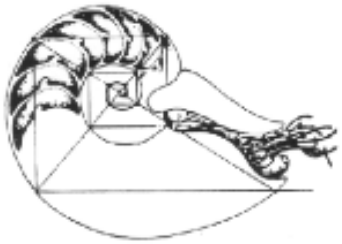

Mathematical Biology Newsletter

Volume 15 #3 – September 2002

The Society for Mathematical Biology
http://www.smb.org

Edited by: Elizabeth H. Scholl

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September 2002

Dear members of the Society for Mathematical Biology,

In preparation for our members open meeting this year at Knoxville I went through some contributions the SMB makes to the world of mathematical biology and was impressed by the breadth of impact. I would like to share some of these contributions with you.

The annual meeting is an opportunity for members to share new research results and to interact. Thanks to Lou Gross and colleagues for organizing an excellent meeting at Tennessee this last July. Next year's meeting will be held in Dundee Scotland, August 6-9, 2003.

The Society owns the Bulletin of Mathematical Biology. This is a world class journal devoted to the interface of mathematics and biology. Both the journal impact factor and number of electronic downloads per year have grown substantially in the last few years.

Training the next generation of mathematical biologists is crucial for our field. The Society is active in a wide variety of educational initiatives to initiate and promote education in mathematical biology. There are funds available for students (both graduate and undergraduate) to attend the annual SMB meeting and the Society supports students in travel to other math biology meetings. There is also a mentoring program to help students interact with senior faculty at the annual meeting.

Through world outreach support, the Society helps foster mathematical biology in developing countries. Much of this money goes to support meetings and help with travel when other funds are not available.

The activities in mathematical biology and of the Society are communicated to members through this newsletter. The newsletter is for the whole Society, and you are encouraged to contribute.

The activities listed here happen through the dedicated service of volunteers including committee chairs (see http://www.smb.org/officers.shtml) and the funds for the outreach are primarily generated by the Bulletin. Feel free to contact me, committee chairs or board members with ideas or requests. Thank you to those who volunteer their effort to make things happen in this Society!

Best wishes for a good fall season

Mark Lewis

Report on the Knoxville Conference and Meeting of SMB

submitted by Lou Gross

Over 170 researchers gathered in Knoxville from July 12-16, 2002 for a stimulating conference dealing with many aspects of mathematical biology. Along with numerous contributed talks and posters, the conference included several special mini-symposia organized on particular themes. These included: Cancer Modeling (organized by Robert Gatenby), Computational Biofluid Dynamics (organized by Eunok Jung), Education (organized by John Jungck), Evolutionary Theory (organized by Warren Ewens and Sergey Gavrilets), Infectious Diseases and the Evolution of Drug Resistance (organized by Sally Blower), and Structured Population and Community Modeling and Ecotoxicology in Honor of Tom Hallam's 65th Birthday (organized by Linda Allen).

Six plenary speakers provided surveys of recent research in a variety of areas of current emphasis in mathematical biology. The plenary speakers and their talk titles were:

- Sally Blower (Predicting the unpredictable: the transmission of drug resistant HIV)
- Lisa Fauci (Integrative models of swimming organisms)
- Michael Miller (Computational anatomy: an emerging discipline)
- Roger Nisbet (How useful for ecologists are simple population models?)
- Lee Segel (Controlling neurotransmitter release)
- Simon Tavaré (Inference from the fossil record: when was the last common ancestor of extant primates?).

The speaker at the closing banquet was Avner Friedman, who provided an overview of the objectives planned for the new NSF-funded Mathematical Biosciences Institute. Together there were over 100 talks presented in addition to 20 posters. Abstracts of all presentations are available on line through the web site at http://www.tiem.utk.edu/smb02/

The Conference received generous financial support from the National Science Foundation and GlaxoSmithKline. These funds allowed the Conference to provide partial financial assistance for attendance to over 40 students and post-doctoral researchers. SMB provided funds to support additional students and non-US attendees through the Landahl and Busenberg Endowment Funds and through World Outreach Committee funds. CPS Innovations sponsored a lunch on career opportunities oriented towards younger researchers that featured talks by Frank Tobin (GlaxoSmithKline), Maurizio Conti (CPS Innovations) and Gene Bruce (NSF). For the first time, a pre-conference short course was held, An Introduction to the Mathematics of Biological Complexity, funded by the National Institutes of Health. This short course, with presentations and computer-based workshop sessions led by Holly Gaff, Louis Gross, Suzanne Lenhart and Jason Wolf, was oriented towards biologists without strong quantitative training.

In addition to a performance of Scottish and Appalachian fiddle music presented by Betsy Hooper (who was joined by a few attendees, notably Steve Ellner on accordion), many Conference attendees took advantage of the opportunity to visit the Museum of Appalachia, or hear a concert by old-time musician Howard Amstrong in conjunction with the premier of a documentary that was broadcast on PBS ("Sweet Old Song") the following week. As a special treat, the University of Tennessee Departments of Mathematics and Ecology and Evolutionary Biology hosted a reception in honor of Tom Hallam's 65th birthday, which was attended by many of Tom's colleagues, friends and students.

The organizing committee for the conference was Louis Gross (Chair), Sergey Gavrilets, Eunok Jung, Suzanne Lenhart, Vladimir Protopopescu and Ed Uberbacher. The committee thanks all who attended for their contribution and appreciates the superb support provided by the University of Tennessee Conference Center, particularly the Conference Coordinator, Barry Neal.

Mentoring Program at Our Annual Meeting in Knoxville, Tennessee

submitted by Gerda de Vries

During the last three annual meetings, the SMB has run a mentoring program to benefit junior scientists. Junior scientists interested in the mentoring program sign up with the program coordinator, and are matched with a senior scientist attending the meeting. Matches can be made based on research interests or by special request. The goal of the mentoring program is to optimize the educational and professional experience of mentees attending the conference, and to assist the mentees' socialization into the field of mathematical biology.

This year, 14 junior scientists applied to be mentored, and a match was found for all applicants. Thanks to all the mentors for enthusiastically volunteering their time!

Both mentees and mentors found participation in the mentoring program to be a valuable experience. Many of the mentees commented that they very much appreciated the time spent with the mentor discussing their research and career options, and receiving feedback on their poster or oral presentation from their mentor.

We are planning to offer the program again at our annual meeting next year. Watch for announcements in future issues of this newsletter, in the electronic SMB Digest, and on the meeting web pages. For details on the objectives of the program and the process used to administer the program, visit the program web page at http://www.smb.org/mentoring.shtml.

Comments and suggestions are always welcomed (email devries@math.ualberta.ca).

A Report on the 5th Conference of ESMTB on Mathematical Modeling & Computing in Biology and Medicine.

submitted by Lisa Sattenspiel, Carl Panetta and Ramit Mehr

The 5th conference of the European Society for Mathematical and Theoretical Biology, on Mathematical Modeling & Computing in Biology and Medicine, was held in Milano, Italy from July 2-6, 2002. Events took place at both the University of Milano and the Politecnico. The conference brought together a variety of researchers from all over the world, including many graduate students and other young researchers.

The conference opened with an interesting lecture by Mimmo Iannelli on the life of Vito Volterra and his contributions to mathematical biology. There were also invited lectures, minisymposia, and contributed talks throughout the conference on a variety of topics including: Individual Based Models, Cell Signaling and Cellular Organization, Bioinformatics and Computational Biology, Infectious Diseases, Immunology, Evolution, Ecology, Stochastic Modeling, Cardiovascular Systems, Space and Patterns, Computational Neurosciences, and Tumor Growth and Therapy. At the end of the meeting the conference organizers announced that a proceedings volume will be compiled and published as a volume of the series MIRIAM (the Milan Research Centre for Industrial and Applied Mathematics).

At the social dinner, where the participants enjoyed a wonderful Italian meal, the ESMTB had several announcements of interest to members of the SMB. First, the society announced that it has adopted the Journal of Mathematical Biology as its official journal. Second, the society announced that it is considering reciprocal membership agreements with both the Society for Mathematical Biology and the Japanese Society for Mathematical Biology. The latter is an issue that is also under discussion by the SMB. The members of the SMB board welcome your input.

More on the meeting can be found at the website: http://ecmtb.mat.unimi.it/

SMB Financial Report

submitted by Torcom Corbajian

SMB finances continue to be in good standing with revenues exceeding expenses. Membership dues have continued at the same rate for the past several years. The Society has members in more than 50 countries worldwide. If you would like to sponsor a new member from a developing country, at a discounted rate, please contact the treasurer (torcom@smb.org) for details.

A New Institute in Mathematical Biosciences

Ohio State University

The National Science Foundation, Division of Mathematical Sciences, has recently announced an award of $10 million to the new Mathematical Biosciences Institute, which is located at the Ohio State University. For more details visit our web site: http://mbi.osu.edu

The program for September 2002 - August 2003 is mathematical biosciences. Below is a list of tutorials and workshops:

Tutorial on Neural Dynamics (September 2nd - 13th)

Workshop 1 - Neuronal Dynamics (October 7th - 18th)
Organizers: Bard Ermentrout, David Terman

Workshop 2 - System Level Modeling (November 18th - 22nd)
Organizers: John Rinzel, Barry Horwitz

Tutorial on Neural Coding (January 9th - 14th)

Workshop 3 - Neural Coding (February 10th - 14th)
Organizers: John Miller, Emery Brown

Period of Concentration (February 17th – 28th):

Functional Analysis of Nervous Systems: from tasks to implementation

Tutorial on Olfaction, Auditory and Sensory-Motor System (One week in March)

Workshop 4 - Olfaction (April 3rd - 5th)
Organizers: Bard Ermentrout, Alan Gelperin

Workshop 5 - Auditory (May 5 - 9)
Organizers: Catherine Carr, John Rinzel

Workshop 6 - Sensory-Motor System (June 9-13)
Organizers: David Terman, Charles Wilson

First Call for Papers

IPCAT2003
Fifth International Workshop on Information Processing in Cells and Tissues

September 8 - 11, 2003
Swiss Federal Institute of Technology Lausanne (EPFL)
Lausanne, Switzerland
http://lslwww.epfl.ch/ipcat2003

Description:

The aim of the series of IPCAT workshops is to bring together a multidisciplinary core of scientists who are working in the general area of modeling information processing in biosystems. A general theme is the nature of biological information and the ways in which it is processed in biological and artificial cells and tissues.

The key motivation is to provide a common ground for dialogue and interaction, without emphasis on any particular research constituency, or way of modeling, or single issue in the relationship between biology and information.

IPCAT2003 will highlight recent research and seek to further the dialogue, exchange of ideas, and development of interactive viewpoints between biologists, physicists, computer scientists, technologists and mathematicians that have been progressively expanded throughout the IPCAT series of meetings (since 1995). The workshop will feature sessions of selected original research papers grouped around emergent themes of common interest, and a number of discussions and talks focusing on wider themes. IPCAT2003 will give particular attention to morphogenetic and ontogenetic processes and systems.

IPCAT2003 encourages experimental, computational, and theoretical articles that link biology and the information processing sciences and that encompass the fundamental nature of biological information processing, the computational modeling of complex biological systems, evolutionary models of computation, the application of biological principles to the design of novel computing systems, and the use of biomolecular materials to synthesize artificial systems that capture essential principles of natural biological information processing.

Important Dates:

Paper submission:	February 28, 2003
Notification of acceptance:	May 28, 2003
Camera-ready copy:	July 11, 2003

For up-to-date information, consult the IPCAT2003 web-site: ttp://lslwww.epfl.ch/ipcat2003

Guidelines for SMB Financial Support for Travel to Meetings Other than the SMB Annual Meeting (revised July 2002)

submitted by Lisa Sattenspiel

Guidelines for support of SMB members for travel to meetings other than our annual meeting were revised at the last board meeting (July 2002). The following guidelines have been approved by the board of directors:

- Applicants must already be members of the SMB at the time funds are requested. Equal opportunity will be afforded all members with no discrimination on the basis of gender, race, age, sexual orientation, nationality, ethnic background, or religious belief.
- *Either the applicant or the applicant's referee must have been a member of the SMB for at least a year preceding the time of application.*
- Preference will be given to junior scientists (students, post-docs, and non-tenured junior faculty) who do not have sufficient travel funds from other sources, such as grants. Senior scientists with insufficient travel funds may also be supported, but with lower priority.
- Applicants must be active participants in the meeting for which funds are requested (i.e., must be giving a paper or poster or attending a relevant course).
- Funding will normally consist of no more than $500 US of support per request.
- Priority will be given to individuals who have not received a travel grant from the SMB within the last five years.
- Deadlines for funding requests will be March 15, July 15, and November 15 of each year, with decisions to be made within the two months following.

Application materials to be submitted:

1) A letter stating when and where the meeting will be held and how the proposed meeting will contribute to the applicant's research. Indicate applicant's professional status (i.e., undergraduate student, Master's student, PhD student, post-doc, etc.) as well.
2) A copy of an abstract for a proposed talk or poster. If no abstract is available, indicate more specifically what will be done at the meeting and why attendance is important for future career goals.
3) A copy of the applicant's C.V.
4) A statement of expected travel expenses, indicating the amount of funding received or requested from other sources.
5) A letter of recommendation from applicant's supervisor (if a student or post-doc) or colleague, including verification of applicant's professional status and need to attend the meeting for which funds are requested

Send application materials to:

Lisa Sattenspiel
Department of Anthropology
107 Swallow Hall
University of Missouri
Columbia, MO 65211 USA

Email: SattenspielL@missouri.edu
Fax: (573) 884-5450

Note: If applying after August 2003, please check website or newsletter for any changes in submission details.

A Report of the Co-Chairs of the Gordon Research Conference in Theoretical Biology and Biomathematics

submitted by Claudia Neuhauser, University of Minnesota, co-chair and Alexander Mogilner, UC Davis, co-chair

The 2002 Gordon Research Conference (GRC) in Theoretical Biology and Biomathematics took place in Tilton, New Hampshire, from June 9 to June 14, 2002. The overarching theme was complex networks; the talks ranged from genes to ecosystems. About 100 participants gathered in the informal setting of a boarding school in Tilton to discuss current research topics in phylogenetic trees, visual cortex, Parkinson disease, chemotaxis, morphogenesis, global environmental changes, gene regulation networks, and transcriptional regulation. The conference concluded with a discussion of computational biology in a changing scientific culture. The speakers were a mix of junior and senior scientists, which is typical of Gordon Research Conferences. The program and abstracts are still available on the web (http://math.ucdavis.edu/mogilner).

Traditionally, the conference has strived to span a large range of topics to encourage theoretical and mathematical biologists with diverse research interests to participate. The breadth of this conference is particularly exciting for young scientists who make up a large fraction of the participants. Since senior scientists make an effort to introduce junior scientists to established researchers, this conference also provides an unusually nurturing environment for graduate students and postdocs.

This year, an impromptu afternoon session on “Women in Mathematical and Theoretical Biology” was held to address the persistent problem of a lack of women at all academic levels in mathematical research, including higher level administrative positions (department heads and deans). Though the situation has been improving, there are still few women faculty employed in mathematics departments at major research universities. This lack of role models continues to discourage students from pursuing a career in theoretical or mathematical biology. Many young scientists also question the feasibility of juggling a career and family; this problem needs to be addressed much more aggressively by both university administrations and funding agencies.

The form of Gordon Research Conferences is very conducive to informal discussions among participants. GRC does not allow any recordings of the talks or dissemination of results through conference proceedings or other reports, which encourages speakers to discuss unpublished research and provocative hypotheses. Talks are held in the mornings and after dinner; afternoons are free and used for informal sessions and one-on-one discussions. A large number of posters were presented that resulted in lively discussion among the participants. In addition, canoeing trips, hiking, and excellent food facilitated scientific exchange.

Reflecting recent trends, many sessions and talks were devoted to explosively growing areas of bioinformatics, genomics, proteomics (and other –tics and –mics), such as phylogenetic trees, gene and transcriptional regulation networks, and computational biology in general. These sessions highlighted the importance of ‘discrete mathematics’ (as compared to traditional methods of analysis and differential equations).

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The participants received a clear message that mathematical biologists must 'speak biology' to contribute to biology: models and data from empirical studies must be combined. Mathematical models that are only loosely motivated by real systems may very well contribute to mathematics but may have little impact in biology. The tight link between empirical and theoretical studies was nicely demonstrated in the neuroscience talks where theoretical neuroscience talks were complemented by experimental talks, and in the talks on ecological topics where global ecological models were directly linked to data.

Very thought provoking was the last session. Dr. Charles DeLisi, one of the pioneers of the human genome project, talked about perspectives and challenges in genomics and proteomics. Dr. Marvin Cassman, former head of NIGMS and NIH, now director of the QB3, the Institute for Quantitative Biomedical Research, spoke about 'collectivization' and 'industrialization' of modern biology driven by a shift in funding philosophy among federal funding agencies. He compared the changes in biology to the changes occurring in human societies when the switch from hunters to gatherers occurred. This paradigm resulted in a lively discussion about the value of 'big science' where individuals' contributions are frequently obscured by the compartmentalization of large projects versus the value of highly individualistic science where the entire project is carried out by few individuals.

A number of talented young researchers presented talks that promise a bright and exciting future for mathematical biology. To name but a few, Dr. Ed Munro, who just finished his Ph.D. with Dr. G. Odell, dazzled us with computer movies. Drs. Oudenaarden and Levchenkos' talks pointed us to where the future of mathematical biology lies: experiments and theory combined in the same project.

The participants gave the conference high marks and unanimously voted for continuation of this conference series. The 2004 meeting will be chaired by Dr. Tim Elston (University of North Carolina) and Dr. Ray Mejia (NIH); Dr. Paul Bressloff (University of Utah) will be vice chair in 2004 and chair in 2006. Input on the content of these meetings is always solicited from the entire mathematical biology community. One of the most important issues when organizing this conference remains the balance between a conference that is too narrowly focused and thus only attracts a limited number of people, and a conference that is so broad as to lose attractiveness.. In addition, the conference needs to be well balanced with respect to theoretical and empirical talks. This year's conference saw a large number of new faces with very diverse backgrounds, from exclusively experimental to hard core mathematics, but a smaller number of 'founding fathers and mothers' compared to previous years.

This conference is held every other year, typically at the same time of the year and in the same place. Come and join us in 2004!

NSF Postdoctoral Fellowships in Interdisciplinary Informatics

NSF has announced the following opportunity for postdoctoral training that connects the Mathematical and Physical Sciences with the Biological Sciences. This program is particularly seeking candidates with training in one of the Mathematical and Physical Sciences who are interested in further training to work on problems in the biological sciences.

"The Directorate for Mathematical and Physical Sciences (MPS) and the Directorate for Biological Sciences (BIO) have established a formal partnership for the support of research that crosses the disciplinary boundaries between the mathematical and physical sciences and biology. As part of this partnership, MPS and BIO are announcing joint sponsorship and expansion of the Postdoctoral Fellowships in Biological Informatics, now renamed Postdoctoral Research Fellowships in Interdisciplinary Informatics. These fellowships provide opportunities for interdisciplinary research and educational activities in biology and informatics to a wide range of recent doctoral recipients. The program is being expanded to include chemists, physicists, mathematicians, statisticians, computer scientists, and others who seek to conduct research on biological questions using informatics tools and methods."

The full text of the announcement, including application details, can be found at the URL: http://www.nsf.gov/pubs/1998/nsf98162/nsf98162.htm Questions about the program can be addressed to either Carter Kimsey (ckimsey@nsf.gov or 703-292-8470) or Denise Caldwell (dcaldwel@nsf.gov or 703-292-7371).

EUROCAST 2003

Ninth International Conference on Computer Aided Systems Theory

February 24-28, 2003 - Casa de Colón, Las Palmas de Gran Canaria
Canary Islands, Spain

The conference consists of the following Workshops, having a common emphasis in the use of formal methods in modelling and simulation.

- Workshop "CS": Modelling Complex Systems
  Franz Pichler (Linz), Roberto Moreno-Díaz (Las Palmas)

- Workshop "NAN": Modelling Natural and Artificial Neurons and Nets
  José Mira (UNED Madrid), Roberto Moreno-Díaz (Las Palmas)

- Workshop "NI": Neuroinformatics and Neuroimaging
  Juan Ruiz-Alzola (Las Palmas), Carl-Friedrik Westin (Harvard, MIT)

- Workshop "CMB": Computational Methods in Biomathematics
  Luigi Maria Ricciardi (Naples)

- Workshop "DC": Methods and Techniques for Distributed Computing
  José Luis Freire-Nistal (La Coruña)

More information at http://www.ciber.ulpgc.es/iuctc/spain/eurocast/

Postdoctoral Position Available

Notre Dame University
Biocomplexity: Multi-Scale Modelling of Avian Limb Development

We seek a postdoctoral fellow to participate in a five-year NSF funded collaboration between research groups at University of Notre Dame, Indiana University, Bloomington, the University of Missouri, New York Medical College and Emory University. This project develops a multi-scale (genetic, cellular and supercellular) understanding of complex organ formation, focusing on avian limb development as a model for general organogenesis. The project has experimental, computational, and theoretical components. The theoretical/computational goal is to develop an integrated simulation of limb development based on our existing reaction-diffusion equation framework and simulations of cell sorting and chemotaxis in cell aggregates. Our objective is to integrate additional cell level processes (formation of extracellular matrix, haptotaxis, and cell anisotropy) and subcellular descriptions (gene expression and regulation, modelling of cell signaling, cytoskeletal properties) to produce a flexible net-distributed package that can be customized to model other embryonic organogenesis. Experimental goals include quantitative studies of cell adhesion, molecule distributions, measurements of cell mechanical properties (surface tensions and viscosities), chemotactic secretion and response, tracking of gene expression and production of cell adhesion molecules and ECM production during limb formation.

The applicant should have a strong background in modelling and analysis of pattern formation in biology including knowledge of properties of reaction diffusion-systems and should have extensive experience in computer simulation of complex systems. Ph.D.'s in Mathematical or Theoretical Biology, Applied Mathematics, Computer Science or Physics will all be considered.

The starting date for this position will be November 1, 2002. Initial appointments will be for one year, renewable for up to three years.

Contact:
Please send inquiries or applications to: Prof. Mark Alber, E-mail malber@nd.edu
Tel.: (574) 631-8371

Pacific Symposium on Biocomputing 2003

January 3-7, 2003 - Kaua'i Marriott, Kaua'I

Registration is now open for PSB 2003. Please register and make travel arrangements early if you are planning to attend PSB. Travel and lodging in Hawaii in January is always booked well in advance.

For more information or to register on-line, please visit our web site: http://psb.stanford.edu

The Many Faces of SMB

Tom Hallam speaking at the reception in his

Steve Ellner and Betsy Hooper

Alan Hastings, Lee Segel and Bas Kooijman

Mark Lewis and David Logan

Linda Allen and Azmy Ackleh

Forming friendships over a meal