling: What are the dynamics of human infectious diseases such as measles, influenza, HIV, tuberculosis, and cholera, and how can we use quantitative models to understand and ultimately control human disease? Research focus is on consideration of transmission modes (direct and indirect), incorporation of immune strength and memory period for waning immunity and vaccination, and parameterization from epidemiological data (inverse methods).

Human health: Obesity and cancer are human health challenges that continually challenge our health care system. How can quantitative models aid in our understanding of these processes, and suggest possible solutions? Our research focuses on models for optimal radiotherapy in cancer research, in particular prostate and brain cancer, and mathematical models for the dynamics of body composition.