

Mathematical Biology Newsletter

Volume 10 # 2 Spring, 1997

The Society for Mathematical Biology

FIND THIS ON THE WWW:
<http://malthus.micro.med.umich.edu/~kirschne/newsletter.html>

Edited by: Denise Kirschner

Letters from our Presidents:

Leah Edelstein-Keshet President, SMB (outgoing) and

Leon Glass President, SMB (incoming).

Bulletin of Mathematical Biology

Updates on publication, membership and future, LEK.

Year in Mathematical Biology at the IMA

1998-1999, by DK

A Look at Math Biology Journals

A diversity perspective, by DK

Literary Events

Books, journals and other publications

Annual SMB Meeting

North Carolina State University, Aug 3-6

Micellaneous items of Interest

to SMB members

In Memory of George Karreman

Co-founder and first president of SMB, (taken from the Univ. of Penn. weekly almanac)

PRESIDENTS of SMB

A brief history of SMB Leadership

Pacific Northwest Workshop in Math Biology

Meeting highlights by Lisette de Pillis

Mathematical Biology in New Zealand

Contributed by James Sneyd

Conferences

Upcoming meetings of interest

Dear SMB members,

This issue of the SMB newsletter is being edited and assembled by Denise Kirschner, who very kindly agreed to take over the project despite her recent move, and a heavy workload. Thank you Denise !

August, 1997 is almost here. It is time to plan for our annual meeting (See details, this newsletter). It is also time for a "changing of the guard": Leon Glass, our current president elect will be inaugurated at this year's SMB meeting.

It is hard to summarize all the SMB activities in a short space of this letter, but here are the main points: We are gradually becoming more fully electronic (as this newsletter and SMB home page demonstrate). We have several new initiatives ongoing: the newsletter has been placed on a stricter schedule, with three issues per year and target dates of January 1, June 1, and Sept 1. (We still ask for donations of material, editorials, announcements, and other news. We would like to open this forum to greater participation by members). The Busenburg Memorial Funds have now been applied towards student travel, and this year should see students reaping the benefits of these and the Landhal travel funds to attend our annual meeting. The Okubo Fund for scientific Excellence is growing. We hope to award periodic prizes from the interest earned from this fund. A committee consisting of Lee Segel, Simon Levin, and Don Ludwig has been appointed to oversee this process. We are involved in negotiations with Elsevier, and other potential publishers of our official research Journal, the Bulletin of Mathematical Biology (see details this newsletter) to reduce price to libraries and ensure a wide dissemination.

With this last message, I would like to thank you for your support and encouragement these past two years. I look forward to continued association with the Society as a regular member in the coming years.

Sincerely yours,

Leah Edelstein-Keshet

Dear SMB members,

First I want to thank Leah Edelstein-Keshet for the fantastic job she has done as President of SMB. She has devoted a great deal of time and effort to SMB always doing so with great skill, tact, and attention to detail. The SMB has flourished under her Presidency.

Over recent years there has been increasing recognition that mathematical and computational approaches are needed to understand biological systems. The SMB must continue to provide a mechanism for communication and dissemination of information in this area. I plan to continue the current efforts in several different directions. As mentioned by Leah, there is a reconsideration of the publisher of the Bulletin for Mathematical Biology. It is essential that the Bulletin remain healthy and that it make maximal use of electronic media.

The annual meetings will continue to provide an essential means for communication. The 1997 annual meeting, being held August 3-6 at North Carolina State University Annual SMB Meeting will feature Yoh Iwasa and Michael Waterman as plenary speakers. In 1999 arrangements are being made for an annual meeting to be held jointly with the European Society for Mathematical and Theoretical Biology, June 29 - July 3 in Amsterdam. This promises to be an important international event so place the dates in your calendar now. The annual meetings provide an ideal opportunity for students to present their work and to form lasting friendships; funds to facilitate student participation are awarded by the SMB.

The world wide web is revolutionizing the way information is communicated. As an example, I was impressed by Art Winfree's site , which among other goodies provides Winfree's technique to beat jet lag by judiciously timed applications of light. The SMB needs to continue to develop the SMB web site . Anyone with special ideas or skills should contact me at glass@cnd.mcgill.ca.

As the SMB grows it is essential to devote attention to administrative details. A finance committee consisting of Ray Mejia (chair), John Tyson, and Glen Webb has been established. The finance committee will oversee investments and budgetary matters - thanks to the committee for their help. A matter of concern is the membership lists. I expect that there have been some Society members lost in recent years as a result of missed communications. This is an important matter and will be a priority.

To close on a personal note. To many of us, the SMB is not simply a professional society, but a collection of lifelong friends and colleagues who view the living world with profound awe and respect. Yes, we share common scientific goals. But more striking to me are the strong commitments of many to a world where justice prevails and where life's diversity and richness can flourish. I am privileged to have been selected to the Presidency.

Sincerely yours,

Leon Glass

News about the Bulletin of Mathematical Biology



Historical Note about BMB

The Bulletin of Mathematical Biology is the official research publication of the Society For Mathematical Biology . BMB was originally called the Bulletin of Mathematical Biophysics when it was founded by Nicholas Rashevsky prior to 1972. When Rashevsky died, Mrs. Rashevsky transferred the ownership to Herb Landahl, who subsequently transferred it to SMB. Originally, BMB focused on abstract and theoretical work. Since Lee Segel took over as editor, in 1984, the emphasis has shifted to a greater biologically-relevant content, at the interface of theoretical and experimental biology.

Many members of the Society for Mathematical Biology take for granted the arrival of the six issues of the Bulletin of Mathematical Biology every year. This inexpensive and convenient research journal keeps us current, and brings many interesting and informative articles directly to our desks. The SMB membership fee of US \$50 for full members pays \$36 to the BMB publisher, Elsevier. Only \$14 from each regular member is returned to the Society. For students, who get membership to SMB at the low rate of US \$25, this journal is a particular bargain, as it is subsidized by the Society: Each student membership is topped up by \$11 from SMB funds to bring the journal subscription to our young members.

But a price for these unusually low Society fees is exacted ! In recent years, to cover the costs of printing and processing, our publisher has dramatically increased the cost of the Bulletin to institutional subscribers (e.g. libraries), with the result that many libraries have cancelled their subscription. Have you checked your local library for BMB recently? Even if you have a desk-copy of the Bulletin, consider these important reasons for having your institution subscribe: (1) availability of back issues, and ongoing issues to students, colleagues, and others who have interdisciplinary interests. (2) Ensuring the continuity of the archives in Mathematical Biology at a time when this area is becoming more important and timely. (3) Ensuring that the work of your colleagues and members of your profession is made available to as wide a readership as possible.

Though it may be tempting to ignore your library shortfall when BMB arrives promptly at your desk, and though there may be pressure to donate your (subsidized) copy to others or to the local library. Consider the fact that this hurts the Society for Mathematical Biology, whose health and vigor is intimately dependent on a healthy and vigorous BMB.

SMB is concerned about library attrition, and we are working in several directions to save our precious journal's wide dissemination. (A) We have opened up BMB for bids from competing publishers in an effort to get the best product for the most reasonable arrangement, and to win back the libraries that cancelled their subscription. (B) We ask you, our members to (a) talk to your librarians about keeping and renewing BMB : indicate your interest in preserving this journal on your University campus. (b) Find out what your library is prepared to pay for a continuing subscription (this helps our negotiations with the publishers) (c) Take an active role in promoting and showing pride in this fine journal. Thank you for your part in keeping our Society strong and healthy !

YEAR OF MATHEMATICS IN BIOLOGY AT THE INSTITUTE MATHEMATICS AND ITS APPLICATIONS

FALL 1998-SPRING 1999

PRELIMINARY ANNOUNCEMENT

To learn more about the IMA, please see their homepage at <http://www.ima.umn.edu/>.

The IMA believes the time is right for a Special Year in Mathematical Biology at the IMA in Minneapolis, Minnesota. The program will be built upon a selected series of workshops highlighting some of the mathematical challenges emerging from the consideration of biological issues. The focus will endeavor to show how the mathematics can be applied to the resolution of those issues. The following is a list of the three quarters each focusing on a different area of mathematical biology that has had profound success.

Theoretical Problems in Developmental Biology and Immunology

QUARTER 1- Fall Program: September 1- November 30, 1998

Organizers: J. Cook, B. Goldstein, C. Wofsy, L. Segel, P. Maini

- Workshop 1: **Pattern Formation and Morphogenesis: Basic Processes**, J. Murray, P. Maini and H. Othmer
- Workshop 2: **Pattern Formation and Morphogenesis: Model Systems**, J. Murray, P. Maini and H. Othmer
- Workshop 3: **Immune System Modeling and Cell Signaling**, A. Perelson, B. Goldstein, L. Segel, D. Kirschner
- Workshop 4: **Dynamics and Control of AIDS**, A. Perelson and D. Kirschner

Partial Differential Equations in Physiology

QUARTER 2- Winter Program (tentative): January 1- March 31, 1999

Organizers: L. Fauci, M. Reed, J. Sneyd, R. Tranquillo

- Workshop 1: **Intracellular Transport**
- Workshop 2: **Cell Signaling, Motility and Adhesion**
- Workshop 3: **Tissue and Organ Physiology**
- Workshop 4: **Animal Locomotion**

Global Change and Biodiversity

QUARTER 3: Spring Program (tentative): April 1- June 30, 1999

Organizers: S. Levin, C. Castillo-Chavez, S. Blower, R. Durrett, C. Neuhauser, P. van den Driessche, D. Kirschner

- Workshop 1: **Linkage Between Climate Change and Vegetation**
- Workshop 2: **Models of Schooling and Aggregation**
- Workshop 3: **Interacting Particle Models**
- Workshop 4: **Emerging and Re-emerging Infectious Diseases**

If you are interesting in participating or would like more information, please contact any one of the directors listed or the director of the IMA, Avner Friedman, at friedman@ima.umn.edu.

DEADLINE for applications for postdoctorate, long-term and short-term visitors is January 15, 1998.

A look at the Journals in the Field of Mathematical Biology

A Diversity Perspective, by DK

Evaluating the direction of mathematical biology may be more important today than ever before. I believe that part of this evaluation entails examining exactly who are the members of the Society of Mathematical Biology, and how we can best serve their goals of research, teaching and service.

To this end, I would like to present a diversity perspective of our society's members. This information was taken from the most recent membership list available (Fall, 1996).

Total Members: SMB	Total Female Members	Total Male Members	Total Non-USA members
558	100 (18%)	458 (82%)	240 (43%)

These numbers are interesting. First, 43% of our cohort are non-USA members. This statistic alone may warrant careful consideration of where we hold our annual meeting each year. Second, we know that female representation in mathematics is traditionally low (~20% *Notices of AMS*, 1996), and in the biological sciences traditional high (~ 42% *Science*, 1996). Yet, the 18% in SMB may signal that there is an under-representation of women amongst our group. As many women begin their scientific careers, it is clear better mentoring and 'advertising' efforts can and should be put into practice to encourage young scientists into this exciting field.

Other places that represent past, present and future directions for the field of mathematical biology are the journals that we publish in. I will present data for six of the top journals in mathematical biology; however, I point out that this is in no way a comprehensive list, but meant as an illustration using some of the most popular journals.

	Total no. of editors	No. of female editors	No. of male editors	No. of non-USA editors	No. of non-university editors (Govt or Industry)
Bulletin of Mathematical Biology	15	2 (1 repeat) (13%)	13 (87%)	10 (67%)	1 (7%)
Journal of Theoretical Biology	36	4 (1 repeat) (11%)	32 (89%)	22 (61%)	1 (3%)
Mathematical Biosciences	22	0 (0%)	22 (100%)	5 (23%)	3 (14%)
Journal of Mathematical Biology	9	0 (0%)	9 (100%)	4 (44%)	0 (0%)
Theoretical Population Biology	36	2 (6%)	34 (94%)	14 (39%)	3 (8%)
Journal of Computational Biology	53	2 (4%)	51 (96%)	10 (19%)	14 (26%) (note: only journal with Industry representation)

It is interesting that the non-USA members are well reflected in the editorship of the journals, while the female constituents are under-represented (and sometimes, non-existent!). There are a few individuals who appear on multiple editorial boards (at least 10); one individual serves on 4 of the above 6 journals boards. The table shows 1 repeat of female representation. These repeats may reflect the fact that the society originally started out with small numbers and responsibility was shared among the members. There are, perhaps, a smaller number of senior members than junior, represented in the total of 558 for SMB. Finally, we may have to do a better job recruiting individuals to join SMB; many of the (non-managing) editors on these boards are not members of the society.

SMB Presidents

1973-1997: 24 years of SMB Leadership

Below is a pictorial history of the presidents of SMB:

- In the September 1996 newsletter, there is a very nice article by Michael Conrad detailing the life history of the SMB. Please see it together with this pictorial history.



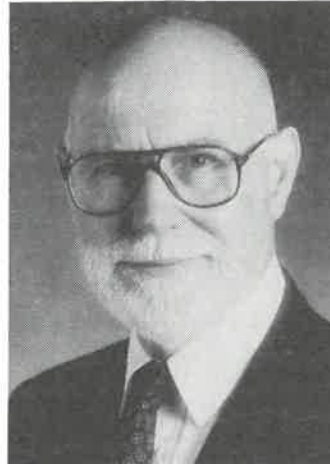
George Karreman:
1973-1981. Please see
memorial this newsletter.



Herbert Landahl:
1981-1983



John Stephenson:
1983-1985



John Jacquez:
1985-1987



Simon Levin:
1987-1989



Stuart Kauffman:
1989-1991
Photo by Daryl Black



Alan Perelson:
1991-1993



John Tyson:
1993-1995



Leah Edelstein-Keshet:
1995-1997



Leon Glass: 1997-
*(From a Daquerrotype
by Robert Shlaer)*

In Memory of GEORGE KARREMAN
Our First President



- Communicated by the Chairman of his department, Paul De Weer.
- His degrees: Drs. (Theoretical Physics), Ph.D. (Mathematical Biology), M.A. (Honorary, University of Pennsylvania)

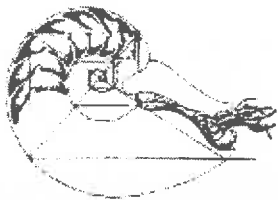
Dr. George Karreman was born on November 4, 1920 in Rotterdam, the Netherlands, the youngest of three sons. His father, from whom he most likely inherited his mathematical skills, was Chief Engineer for the Dutch Merchant Marine. George studied at Leiden University. He received his B.S. in Physics and Mathematics in 1939. He obtained his M.S. [*Doctorandus* (Drs.)] in Theoretical Physics in 1941 under professor Kramers one month before the University was closed. For the remainder of the second World War he "kept food on the table" by tutoring students.

After having seen A book on Mathematical Biophysics by Nicholas Rashevsky, in August 1948 he came to Chicago with a ten day visitor's visa and \$100 in his pocket and he contacted Rashevsky at the University of Chicago. He was awarded a University of Chicago Fellowship and completed a Ph.D. in Mathematical Biology in 1951. In 1950 he was only the third cardiac patient to undergo successful coarctation surgery at the University of Chicago. In 1953 he married Anneke Halbertsma and they moved to Cape Cod, Massachusetts where their first child, Grace, was born in 1954. Dr. Karreman worked as a scientific research Advisor to Dr. Albert Szent-Gyorgi at the Institute for Muscle Research at the Marine Biological Laboratory in Woods Hole. To access more advanced computers in 1957 he moved to Philadelphia, where he was appointed to Senior Medical Research Scientist at the Eastern Pennsylvania Psychiatric Institute. In 1958 his first son, Frank, and in 1962 his second son, Hubert-Jan were born. One month after his second child was born he was appointed Associate Professor of Physiology at the University of Pennsylvania School of Medicine. He worked at the Bockus Research Institute at the Graduate Hospital. In 1970 he was appointed professor of Physiology, a position he held until his retirement in 1983, when he was named the first Professor of Emeritus of Mathematical Biology. He continued to be active in research. Among his interests were: physiological irritability; biological energy transfer; quantum biology; system analysis of cardiovascular and other systems; cooperative and threshold phenomena; adsorption mechanisms.

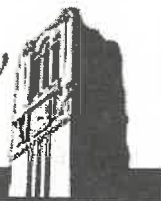
Dr. Karreman was Co-Founder (together with H. Landahl and A. Bartholomay) and first president of the Society for Mathematical Biology. He was also a member of Sigma Xi, the Physiological Society of Philadelphia, the American Physiological Society, the New York Academy of Sciences, the Franklin Institute, the Society for Supramolecular Biology and the Society for Vascular System Dynamics.

George was a devoted educator and an inspiration to his students, family, and friends. All of his children received advanced degrees from the University of Pennsylvania. He was an avid reader and chess player, and a devoted husband and father. In his later years he developed an interest in painting and sculpture and traveled frequently to the Pacific Northwest to be with his son and daughter and their families.

Dr. Karreman passed away on February 27, 1997 at the age of 76. He is survived by his wife Anneke, his children Grace, Frank and Hubert-Jan, Daughter-in-law Jennifer, Grand-daughter Nancy, brother Herman, and sister-in-law Erna. A memorial service was held at the Unitarian Church in Devon on March 6.



NC State University
Raleigh, NC



1997 SMB Annual Meeting

<http://www.stat.ncsu.edu/smb/>

Registration and Abstract Forms Now Available!

Plenary addresses by

Yoh Iwasa

Michael Waterman


Sponsored by PPD PHARMACO

The SMB annual meeting will be 8 am, Sunday, Aug. 3 to noon, Wed., Aug. 6, 1997 at North Carolina State University in Raleigh, NC. The NCSU Biomathematics Graduate Program will serve as the local host with additional local support from other biomathematicians in the Research Triangle Area.

The program will include sessions on a diverse set of topics (excitable media, immunology, molecular biology, pharmacokinetics and toxicology, ecology, biofluid dynamics, etc) with a format of 1 or 2 invited speakers per session followed by contributed papers. The role of complexity, computation and stochastics will be emphasized. For graduate students, several talks/discussion groups by non-academic biomath folks are planned.

PPD-Pharmaco is also sponsoring a \$150 award for the best contributed paper in bioinformatics and a \$150 award for the best contributed paper in pharmacokinetics and toxicology.

A computing lab (30 Sun workstations) has been reserved in the evenings for demos, e-mailings, etc. Registered participants will have guest accounts. The sessions will be on-campus near the NCSU biomath office and computing lab.

 Coffee will be provided by Starbucks.

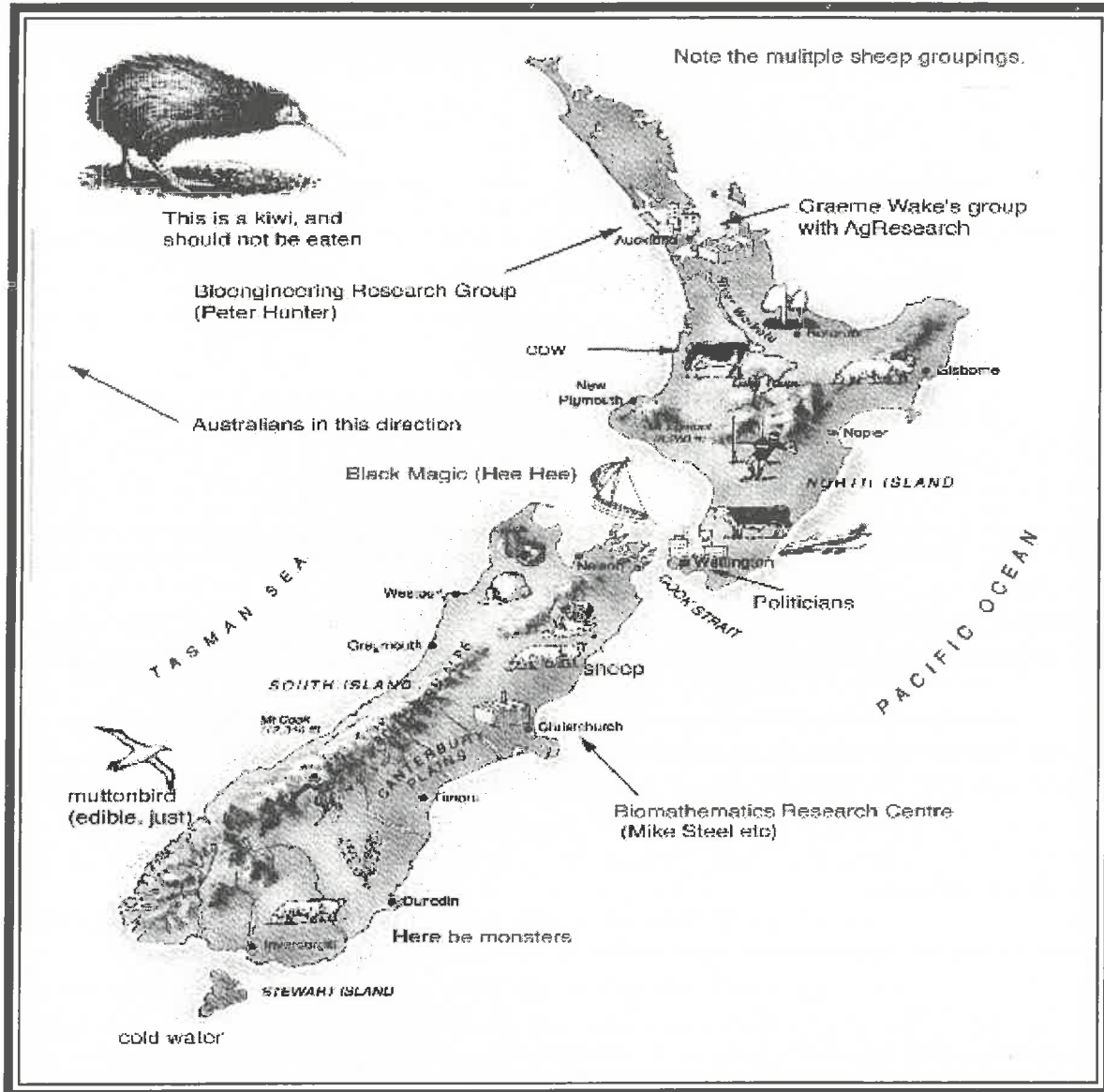
There are two housing options, both contiguous to campus, 1/4-1/2 mile from lecture rooms:

- Brownstone Hotel, 1707 Hillsborough St., \$62/ room single, \$72/room double, \$76/room triple, swimming pool, A/C, free shuttle service is provided from Raleigh Durham airport
- University Towers,(private modern dorm) 111 Friendly Drive, \$35/room single, \$17.50/person for

double occupancy, bathroom shared with adjacent room, swimming pool, A/C, meal plan (3 meals) \$14.50/day.

Mathematical Biology in New Zealand

A kiwi's eye-view, by James Sneyd



Recently, I spent just over two years working in New Zealand (my native country), and was impressed by the number and quality of research projects in the field of mathematical biology and bioengineering. In some ways, researchers in the United States, myself included, are an insular group, unaware of much work that is going on in other countries. This is indeed a shame, as many countries offer unique opportunities to the mathematical biologist. For instance, pest control is of vital importance to the New Zealand economy, and mathematical models can, and have already, played a vital role in the development of control strategies. Similarly, New Zealand has a large number of endangered species, so models of species preservation have an important role to play, while the unusual flora and fauna offer unique opportunities to the evolutionary biologist.

Since I am sure that many readers will have only a vague notion of what, or where, New Zealand is, let me begin with an introduction. Firstly, I state for the record that New Zealand is in fact a country. Not part of Australia, to which other country it happens to be physically close, a fact that causes considerable malicious confusion. It can be found about a thousand miles south-east of Australia, and consists of three major islands and a large number of smaller ones. The economy of New Zealand is based largely on sheep and cows, of which there are a very great many, and trees, of which there are also a great many, but they are counted less frequently. With a land area approximately that of Great Britain, and a population of somewhere between 3 and 4 million people, life there is uncrowded. Probably the most attractive aspect of the country, apart from the scenery, is that nobody knows who O.J. Simpson is. The principal religion is rugby.

Because the economy is so closely tied to primary production there is tremendous interest in, and support for, the study of ecological systems and the biology of populations. These topics are the principal focus of one of the major groups in mathematical biology in New Zealand, the University of Auckland and AgResearch Mathematical Biology Research Unit, headed by Graeme Wake (<http://www.math.auckland.ac.nz/~wak>). This group consists of a number of faculty members of the University of Auckland working closely alongside scientists in an Agricultural Research facility. Two present PhDs are working on Hill-land sustainability, earthworm activity and soil sulphur dynamics, while projects in the recent past have included animal growth processes, a stochastic model for ecological competition, cell-growth models in plants, and models for possum populations.

This last topic, the study of possums (and don't ask me what their Latin name is, I wouldn't have a clue), is an area in which many groups have worked, as the problem is central to the New Zealand economy and environment. Possums were introduced to New Zealand in the middle of last century, and, in the absence of significant predation, have expanded until now they can be found in almost every part of New Zealand. Not only do they destroy the native vegetation almost as efficiently as people do, they also are the principal reservoir of bovine tuberculosis. Since it is best to know thine enemy, a great deal of effort has been put into determining possum behaviour, and the best ways to kill them. (Interestingly, much the same thing can be said of rabbits, as the only good bunny is a dead one, but I know of much less modelling work done on rabbit populations in New Zealand.) As well as the work done by Graeme Wake's group, other principal players in the quantitative study of possum are Nigel Barlow and Murray Efford. Efford's model has made a particular effort to incorporate detailed spatial information for specific regions, and is one of the few models of this type I have seen. For instance, if possums need to be controlled in a specific region, then how should the kill be best distributed for maximum effect? A model can be a useful tool for answering this question.

Some of Efford's later work was done in collaboration with the Biomathematics Research Centre (BRC) at Canterbury University, another of the major research groups (<http://www.canterbury.ac.nz/math/biomath.html>). The BRC was established in 1996 and is directed by Mike Steel and David Wall. It has research efforts in a number of fields in addition to the work on possums described above. Principally, Mike Steel is an internationally recognised researcher in the field of evolutionary genetics. His collaboration with Mike Hendy and Dave Penny, both of Massey University, is now of some years standing, and has resulted in major advances in algorithms for the reconstruction of evolutionary trees. As an application of the theory, the group has studied the origin of native New Zealand fauna such as the kiwi and the moa. The kiwi, let me add, is a small brown flightless bird, not a small brown fuzzy fruit, which is actually called a kiwifruit. A trivial point you might think, and you would be right, but I still find it odd to hear people talking about eating kiwis. Moas are large brown flightless birds, now long extinct.

Another major research program at the BRC studies the physiology of neuroendocrine cells, and is led by Andrew LeBeau, David Wall, Bruce Robson, and Alan McKinnon. Its goal is to understand the mechanisms controlling the secretion of adrenocorticotrophic hormone (ACTH) from anterior pituitary corticotrophs, and is presently focusing on the cellular mechanisms of ACTH release. One major stimulus for this work was the wonderful experimental work of Cliff Irvine and Sue Alexander. They insert a cannula into the facial vein of a conscious horse, and then manipulate the cannula via a venous pathway unique to the horse such that the cannula ends in a position immediately below the pituitary. This allows the determination of pituitary hormone output with much greater accuracy than that obtained by sampling from the peripheral circulation. I am told this doesn't hurt the horse at all; if it did, one would be tempted to try the experiment on lawyers.

Probably the best known biomathematics research group in New Zealand is that of Peter Hunter, in the Engineering Sciences department of Auckland University (<http://www.esc.auckland.ac.nz/Groups/Bioengineering/>). This group studies the biochemical, mechanical and electrical properties of the heart, and has an extensive web of collaborations with other researchers overseas, as well as with experimentalists within New Zealand. Their research projects are far too numerous to list here, but their major contribution is probably the construction of a three dimensional finite element model of the heart based on finite deformation elasticity theory. This model incorporates some of the most detailed measurements of cardiac fibre architecture yet taken, includes interactions between electrical and mechanical effects, and more recent versions have

even included data on the coronary circulation and cardiac energetics. Many people around the world have been involved in this work, including Denis Noble, Sasha Panfilov, Jim Bassingthwaite, and Andrew McCulloch.

Although I have only been able to give the briefest description of biomathematical research in New Zealand, I hope it is clear that there are many possibilities there for the biomathematician, whether interested in population level models, or cellular electrophysiology. As elsewhere in the world, mathematical biology is one of the fastest growing areas of applied math, and will continue to be so for the foreseeable future. Even in such a far-flung corner of the globe, progress cannot be denied.

Pacific Northwest Workshop in Mathematical Biology
by: L.G. de Pillis, Department of Mathematics, HMC

This year's Pacific Northwest Meeting in Mathematical Biology (PNWMMB'97), organized by David Wollkind and Ed Pate, was held on the campus of the University of Washington in Pullman (March 22--24). Meeting participants were graduate students and researchers in mathematics, biology, genetics, ecology, zoology, biochemistry, and various combinations thereof.

The broad areas addressed by the 21 speakers during the three-day conference included excitable systems and neurobiology, muscle mechanics, and ecological systems. An excellent mix of fascinating problems and solution approaches was presented. One came away with the sense that much progress has been made on several fronts in mathematical biology; and that there still remain many open and important questions that must be pursued.

A highlight of the meeting was the Sixteenth Annual T.G. Ostrom Lecture in which Nancy Kopell of Boston University spoke on "Networks of Neurons as Dynamical Systems: Biophysics to Geometry". In her talk, Kopell, a National Academy of Sciences member, described several case studies in which she emphasized some of the many challenges intrinsic to understanding synchronization and phase relationships in networks that produce rhythmic output.

Presentations by other meeting participants included a description of pancreatic beta-cell bursting, a model for understanding the role of surface diffusion in biology, a method for reducing the dynamics of a mutually inhibited coupled network of neurons to a one-dimensional map, models of muscle mechanics, an approach to detecting oscillations in differential equations solutions using saddle points as indicators, a comparison of Turing pattern theory with experimental data, and models for understanding the behavior and cohesiveness of locust swarms. Our research endeavors are evolving from attaining understanding about single biological elements to developing descriptive theories of collected elements in interconnected biological networks.

Saturday night a panel discussion was held, in which the current and future state of mathematical biology was addressed. The panel was made up of Leah Edelstein-Keshet (UBC), Ed Pate (WSU), Robert Miura (UBC) and Tom Daniel (U of W). A lively interchange between audience and panel members ensued, in which topics arose ranging from the question of what are the up and coming areas in mathematical biology to what an academic advisor's responsibilities are to students needing career guidance, to what background and training a good mathematical biologist should have -- should students be trained as mathematical biologists, per se, or should they be encouraged to focus their studies more in either mathematics alone, or biology alone? One answer to this last question was offered by Tom Daniel, who opined that a good mathematical biologist would be "not so much a half-breed, but a cross-dresser".

Whether the conference participants would be inclined to label themselves as half-breeds, cross-dressers, or something else altogether, there is no question that, amusing categorizations aside, many have already enriched the field with exciting, relevant and timely work. The conference atmosphere was congenial and relaxed, and much positive interaction took place. The organizers are to be congratulated for orchestrating a highly successful and enjoyable meeting.

Announcements: Conferences and Events

The Announcements on this page come from a variety of sources, including the SMB Digest

The Society for Mathematical Biology Annual Meeting, 1997

Sunday, Aug. 3 to Wed., Aug. 6, 1997 at North Carolina State Univ. in Raleigh, NC.

The NCSU Biomathematics Graduate Program will serve as the local host with additional local support from other biomathematicians in the Research Triangle Area.

The program will include sessions on a diverse set of topics (excitable media, immunology, molecular biology, pharmacokinetics and toxicology, etc) with a format of 1 or 2 invited speakers per session followed by contributed papers. The role of complexity, computation and stochastics will be emphasized.

For more information, contact Charlie Smith at bmasmith@eos.ncsu.edu, voice mail 919-515-1907, FAX 919-515-1909.
<http://www.stat.ncsu.edu/smb/97meeting.html>

International Conference on Deterministic and Stochastic Modelling of Biointeraction Destobio'97 August 28th - 31st, 1997, Sofia, BULGARIA

We announce the above international conference organized by the Institute of Mathematics and Informatics and the Central Laboratory for Parallel Processes at the Bulgarian Academy of Sciences. This meeting will be held in Sofia, the Capital of Bulgaria. Topics of the conference include: **Deterministic and stochastic approaches to mathematical modelling in population dynamics; epidemiology; immunology; genetics; neurophysiology; molecular biology; cell biology; pattern formation; bioecology; Computational biomathematics.**

COMMUNICATION: E-mail is preferred. A registration form should be completed. Unless the prospective participant requests ordinary mail or fax, all information will be sent electronically. Send e-mail to destobio@ischg.acad.bg and ordinary mail to Dr. Tanya Kostova, Institute of Mathematics, Bulgarian Academy of Sciences, Acad. G. Bonchev str., block 8, 1113 Sofia, Bulgaria fax: (+3592) 971 36 49
<http://www.math.acad.bg/special/destobio.html>

Cells "Biological, Medical and Ecological Aspects": Mathematical Models and Methods

Saint-Flour, June 14-15, 1997.

Organized by P. Auger, President of the F.S.T.B, O.Arino, M.Kimmel, J.C.Poggiale, P.Tracqui

The French Society for Theoretical Biology invites participation and contribution to a two-day Conference. The Conference follows a Summer School on Biology and Mathematics of Cell Proliferation. It will focus on mathematical models of cells on a variety of subjects including Mechanisms of the cell cycle, molecular to population level; Cells in the chemostat; Cell migration; Cell population models of the HIV infected immune systems and others.

Each day, there will be a single session. In order to allow the largest number of contributions each speaker will be given 20 mn (including questions and comments). About 50 talks will be presented during the two days. Due to the limitation of space, attendance will be limited to a maximum of 100 people.

Deadline for applications: February 28, 1997. For more information, or an application form, please contact Ovide Arino, Department of Mathematics, University of Pau, 64000 Pau, France, ph: (33)5 59 80 83 18, fax: (33)5 59 92-32-00, e-mail: arino@crisv2.univ-pau.fr

International Conference on "Control of Oscillations and Chaos" Saint-Petersburg, RUSSIA, August 27-29, 1997

ORGANIZERS: St.Petersburg Informatics and Control Society, St.Petersburg State University, Institute for Problems of Mechanical Engineering of Russian Academy of Sciences

For information please contact: Prof.A.L.Fradkov, The Institute for Problems of Mechanical Engineering, 61 Bolshoy ave. V.O., 199178, St.Petersburg, RUSSIA, Tel: +7(812)217-8185, Fax: +7(812)217-8614, E-mail: coc97@ccs.ipme.ru

Information can also be obtained from the web-site in Russia <http://www.ipme.ru/coc97.html> or the USA web site <http://www.egr.uh.edu/Departments/ECE/Conferences/coc97.html>

Bio-Computing and Emergent Computation Sept 1-2,1997 Skovde, Sweden

BCEC97 is intended to be a general forum for presenting and disseminating current research in biocomputing and emergent computation. The aims are to strengthen this research area in Sweden and to allow researchers to discuss and identify: common approaches, models and techniques; appropriate levels for explaining emergent computation and cognition; future developments in biological hardware and bioengineering; short-term and long-term applications.

For more information visit the WWW page <http://www.his.se/ida/~bcec/or> contact

Bjorn Olsson, Department of Computer Science, University of Skovde, Box 408, 541 28 Skovde, Sweden; phone +46-500-464716, fax +46-500-464725, email bjorne@ida.his.se <http://www.his.se/ida/~bjorne/>

Meeting in Honor of Darcy Thompson

Sept 20-24, 1998 in Dundee, Scotland

Information is not currently available, but contact the organiser, Mark A.J. Chaplain at <http://www.mcs.dundee.ac.uk:8080/~chaplain/>

Dr. Mark A.J. Chaplain, Department of Mathematics and Computer Science, University of Dundee, Dundee DD1 4HN, e-mail: chaplain@mcs.dundee.ac.uk tel: 01382 345369 FAX: 01382 345516

Mobil Computing in the Field

25-26, September 1997 University of Kent, Canterbury, UK

The Mobile and Context-aware Computing Group at UKC is organizing an interdisciplinary conference on the use of mobile computers, Global Positioning Systems and mobile communications to support fieldwork. It will interest ecologists, environmental scientists, archaeologists and other fieldworkers, and computer scientists and engineers interested in the challenges which fieldwork presents.

For more information see the web page http://www.ukc.ac.uk/computer_science/Html/MobiComp/ or contact: Dr David R. Morse, Email:

D.R.Morse@ukc.ac.uk Computing Laboratory, Phone: (01227) 764000 extn 7571 University of Kent, Direct dial: (01227) 827571 Canterbury, Fax: (01227) 762811 Kent CT2 7NF. United Kingdom

Pacific Symposium on Biocomputing

January 4-9, 1998 Kapalua, Maui (Hawaii)

The third Pacific Symposium on Biocomputing (PSB), will be held January 4-9, 1998 in Maui, Hawaii. PSB will bring together top researchers from North America, the Asian Pacific nations, Europe and around the world to exchange research results and address open issues in all aspects of computational biology. PSB will provide a forum for the presentation of work in databases, algorithms, interfaces, visualization, modeling and other computational methods, as applied to biological problems, with emphasis on applications in data-rich areas of molecular biology. PSB intends to attract a balanced combination of computer scientists and biologists, presenting significant original research, demonstrating computer systems, and facilitating formal and informal discussions on topics of importance to computational biology. Paper submissions due: July 14, 1997 Notification of paper acceptance: August 22, 1997 Final paper deadline September 22, 1997 Abstract deadline October 1, 1997 Meeting January 4-9, 1998

For more information see the web page <http://www.cgl.ucsf.edu/psb> or contact: Norma Belfer PSB Conference Coordinator UCSF Computer Graphics Laboratory Box 0446 513 Parnassus Avenue San Francisco, California 94143-0446 email: psb@cgl.ucsf.edu fax: +1 (415) 476-0688 tel: +1 (415) 476-5128

Mathematical Modelling in Medicine

25,26 September, 1997 Roskilde University, DENMARK

The BioMath Group at Roskilde University is involved in the development of advanced simulators which can be used as laboratories for cognitive studies of medical reasoning in various critical situations (e.g. anaesthesia, cardiological intensive care units). Construction of advanced simulators must be based on deep detailed mathematical models of physiological processes. Consequently, an important goal of the BioMath Group is to develop, implement, and validate models based on fundamental physiological and biological principles. This conference will focus on these fundamental goals. The work is inherently interdisciplinary and the conference will bring together medical experts in physiology and anaesthesiology, mathematical modelling and cognitive engineering.

For more information contact: Johnny Ottesen: tel. +45 46757711 ext. 2298, fax: +45 46755065, email: johnny@ruc.dk., or Stig Andur Pedersen: tel. +45 46757711 ext. 2265, fax: +45 46755065, email: sap@ruc.dk. at: IMFUFA, RUC, Postbox 260, DK-4000, Roskilde, Denmark

Fifth International Conference Mathematical Population Dynamics

June 20 - 24, 1998 in Zakopane, Poland

The Fifth International Conference on Mathematical Population Dynamics will be an interdisciplinary forum where applied mathematicians, statisticians, engineers, computer scientists, biologists, epidemiologists, biomedical scientists and ecologists can share their experiences. It will concern mathematical modeling of populations at various levels, including biomolecules, genes and cells, and other topics of population biology, epidemiology and ecology. The meeting will focus on mathematical theory, model analysis and modeling of quantitative data in these fields.

For more information, please contact: Mr. Jaroslaw Smieja, Department of Automatic Control, Silesian Technical University, Akademicka 16, 44-101 Gliwice, POLAND E-mail: jsmieja@peach.ia.polsl.gliwice.pl Fax: (+48 32) 371165

Molecular Biophysics of the Cytoskeleton

August 18-22, 1997 Banff, Alberta, Canada.

The aim of this workshop is to review the state of the art in the field and to formulate the key questions which remain unanswered. Such a group of experts might outline possible schemes to attack these problems. Any solutions would undoubtedly involve both international and interdisciplinary collaboration. The ultimate purpose is to foster a multi-disciplinary investigation of the molecular biophysics of the cytoskeleton.

For more information see the web page <http://fermi.phys.ualberta.ca/~biophys/> contact: Jack Tuszynski, Phone: (403) 492-3579, Dept. of Physics, Fax: (403) 492-0714, University of Alberta, Email: biophys@phys.ualberta.ca, Edmonton AB T6G 2J1, Canada

LITERARY EVENTS

- **Population Biology: Concepts and Models**, Alan Hastings. Springer, 1997 / 240pp. \$49.95(cloth), \$21.95(paper). <http://www.springer-ny.com>
- **Weakly Connected Neural Networks**, Frank Hoppensteadt and Eugene Izhikevich. Springer, July, 1997 / 350pp. \$49.95.
- **Modeling Dynamic Biological Systems**, B. Hannon and M. Ruth. Springer, 1997 / 250pp. \$59.95.
- **Computational Biology of the Heart**, A. Panfilov and A.V. Holden. John Wiley, 1997 / 416pp. \$115.00. <http://www.wiley.com>
- **Interactive Differential Equations**, Beverly West, Steve Strogatz, JM McDill and John Cantwell (software-Hu Hohn). It is an Educational software package. Go to <http://www.awi.aw.com/> and choose mathematics and then choose the software by title. To order a review copy of the CD and instructor's manual, please contact Bill Danon at billda@aw.com and send him your mailing address.
- **Advances in Mathematical Modeling of Biological Processes**, Denise Kirschner, editor, in: *International Journal of Applied Science and Computation* This is a memorial issue dedicated to Betty Tang. Contact Suhrit Dey at cfskd@eiu.edu to order a copy at \$40.00.



NEW WILEY TITLE

COMPUTATIONAL BIOLOGY OF THE HEART

ALEXANDER V PANFILOV, UNIVERSITY OF UTRECHT, THE NETHERLANDS
ARUN V. HOLDEN, UNIVERSITY OF LEEDS, UK (eds)
ISBN 0-471-96020-9 1997 300pp cloth \$115.00

Description

This book explores computational approaches to cardiac electrophysiology. It discusses various computational models and techniques, and applies them to visualizations and reconstructions of both normal and pathological propagation in mammalian and human hearts. The book uses non-linear biological and physiological models in form and uses techniques of ordinary differential equations, partial differential equations and eikonal equations. Reviews state-of-the-art methods. Provides readers with sufficient mathematical and computational details to use the methods in practice.

Partial Contents

Modelling Cardiac Excitation and Excitability (M Boyett, et al.)
Modelling Propagation in Excitable Media (A. Holden & A. Panfilov)
Rotors, Fibrillation and Dimensionality (A. Winfree)
A Mathematical Model of Cardiac Anatomy (P. Hunter, et al.)
Finite Element Methods for Modelling Impulse Propagation in the Heart (J. Rogers, et al.)
The Effects of Geometry and Fibre Orientation on Propagation and Extracellular Potentials
in Myocardium (J. Keener & A. Panfilov)
Forward and Inverse Problems in Electrocardiography (A. van Oosterom)
Computational Electromechanics of the Heart (P. Hunter, et al.)

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