Mathematical Biology Newsletter

Society for Mathematical Biology | Volume 6, Number 1 | March, 1993

Welcome to the Newsletter. I am the new editor and I welcome any suggestions that you have as to the contents herein. First, I want to thank the previous Editor, Michael Conrad, for his often thankless work for many years. Since the *Bulletin* does not publish letters and other commentary on the articles and the field of Mathematical Biology in general, I think that the Newsletter could be an excellent forum for this. I am also interested in any comments that you might have on software for easing our work in Mathematical Biology. For example, if you know of some great free software, tell us about it (see later in this issue). Because of severe time constraints, I will not be able to do the kind of in depth profiles of mathematical biologists that were the forte of my predecessor. Instead, I will report any news that crosses my desk and that is relevant to Mathematical Biology. If people are willing to write small articles on any relevant subject, I will be willing to publish them (modulo their suitability of course). I would prefer that anything you want to submit be sent electronically; if this is an impossibility, I will take them via snail mail. My e-mail address is PHASE@VM2.CIS.PITT.EDU

Since a number of you (or so I am told) have little or no access to electronic mail and/or the Internet, I will also glean the best of the SMB digest that is maintained by Ray Mejia. For those of you who do have access, the address of this valuable resource is: fconx.ncifcrf.gov (129.43.52.4)

Below, I will comment on the Internet in general and how to get loads of free and often valuable software.

Anyway, I thank you for your patience and hopefully I will be able to put this paragon of journalism out 3 to 4 times a year.

Bard Ermentrout

SMB News

As you know, we had our annual meeting last year in Berkeley. There were some interesting as well as a number of strange lectures; however, a good time was had by all. We had a dinner in honor of the 60th birthday of Professor Lee Segel who is also the editor of the aforementioned *Bulletin*. Leah Edelstein-Keshet regaled the audience with anecdotes about Lee (she was a student of his). Among Lee's manifold talents is his ability to produce vast amounts of doggerel and the occasional ill-metered limerick. In light of this, I would like to announce the First Annual Lee Segel Poetry Contest in which you are encouraged to submit amusing original rhymes that are at least peripherally connected to mathematics or biology or both. The prize will be publication in this newsletter as well as the chance to put "Prize Winning Contribution to Mathematical Biology" on your vita.

The Society held elections recently to fill positions on the Board as well as the President. Our new chief executive is John Tyson who is in the Biology Department at Virginia Polytechnical Institute. John has been a longtime member of the Society and currently edits the book reviews for the *Bulletin*. His interests are in cell biology and excitable media. Other electees to the Board are Leah Edelstein-Keshet and Leon Glass. Leah works in a variety of areas in mathematical biology, can be found in the Mathematics Department at the University of British Columbia, and is the author of an excellent book on Mathematical Biology. Leon Glass is in the Physiology Department at McGill University and is interested in the applications of mathematics to physiology (notably cardiac rhythms). Leon is the co-author (with Michael Mackey) of *From Clocks to Chaos: the Rhythms of Life*, and the co-editor of *Theory of Heart* (see Literary Events section).

This year's annual meeting will be held at Cornell University, Ithaca, NY, July 10 (registration/reception) through July 13. The meeting should end around 1PM. Detailed program and registration materials are included with the Newsletter. Reserve these dates.

Lee Segel, editor of the *Bulletin*, is on sabbatical during the academic year. For the period Sept 20,1992-Sept 1,1993, kindly send the original and TWO copies of submitted manuscripts to him at his usual address (Dept of Applied Math and Computer Science, Weizmann Inst., Rehovot IL-76100, Israel).
IN ADDITION, send a copy of the covering letter and ONE copy of the manuscript to the mailing address below.
Mail: Center for Nonlinear Studies (CNLS), Mail Stop B258, Los Alamos National Laboratory (LANL), Los Alamos, NM 87545
Alternative address: T-10 (Biophysics and Theoretical Biology), Mail Stop K710, LANL, Los Alamos, NM 87545
Email: las@temin.lanl.gov
Phones: LAS office: 505-665-2659; CNLS office: 505-667-9469 (T-10 c/o Alan Perelson: 505-667-6829)
FAX: CNLS: 505-665-2659; T-10: 505-665-3493

Society for Mathematical Biology

Society for Mathematical Biology Newsletter Editor: Bard Ermentrout (Department of Mathematics, University of Pittsburgh, Pittsburgh, PA 15260); President: Alan Perelson (Group T-10, Mail Stop K-710, Los Alamos National Laboratory, Los Alamos, NM 87545); President- Elect: John Tyson (Department of Biology, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061); Treasurer and Newsletter CoEditor: Torcom Chorbajian, (P.O. Box 11283, Boulder CO 80301); Board of Directors: Joan Aron, Leah Edelstein-Keshet, Bard Ermentrout, Leon Glass, James Keener, Donald Ludwig, Alan Perelson, John Tyson

LETTER FROM THE PRESIDENT-ELECT

Dear colleagues and friends,

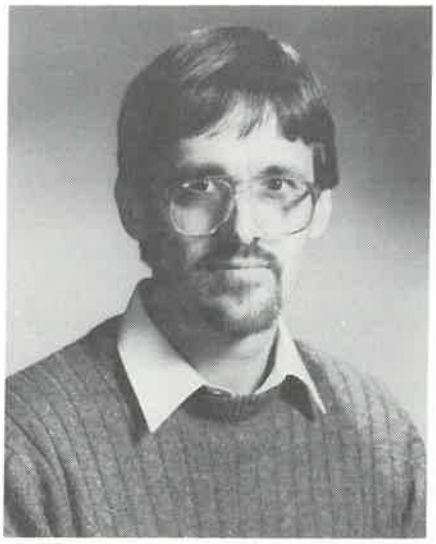
Thanks for the trust you have placed in me as the next president of SMB. I look forward to serving you and fostering the craft of mathematical biology. To do this effectively, I will need your advice, help and encouragement, so please let me know your suggestions, frustrations, anecdotes, etc. You can reach me at 703-231-4662 (voice), 703-231-9307 (FAX), tyson@vtvm1.cc.vt.edu *or* tyson@vtvm1.bitnet. You should probably know the sorts of issues that especially catch my attention. At the top of my agenda is to make theoreticians indispensable to future progress in biology. Theoretical modeling and mathematical analysis should be as integral a part of modern biology as they are of physics, chemistry and engineering. To achieve this goal, first of all we need to tell our experimental colleagues interesting things that they don't already know and could never figure out without our help. Telling each other about elegant theorems and efficient algorithms has a place in our Society, to be sure, but more thought and effort should be given to communicating the power and utility of theoretical biology to experimentalists in a comprehensible and winsome manner. Some areas of mathematical biology (epidemiology and population genetics, for instance) have a long history of fruitful interactions between theoreticians and experimentalists, but in other areas (cellular and molecular biology, especially) there is still a great deal of skepticism and downright hostility to be overcome.

Secondly, in the classroom we need to increase our efforts to introduce the next generation of biologists to quantitative reasoning. This will require some restructuring of introductory courses in both biology and mathematics. I know many of you are experimenting in this area, and we could use better lines of communication for swapping ideas, successes and failures. For instance, what books are written especially for bright young students who would love to see how their first courses in biology, chemistry and math fit together? Wilson & Bossert's *Primer of Population Biology* is a good example of the genre I have in mind. Perhaps we need a collection of such short, inexpensive paperbacks that present specific topics in biology from a mathematical perspective; books that can supplement traditional texts used in biology and math curricula.

Finally, there are two professional issues that are especially important to me. First, in light of the worsening state of federal funding for basic research, I am pleased with the favorable reception that mathematical biology has received lately at NSF and NIH, thanks to past efforts of the SMB and its members. We need to nurture this trust and deliver on our promises! Second, I am eager to foster fair and productive relationships among the regional societies of mathematical biology around the world. I would like to see the SMB play a major role in the international community.

If I can see some progress in these areas during my tenure as president of SMB, I will be satisfied. I look forward to hearing from you about these issues and others that I haven't mentioned.

Yours sincerely, John Tyson.



JohnTyson, President-Elect

Leah Edelstein-Keshet, Director

Leon Glass, Director
(From a daquerrotype taken by Robert Shlaer, Santa Fe, New Mexico)

THIS ISSUE'S SPECIAL FEATURE
The Internet

There is a huge body of free software available at a number of sites throughout the US, Canada and the rest of the world. These sites are loosely connected by the Internet. If you have access to electronic mail, then you are likely to be connected to the Internet. This facility allows you access to hundreds of free programs that run on everything from HP calculators on up through PCs and workstations. If you haven't taken advantage of this, you should. The key means by which you can obtain this freeware is through anonymous ftp, a program that allows one to connect to other computers and download programs and text as well as pictures and music. The "anonymous" part of anonymous ftp means that when you ftp to the site, you will be asked for a login name. Give "anonymous" as the name and then your real login name as the password. You can then obtain access to a large body of software and news. For example, you can obtain all the back issues of the SMB e-mail Digest by ftp'ing to the NIH site and changing to the appropriate directory. An example session with my comments in << >> and the computers output in brackets

```
ftp fconx.ncicrf.gov << dial up the site >>
[ftp 129.43.52.4]
[Connected to 129.43.52.4.]
[220 fconvx FTP server (Version 4.164 Fri Nov 29 17:17:19 CST 1991) ready.]
[Name (129.43.52.4:bard):] anonymous << give login name >>
[331 Guest login ok, send ident as password.]
[Password:] << At this point type your name >>
[230 Guest login ok, access restrictions apply.]
ftp> cd smb << Change to smb directory >>
[250 CWD command successful.]
ftp> cd digest << Change to digest directory >>
2[50 CWD command successful.]
ftp> prompt << Don't prompt me >>
[Interactive mode off.]
ftp>mget SMB_* << get all of the digests >>
[ A whole lot of stuff...]
ftp> quit << say goodbye >>
[221 Goodbye.]
```

Now you will have the entire smb digest. If you had only wanted some of it you specify only those files you want to copy. The main ftp commands that are useful are:

```
get <filename> <------ get a single file
mget <filenames> <------ get wildcards
mput <filenames> <------ put files onto the remote machine
put <filename>
prompt <------ toggle between interactive/non interactive modes (important for
mput/mget)
ascii <------ To get ascii files
binary <------ To get binary files (executable, pictures, etc.)
quit <------ Exit ftp
cd <directory> <------ change directories for searching
lcd <directory> <------ change your local directory
! <commands> <------ execute shell commands within ftp
ls <------ list the contents of a directory
dir <------ long directory
help <------ print help
pwd <------ print current remote directory
```

I want to point out a number of locations which allow you access to program development software and some useful tools for modeling.

1. wuarchive.wustl.edu This has tons of stuff for PCs, MACs and workstations.
2. prep.ai.mit.edu All of the X windows software and the free Gnu software such as the complete C++ Gnu compiler for both Unix and for PCs. The latter is a full blown 32 bit compiler and allows you to create native X windows code on your PC. I have used it and it produces very fast code.
3. 128.146.8.52 (neuroprose) A huge number of reprints and preprints on theoretical neuroscience and neural nets.
4. daisy.waterloo.edu Maple ftp site.
5. 128.2.242.8 (Connectionists) The connectionist network.
6. PhasePlane for X windows. mthsn4.math.pitt.edu Software written by yours truly for solving initial and boundary value problems of up to 50 dimensions.

There are many others, but these should get you started.

Until next time, Bard Ermentrout

Graduate and Postdoctoral Study

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 Street, Pittsburgh, PA 15260

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 computational 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

Careers in Theoretical Biology

Careers in Theoretical Biology by Richard Gordon, Carolina Tips, Vol. 56, No. 3 (Summer 1993). A prepublication copy (without pictures) of this brochure was included with the April 1992 Newsletter. The brochure is now available and may be obtained free of charge by writing to Harry Shoffner, Carolina Biological Supply Company, 2700 York Road, Burlington, North Carolina 27215 USA, and requesting *Careers in Theoretical Biology*. Or, you may send a fax to Harry Shoffner at 919-584-3399. Richard Gordon apologizes that the acknowledgments were dropped by the publisher to make room for advertising. He would like to thank members of the SMB for their help in polishing the text.

SMB MEETINGS

1993 SMB Annual Meeting

The 1993 Annual Meeting of the Society for Mathematical Biology will be held at Cornell University, Ithaca, New York, July 10-13. There will be an informal mixer, with refreshments, Saturday evening (July 10). The formal program will begin Sunday morning and will continue through Tuesday (early afternoon). The Annual SMB business meeting will convene late Sunday afternoon, and there will be a picnic Monday evening.

The program is being organized by **John Tyson** (chair), **John Guckenheimer** and **Carlos Castillo-Chavez.**

Areas of focus and invited speakers include:

Cellular and Molecular Biology (John Tyson), July 11

Dan Hammer (Cornell), *Kinetics and Mechanics of Biological Adhesion and Detachment*

Mark Kimmel (Rice), *Stochastic Models of Gene Amplification and Related Processes*

Arthur Sherman (NIH), *Calcium and Membrane Potential Oscillations in Insulin-Secreting Cells*

DeWitt Sumner (Florida State), *The Topology of DNA*

Ecology, Epidemiology and Immunology (Carlos Castillo-Chavez), July 12

Fred Brauer (University of Wisconsin), *General Models for Diseases with Vector Transmission*

Linda Harnevo (Bar-Ilan University), *HIV-Infection, the Immune System, and AIDS: from the Individual Level*

Denise Kirschner (Vanderbilt), *AZT Treatment of HIV Infection: Results at Both the Immunological and Epidemiological Level*

Simon Levin (Princeton), *Modeling Ecological Aggregations*

Jorge X. Velasco-Hernandez (Universidad Autonoma Metropolitana-Xochimilco) *Treatment and Behavioral Change in HIV Population Dynamics*

Physiology (John Guckenheimer), July 13

Larry Abbott (Brandeis), *Beyond Hodgkin-Huxley: Cumulative Inactivation and Short Term Memory*

Art Winfree (University of Arizona), *Theorists' Visions of Cardiac Turbulence*

As always, contributed papers and posters are welcome in all areas of mathematical biology. An abstract form, a registration form, and an information sheet are enclosed. You are welcome to make photocopies of any of the above for your colleagues. Please send the completed abstract forms to John Tyson.

Colleen Martin at Cornell University is in charge of the local arrangements.

1993 AMS-SIAM-SMB Symposium

The twenty-seventh annual Symposium on Some Mathematical Questions in Biology will be held during the annual meeting of the Society for the Study of Evolution, June 19-23, 1993, in Snowbird, Utah.

Mark Kirkpatrick, University of Texas, is the organizer of the Symposium, and the theme is ***Theories for the evolution of haploid-diploid life cycles***. The session will be on Wednesday morning, June 23. The speakers and their topics are: **Graham Bell** (McGill University), *The comparative biology of the alternation of generations*; **James Crow** (University of Wisconsin) and **Alex Kondrashov** (University of Oregon), *The evolution of haploid-diploid life cycles under deleterious mutation*; **Cheryl Jenkins** (University of Texas), *Ecological selection and deleterious mutation in the evolution of life cycles*; **Richard Michod** (University of Arizona), *Genetic repair and life cycle evolution;* **Sarah Otto** (Berkeley), *Genetic prerequisites and consequences of life cycle evolution*; and **Veronique Perrot** (Universitat Basel), *Experimental tests of theories for the evolution of haploid-diploid life cycles.*

Proceedings of the symposium will be published by the AMS in the series *Lectures on Mathematics in the Life Sciences.*

For further information, contact the Symposium Conference Coordinator, AMS, P.O. Box 6887, Providence, RI 02940, or DLS@MATH.AMS.COM by e-mail.

THE LANDAHL TRAVEL GRANTS

The Society for Mathematical Biology has funds for partial support of travel for graduate students to meetings cosponsored by the SMB. There are two meetings in 1993: the Symposium on Some Mathematical Questions in Biology, Snowbird, UT, June 19-23, 1993 and the SMB Annual Meeting, Ithaca, NY, July 10-13, 1993. Application deadlines are May 10 and May 24, respectively. 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 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.

Lee Segel (with Albert Goldbeter) at the dinner in honor of Lee's 60th birthday at the SMB meeting in Berkeley (photograph courtesy of Linda Harnevo)

OTHER MEETINGS

Gordon Conference News

To: Past and Future Gordon Conference Attendees
Theoretical Biology and Biomathematics
From: Carla Wofsy and Artie Sherman, Co-chairs
'94 Gordon Conference
Dear Colleagues,

We have begun to make plans for the 1994 Gordon Conference on Theoretical Biology and Biomathematics. A survey was mailed to as many of the 1992 participants as we had good addresses for. If anyone on the SMBnet did not get a survey and would like to correct their email address or would like to be added to the Gordon Conference mailing list, send a message (with the old and new addresses if changing) to:
sherman@helix.nih.gov

Fifth Annual Conference on Biomathematics

State University of New York
at Stony Brook
April 16, 1993

This informal conference is being sponsored by the Department of Applied Mathematics and Statistics with funds provided by a grant from the Army Research Office. Its purpose is to bring together researchers of diverse backgrounds to discuss issues of mutual concern at the interface of mathematics, biology, and medicine. The opening talk is by **David Shalloway**, Greater Philadelphia Professor of Biological Sciences at Cornell University. The second major presentation is by **Sten Vermund** of NIH.

The conference takes place in Room S-240 of the Math-Physics Tower and begins at 9:00 a.m. Registration is free and starts at 8:00 a.m. Light lunch and refreshments will be served.

For further information, please contact Edward Beltrami in the Department of Applied Mathematics and Statistics, SUNY @ Stony Brook, Stony Brook, New York 11794-3600.
Telephone: (516) 632-8367 or (516) 632-9125;
Fax: (516) 632-8490; E-mail: beltrami@ams.sunysb.edu

Summer School on Nonlinear Systems in Evolutionary and Population Biology

Driebergen, The Netherlands
May 6-10, 1993

Topics:
Persistence of species or infectious diseases
Dynamics of populations in a stochastic environment
Evolution of characters in a fluctuating environment

Lecturers:
Yoh Iwasa (Kyoto, Japan)
Simon Levin (Princeton, USA)
Patsy Haccou (Leiden, The Netherlands)
Marten Scheffer (Lelystad, The Netherlands)

Costs:
For full board (including registration) for staff DFL. 400,==
For students (including PhD students) DFL. 200,==.

Organizing committee:
Odo Diekmann, Johan Grasman, Lia Hemerik,
Hans Metz, Marten Scheffer

Correspondence and information:
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The Twelfth Pacific Coast Resource Modeling Conference

Tucson, Arizona
Westward Look Resort
May 13 -15, 1993

The purpose of the conference is to provide a forum for the presentation of recent progress in the mathematical modeling and analysis of renewable resources. Particular emphasis will be given to the modeling of biological processes, population dynamics, and bioeconomics, especially as they relate to problems in fisheries, forestry, pest and wildlife management, as well as water resources, environmental and conservation issues.

The featured speakers will be **Joel Brown** (University of Illinois at Chicago), *Honey, I shrunk the cod: using game theory to model evolving resources*; **Tom Hallam** (University of Tennessee), *Modeling effects of chemicals in aquatic systems*; **George Leitmann** (University of California at Berkeley), *One approach to the control of uncertain dynamical systems*; **Michael Mesterton-Gibbons** (Florida State University), *Game-theoretic resource modeling*; and **Bill Schaffer** (University of Arizona), *Chaos and periodicity in biological dynamics.*

Westward Look, overlooking the city of Tucson, is a first class resort located in the foothills of the beautiful Santa Catalina Mountains. Conference participants will have full use of the resort facilities and an opportunity to enjoy the unique natural environment and climate of the Sonoran Desert. Other nearby attractions include the world famous Sonoran Desert Museum and Biosphere II. A conference banquet is planned at which **Robert McKelvey**, out-going president of the Resource Modeling Association, will be guest speaker. A post-conference overnight hike (for a limited number of participants) is also being planned.

Registration fees are US$80 for RMA members, US$100 for non-members, and US$30 for students. For further information, please contact either:

J.M. Cushing
Department of Mathematics
Building 89
University of Arizona
Tucson, AZ 85721
Phone: (602) 621-6863;
FAX: (602) 621-8322
cushing@math.arizona.edu

Tom Vincent
Aerospace and Mechanical Engineering
Building 16
University of Arizona
Tucson, AZ 85721
Phone: (602) 621-2325
VINCENT1TL@ccit.arizona.edu

Workshop On Computational Neurosciences

Austin, Texas
May 14-15, 1993

Workshop Director: Dr. Matthew Witten, Associate Director, University of Texas System - CHPC Balcones Research Center, 10100 Burnet Road, CMS 1.154, Austin, TX 78758-4497 USA Phone: (512) 471-2472 or (800) 262-2472; Fax: (512) 471-2445 email: m.witten@chpc.utexas.edu *or* m.witten@uthermes.bitnet

This Workshop is part of an ongoing series of workshops being held at the UT System Center For High Performance Computing; addressing issues of high performance computing and its role in medicine, dentistry, allied health disciplines, and public health.

The purpose of this Workshop is to bring together interested scientists for the purposes of introducing them to state-of-the-art thinking and applications in the domain of neuroscience. Topics to be discussed range across the disciplines of neurosimulation, cognitive neuroscience, neural nets and their theory/application to a variety of problems, methods for solving numerical problems arising in neurology, learning abilities and disabilities, and neurological imaging.

Current speakers: **Peter Fox** (UT HSC San Antonio), **Terry Mikiten** (UT HSC San Antonio), **Robert Wyatt** (UT Austin), **Elizabeth Thomas** (UT Austin), **George Adomian** (General Analytics Corporation, Athens, Georgia), **George Moore** (University of Southern California), **William Softky** (California Institute of Technology), **Cathy Wu** (UT Health Center, Tyler), **Dan Levi** (University of Texas at Arlington), **Michael Liebman** (Amoco Technology Company, Naperville, Illinois), **George Stanford** (UT Austin), **Tom Oakland** (UT Austin), **Matthew Witten** (UT System - CHPC).

There is a nominal registration fee of US $60.00. The conference proceedings will be an additional US $10.00. The conference registration fee includes luncheon and refreshments for both days of the workshop.

For further information, contact: Ms. Leslie Bockoven, Administrative Associate, Workshop On Computational Neuro-Sciences, UT System - CHPC Balcones Research Center, 10100 Burnet Road, CMS 1.154, Austin, TX 78758-4497.
Phone: (512) 471-2472 or (800) 262-2472; Fax: (512) 471-2445; Email: neuro93@chpc.utexas.edu *or* neuro93@uthermes.bitnet

The 6th Interdisciplinary Conference on Natural Resource Modeling and Analysis

Circeo National Park,
Sabaudia (Rome) Italy
June 16-19, 1993

The purpose of the meeting is to provide a forum for a presentation of the most recent theoretical and experimental advances in mathematical modeling and analysis of physical, chemical, biological, ecological and socio-economic processes dealing with natural renewable resources. Particular emphasis will be given to assessment, conservation, sustainable exploitation and management of aquatic and terrestrial ecosystems and biological resources. Focus will be put especially on related topics in water, wildlife, forestry, fisheries and aquaculture management.

Invited speakers are: **Enzo Tiezzi** (University of Siena, Italy), *Entropy and sustainable development in environmental modeling;* **Candace Oviatt** (University of Rhode Island, USA), *Eco-physiology of aquatic systems*; **John Caddy** (FAO - Rome Italy), *Geographical modeling in fisheries;* **Sergio Rinaldi** (Politecnico di Milano, Italy), *Food chain dynamics: seasonality in chaos*; **Harold Burkhart** (Virginia Polytechnic, USA), *Forest growth and yield modeling;* **Michael Hoel** (University of Oslo, Norway), *Economics of natural resources*.

The abstract deadline is May 1. Registration fees before May 1 are $60 for RMA members, $75 for non-members, and $30 for students; after May 1, the fees will be $80 for members, $90 for non-members, and $30 for students.

For further information, contact: Vincent Hull, Laboratorio Centrale di Idrobiologia, Via del Caravaggio, 107, I-00147 Rome ITALY. E-mail: HULL@IRSA. RM.CNR.IT

For additional information about the **Resource Modeling Association,** contact: Lee Badger, Department of Mathematics, Weber State College, Ogden, UT 84408-1702 USA.

Canadian Society for Theoretical Biology

Windsor, Ontario
June 18, 1993

The CSTB will meet in Windsor, Ontario, June 18, under the auspices of the Canadian Federation of Biological Sciences (CFBS). A symposium on ***the application of visualization methods in biology and ecology*** has been organized by **Efraim Halfon**. The symposium will have two parts; in the morning papers will be presented, while in the afternoon a set of computers will be set up in an appropriately organized room. Prospective users will be able to meet the software developers as well as scientists from other institutes in Canada and the United States, and try the programs hands on.

Speakers: **Mica Panzer** (University of Western Ontario), *Spatial image processing: from simple to sophisticated*; **James J. Kay** (University of Waterloo) *NETWORK, The analysis of mass and energy flows in ecosystems*; **David Foster** (University of Washington), *SAAM II: Modelling lipoprotein kinetic data using a new computer program*; **William Silvert** (Bedford Institute of Oceanography, Dartmouth, Nova Scotia), *Putting management models on the manager's desktop*; **Clark Jeffries** (Clemson), *Toxicant transport in energy flow ecosystem models*; **John Cleave** (Northwestern), *Using student design as a basis for teaching biology: The Institute for the Learning Sciences Creanimate Project*; **Alan D. Day** (University of Western Ontario), *The bio-animate series, a large teaching library of computer animation-lessons on cell and molecular biology/genetics.*

For further information, contact: Dr. Efraim Halfon, Lakes Research Branch, National Water Research Institute, Canada Centre for Inland Waters, Burlington, Ontario, Canada L7R 4A6. E-mail: U044@cs.cciw.ca

Classification Society of North America
June 24-26, 1993
Numerical Taxonomy Group
June 25-27, 1993
Pittsburgh, PA

This year, for the first time, the Numerical Taxonomy Group (NT) and the Classification Society of North America (CSNA) will hold back-to-back meetings at one location. Participants may register for either meeting alone or both meetings together. Those attending both meetings will be charged a reduced joint registration fee. There will be a joint CSNA/NT banquet on Friday evening, June 25 and on Saturday, there will be a jointly sponsored symposium.

Highlights of the NT Program:

Saturday, June 26: **Joint CSNA/NT Symposium** - ***Morphometrics***, organized by **F. James Rohlf:** *Statistical Analysis of Shape Using Partial Warp Scores,* **F. James Rohlf**; *Statistical Analysis of Shape in Biological Data,* **Colin Goodall**, University of Montreal; *The Geometric Sources of Morphometric Information: Landmarks, Outlines, and Deformation,* **Fred L. Bookstein**, University of Michigan.

Sunday, June 27: **Symposium** - ***Perspectives on the Role and Impact of Numerical Taxonomy,*** organized by **Richard Jensen:** *Numerical Taxonomy in Ecology,* **Pierre Legendre**, University of Montreal; *Numerical Taxonomy in Species/Population Level Studies,* **Timothy Dickinson**, Royal Ontario Museum; *Numerical Taxonomy in Evolutionary Classification,* **George Estabrook**, University of Michigan; *Thirty Years of Numerical Taxonomy,* **Peter Sneath**, University of Leicester.

Highlights of the CSNA Program:

Anniversary Keynote by **Robert R. Sokal**, *Classification: Our First Twenty-Five Years.* ***Probability Models for Random Graphs***, organized by **David Banks**, Carnegie Mellon. **Invited session on Neural Networks and Classification**: *Performance Bounds for Neural Network Estimation and Classification,* **Andrew Barron**, Yale; *Clustering and Classification with Extensions of LVQ,* **James C. Bezdek**, University of West Florida; *Binary Classification Using a Gaussian Mixture Approximation,* **Arthur Nadas,** IBM Research. **Invited Talks**: *Admissibility of Lance and Williams Clustering Algorithms,* **John W. Van Ness**, University of Texas at Dallas; *Reticulate Models for Evolution,* **John A. Hartigan**, Yale; *Perspectives of Consensus Sequences Based on Plurality Rule,* **William H. Day,** Memorial University of Newfoundland. *Software Environments: Interactive Clustering and Classification,* **Daryl Pregibon,** AT&T Bell Laboratories; *A Software Environment for Cluster Analysis,* **Laszlo Engelman** and **Leland Wilkinson**, Systat Inc. **Short Course**: Multivariate Density Estimation: Theory, Practice and Visualization, **David W. Scott**, Rice

For registration forms, information about housing and travel, or information about the CSNA meeting, contact: Mrs. Susan Strauss, Department of Information Science, University of Pittsburgh, Pittsburgh, PA 15260; Telephone: 412-624-9424; FAX: 412-624-5231; E-mail: strauss@lis.pitt.edu

For information about NT-25, or to submit an abstract for the NT-25 contributed paper session, contact: Richard Jensen, Department of Biology, Saint Mary's College, Notre Dame, IN 46556; Telephone 219-284-4674; FAX 219-284-4716; E-mail: fnpfr3@irishmvs.cc.nd.edu

The First International Conference on Intelligent Systems for Molecular Biology
Washington, DC
July 7-9, 1993

The conference will bring together scientists who are applying the technologies of artificial intelligence, robotics, neural networks, massively parallel computing, advanced data modelling, and related methods to problems in molecular biology. Participation is invited from both producers and consumers of any novel computational or robotic system, provided it supports a biological task that is cognitively challenging, involves a synthesis of information from multiple sources at multiple levels, or in some other way exhibits the abstraction and emergent properties of an "intelligent system." The three-day conference, to be held in the attractive conference facilities of the Lister Hill Center, National Library of Medicine, National Institutes of Health, will feature both introductory tutorials and original, refereed papers, to be published in an archival Proceedings. The conference will immediately precede the Eleventh National Conference of the American Association for Artificial Intelligence, also in Washington.

Sponsors: American Association for Artificial Intelligence, The Biomatrix Society, National Library of Medicine

Organizing Committee: Lawrence Hunter (National Library of Medicine), David Searls (University of Pennsylvania), Jude Shavlik (University of Wisconsin)

For more information, contact ISMB@nlm.nih.gov
Jude Shavlik, Computer Sciences Dept., University of Wisconsin
1210 W. Dayton Street, Madison, WI 53706

World Congress on Neural Networks
Oregon Convention Center
Portland, Oregon
July 11-15, 1993

General Meeting Chairman: George Lendaris
Main Program Chairs: Stephen Grossberg, Bart Kosko
SME/INNS Track Program Chairs: Kenneth Marko and Bernard Widrow; ISFSA/INNS Track Program Chairs: Ronald Yager and Paul Werbos
Plenary Speakers include: **Carver Mead**, *Learning in VLSI;* **Stephen Grossberg**, *3-D Vision*; **Bart Kosko**, *Neural Fuzzy Systems*; **Wolf Singer**, *Coherent Cortical Function*; **Kumpati Narendra,** *Neural Control*
Tutorials will be offered on Sunday, July 11

Cognitive Neuroscience -- Robert Desimone
Structural and Mathematical Approaches to Signal Processing -- S.Y. Kung
Adaptive Resonance Theory -- Gail Carpenter
Practical Applications of Neural Network Theory -- Robert Hecht-Nielsen
Cognitive Science -- David Rumelhart
Neural Fuzzy Systems -- Fred Watkins
Neurobiology and Chaos -- Walter Freeman
Neural Control and Robotics -- M. Kuperstein
Neural Computation and Vlsi -- Eric Schwartz
Biological Vision -- V.S. Ramachandran
Supervised Learning -- Hall White

Technical Sessions and Session Chairs:

Biological Vision -- C. Malsburg, V. S. Ramachandran
Local Circuit Neurobiology --J.Houk, J. Byrne
Robotics and Control -- M. Kuperstein, K. Narendra
Intelligent Neural Systems -- S. Grossberg, D. Levine
Signal Processing -- B. Widrow, S.Y. Kung
Biological Sensory-Motor Control -- A. Barto, S. Kelso
Neurodynamics -- S. Amari, H. White
Electro- Optical Neurocomputers -- H. Szu, L. Giles
Speech and Language -- D. Rumelhart, M. Cohenoo
Machine Vision -- K. Fukushima, R. Chellappa
Cognitive Neuroscience -- L. Optician, R. Desimone
Applications -- J. Dayhoff, R. Hecht-Nielseno
Unsupervised Learning -- G. Carpenter, E. Oja
Supervised Learning -- P. Werbos, L. Cooper
Pattern Recognition -- T. Kohonen, D. Specht
Associative Memory -- J. Taylor, J. Anderson

For registration and additional information, please contact:

WCNN '93 Talley Management Group
18251 I Street NW, Suite 400
Washington, DC 20006
Telephone: (609) 845-1720; Fax: (609) 853-0411

1993 CRM-UBC Summer School on MATHEMATICAL BIOLOGY

University of British Columbia
Vancouver, B.C.
July 19 to August 13, 1993

The third Summer School held by the Centre de recherches mathematiques (CRM) of l'Universite de Montreal will be jointly sponsored by the University of British Columbia, and will be held on the UBC campus in Vancouver, B.C. The theme of the 1993 CRM-UBC Summer School will be MATHEMATICAL BIOLOGY, and the School is under the scientific direction of **Robert M. Miura** (UBC).

In the 1993 Summer School, there will be courses on a number of different subjects in Mathematical Biology, with lectures by **C.W. Clark** (UBC), **A. Dobson** (Princeton), **L. Keshet** (UBC), **S. Levin** (Princeton), **D.A. Ludwig** (UBC), **M. Mangel** (UC Davis), **J. Milton** (Chicago), **R.M. Miura** (UBC), **S. Pimm** (Tennessee), **J. Rinzel** (NIH), **L.A. Segel** (Weizmann), and **J.J. Tyson** (Virginia Tech), each of whom is a well known expositor. The school will run for four weeks and each lecturer will give one or two weeks of lectures with three 90-minute lectures per week. The lectures are intended for an audience of graduate students, and in keeping with this objective, only graduate students and postdoctoral fellows are invited to attend. NOTE: prior experience in mathematical biology is not an absolute prerequisite.

The various courses will cover a wide range of topics in mathematical biology. These themes include problems of conservation biology, evolutionary biology, developmental biology, population biology, molecular and cellular biology, infectious diseases, pattern formation, cell division, physiological control, stochastic effects, excitable media, neurophysiology, immunology, neural networks, and nonlinear waves. The mathematical topics involved include optimization theory, game theory, ordinary differential equations, partial differential equations, differential-delay equations, statistical methods, and perturbation methods. Numerical computations also play an important role in understanding complex mathematical systems, as will be evident in these lectures. Most important, the participants will learn some of the background biology and modeling giving rise to the mathematical problems.

To register for the Summer School, applicants must be prepared to attend for the full duration of the School. A completed Application Form requires an accompanying fee of $25 (Cdn) or $20 (US). Also, a letter of recommendation from a supervisor must be submitted.

There are fellowships available to help defray living and travel expenses. Since the number of fellowships is limited, each participant is encouraged to seek support elsewhere, e.g., from a supervisor or other source at his or her university. There are no tuition fees for the School.

Accommodations will be available on the campus of the University of British Columbia through the UBC Conference Centre. (The rate for a single room is $22.00 Cdn/day. This rate includes breakfast and linens but participants must provide their own towels and soap.). Request for Accommodation forms will be sent to registered participants and should be completed and returned directly to the UBC Conference Centre.

For further information, please contact :

Louis Pelletier, Scientific Activities Coordinator,
CRM,Universite de Montreal, C.P. 6128-A,
Montreal (Quebec), Canada, H3C 3J7
Fax: (514) 343-2254; E-Mail: PELLETL@ere.umontreal.ca

Annual Meeting
Society for the Study of Evolution
American Society of Naturalists
Society of Systematic Biologists

Snowbird, Utah
July 19-23, 1993

This is the meeting at which the AMS-SIAM-SMB Symposium on Some Mathematical Questions in Biology will be presented in conjunction with the Society for the Study of Evolution. Snowbird is a lovely resort village in the Wasatch-Cache National Forest, just 25 miles from the Salt Lake City Airport. The conference is using three hotel facilities: Cliff Lodge, The Lodge at Snowbird, and The Inn. A special, low-priced package plan (room and meals) is being offered at all three hotels.

Registration fees: Non-student - $95 before May 14, $115 after May 14; Student - $60 before May 14, $90 after May 14.

For matters pertaining to registration and fees, contact:
SSE Conference, c/o KREBS Convention Management Services, 555 DeHaro Street, Suite 200, San Francisco, CA 94107-2348
Phone: 415-255-1297; Fax: 415-255-8496

For inquiries about the scientific program and related matters, contact: Dr. Charles Mitter, SSE Secretary, Department of Entomology, University of Maryland, College Park, MD 20742
Phone: 301-405-3911; Fax: 301-314-9290

Second Annual Computation and Neural Systems Meeting CNS*93

Washington D.C.
July 31 - August 7, 1993

This is the second annual meeting of an interdisciplinary conference intended to address the broad range of research approaches and issues involved in the general field of computational neuroscience. Last year's meeting in San Francisco brought 300 experimental and theoretical neurobiologists along with engineers, computer scientists, cognitive scientists, physicists, and mathematicians together to consider the functioning of biological nervous systems.

As last year, the meeting is intended to equally emphasize experimental, model-based, and more abstract theoretical approaches to understanding neurobiological computation. The first day of the meeting will be devoted to tutorial presentations and workshops focused on particular technical issues confronting computational neurobiology. The main body of the meeting will include plenary, contributed and poster sessions. There will be no parallel sessions and the full text of presented papers will be published in a proceedings volume. Following the regular session, there will be two days of focused workshops at a rural site outside of the D.C. area.

Meeting Coordination: Dennis Glanzman (National Institutes of Mental Health), Frank Eckman (Lawrence Livermore Labs)

Program Co-Chairs: James M. Bower (Caltech), Eve Marder (Brandeis), John Rinzel (NIH)

Presentation categories:

A. Theory and Analysis
B. Modeling and Simulation
C. Experimental
D. Tools and Techniques

Themes:

A. Development
B. Cell Biology
C. Excitable Membranes and Synaptic Mechanisms
D. Neurotransmitters, Modulators, Receptors
E. Sensory Systems
(Somatosensory, Visual, Auditory, Olfactory, Other)
F. Motor Systems and Sensory Motor Integration
G. Behavior
H. Cognitive
I. Disease

For additional information, contact:

Chris Ploegaert
CNS*93
Division of Biology
216-76 Caltech
Pasadena, CA 91125

1993 Meeting of the International Society for Molecular Electronics and Biocomputing

Gaithersburg, Maryland
September 21-23, 1993
(with tutorial sessions on September 20)

The International Society for Molecular Electronics and Biocomputing was founded in May 1991 to foster the interdisciplinary study of molecular electronics, ionics and photonics, and information processing in natural and artificial molecular and biomolecular systems. In part, the Society was formed to continue a tradition of highly successful meetings on molecular electronics and biocomputing held in Budapest (1988), Moscow (1989), and New York (1991). The Gaithersburg meeting (MEBC-4) is expected to play a decisive role in increasing the visibility of this important and rapidly maturing domain of science and technology.

Conference Co-Chairs: Michael Conrad (President),
Geza Biczo (Immediate Past President)

Indicative areas of interest include, but are not restricted to:

Molecular recognition and switching
Membrane electrochemistry and technology
Self-assembly, Langmuir-Blodgett films, and other fabrication technologies
Conducting polymers and electron transfer processes
Molecular and biomolecular sensing systems
Optomolecular devices and computing systems
Cellular transduction and information processing (e.g., cytoskeleton, biochemical dynamics)
Neural and neuromolecular computing
Theory and modeling (e.g., quantum mechanics, reliability issues, domain applicability of different modes of computation, computer simulation)
Technological applications and needs (e.g., industrial, biomedical)
Relevance of molecular computing to automation technologies and environmental protection.

The meeting will be held at the National Institute of Standards and Technology, Gaithersburg, Maryland. Registration is $200 per person.

To receive additional registration information, please contact Lori Phillips, National Institute of Standards and Technology, Bldg. 101, Room A903, Gaithersburg, MD 20899 USA
Phone: 301-975-4513; Fax: 301-990-8729.

For technical information, contact Ann E. Tate (N35), Naval Surface Warfare Center, Dahlgren, VA 22448-5000 USA
Phone: 703-663-8411; Fax: 703-663-8223
Email: atate@relay.nswc.navy.mil

Abstracts (typed camera ready on one page) of contributed papers (Indicate if oral or poster presentation is desired) should be submitted by May 30, 1993, to Richard Potember, The Johns Hopkins University, Applied Physics Laboratory, Johns Hopkins Road, Laurel, MD 20723-6099 USA
Phone: 301-953-6904
Email: REDWING@APL.comm.JHUAPL.EDU

The Sixth International Congress on Biomathematics

San Jose, Costa Rica
October 18-22, 1993

This congress offers the participants an international forum for the interchange of ideas and experiences about the development and use of mathematical models for the study of problems in general biology.

The Latin American Association on Biomathematics publishes the Proceedings of the Congress and also makes two awards: (1) The Nicolas Rashevsky Award for the best research on Biomathematics during the past two years (1991-1993) and (2) for the best paper of the Congress.

For further information, contact: Carlos Leguizamon, Biomathematics, Department of Radiology, Atomic Energy Commission, Av. del Libertador 8250, (1429) Buenos Aires, Argentina.

2nd European Conference on Mathematics Applied to Medicine and Biology

LYON (France)
December 15-18,1993

The aims of the conference are to bring together theoreticians and experimentalists who share the same interdisciplinary interest in mathematical modelling in the medical and biological sciences. The conference will take place at Ecole Normale Superieure de Lyon, one of the most famous French academic institutions.

The scientific committee consists of: J.P. Aubin (Paris IX), Y. Bouligand (Angers), V. Capasso (Milan), L. Demetrius (Harvard), J. Demongeot (Grenoble), A. Goldbeter (Bruxelles), K.P. Hadeler (Tübingen), R. Heinrich (Berlin), R. Jean (Rimouski), J.M. Legay (Lyon), C. vonderMalsburg (Bochum), G.I. Marchuk (Moscow), H. Metz (Leyden), J. Murray (Seattle), A. Perelson (Los Alamos), R. Rosen (Halifax), L.A. Segel (Jerusalem).

The organization committee consists of: P. Auger, président (Lyon), C. Bernstein (Lyon), A. Pavé (Lyon), M. Peyrard (ENS Lyon), D. Pontier (Lyon), J.C. Thalabard (Lyon), P. Baconnier (Grenoble), P. Cinquin (Grenoble), T. Hervé (Grenoble), J.L. Martiel (Grenoble).

Topics and sessions chairmen include: population dynamics (O. Arino), time and space scales in ecological modelling (J.D. Lebreton and C. Lobry), chemotherapy modelling (Z. Agur), morphogenesis (J. Murray), cardiac modelling (A. Bardou), respiratory modeling (R. Hämäräinen), neuro-modelling and cognitive sciences (E. Bienenstock), evolution (B. Goodwin), cellular metabolism (J.P. Mazat), cell cycle and genome evolution (M. Kimmel), genetics and immunology (R. Thomas), epidemiology (V. Capasso), anatomic modelling (R. Mösges), ecosystems modelling (P. Nival), delay equations and hormonal physiology (U an der Heiden), global change (R. Sadourny), neurocomputing and genetic algorithms (H. Paugam-Moisy).

Abstracts of one page may be sent, before the 1st of May, to Professor P. Auger, URA-CNRS No. 243, Biomérie Génétique et Biologie des Populations, Universite Claude Bernard, Lyon 1 IASBSE, 43 Blvd. du 11 novembre 1918, 69622 VILLEURBANNE CEDEX, FRANCE
Fax: (33) 78892719; E-mail:PAUGER@biomserv.univ_Lyon1.Fr

Invitation to Join The International Research Team for 3D Breast Cancer Imaging

Up to one out of eight women contract breast cancer. The disease has no proven means of prevention, and current imaging methods seem to be of equivocal value. There is a compelling need to bring together people who can solve the major outstanding research problem of detecting breast tumors early enough to effect a cure. As the field is an epidemiological, political and economic battlefield, those carrying out research on the leading edge also need alliances with all concerned organizations.

The International Research Team for 3D Breast Cancer Imaging was founded to marshal resources to solve the problem of detecting breast cancer at its earliest, hopefully curable stages. Members of the Team agree to cooperate and compete with one another in riding each potential 3D imaging modality to its ultimate capability to detect small breast tumors, or to aid those carrying out such research.

Anyone working with the following or newer modalities with the aim of finding small breast lesions or other breast pathologies is encouraged to join and become active in the Research Team:

MRI (magnetic resonance imaging)
Time resolved light scattering
3D Ultrasound
X-ray CT (computed tomography)
X-ray microbeam CT

Radiologists, mammographers, manufacturers, health administrators, health activists, government health employees and political representatives, computer scientists, engineers, physicists, and mathematicians are most welcome to join and give us a hand. If you are working on research or technology of any kind and think your efforts may help solve this major outstanding medical problem, please join us.

There is no established membership fee at this time. We encourage you to send whatever you think reasonable to help us with postage and printing costs for communicating with one another and contacting potential new members.

Benefits of membership include:

Quarterly Newsletter
Summaries of your colleagues' work
Running, computer based bibliography
Requests for collaborators
Summaries of the ongoing mammographic screening debates
Brain picking
Grant sources
Theses in progress
E-mail and computer bulletin board contact with colleagues
Meetings and sections of larger meetings
A team within which to contribute your own skills to this major effort.

For additional information and a list of current members, please contact: Richard Gordon, Department of Radiology, University of Manitoba, Winnipeg R3T 2N2, Canada
Phone: (204) 474-8763 or 586-9561; fax: (204) 783-8565
e-mail: GordonR@ccm.UManitoba.Ca

AWARDS

Carlos Castillo-Chavez

Carlos Castillo-Chavez, Associate Professor of Biomathematics at Cornell University, was selected in 1992 as one of 30 scientists and engineers to receive the first Presidential Faculty Fellow Award. The Presidential Faculty Fellows Program provides recognition and support for young faculty members who demonstrate excellence and promise in scientific or engineering research and in teaching future generations of students to apply and extend human knowledge. Each award carries a grant from the National Science Foundation of $100,000 per year for five years.

Dr. Castillo-Chavez works at the interface of epidemiology, ecology, demography, and sociology using dynamical systems theory, stochastic processes, statistical methods and simulations. He has written a series of papers on the role of long periods of incubation on the dynamics of HIV/AIDS in homogeneous and heterogeneous mixing populations (collaborators include K. Cooke, W. Huang, and S. A. Levin). In collaboration with V. Andreasen, H. Hethcote, S. A. Levin, and W-m Liu, he has developed a theory of cross-immunity that provides an explanation for the co-existence of strains of influenza and the reappearance of new subtypes. His joint work with H. Thieme concentrates on the study of the effects of variable--age-dependent--infectivity in epidemiological models. Their work also includes the study of the relationship between non-autonomous and autonomous epidemic models. On a series of recent papers, he has begun to address the role of behavioral changes on the dynamics of sexually transmitted diseases such as gonorrhea and HIV/AIDS (collaborators include S. P. Blythe, F. Brauer, K. Cooke, K. Heiderich, J. Palmer, and J. X. Velasco-Hernandez). Recent joint work with J. X. Velasco-Hernandez concentrates on the development of a mathematical framework for the study of biological processes that take place at different time scales including food-web dynamics and vector-transmitted diseases such as Chagas disease. A mathematical theory of pair-formation that characterizes all marriage functions has been developed in collaboration with S. Busenberg (other collaborators include S. P. Blythe and S-F Hsu Schmitz). Data to determine the shape of these marriage functions were collected in collaboration with C. Crawford and S. Schwager. Methods for estimating the shape of the marriage surfaces have been developed in a series of papers with several investigators including S. P. Blythe, G. Casella, S-F Hsu Schmitz, G. Rubin and D. Umbach. Stochastic models and stochastic simulations that incorporate marriage functions to demographic and epidemic models are being conducted in collaboration with S. Fridman and X. Luo. Additional recent research begins to establish the necessary conditions for the co-existence or preservation of religions, languages, and other cultural traits (joint work with S. Lubkin), and the effects of individual immune system responses on the transmission dynamics of communicable and sexually transmitted diseases (joint work with L. Harnevo).

Literary Events

The November 1992 issue of ***Computer*** was a special issue on Molecular Computing guest edited by Michael Conrad. ***Computer*** is the mass circulation journal of the IEEE Computer Society.

A special issue of ***Biosystems*** (Vol. 27, No. 4. 1992) contains the Proceedings of the Workshop and Initial Meeting of the International Society for Molecular Electronics and Biocomputing.

The journal ***Biosystems*** is introducing a new section on evolutionary systems to be edited by David Fogel. The section will cover stochastic evolutionary algorithms, evolutionary optimization, simulation of genetic and ecological systems, and applications (neural nets, machine learning, robotics).

Theory of Heart: Biomechanics, Biophysics, and Nonlinear Dynamics of Cardiac Function, ed. by Leon Glass, Peter Hunter, and Andrew McCulloch, Springer-Verlag, New York 1991. Mathematical techniques from biomechanics, biophysics, and nonlinear dynamics are beginning to provide detailed theoretical understanding of the heart in health and disease. This volume is one product of a conference held under the auspices of the Institute of Nonlinear Science at the University of California at San Diego. It contains a variety of interdisciplinary studies dealing with theoretical models of heart function.

Some new books to look for:

* ***Mathematics in Medicine and the Life Sciences,*** F.C.Hoppensteadt and C.S. Peskin. Springer-Verlag, New York, 1992. $39.95, 252pp.

* ***The Dynamics of Cellular Motility,*** M. Murase. John Wiley, Chichester, 1992. $150, 357pp.

* ***Newton Rules Biology: A Physical Approach to Biological Problems,*** C.J. Pennycuick. Oxford University Press, New York, 1992. $39.95, 111pp.

Introduction to Theoretical Population Genetics, T. Nagylaki. Springer-Verlag, Berlin, 1992. 369pp.

Oscillations and Morphogenesis, Ed. by L. Rensing. Marcel Dekker, New York, 1993. $175, 501pp.

*Review to appear in ***Bulletin of Mathematical Biology***

STIS

The Science & Technology Information System at the National Science Foundation

What is STIS?

STIS is an electronic dissemination system that provides fast, easy access to National Science Foundation (NSF) publications. There is no cost to you except for possible long-distance phone charges. The service is available 24 hours a day, except for maintenance periods.

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- Program announcements and "Dear Colleague" letters
- General publications and reports
- *NSF Directions*
- Press releases
- NSF organization charts and phone books
- NSF vacancy announcements
- Award abstracts (1989—now)

The goal is for all printed publications to be available electronically.

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On-Line STIS. If you have a VT100 emulator and an Internet connection or a modem, you can log on to the on-line system. The on-line system features full-text search and retrieval software to help you locate the documents and award abstracts that are of interest to you. Once you locate a document, you can browse through it on-line or download it using the Kermit protocol or request that it be mailed to you.

Direct E-Mail. You can request that STIS E-mail you an electronic copy of every document that is added to the system. This is particularly effective for periodic and time-sensitive publications such as the *Bulletin*.

Getting Started With Documents Via E-Mail

Send a message to **stisserv@nsf.gov** (Internet) or **stisserv@NSF** (BITNET). The *text* of the message should be as follows (the Subject line is ignored):

Request: stis
Topic: index

You will receive a list of all the documents on STIS and instructions for retrieving them. Please note that all requests for electronic documents should be sent to **stisserv**, as shown above. Requests for *printed* publications should be sent to *pubs@nsf.gov* (Internet) or *pubs@NSF* (BITNET), and include the document name, number, and your postal address.

Getting Started with Anonymous FTP

FTP to *stis.nsf.gov*. If you cannot connect, try *128.150.195.40*. Enter *anonymous* for the username, and your E-mail address for the password.

Retrieve the file *ftpindex*. This contains a list of the files available on STIS and additional instructions.

Getting Started with the On-Line System

If you are on the Internet: *telnet stis.nsf.gov*. If you cannot connect, try *telnet 128.150.195.40*. At the login prompt, enter *public*.

If you are dialing in with a modem: Choose 1200, 2400, or 9600 baud, 7-E-1. Dial 202-357-0359 or 202-357-0360. When connected, press Enter. At the login prompt, enter *public*.

Getting Started with Direct E-Mail

Send an E-mail message to **stisserv@nsf.gov** (Internet) or **stisserv@NSF** (BITNET). The Subject field will be ignored. Put the following in the message text:

Request: stis
Topic: stisdirm

You will receive instructions for this service.

For More Information

For additional assistance contact:

E-mail: *stis-request@nsf.gov* (Internet)
stis-req@NSF (BITNET)
Phone: 202-357-7555 (voice mail)
FAX: 202-357-7663
TDD: 202-357-7492

NSF 91-10 Revised 10/4/91