Mathematical Biology Newsletter

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

Edited by: Holly Gaff

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Results of 2006 SMB Elections

Congratulations to the newly elected Board Members.

President-elect:

Avner Friedman

New Board Members:

Nicolas Britton

Patrick Nelson

Kristin Swanson

Dear SMB Colleagues,

Welcome to the Spring 2006 issue of the Newsletter. Firstly, I would like to once again draw your attention to the Society's Annual Meeting, which this year will take place from 31 July – 4 August 2006 in the Brownstone Hotel and Conference Center, Raleigh, North Carolina. The meeting this year is being co-sponsored by the SIAM Activity Group on the Life Sciences. Details of the meeting are discussed on page six and are available at the conference website: http://www.siam.org/meetings/ls06/

One aspect of the meeting I would particularly like to draw your attention to is the Society's highly successful **Mentoring Program** where a junior scientist (mentee) is teamed up with a senior scientist (mentor). The Society for Mathematical Biology recognizes the importance of mentoring in the development of a successful career in mathematical biology and the main aims of the program are two-fold: (1) to optimize the educational and professional experience of mentees attending the conference; (2) to assist the mentees' socialization into the field of mathematical biology.

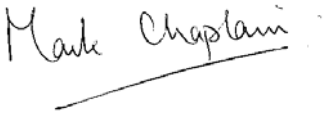
During the conference mentors and mentees meet and interact in various ways such as having lunch together discussing the mentee's educational and career plans. The mentor may also attend the mentee's presentation and provide constructive feedback. A recent article in the weekly online magazine *Science Next Wave* appositely described the SMB's Mentoring Program as "**Turning a random walk into a focussed mission."** The article contains interviews with three mentees who benefited from the program at recent SMB Annual Meetings. The complete article is at http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2660/turning_a_random_walk_into_a_focussed_mission/

I would therefore encourage potential mentors and mentees to sign up and participate in the Mentoring Program this year. To do this, please see the article about this program on page three.

At this point in the academic year no doubt many of you will have stopped lecturing/teaching or will be about to stop lecturing/teaching, leaving the summer period completely free to pursue your research activities. Recently I attended a public lecture given by the author and journalist Simon Singh who has published several books popularizing mathematics (e.g. "*Fermat's Last Theorem*"). His talk described the history of the Big Bang theory of the origin of the universe (his latest book being "*Big Bang*") beginning with its formulation and proposition by the Belgian Jesuit Georges Lemaître ("*a day without a yesterday*"), through the findings of Edwin Hubble on receding galaxies, to the vindication of the theory with the discovery of background microwave radiation in the 1960s. All along the way, the theory met with considerable opposition from the "scientific establishment" of the day who were proposing other "*more elegant theories*". However, it was ultimately vindicated through hard experimental fact. For me personally one of the best moments of the lecture was when Mr. Singh gave a quote from the biologist Thomas H. Huxley: "*The great tragedy of Science–the slaying of a beautiful hypothesis by an ugly fact*."

So as we move into the months of summer research activity and the conference season, may all your mathematical models be underpinned by experimental facts (ugly or not) and may they lead to new and experimentally testable hypotheses (beautiful or not).

I look forward to seeing many of you in Raleigh in July/August.



Mark Chaplain
SMB President

Mentoring Program for Junior Scientists Attending the 2006 Joint SIAM/SMB Conference on the Life Sciences

Objective: The Society for Mathematical Biology recognizes the importance of mentoring in the development of a successful career in mathematical biology. Following the successful mentoring program at previous annual meetings, we are again offering a mentoring program for the benefit of junior scientists attending the 2006 Joint SIAM/SMB Conference on the Life Sciences, to be held in Raleigh, North Carolina, July 31 - August 4, 2006. The goal of this program is two-fold: (1) to optimize the educational and professional experience of mentees attending the conference; (2) to assist the mentees' socialization into the field of mathematical biology.

How does it work? Anyone attending the annual meeting can sign up, either as a mentee, a mentor, or both. Note that we do not offer the mentoring program outside of the annual meetings. Junior scientists can request to be matched with a senior scientist. **Junior scientists** include students (both undergraduate and graduate), postdoctoral fellows, research assistants, newly appointed faculty members, etc. **Senior scientists** include postdoctoral fellows, research assistants, faculty members, etc. Because of the overlap in our definitions of junior and senior scientists, some individuals may sign up both as a mentee and a mentor. The program coordinator will find suitable matches between mentees and mentors, based on research interests and/or special requests. It is expected that the bulk of the interaction between the mentor and mentee will occur during the conference, although initial contact may be made before the conference. Of course we hope that the relationship is mutually satisfying to the mentor and mentee, and will continue after the conference!

At the conference, we envision the following types of interactions, as the mentor and mentee see fit: mentors introduce mentees to their colleagues to help the mentee establish a professional network; mentors and mentees spend a lunch or dinner together discussing the mentees' educational and/or career objectives; mentors share their career experience with their mentees; mentors attend the (poster or lecture) presentation of the mentee and provide constructive feedback; mentors spend some time explaining how conference presentations relate to each other, or how they fit into 'the bigger picture'. We ask that mentors and mentees keep their discussions confidential to protect the privacy of everyone involved.

How do I sign up? Visit the SMB mentoring webpage, at http://www.smb.org/-meetings/mentoring.shtml, and follow the directions posted there. Note that the application deadline is June 1, 2006.

Update: Bulletin of Mathematical Biology

A new partnership between Springer and the Society for Mathematical Biology to publish the Bulletin of Mathematical Biology has commenced in January 2006. The new website for the Bulletin of Mathematical Biology can be found at: http://www.springerlink.com/link.asp?id=119979. Under Springer, the journal will increase the number of pages published per year, as well as install a manuscript tracking system to speed publication of important articles in the field. As SMB members, you will have complimentary online access to the Bulletin of Mathematical Biology. All issues and articles available on springerlink.com will be available to you at no charge. Also, as members of the SMB, you are entitled to 20% off all Springer books.

Heineken Prize for Environmental Sciences 2006 to Stuart Pimm

The Royal Netherlands Academy of Arts and Sciences has awarded the Dr A.H. Heineken Prize for Environmental Sciences 2006 (US$150,000) to Professor Stuart L. Pimm, Duke University, Durham, North Carolina, United States, for his research on species extinction and conservation.

It was Stuart Pimm who introduced the concept of the 'food chain' into research on the extinction of plant and animal species in the early 1980s. The extinction of a particular species within an ecological system may have an enormous impact on other species, but introducing a new species into a particular ecological system can also have far-reaching consequences. Pimm's analyses have proved to be highly inspiring for other researchers. He has gained worldwide reputation for his research on the loss of biodiversity and the potential for species conservation, making use of many modern methods and techniques to track populations, such as remote sensing by satellite. As early as 30 years ago, when "mathematics as a tool" was controversial in ecology, Pimm was a vocal advocate for the development of ecological theory using simple, comprehensible models.

A recurring theme in his work, including his book The World According to Pimm, is the impact of human beings on the natural environment. The rapid extinction of plant and animal species is closely associated with such human activity as deforestation, land reclamation, overfishing and overhunting, excessive consumption of water and water pollution. It is therefore also up to the human race to call a halt to species extinction.

Pimm explains that the overwhelming majority of organisms depend directly but most frequently indirectly on plant species (primary producers) for their survival. He fervently believes that mankind must do everything possible to preserve ecosystems such as the tropical rainforest. Pimm continuously presents factual evidence for his arguments and is considered an influential lobbyist by the media and policy-makers.

Stuart Pimm was born in Derbyshire, United Kingdom, in 1949. He studied zoology at Oxford and received his doctorate in 1974 from New Mexico State University in the United States. He has remained in the U.S. ever since and is a naturalized American citizen.

Pimm decided to study conservation biology when he watched various bird species on Hawaii go extinct in the 1970s. He is still involved in a research program on Hawaii, but also conducts research in Madagascar, Brazil and South Africa. One of his beliefs is that conservation should be practiced on a global scale. Pimm feels it is his task to share his knowledge with politicians and journalists, and he has worked energetically for many years to impart his research results to the general public and policy-makers. He has succeeded in communicating the importance of ecological conservation to a wide audience through his highly accessible publications, for example The World According to Pimm.

Starting in the 1970s, Professor Pimm held appointments at Texas Tech University and the University of Tennessee. In 1999 he accepted a position as Professor with the Center for Environmental Research and Conservation at Columbia University. He currently holds the Doris Duke Chair of Conservation Ecology at Duke University and Extraordinary Professor with the Con-

servation Ecology Research Unit at the University of Pretoria in South Africa.

Pimm, S.L., *Food webs*, Chapman and Hall, London, 1982

Pimm, S.L., “The complexity and stability of ecosystems” Nature 307, 321 - 326 (26 January 1984)

S. L. Pimm; H. Lee Jones; Jared Diamond “On the Risk of Extinction” The American Naturalist, Vol. 132, No. 6. (Dec., 1988), pp. 757-785

Pimm, S.L., *The balance of nature?: Ecological issues in the conservation of species and communities*, University of Chicago Press, Chicago IL, 1991

Pimm, S.L., Russell G.J.; Gittleman J.L.; Brooks T.M. “The future of biodiversity” Biological Conservation, Volume 75, Number 3, 1996, pp. 310-310(1)

Pimm, S.L., *The world according to Pimm: A scientist audits the earth*, McGraw Hill, New York, 2001

The Dr A.H. Heineken Prize for Environmental Sciences was established in 1990. Previous prizewinners have included James Lovelock, Paul Ehrlich, Lonnie Thompson and Simon Levin.

Report from BIOMAT 2005

Priya Kooner

BIOMAT 2005, International Symposium on Mathematical and Computational Biology, was held on 3rd-8th December 2005 at the National Laboratory of Scientific Computing (LNCC), Petropolis, Brazil. The BIOMAT symposia are annual meetings organised by the BIOMAT consortium based in Brazil, with the meetings being held at various venues throughout Brazil each year. The attendees were therefore mainly from South America but also included many researchers from USA and Europe.

The meeting began with two days of tutorials, with topics including: “Spatially Structured Discrete Models”, “P-fuzzy Modelling”, and “Control Optimization of Chaotic Population Systems”. The remainder of the meeting consisted of a good mix of keynote, contributed and poster presentations from wide-ranging areas of mathematical biology. Keynote lectures included: "On the Origin of Metazoans" by Frederick Cummings, "Structure Prediction of Alpha-Helical Proteins" by Christodoulos Floudas, "Exploring Chemical Space with Computers: Informatics Challenges for AI and Machine Learning" by Pierre Baldi, "Theoretical Study of a Biofilm Life Cycle: Growth, Nutrient Depletion and Detachment" by Jorge Velasco-Hernández, "On Biclustering with Feature Selection for Microarray Data Sets" by Panos Pardalos, "Steiner Minimal Trees and Twist Angles in Folded Protein Structures" by James MacGregor Smith, "Modeling Plague Dynamics: Endemic States, Outbreaks and Epidemic Waves" by Eduardo Massad, "Modelling Aspects of Vascular Cancer Development" by Philip Maini, "Modeling the in vivo Dynamics of Viral Infections" by Ruy Ribeiro, "Optimization of Between Group Analysis of Gene Expression Disease Class Prediction" by Guy Pièrre, "Software Tool to Model Genetic Regulatory Networks: Applications to Segmental Patterning in Drosophila" by Rui Dilão, "Modelling Cooperative Phenomena in Interacting Cell Systems with Cellular Automata" by Andreas Deutsch, "Quality and Effectiveness of Protein Structure Folding" by Anna Tramontano and "Space: The Final Frontier of Control Theory in Application to Natural Resource Management" by Louis Gross.

The BIOMAT symposium was very well organized and the organising committee, led by Rubem Mondaini, were extremely welcoming. The beautiful surroundings of the mountains of Petropolis helped to add an air of tranquillity over the meeting. Further details of the symposium and proceedings from past symposia can be found on the BIOMAT website at http://biomat.org/.

2006 SMB Annual Meeting

Charlie Smith

The annual meeting of SMB this year will be held Monday-Friday, July 31-August 4 jointly with the SIAM Life Sciences Group. The link to the meeting homepage is at http://www.siam.org/meetings/ls06/ and can also be reached from the annual meetings section of the SMB homepage http://www.smb.org/meetings/annual.shtml

The location will be the Brownestone Hotel and Conference Center contiguous to the North Carolina State Univ. (NCSU) campus about 10 miles from RDU (Raleigh-Durham Airport) and Research Triangle Park. The chairs are Charlie Smith (NCSU), Tim Elston (UNC-Chapel Hill) and Steve Cox (Rice Univ.).

The response to calls for mini-symposium proposals and contributed oral and poster presentations was indicative of the growing importance of biomathematics and computational biology. We have maxed out the conference meeting rooms available and went to a building next door for the poster sessions. Over 537 abstracts were received!

The themes of the meeting are: Ecology, Environmental and Evolutionary Biology, Genomics, Imaging, Neuroscience, Structural Biology, Modeling Diseases, Biomathematics in Industry, Biology, Toxicology, Stochastic effects in Biology, and Cell Motility. The complete program can be found at: http://www.siam.org/meetings/ls06/program.php

The plenary speakers, representing a diverse set of research areas, are: Ivet Bahar, University of Pittsburgh; Gaudenz Danuser, The Scripps Research Institute; Kirk Jordan, IBM Corporation; Ioannis Kevrekidis, Princeton University; Otso Ovaskainen, University of Helsinki; Jeffrey Saltzman, Merck & Co., Inc.; Brian Smith, Arizona State University; John Tyson, Virginia Tech.

Housing information for the Brownestone Hotel is at http://www.siam.org/meetings/ls06/hotel.php. If that hotel becomes full, about 100 yards away, also on Hillsborough Street, is the Velvet Cloak Inn with rooms at the same price $89 plus tax (http://www.velvetcloakinn.com/).

For those desiring less expensive housing, a private and a university dorm will be available. The private dorm is University Towers. It is a 10-15 minute walk from the meeting hotel and on same street as the meeting hotel; air conditioned rooms, 2 rooms share 1 bath, but sink in each room; same dorm used in SMB 97; more details at http://www.universitytowers.net/. A pdf application form for rooms, $35/day single; $20/day if sharing room; is at: http://www.siam.org/meetings/ls06/housingapplication.pdf or http://www.smb.org/meetings/2006housing_app.pdf. A form will be forthcoming on the SMB website for the university dorm, North Residence Hall, also on Hillsborough Street and a bit closer to the conference hotel and with a bathroom in each room, not shared.

Travel Support is available. Check the SMB website at http://www.smb.org/meetings/landahl.shtml. Mentoring information can be found at: http://www.smb.org/-meetings/mentoring.shtml. Note deadline of June 1, 2006 to contact Gerda de Vries, the SMB mentoring coordinator. Other details can be found on the meeting website and will be forthcoming in the SMBDigest electronically. Biomath Music: Rumor has it that a number of biomathematicians are also musicians and might be interested in having a room on campus one or two evenings for a jam session and fun. If this includes you, send an email to Charlie Smith at bmasmith@ncsu.edu with SMB Music in the subject line, and we will try to arrange a time and place at the conference. Other ideas for social activities are also welcome, however please put SMB in the subject line. Tim, Steve, and I are looking forward to seeing you all in Raleigh for SMB 2006.

Janet Anderson
1958-2005

Dr. Janet L. Andersen, professor of mathematics at Hope College, Holland, Michigan, 47, was killed in an automobile accident in a whiteout on Thursday, November 24, 2005.

Janet joined the Hope College faculty in 1991. She served as chair of the department of mathematics from 2000-04. She held the academic rank of Professor of Mathematics. Dr. Andersen served as director of general education at Hope College from 1998-2000. Dr. Andersen completed her bachelor's degree at LeTourneau University in Longview, Tex. She received the master's and doctorate degree at the University of Minnesota. Earlier this year Janet and her faculty colleague Todd Swanson coauthored a new mathematics textbook, her third, "Understanding Our Quantitative World", which related to her commitment to general education mathematics courses including her “Mathematics in Public Discourse.” She was also the co-author of two other textbooks, "Projects for Precalculus" (1997) and "Precalculus: A Study of Functions and Their Applications" (2000). Her work, "Projects for Precalculus" was an award winner in the Innovative Programs Using Technology competition of the Mathematics Association of America in 1997 and was featured in the book, "Exemplary Programs in Introductory College Mathematics." She had developed a sophomore-level mathematical biology course that focused on applications of linear algebra; both this course development and summer undergraduate research in mathematical biology were supported by grants from the National Science Foundation.

Janet received an NSF CCCLI grant to develop the course in Mathematical Biology, which then translated into co-organizing an MAA PREP workshop on Creating and Maintaining Courses in Mathematical Biology. She had also recently begun getting more involved in mathematical biology research having done a sabbatical at the University of Utah working with James Keener.

Nationally, Janet chaired the Mathematical Association of America's committee on the teaching of undergraduate mathematics. She also served as director of the Pew Midstates Science and Mathematics Consortium, a collaboration of 11 liberal arts colleges and two research universities, the University of Chicago and Washington University, St. Louis. The consortium promotes effective collaboration among faculty at the member institutions with the goal of improving undergraduate science and mathematics education. In this role, she promoted the inclusion of mathematics in biology education, biology in mathematics education, and the collaboration of mathematicians, computer scientists, and biologists in both research and teaching.

Dr. Andersen was a beloved teacher, a superb administrator and cherished colleague. In 2004 she was presented a Hope College Provost's Award for Excellence in Teaching. Memorial Gifts may be given to the Hope College Department of Mathematics Scholarship Fund in memory Janet L. Andersen (send checks to the Hope College Advancement Office, Hope College, Holland, MI 49422-9000, with reference to "Mathematics Department Scholarship Fund in memory of Janet Andersen").

Submitted by John Juncgk with contributions from Eric Marsland

Open Positions

PhD Position
Stockholm University

A PhD position in theoretical evolutionary biology is available at the Department of Zoology, Stockholm University, Sweden. Research topics for the position include the evolution of phenotypic polymorphism and the evolution of individual variability, viewed from the perspective of modern developmental biology. The starting date is flexible, but should be in the second half of 2006. Applicants should have a MSc (or equivalent background) in a field like evolution, ecology or population genetics, or possibly physics and applied mathematics. The position is open until filled, but primary consideration will be given to applications received by 15 May 2006. Informal inquiries (by email to olof.leimar@zoologi.su.se) about the position are welcome.

PhD Position
INRIA Rhône-Alpes

INRIA Rhône-Alpes is seeking a PhD student to work on Methods for the integrated modeling of metabolic and genetic networks. A description of the subject of the PhD project, as well as conditions for applicants, can be found on the INRIA web site: http://www.inrialpes.fr/doctorants_eng.html http://www.inria.fr/travailler/opportunites/doc.en.html. All further information can be obtained from Hidde de Jong, INRIA Rhône-Alpes (Hidde.de-Jong@inrialpes.fr) or Daniel Kahn, INRIA Rhône-Alpes and Laboratory of Biometry and Evolutionary Biology, CNRS/University of Lyon (kahn@biomserv.univ-lyon1.fr).

PhD studentship
University of London

This project aims to model the spread of diseases on social networks. Within this project we will study the spread of infectious agents on networks. This project is part of an interdisciplinary study in which the dynamic behaviour of large interacting systems on random networks is studied and is funded by the EPSRC under their Novel Computation initiative at Royal Holloway and the Universities of Sheffield, Leeds and Southampton (see http://amorph.group.shef.ac.uk/ for further details about this programme). The studentship is fully funded, EPSRC eligibility criteria apply. For further information about the studentship contact vincent.jansen@rhul.ac.uk.

Postdoctoral Position
Liverpool University

The postdoc will be based at Liverpool University working with Dr. I. V. Biktasheva and Prof. V. N. Biktashev. The postdoc will also interact closely with Prof. D. Barkley at the University of Warwick. The aim of the project is to create a practical, regular and generic technology of predicting the drift of spiral and scroll waves in excitable media using their response functions. See http://www.csc.liv.ac.uk/~ivb/FHN_RFs.html for further details

Postdoctoral Fellowships
Institute of Biomedical Innovation

Applications for postdoctoral fellowships in any area of research excellence within the Institute of Health and Biomedical Innovation (IHBI), Queensland University of Technology, Brisbane, Australia, are welcome. The closing date is May 19, 2006. More information on the Institute and the positions are available at http://www.ihbi.qut.edu.au/. For further information on mathematical and statistical modelling in medicine and the life sciences in IHBI and possible projects contact: Professor Sean McElwain, email: s.mcelwain@qut.edu.au in the first instance.