Mathematical Biology Newsletter

Society for Mathematical Biology | Volume 7, Number 1 | February, 1994

SMB News

We had our annual meeting last Summer at Cornell from July 10th to the 13th. The meeting had a number of very good talks with general themes of population biology, neurobiology, and cell biology. The total attendance at the meeting was more than 80 so it was quite successful. Some highlights were the software demonstrations and the tour of the Center for Applied Mathematics at Cornell. The picnic was as always well-received and included a great hike through one of the many gorges for which Ithaca is famous. Special thanks to John Tyson (chair), John Guckenheimer, and Carlos Castillo-Chavez for organizing the program, and to Colleen Martin for coordinating the local arrangements.

Unfortunately, we recently lost one of our best known members, Stavros Busenberg. Carlos Castillo-Chavez has contributed an obituary for him (see page 10).

The International Conference on Differential Equations and Applications to Biology and to Industry will be held on June 1-4, 1994, in Claremont, California, to honor the memory of Stavros Busenberg (see page 7).

A fund is being set up in Stavros Busenberg's name through the Society for Mathematical Biology to support travel awards for graduate students and young investigators to attend professional meetings or workshops (see page 5).

The Society will meet this summer with SIAM in San Diego (see Letter from the President).

Letter from the President

Dear Members of SMB:

The Board of Directors of the Society for Mathematical Biology has voted to change slightly the format of our annual meetings. Instead of holding a stand-alone meeting of the Society every year, we propose to hold stand-alone meetings each odd-numbered year and in the even-numbered years to hold a joint meeting with some other society. For 1994 we have decided to join forces with SIAM, which holds its annual meeting in San Diego, California, on July 25-29, 1994. The next stand-alone meeting of the SMB is scheduled for May or June of 1995 in Mexico, to be organized by Professor Francisco Lara-Ochoa.

We believe this new format will use the Society's resources more efficiently and we hope it will create greater interest in and attendance at our biennial stand-alone meetings. We also intend to diminish competition between SMB meetings and the Gordon Research Conference on Theoretical Biology and Biomathematics, which is held in even-numbered years. By biasing SMB meetings away from the East Coast, we plan to complement the GRC program geographically as well as temporally. We hope that many members of SMB will avail themselves of the two fine conference opportunities this summer, the GRC in June and/or the SIAM meeting in July, and that you will keep in mind our plans to meet in Mexico in 1995.

More details about the SIAM meeting follow in the newsletter.

Very truly yours,
John Tyson

This Issue's Special Feature

Free UNIX

In the last issue, I described a number of different software sites which contain a variety of useful packages that are readily obtained via anonymous ftp over the INTERNET. This issue, I want to be more specific and talk about a fantastic operating system that is available for free. The name of the package is LINUX and it is a collection of some 600 utilities, packages, graphics, etc that are for all intents and purposes a free version of the UNIX operating system. In March of this year, I installed LINUX on my 486 laptop and now can run all of the programs (including fancy windowing packages such as X windows) that I use on my SUN Workstation. I will not go into the details for installing the software but instead will highlight some of the features. LINUX runs on any 386 or 486 computer with sufficient memory and hard disk space. It is a true multi-tasking operating system with virtual memory, VGA graphics support, a DOS emulator, a full complement of C and C++ compilers, X Windows support, TeX support, and all of the usual utilities that one expects with UNIX such as EMACS, more, grep, network support, gnuplot, and many others. The most complete package is available at the following ftp site:

tsx-11.mit.edu

Thus, to obtain it you ftp to this site, log in as anonymous, give your name as a password. Once you have logged in, change directories by typing

cd /pub/linux/packages/SLS

There are over 30 files each of which will fit onto a 3 1/2" diskette so that you can load them onto your PC. They are divided into several groups:

a1-a4: The minimal base system
b1-b7: The utilities like man, emacs, perl, etc
c1-c3: The compilers (lisp, f2c, p2c, gcc, g++)
x1-x9: X windows
t1-t3: TeX
s1: sources
d1-d4: documentation

Installing the full system requires commitment on your part as you must reformat your hard disk and thus lose all of your DOS/Windows software. However, if you have a large drive, you can partition it into DOS and UNIX and thus have the best of both worlds. In addition, UNIX knows about the DOS partition so that you can have access to all of your DOS text files.

If you just want to experiment without reformatting your hard disk, just get a1 and a2. These must be put on unformatted diskettes. Before you start or make a decision you should download the README and DOWNLOADING files. Once you have done this, you should be ready to try it. The best instructions on installing the software can be found in the March 1993 issue of UnixWorld which should be available at your library. If you don't want to fool with downloading 25+ disks, you can get the whole set from

Softlanding Software
910 Lodge Ave.
Victoria, B.C., Canada
V8X-3A8
(604) 360-0188

They charge for the cost of the diskettes (about $100.) It is really a fantastic UNIX system; I have had no problems recompiling all of my home grown software written for the SUN onto my laptop.

In the next issue, I will describe some simulation software.

Until next time, Bard Ermentrout

Report on SMBnet

SMBnet was instituted by the Society in January 1992 in order take advantage of present technology to facilitate communication within the mathematical biology community. It consisted initially of a Digest that has been distributed electronically approximately once a month and an anonymous ftp facility. Since then, Gopher access of the Digest has been added.

SMB Digest

The Digest publishes items of timely interest and is distributed via email to those subscribed. If you have email and are not already subscribed, do so as follows: send email to listserv@fconvx.ncifcrf.gov with "subscribe SMBnet <your-personal-name>" in the body of the mail. For example, Ignatius Nobel might subscribe from a UNIX system as follows:

```
echo "subscribe SMBnet Ignatius
Nobel" | mail listserve@fconvx.ncifcrf.gov
```

(this command should be entered on one line)

Items published in the Digest include announcements of general interest, such as of meetings, workshops and short courses, job opportunities, software and other computing resources, grant information, etc. Questions, answers and commentary about scientific issues are appropriate.

We invite Department Chairs to describe their University's program in Mathematical Biology, including areas of special interest or need. Recent graduates in related fields are urged to submit an abstract of their PhD thesis.

FTP

The anonymous ftp facility contains back issues of the Digest (in directory smb/digest) as well as publications (in smb/pubs). The goal is to facilitate the exchange of pre-prints, software and other materials of interest to the community. In order to submit an item to be stored in anonymous ftp, ftp fconvx.ncifcrf.gov (129.43.52.4) and download the information file INFO as follows:

```
ftp fconvx.ncifcrf.gov
name: anonymous
password: <your_email_address>
cd tmp/smb
get INFO
bye
```

After reading INFO, send email to ray@helix.nih.gov describing the contribution. When acknowledged, you will be asked to put the file(s) in directory tmp/smb. When accepted, the file(s) will be made available in directory smb/pubs. (If you think that this procedure cumbersome, I agree. However, hackers' use of the system has made it necessary!)

To retrieve a file from smb/pubs, proceed as follows:

```
ftp fconvx.ncifcrf.gov
Name: anonymous
Password: <your_email_address>
cd smb/pubs
ls
get <file_name>
bye
```

GOPHER

The SMB Digest is now available through the Gopher node at the National Institutes of Health (NIH). The question, "What is Gopher?" is aptly answered in the University of Minnesota Gopher file "Frequently Asked Questions about Gopher", along with many other questions, as follows:

> The Internet Gopher client/server provides a distributed information delivery system around which a world/campus-wide information system (CWIS) can readily be constructed. While providing a delivery vehicle for local information, Gopher facilitates access to other Gopher and information servers throughout the world.

What is required to access Gopher and other pertinent questions are answered in SMB Digest v93i03 and v93i11, which may be retrieved from SMBnet via anonymous ftp at boombox.micro.umn.edu in the pub/gopher directory.

Acknowledgments

The Frederick Biomedical Supercomputing Center, Frederick Cancer Research and Development Center, National Cancer Institute provides the listserver and anonymous ftp facilities that we use.

The SMB Digest is installed on the NIH Gopher by the NIH Convex Systems Staff, Division of Computer Research and Technology, National Institutes of Health.

Any questions, comments or suggestions about SMBnet may be directed to:

Raymond Mejia
National Institutes of Health
Mathematical Research Branch
Bldg. 31, Room 4B54
Bethesda, MD 20892
tel: (301) 496-4325
email: ray@helix.nih.gov

Literary Events

* ***Infectious Diseases of Humans: Dynamics and Control,*** Roy M. Anderson and Robert M. May. Oxford University Press, 1992/768 pp. paper $47.50

* ***Neural Networks and Qualitative Physics: A Viability Approach,*** Jean-Pierre Aubin. Cambridge University Press, 1994/325 pp. $49.95.

* ***Vertically Transmitted Diseases: Models and Dynamics,*** S. Busenberg and K. Cooke. Springer-Verlag, 1993/248 pp. $109.00.
Biomathematics,Volume 23

* ***Adaptation in Stochastic Environments,***
C.W. Clark and J. Yoshimura (Eds.). Springer-Verlag, 1993/200 pp. paper $34.00.
Lecture Notes in Biomathematics, Volume 98

* ***Kinetic Theory of Living Pattern,***
Lionel G. Harrison. Cambridge University Press, 1993/373 pp. $69.95

* ***Fractals: A User's Guide for the Natural Sciences,***
Harold M. Hastings. Oxford University Press, 1994/248 pp. cloth $49.95; paper $19.95

(***Literary Events*** *continued on page 5*)

SMB MEETING

The 1994 Annual Meeting of the Society will be held in conjunction with the SIAM meeting.

1994 SIAM Annual Meeting
Sheraton Harbor Island East
San Diego, California
July 25-29, 1994

The 1994 SIAM annual meeting will focus on mathematics, its applications, and the interdisciplinary interaction that yields new perspectives on research, on education, and on the contribution of mathematics to science and industry.

The meeting will highlight the role of mathematics, modeling, and computation in applications that are dramatically affecting the way we live. Among these applications are biochemistry, environmental study, economics, and manufacturing.

Themes

Applications of Dynamical Systems
Applied Probability and Statistics
Control Theory, Optimization and Applications
Economics and Financial Modeling
Environmental and Geophysical Modeling
Large-Scale and Scientific Computing
Manufacturing and Design
Molecular Dynamics and Biological Modeling
Partial Differential Equations
Wave Propagation

SMB will be co-sponsoring a minisymposium, "Dynamics of Repeated Structures of the Genome," organized by Marek Kimmel, Rice University, plus a session(s) of contributed talks on theoretical biology, also organized by Marek Kimmel. The time and location of the SMB Mixer will appear in the program.

There will also be two plenary lectures of special interest to SMB members:

Molecular Dynamics and Supercoiled DNA, **Tamar Schlick,** Courant Institute of Mathematical Sciences, and Department of Chemistry, New York University
Sobering Lessons from a Simple Protein Folding Model, **Frank H. Stillinger**, AT&T Bell Laboratories

Other Minisymposia of interest include:

Medical Imaging, **Yali Amit,** University of Chicago
Parallel Algorithms and Tools for Solving PDE's, **Marsha Berger,** Courant Institute of Mathematical Sciences, New York University
Mathematical Models of the Dynamics of Financial Markets, **Gunduz Caginalp**, University of Pittsburgh
Design and Analysis of Computer Experiments, **Dennis Cox**, Rice University
Computational Methods in the Geosciences: Porous Media, I and II, **James G. Glimm,** SUNY, Stony Brook, and **Mary F. Wheeler,** Rice University
(Co-sponsored by SIAM Activity Group on Geosciences)
Applications of Large-Scale Computing to Scientific Problems, **Jeffrey Stewart Saltzman**, Los Alamos National Laboratory
Waves in Heterogeneous Media, **William W. Symes**, Rice University

Sunday, July 24, in conjunction with the SIAM meeting, there will be a

Workshop for Women Graduate Students and Postdoctoral Applied Mathematicians,

sponsored by the Association for Women in Mathematics (AWM), with support from National Science Foundation and Office of Naval Research.

For further information, contact Virginia Reinhart, AWM, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461.
Telephone: 301-405-7892.
E-Mail: awm@math.umd.edu

Call for Papers

You are invited to contribute a presentation at the SIAM Annual Meeting in one or both of the following formats: Lecture or Poster

A lecture consists of a 12-minute oral presentation with an additional three minutes for discussion. A poster presentation consists of the use of visual aids, such as 8-1/2"x11" sheets, mounted on 4'x6' poster board. A poster session is two hours long.

Deadline for submission of abstracts: May 2, 1994

Please send a 75-word abstract to SIAM, and indicate whether your presentation is oral or poster. Along with the abstract, please indicate the following: "This abstract is for SMB."

SIAM welcomes submission in any of the following ways:

e-mail: meetings@siam.org
fax: 215-386-7999
post: SIAM Conference Department
3600 University City Science Center
Philadelphia, PA 19104-2688, U.S.A.

Electronic submission is encouraged. To help in formatting your submission, plain TeX or LaTeX macros are available by contacting SIAM at meetings@siam.org. Copies of the macros are also available via anonymous ftp from the SMBnet archives. The files for LaTeX and TeX users are: smb/pubs/SIAM_LaTeX_Macro and smb/pubs/SIAM_Plain_Tex_Macro, respectively. If you are not using TeX, submissions can be made as plain text e-mail.

If you wish to submit your abstract by postal mail, you may obtain a standard abstract form from SIAM, or you may simply type the abstract on a plain sheet of 8-1/2"X11" paper while conforming to the format below. (Please do not draw lines on the paper as SIAM will be photographing the copy you submit.)

Title

two spaces

75-word abstract
--- 4-1/4 inches across ---

two spaces

Names of authors
(with affiliation, address,
phone and E-mail)

Registration

The preliminary program and registration information will be available in mid-April 1994. You should receive a copy automatically since the Society will be sending a set of address labels to SIAM. If you do not receive your copy , please contact SIAM (address above, or phone 215-382-9800).

The Landahl Travel Grants

The Society for Mathematical Biology has funds for partial support of the travel of graduate students to meetings co-sponsored by the SMB. Graduate students who wish support may apply to: John Rinzel, Mathematical Research Branch, NIDDK Bldg. 31, Rm. 4B-54, National Institutes of Health, Bethesda, MD 20892. The application, which should be received by June 1, 1994, should include a one-page research summary, a letter from a faculty sponsor, a summary of requested funding and a statement of any past Landahl awards.

STAVROS BUSENBERG TRAVEL AWARD

- Open Letter -

Dear Colleague,

On April 3, 1993 Stavros Busenberg lost his life to Lou Gerhig's disease. He fought his last battle with great dignity and incredible courage, remaining the consummate professional till the very last minute. Although confined to a wheelchair and unable to write, he continued teaching, doing research, counseling students, and reviewing articles, always hiding behind a smile the terrible tragedy he was living. On the day of his death he called Ken Cooke to apologize for his inability to introduce the speaker of the Applied Mathematics Seminar. Throughout his career he actively helped young people and touched the lives of many. We will always remember him, and would like others, especially young researchers, to grab a piece of the Stavros whom we loved.

We have began a drive to collect the necessary funds to endow the STAVROS BUSENBERG TRAVEL AWARD to be administered by the Society for Mathematical Biology (SMB). Every year a graduate student will be selected as a recipient of the award and will use it to attend a meeting or a workshop organized or cosponsored by SMB. Our goal for the award endowment is $10,000. We are asking for your support. Please send your contribution by check (payable to the Society for Mathematical Biology) to Carlos Castillo-Chavez, Biometrics Unit, 341 Warren Hall, Cornell University, Ithaca, NY 14853

Best regards,
Carlos Castillo-Chavez
Kenneth Cooke
Mario Martelli
Betty Tang
Horst Thieme

Literary Events *(continued from page 3)*

* ***Phyllotaxis: A Systemic Study in Plant Morphogenesis,*** Roger.V. Jean. Cambridge University Press, 1994/574 pp. $74.95.

* ***Fractal Modeling: Growth Forms of Biological Objects,*** J.A. Kaandorp. Springer-Verlag, 1994/app.220 pp. $49.00(tent.)

* ***Dynamic Energy Budgets in Biological Systems: Theory and Applications in Ecotoxicology*** S.A.L.M. Kooijman. Cambridge University Press, 1993/364 pp. $64.95

*(**Literary Events** continued on page 11)*

OTHER MEETINGS

PACIFIC NORTHWEST WORKSHOP ON MATHEMATICAL BIOLOGY

Washington State University
Pullman, Washington
March 18-20, 1994

The goal of the workshop is to bring together pacific northwest researchers who are interested in sharing ideas in mathematical and theoretical biology.

The workshop will be held from Friday evening (March 18) until Sunday noon (March 20). There will be four (one-hour) invited talks and they will be presented by

Simon Levin (Princeton University)
Richard Field (University of Montana)
Joel Kingsolver (University of Washington)
Robert Miura (University of British Columbia)

Also, there will be about 20 contributed presentations (15 minutes long). Graduate students and post-docs are especially encouraged to participate. (Depanding upon the outcome of a proposal, financial assistance may be available for participating graduate students and post-docs.)

For more information, please contact either:
V.S. (Mano) Manoranjan
(MANO@ALPHA.MATH.WSU.EDU)
or
Mike Moody (MOODY@ALPHA.MATH.WSU.EDU)

Department of Pure & Applied Mathematics
Washington State University
Pullman, WA 99164-3113
(509) 335-7811 or (509) 335-6868

FIRST WORLD CONGRESS ON COMPUTATIONAL MEDICINE, PUBLIC HEALTH AND BIOTECHNOLOGY

24-28 April 1994
Hyatt Regency Hotel
Austin, Texas

With increasing frequency, computational sciences are being exploited as a means with which to investigate biomedical processes at all levels of complexity, from molecular to systemic to demographic. Computational instruments are now used, not only as exploratory tools but also as diagnostic and prognostic tools. The appearance of high performance computing environments has, to a great extent, removed the problem of increasing the biological reality of the mathematical models. For the first time in the history of the field, practical biological reality is finally within the grasp of the biomedical modeler. Mathematical complexity is no longer as serious an issue as speeds of computation are now of the order necessary to allow extremely large and complex computational models to be analyzed. Large memory machines are now routinely available. Additionally, high speed, efficient, highly optimized numerical algorithms are under constant development. As these algorithms are understood and improved upon, many of them are transferred from software implementation to an implementation in the hardware itself, thereby further enhancing the available computational speed of current hardware. The purpose of this congress is to bring together a transdisciplinary group of researchers in medicine, public health, computer science, mathematics, nursing, veterinary medicine, ecology, allied health as well as numerous other disciplines, for the purposes of examining the grand challenge problems of the next decades. This will be a definitive meeting in that it will be the first World Congress of its type and will be held as a follow-up to the very well received Workshop On High Performance Computing In The Life Sciences and Medicine held by the University of Texas System Center For High Performance Computing in 1990.

Conference Chair: Dr. Matthew Witten, UT System
Center for High Performance Computing, Austin, Texas
m.witten@chpc.utexas.edu

For additional information, use any of the following:
Email: compmed94@chpc.utexas.edu
Fax: (512) 471-2445
Phone: (512) 471-2472
Gopher: log into the University of Texas System-CHPC
select the Computational Medicine and Allied Health
menu choice
Anonymous ftp: ftp.chpc.utexas.edu
cd /pub/compmed94
Postal: Compmed 1994
University of Texas System CHPC
Balcones Research Center
10100 Burnet Road, CMS 1.154
Austin, Texas 78758-4497

Registration deadline and fees:

1 April 1994 - Registration deadline
(includes payment of all fees)

Fees include lunches for three days, all conference registration materials, the reception, and the sit down banquet:

$400.00 Corporate
$250.00 Academic
$150.00 Student (verification required)
Late fee: $50.00 after April 1, 1994

INTERNATIONAL CONFERENCE ON DIFFERENTIAL EQUATIONS AND APPLICATIONS TO BIOLOGY AND TO INDUSTRY

Harvey Mudd College
Claremont, California
June 1-4, 1994

The Conference is in memory of **Stavros Busenberg** and will overlap the areas where he actively contributed for over twenty-five years before his untimely death. The meeting will provide the unique opportunity to pay tribute to his extraordinarily creative and broad scientific career. Please bring the conference to the attention of students and new researchers and encourage them to attend. Throughout his career Stavros made special efforts to nurture young scientists and the organizers want this conference to live up to his spirit.

Conference topics will center around recent advances in

Ordinary Differential Equations
Partial Differential Equations
Functional Differential Equations
Difference Equations
Dynamical Systems
Epidemic Models
Ecological Models
Physiological Models
Applied Analysis in Industrial Mathematics

The conference will feature lectures surveying recent advances, special sessions for invited research papers, and poster sessions. The proceedings of the conference will be refereed and published. A proposal has been submitted requesting financial support and the organizers hope to partially defray the travel costs of some participants, with priority given to students and new Ph.D.'s

Main Speakers: **Andrew Dobson, Avner Friedman, Karl Hadeler, Jack Hale, Mimmo Iannelli, Simon Levin, Misayasu Mimura, John Ockendon, Pauline van den Driessche.**

Scientific Advisory Committee : Jane Cronin-Scanlon, Odo Diekmann, Andrew Dobson, Antonio Fasano, Avner Friedman, John Jacquez, Simon Levin, Robert May, Jean Mawhin, Jukka Sarvas, Willi Shappacher, Ioannis Stavroulakis, Pauline van den Driessche, Graeme Wake, Glenn Webb.

Organizing Committee : Carlos Castillo-Chavez, Courtney Coleman (co-chair), Kenneth Cooke (co-chair), Ellis Cumberbatch, Mario Martelli, Betty Tang, Horst Thieme.

Registration fee (paid at the Conference) is US$ 50 (students: US$25) which covers refreshments and reception. The banquet on June 3 will be US$20/person, students: US$10/person.

For further information please write to
Differential Equations Conference
Department of Mathematics
Harvey Mudd College
Claremont, CA 91711.

E-mail: deconf@hmc.edu

SPATIAL STOCHASTIC MODELS IN BIOLOGY

The Mathematics Department of
The University of Colorado
at Colorado Springs
May 26-28, 1994

The conference will bring together biologists and mathematicians who are interested in applying Probability models to Biology. There will be several hour-long presentations by a principal speaker as well as several short communications sessions.

A tentative list of principal speakers includes **Tamara Awerbuch** (Harvard), **Hal Caswell** (Woods Hole), **Rick Durrett** (Cornell), **Bob Gardner** (Oak Ridge), **David Griffeath** (Madison), **Lou Gross** (Knoxville), **Simon Levin** (Princeton), **Claudia Neuhauser** (Madison).

There is no registration (nor registration fee) for this conference, however, the organizing committee requests that you inform them of your intent to attend.

The committee expects to get funds to support several participants to attend the conference, in particular individuals from groups that are currently under-represented in science.

Organizing Committee:

Rinaldo Schinazi (schinazi@vision.uccs.edu),
Greg Morrow (gjmorrow@colospgs.bitnet),
Yu Zhang (yzhang@vision.uccs.edu).

For additional information:

Spatial Stochastic Models in Biology
Department of Mathematics
University of Colorado
Colorado Springs, CO 80933

Phone: (719) 593-3311
Fax: (719) 593-3588

1994 Gordon Research Conference on Theoretical Biology and Biomathematics

Tilton, NH
June 12-17

The 1994 Gordon Research Conference on Theoretical Biology and Biomathematics will be held in Tilton, New Hampshire, June 12-17. This biannual meeting brings together mathematicians, physical scientists and biologists for a week of lectures, informal workshops, individual discussion, poster presentations, communal meals and recreation.

As in previous years, the 1994 program reflects the dual purpose of the conference: to inform the general mathematical biology community of important work and differing perspectives in a variety of areas, while maintaining enough depth to interest specialists and promote collaboration among the participants. The scheduled morning and evening lectures feature current research in cell biology (calcium oscillations and waves, receptor-mediated cellular processes, immunology), physiology (cardiac rhythms and arrythmias, neuronal networks, auditory processing), development, and population biology (sex, predator-prey systems, resource management, aggregation). Themes that cut across session boundaries include electrophysiology, reaction-diffusion equations, and waves in excitable media.

The slots for invited speakers are filled, but there will be other ways for all participants to present their work. The poster sessions held in the recreation area are as well attended and important to the success of the meeting as the lecture sessions. In addition, there will be the opportunity for informal workshop/discussion sessions during the afternoons. The accessibility of speakers, session chairs, and other established biomathematicians for individual discussion has proved to be the most important aspect of the meeting for many participants, particularly for those just entering the field. Several of this year's speakers and chairs first attended the Theoretical Biology and Biomathematics Gordon Research Conference as graduate students or post-docs and credit the Conference wih introducing them to new research problems and collaborators.

The Conference application form will appear in the February 11 issue of the journal Science. One must apply for acceptance to the meeting, and apply early, since the attendance has been growing and may reach capacity. Graduate students and post-docs are encouraged to attend. The organizers have applied for (limited) funds to support attendance by young scientists as well as attendees from abroad who would otherwise not be able to attend. Let one of the Conference chairs know if you wish to be considered for support. To receive information updates by e-mail, send e-mail to sherman@helix.nih.gov.

Chairs:

Arthur Sherman
Mathematical Research Branch
NIDDK
National Institutes of Health
Building 31, Room 4B54
Bethesda, MD 20892
(301) 496-4325
e-mail: sherman@helix.nih.gov

Carla Wofsy
Department of Mathematics and Statistics
University of New Mexico
Albuquerque, NM 87131
(505) 277-4613
e-mail: wofsy@math.unm.edu

The following program is an up-dated version of the program that will appear in Science:

Monday Morning, June 13, 1993:
Mechanisms of Fibrillation and De-Fibrillation in Myocardium
Chair: **Arthur Winfree**, U Arizona
Continuum Model of Cardiac Muscle,
Wanda Krassowska, Duke University
Dynamics of Reentrant Cardiac Arrhythmias,
Lawrence Frame, V A Medical Center, Philadelphia
Spiral Waves: A Possible Mechanism for Ventricular Tachycardias, **Arkady Pertsov,** SUNY Health Science Center at Syracuse

Monday Evening, June 13, 1993:
Physiological Neural Networks
Chair: **Nancy Kopell,** Boston U
Modeling Neurons and Neural Networks,
Laurence Abbott, Brandeis U
Dynamic Modulation of Neurons and Networks,
Eve Marder, Brandeis U

Tuesday Morning, June 14, 1993:
Calcium Oscillations and Waves
Chair: **John Rinzel**, NIH
Intercellular and Intracellular Waves,
J. Sneyd and M. Sanderson, UCLA
The Roles of Diffusion in IP3-Induced Ca2+ Waves,
Joel Keizer, UC Davis
Coupled Oscillations in Membrane Potential and Calcium in Pituitary Gonadotrophs, **Yue-Xian Li**, NIH

Tuesday Evening, June 14, 1993:
Pattern Formation and Development
Chair: **Leah Edelstein-Keshet,** UBC
Modified Turing Systems for Skeletal Limb Patterning: The Role of Boundary Conditions and Spatial Inhomogeneity, **Philip Maini**, Oxford U, UK
Models for Aggregation: Chemotaxis and Trail Following of Bacteria, **Angela Stevens**, U Heidelberg, Germany

Wednesday Morning, June 15, 1993:
Auditory Neurophysiology
Chair: **Charles Smith,** NCSU
Single Neuron Modeling Constrained by Point Process Measurements, **Don Johnson**, Rice U
Time Coding in the Central Nervous System, **Catherine Carr**, U Maryland
Accoustic Signal Processing by Stellate Cells in the Auditory Cochlear Nucleus, **Rai Winslow**, Johns Hopkins

Wednesday Evening, June 15, 1993:
Population Biology
Chair: **Fern Hunt,** NIST
How Fluctuating Selection Maintains Genetic Variation and Sex (The Kids are Discrete --- But They're Mating), **Stephen Ellner**, NCSU
Individual-Based Predator-Prey Models, **Roger Nisbet,** UCSB

Thursday Morning, June 16, 1993:
Population Biology
Chair: **Carlos Castillo-Chavez**, Cornell U
Modeling Territoriality and Wolf-Deer Interactions, **Mark Lewis**, U Utah
A Delay Equation in the Theory of Sustainable Harvesting, **Don Ludwig**, UBC
Different Approaches for Modeling Animal Aggregation, **Shay Gueron**, Technion, Israel

Thursday Evening, June 16, 1993:
Genetic Algorithms and Immunology
Chair: **Lee Segel**, Weizmann Institute, Israel
Genetic Algorithms: Principles of Natural Selection Applied to Computation, **Stephanie Forrest**, UNM

Friday Morning, June 17, 1993:
Receptor-Mediated Cellular Events
Chair: **Douglas Lauffenburger**, U Illinois
Dynamics of Receptor-Mediated Cell Adhesion, **Daniel Hammer**, Cornell U
Monte Carlo Simulation of Membrane Signal Transduction Events, **Jennifer Linderman**, U Michigan
Models of the Immune Network, **Rob de Boer**, Utrecht U, The Netherlands

THIRTEENTH PACIFIC COAST RESOURCE MODELING CONFERENCE

University of California
San Diego, California
July 11-14, 1994

The theme is movement, migration, dispersal and spatially heterogeneous environments. Featured speakers are:

Akira Okubo, Marine Science Research Center, State University of New York
Diane Dupont, Department of Economics, Brock University, Ontario
Hugh Possingham, Applied Mathematics, South Australia
Alec MaCall, Southwest Fisheries Science Center, Tiburon, California
Ted Case, Biology Department, University of California, San Diego

For additional information contact:
Pierre Kleiber
Southwest Fisheries Science Center
Marine Fisheries Service
La Jolla, CA 92038
Internet: pkleiber@ucsd.edu
Phone: 619-546-7076

THE SEVENTH INTERDISCIPLINARY CONFERENCE ON NATURAL RESOURCE MODELLING AND ANALYSIS

Imperial College
London, UK
August 16-18, 1994

The conference will focus on recent problems and current issues in three basic areas of work: disease control, wildlife management to include fisheries and forestry and the more generic themes of sustainability and risk. For the first time RMA has introduced problems of disease control which, of course, will include both epidemiology and economic factors. The aim of the conference will be to foster collaboration across the traditional discipline boundaries and it is hoped that collaboration between biologists, earth scientists, economists, engineers, medical practitioners mathematicians and resource managers will occur.

Deadline for Contributed Papers

Those who wish to present a paper (20 minutes) should submit an abstract before May 15, 1994. The current aim is that there will be no parallel sessions to ensure that real collaboration across the disciplines can occur. Hence, early submission is advisable.

For registration materials, submission of abstracts or further information, please contact:

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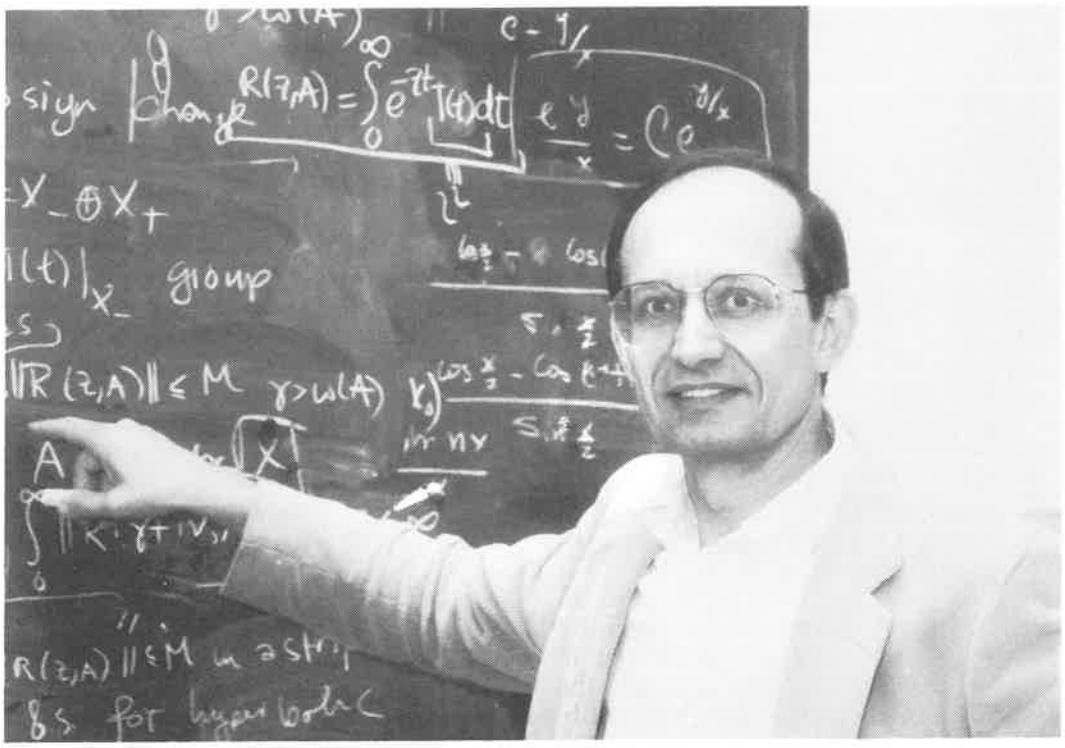
In Memoriam



Stavros Busenberg, 1941-1993

(Contributed by Carlos Castello-Chavez)

Stavros Busenberg lost his fight with Lou Gehrig's disease (Amyotrophic Lateral Sclerosis or ALS) on April 3, 1993. Stavros battled this dreadful disease with courage and dignity. He is survived by his children, John and George, and his wife, Bonnie. He was a member of the Harvey Mudd College faculty for most of his professional career.

Stavros was an outstanding researcher. Here is Bonnie's account of his earlier days:

"Stavros received his Ph.D. from John DeCicco at IIT in 1967. He did his thesis work on horn angles-- a less than mainstream area of geometry. During his postdoc at the North American Science Center, he mostly collaborated with physicists, but his most exciting problem and result came from a problem brought to him by a chemist-- on the behavior of particles in a magnetic colloidal suspension. His first few years at HMC were not very productive from a research point of view. He struggled to select the problems to work on and suffered from isolation. It was only afterwards that he realized that his main problem was the lack of collaborators. He went to see Ken Cooke to see if he could rectify the situation, and then his creativity was really unleashed. He collaborated with all sorts of people, and liked to have several problems going simultaneously. He often worked late at night after the family had gone to bed. But really he worked all the time. Long car trips usually resulted in insights into a new way to attack a problem. His penchant for dreaming through a hike in the mountains, lost in thought over some problem, are legendary in our family. Like most mathematicians, he wrote on napkins while waiting to be served at restaurants, and he often finished up an afternoon of yard work by going inside and doing a calculation which had eluded him before. He was very proud of his calculation ability -- I guess it came from all his engineering training. Although he loved mathematical biology, he almost always was working on problems in DE's too. Most recently he was working with others on modeling semiconductors, and of course he had his clinic work which always involved industrial problems. He has two patents for his work in improving the resolution of CCD cameras. He fully intended to immerse himself in research concerning the new 'smart materials' at the time of his death and had gathered quite a nice collection of articles on the subject."

This is what Bonnie had to say about his teaching:

"Stavros loved teaching and always wanted to be a teacher. His original goal was to get a master's degree and teach somewhere. That expanded somewhat. He taught night classes at IIT for Chicago residents who were trying to get their degrees part time, and later taught at Loyola in Chicago while he was writing his dissertation. He was something of a legend at Harvey Mudd for his ambidexterity. Everyone had to see him write with both hands on the blackboard (some say he did it simultaneously but I don't believe it). He is often quoted as telling his engineering students that 'I am basically lazy - that's why I am a mathematician.' Before

he started the math clinic at HMC, he was involved in the 'conference physics' major, where students did all their work in seminars and worked on real problems. Most of these students went on for their PhDs. During those early years, he also taught a freshman physics lab section and loved it. Because of his strong analytical talents, even when he was an engineer, professors were always telling him not to waste his time in a lab. He resented it, because he was quite good with his hands and was always tinkering with things, a hobby he kept up all his life, especially working with wood and with computer hardware. He taught many different courses at HMC: DE, PDE, Numerical Analysis, Calculus I, II, and III, Linear Algebra . . . He also developed a course on neural networks. He was a great extemporaneous lecturer and didn't spend a lot of time preparing. He told me the material was 'in his bones.' Stavros rarely taught the same things two years in a row. He didn't like to. He said he felt stale when he did that. He hated grading. Stavros thoroughly believed in the importance of the clinic program that he started at HMC. His teams worked very hard and ALWAYS finished the problem to the clients' satisfaction. Stavros was integrally involved with every project he ever ran since the first, in 1971 with Honeywell as a client (It was about the scattering patterns on their screens which really bothered their workers' eyes after a while). He liked to employ undergraduates to work with him on research and spent an inordinate amount of time helping them to come up to snuff. Two of his best students over the years happened to be women: Melissa Aczon, who spoke at Stavros' memorial ceremony and who was just named a runner-up for the Alice Schaefer Award given by Women in Mathematics; and Linda Jaderberg, class of 74, with whom he published a paper while she was still an undergraduate. He was very generous with his time and often helped graduate students who were not being sufficiently helped by their major professors. I think his love of teaching showed most this last semester. No one will ever appreciate the effort he put into preparing his lectures--Stavros, the joking extemporaneous lecturer-- because he was not going to let them down."

In fact, Stavros generated TEX overheads with his voice during the time he was in a wheelchair. He could only move his head, and could barely move his hands. Nevertheless, he insisted on teaching and carrying out his departmental duties. The day he died, he was extremely apologetic for being unable to teach and for being unable to introduce the applied mathematics colloquium speaker. I always marveled at Stavros' energy, enthusiam, integrity, and mathematical skills. I learned from him through several collaborations and endless hours at the blackboard. I knew that he was internationally recognized for his work in industrial mathematics. I knew of his concerns for "young people", his devotion to teaching, and the love for his family and friends but there is a lot more. Bonnie puts it better than anybody else: "Stavros had a mathematical mind, but a Mediterranean heart. He believed in the Greek ideal of developing both his mind and his body. He was very athletic, played varsity volleyball in college, earned a black belt in judo, and jogged, hiked, played tennis and squash, bicycled, canoed etc. all of his adult life. He was a stamp collector --a fairly serious one. He loved classical music and opera, had a huge record collection and went to concerts often. He was a devotee of poetry and could recite verses in Greek, French, and English. When he needed to soothe his spirit, he retreated to Greek poetry. He loved to travel and to speak other languages, for which he had a considerable gift--he spoke Greek, French, Italian, English, and even some Spanish. He also liked to eat well, especially foods from other countries, and was a creditable cook when he had time. He loved plants, especially camellias, and took great pride in our fruit trees and vines. He made wine for several years and never stopped talking about it. He earned a pilot's license several years ago and wanted to go on for his instrument rating. He was a great tease to those close to him: an incorrigible imp. I love him. I miss him."

Literary Events *(continued from page 5)*

* ***Theoretical Models in Biology: The Origin of Life, the Immune System, and the Brain,*** Glen W. Rowe. Oxford University Press, 1994/440 pp. $52.50

* ***Games of Life: Explorations in Ecology, Evolution, and Behaviour,*** Karl Sigmund. Oxford University Press, 1993/256 pp. $49.95

* ***The Exploitation of Evolving Resources: Proceedings of an International Conference held at Julich, Germany,*** T.K. Stokes, J.M. McGlade, and R. Law (Eds.). Springer-Verlag, 1993/264 pp. $50.00
Lecture Notes in Biomathematics,Volume 99

* ***Life in Moving Fluids: The Physical Biology of Flow,*** (Second edition - Revised and Expanded), Steven Vogel. Princeton University Press, 1994/app.640 pp. $49.50

* ***Information Theory and Molecular Biology,*** H.P. Yockey, Cambridge University Press, 1992/427 pp. $74.95.

New Journal

JOURNAL OF COMPUTATIONAL NEUROSCIENCE
This new journal, to be published by Kluwer Academic Publishers, is intended to provide a forum for papers that fit the interface between computational and experimental work in the neurosciences. The managing editors are: James Bower (Calif Inst of Technology), Eve Marder (Brandeis University), John Miller (UC, Berkeley), John Rinzel (NIH), Idan Segev (Hebrew University), Charles Wilson (U. Tennessee, Memphis).

University of Pittsburgh

The University of Pittsburgh now has two programs that are relevant to young or prospective mathematical biologists.

Neural Processes in Cognition is an NSF sponsored training grant for both theoretical and experimental work in Neuroscience. Graduate trainees receive a stipend for 2 years (after which they obtain funding from their advisor) and a workstation or XTerminal. Sponsoring departments include Psychology, Mathematics, Physiology, Neuroanatomy, and Behavioral Neuroscience. Two year postdoctoral positions are also available. Information can be obtained by writing to

Professor Walter Schneider
Program Director
Neural Processes in Cognition
University of Pittsburgh
3939 O'Hara Strret
Pittsburgh, PA 15260
(EMAIL: schneider@vms.cis.pitt.edu)

or

Bard Ermentrout
Department of Mathematics
University of Pittsburgh
Pittsburgh, PA 15260
(EMAIL: bard@mthbard.math.pitt.edu)

Fellowships in Computational Biology -- The W.M. Keck Center For Advanced Training In Computational Biology. The objective of this program is to train graduate students and postdoctoral fellows from biology and computer science in computaional methods (such as molecular dynamics, gene mapping, drug design, molecular medicine). Information can be obtained by writing to

Bruce G. Buchanan
Co-Director
University of Pittsburgh
206 Mineral Industries Bldg
Pittsburgh, PA 15260

or

Susan Henry
Co-Director
Carnegie Mellon University
825 Mellon Institute
Pittsburgh, PA 15213

Santa Fe Institute

Summer Research Opportunities for Undergraduates
at the Santa Fe Institute, Santa Fe, New Mexico

Students work with a faculty mentor on an individual project focusing on some aspect of the computational properties of complex systems. SFI's broad program of research is aimed at understanding both the common features of complex systems and at comprehending the enormous diversity of specific examples. Projects focus on adaptive computation; on the physics, mathematics, information science, and computational aspects of complexity; on economics as a complex, adaptive system; and on the life sciences including modeling of the immune system, theoretical neurobiology, genetic data analysis, theoretical ecology, and models of protein folding.Internships may be part or full-time, although it is likely that most summer students will hold full-time positions.

SUPPORT

Support for this program is provided by a grant from the National Science Foundation through the Research Experiences for Undergraduates Program.

There is no tuition. Interns receive modest living stipends during their stay along with a contribution toward support of round trip travel expenses from their home institution.

TO APPLY

Send a current resume, transcript of grades, along with a statement of your current research interests and what you intend to accomplish during your internship. Mathematical or computational skills or experience -- particularly knowledge of the rudiments of the Unix operating system and/or a programming language such as C -- are favorably considered. Please have three scientists who know your work write letters recommending you for this program. Include your fax number and/or email address.Women and minorities are especially encouraged to apply.

Send material to:

Kimberly Bodelson
Santa Fe Institute
1660 Old Pecos Trail, Suite A,
Santa Fe, New Mexico 87501

Telephone: (505) 984-8800
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