Mathematical Biology Newsletter

Dear SMB Members,

The start of a New Year brings with it winter weather (for some of us), resolutions and hopes (for others), and a general feeling that summer is yet far away. But as we brace down for the next "long haul" in the classrooms, the offices, or the labs, we have many events to look forward to in the coming months.

These pages will hopefully tempt you with the thoughts of numerous interesting conferences and workshops, many of them in exotic surroundings. It's time to start planning and looking forward to our own Society for Mathematical Biology Annual meeting, held this year jointly with AIBS in Seattle, on the campus of the University of Washington (Aug 4-8, 1996). As one of our members, you are cordially invited to join us by attending and contributing a lecture or a poster. Please see details on p 2 of this newsletter. A special feature of this conference is our society-sponsored *field-trip* to Mount St. Helen's, guided by expert ecologists (B Fagan, P Kareiva).

If you are an SMB member, you will also be receiving, with this mailing, a ballot for our upcoming SMB elections. In these elections we must chose three new members of the board of directors, as well as an incoming president. I am particularly pleased at the excellent slate of candidates, and look forward to working with those that are elected. Please exercise your voting powers by filling in the ballot, and returning it to the address indicated by Feb 15, 1996 at the latest.

With many thanks,
> Leah Edelstein-Keshet
> president, SMB

IN THIS ISSUE:

ABOUT THE NEXT ISSUE:

Society for Mathematical Biology

**SOCIETY FOR MATHEMATICAL BIOLOGY
ANNUAL MEETING , 1996 (with AIBS)**
University of Washington, Seattle, WA, August 4-8, 1996

The Society for Mathematical Biology is please to announce our 1996 meeting, joint with the American Institute for Biological Science (AIBS) in Seattle this summer.

Sessions planned:

(1) Developmental Biology and Pattern Formation (Sharon Lubkin, chair); (2) Cell Motility: from muscle contraction to molecular motors, (Tom Daniels, chair); (3) Tumor Growth and Chemotherapy (Carl Panetta, chair); (4) Ecology 1: Evolution of Social Spacing: Aggregation and Territoriality (Dan Grunbaum, chair); (5) Ecology 2: Foraging Theory (Shay Guerron, chair).

Other tentative sessions (subject to demand): Neuro-physiology and Nonlinear dynamics; Genetic, Metabolic, and Physiological Networks; Ecosystems, Evolutionary Biology and Epidemiology, Cellular and Molecular Biology.

Deadlines: for titles of talks and list of speakers to appear in the printed program: MARCH 1, 1996; for abstracts to appear in the SMB abstract booklet AND for housing forms to be mailed in : JUNE 28, 1996.

The AIBS conference (which includes many affiliated biological societies, eg. Botanical Society of America, American Society of Plant Taxonomists, etc) is a large meeting, (anticipated circa 1500 conferees). There will be numerous local field-trips (open to all participants, pre-registration required), displays by publishers and software companies, as well as plenary and contributed talks and poster sessions.

Approximate costs: Registration: Before June 1: $195 (Regular), $85 (Student); After June 1: $250 (Regular), $110 (Student and 1-day Reg). Estimated dorm housing: (arrive Aug 4, depart Aug 8) $200 single, $160 double occupancy (includes full meals from Aug 5-7).

Students can apply to AIBS to work as projectionists/ clerks/go-fers for free registration. Limited coverage of the expenses of invited speakers and session chairs will be available. Students are also encouraged to apply for Landahl Travel Funds (see details this issue).

All members of SMB will receive registration materials directly from AIBS, but if you plan to contribute a paper, you must contact SMB directly. Further information will be posted on the SMB home page. Please contact: Leah Edelstein-Keshet, Department of Mathematics, University of British Columbia, Vancouver, BC V6T 1Z2, Canada; Phone: 604-822-5889, Fax: 604-822-6074, email: keshet@math.ubc.ca

Field Trip Sponsored by the SOCIETY FOR MATHEMATICAL BIOLOGY at the 1996 SMB/AIBS meeting:
**Space, Devastation, and Mathematical Biology
at Mount St Helens.**
Guided by: Bill Fagan, (Kareiva-lab), Dept of Zoology, UW, Thursday, Aug 8, 1996. Cost(TBA) will cover transportation and two boxed meals. Limited to 28 participants. Depart 7:00 am from UW dormitories; returns around 10:00 pm. Bring extra snacks (if desired) and water. Bring sunblock/rain gear and wear sturdy shoes.

Join us for a day-long tour of the Mount St Helens area, both on and off the tourist-beaten track. Participants will learn about the effects of the 1980 blast, and witness the area's current state of recovery. Naturally we intend to visit the standard scenic vistas: 1) the blowdown zone, with its thousands of blast-flattened trees; 2) Spirit Lake, and its mat of floating logs; 3) mudflows filling entire river valleys; 4) the mountain itself. However, we also offer participants a chance to explore the devastation more closely: we plan gentle-to-moderate walking tours contrasting the recovery processes in the blowdown zone and the "Red Zone" right in front of the mountain's gaping north wall. Throughout this field trip, we will be emphasizing the untapped challenges facing theoretically-minded folks wishing to investigate nature's complexity. Among the issues we may highlight are: habitat fragmentation and patch dynamics, links between local and landscape scale processes, community stability, species invasions and the community assembly process, and the demographics and genetics of developing populations. We hope that immersion in the varied and wondrous landscape of Mount St Helens will stimulate mathematical biologists to tackle some of these difficult ecological issues with exciting new approaches.

For more information please contact Bill Fagan, Dept of Zoology, University of Washington, Seattle WA 98195-1800. Tel: (206) 685-6893; faganb@zoology.washington.edu.

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Feature article:

Mathematical Biology in Australia
by Mary Myerscough, U. Sydney, Australia

Australia is a small country. Although its total geographical size is about the same as the US (without Alaska and Hawaii), it has less than 20 million inhabitants.

At first sight, the mathematical biology community in Australia may seem to be small, but this is really just because the population itself is not as large as you might expect from looking at a map. There is, in fact, a great variety of research going on in areas ranging from population dynamics and ecological models, through pattern formation and self organising systems, to physiological neural dynamics and biological fluid mechanics, and to medical imaging and optimal drug dosage models. As you can see, the range of interests is a microcosm of mathematical biology worldwide. In this short space there is room to mention only a few of the people involved.

As in many other countries, resource management and conservation biology are a major concern here. Hugh Possingham and his group at Adelaide University are applying their expertise in stochastic spatial population modelling to optimal harvesting problems in fisheries and forestry. Hugh has recently brought out a book with David Lindenmayer, ``Risk of Extinction''. In it they describe how mathematical models were used to design forestry management options to preserve Leadbeater's possum, a rare marsupial, once thought to be extinct.

Peter Chesson in Canberra pursues research in a related area of coexistence and competition of plants in a stochastic environment. In a climate where floods, fires and droughts can be frequent, random events are a major factor in population dynamics in many Australian ecosystems.

As well as ecological modelling, pattern formation work and neural networks are also strong areas of interest. Barry Nagorcka at CSIRO, Canberra, works on reaction-diffusion models for hair follicle formation with detailed application to wool-growing follicles in sheep. Barry's research has implications for the production of superfine wools in Australia and elsewhere.

At Sydney University there is a large group, comprising both experimentalists and theoreticians, working on associative memory models in the hippocampus, electrical models for muscle tissue and models for synaptic transmission. This group is headed by Max Bennett, John Robinson and Bill Gibson.

There is something of a nexus in Australia and New Zealand between industrial mathematics and mathematical biology. Sean McElwain and his group at Queensland University of Technology are pursuing research into all sorts of biological areas including wound healing, cancer cell movement, leukocyte chemotaxis and models for visual stimuli and electrical activity in the brain. Sean also has strong interests in industrial mathematics.

A similar industrial/biological combination is also evident at the University of Auckland in New Zealand where Graeme Wake and his group work on both industrial problems and on models for agricultural systems. (New Zealand, of course, is not part of Australia but the local Applied and Industrial Mathematics society, ANZIAM, takes in both countries.)

If you know Australian mathematical biology or applied mathematics at all, you will realise that there are many other people doing excellent work whom I have not had space to mention here. Most Australian researchers have strong contacts with other workers overseas and many travel frequently for research purposes. We are also generally keen to make contact and talk with overseas visitors to Australia who have similar interests, so if you're ever passing through, please drop us a line and say hello!

The Society for Mathematical Biology
Mission Statement:

The Society for Mathematical Biology is dedicated to representing and promoting the interests of those committed to the development of theoretical and mathematical biology, and to the development of partnerships between experimentalists and theoreticians. The Society serves as a forum for the exchange of ideas, as an active force in identifying productive research directions, and as an advocate for funding for training and for basic research.

We welcome members from all parts of the world to participate actively in defining the scope and interests of The Society. Membership ($50 regular, $25 student) comes with a subscription to the Bulletin of Mathematical Biology, and reduced subscriptions to other journals. Regular members can vote in SMB elections.

You and your students and colleagues are invited to join SMB by   (a) sending an email to keshet@math.ubc.ca, (b) through the SMB homepage application forms at http://www.iam.ubc.ca/spider/spiros/smb/index/html, or (c) by sending a letter to L. Keshet, Math Dept, UBC, Vancouver, BC, V6T 1Z2, Canada (fax:604-822-6074). Please include your full name, address, phone, fax, areas of interest (and signature of supervisor for students).

The Society for Mathematical Biology Remembers Betty Tang (7/17/54---9/13/95)
Personal recollections by Carlos Castillo Chavez

I had the pleasure of knowing Betty Tang for many years. I saw her give excellent invited presentations at national and international meetings, and followed her work closely. We became friends instantly, and our friendship grew over the years. She came to Cornell several times, where she met my family and left a deep impression on my children. She was a remarkable individual.

Betty came to the US in 1974 and enrolled in Kirkland College, where she completed her BA in 1978. She then moved to the University of Southern California's Department of Mathematics, where she completed her Ph.D. in Mathematics (Combinatorics) in 1983 under the supervision of Prof. Solomon Golomb. The title of her thesis was "Comma-free and bounded synchronization delay codes of even work length". She moved to the University of Heidelberg in Germany as a research staff member (1983-85) of the Center for "Stochastic models in the natural sciences". In Heidelberg, she was mentored by Willi Jager, who became one of her lifelong and closest friends.

She returned to the US as Visiting Assistant Professor in the Department of Mathematics and Computer Science at Emory University (1985-86), where she worked closely with Paul Waltman, another mentor and close friend. Betty also held research or teaching visiting positions at Arizona State and the University of Southern California. She became assistant professor at the Department of Mathematics in Wake Forest University from 1988-1990. She joined the ASU mathematics department faculty in 1990, where she was tenured in 1994.

Betty's decisions in life took always place under the shadow of cancer. Cancer has affected several of Betty's relatives and took the life of her brother. She decided long ago that she would not marry or have children as she expected to die young. Betty had a very productive life. She was not confined to her thesis work and moved into areas that demanded expertise in different fields of applied and pure mathematics. This is quite rare. Betty's work is sophisticated, but more importantly, it is also relevant. Mathematics and research dominated her life even during her last days.

Betty was an important contributor to cell biology--her work on the gradostat is significant. Her work in coding theory with applications to molecular biology shows her breadth and flexibility. Her thesis work in the area of combinatorics contributed to an open question which had been around for over twenty years--Betty was able to expand substantially the sets of integers for which the construction of comma-free dictionaries of even order was possible. Betty also worked on the construction of a combinatorial model that helps estimate the efficiency of some cloning processes.

The most extensive part of her work lies in the applications of deterministic models to cell biology, with emphasis on the gradostat and the chemostat. In her work on the gradostat she developed a complete classification of the competitive outcomes in a spatially heterogeneous environment using sophisticated techniques in nonlinear analysis and monotone dynamical systems. Global analysis, which is usually quite difficult for systems with a large number of equations, is carried out under very general assumptions regarding the spatial heterogeneity of the system (that is, the vessels in the gradostat are linked in various configurations) and the shape of the nutrient uptake function. Betty showed her deep commitment to theoretical biology by the careful analysis of the dynamics and its relationship to parameter space. She was not satisfied with theoretical possibilities but tried to provide results that could be tested by biologists in the laboratory. The main purpose--as I see it--of her work on the chemostat is to provide a more realistic description of how microbes grow upon nutrient consumption. Betty showed that single species growth and competition between two species depends on initial conditions, a result that differs from those obtained with standard chemostat models.

Her model's transient dynamics show oscillations consistent with some experimental data. This type of transient behavior is not obtained from the standard chemostat model. A snapshot of her interests can be found in these selections of her work: "A new result on comma-free codes of even word length", (with S. Golumb and R. Graham), Canadian Journal of Mathematics 39 (1987), 513-526; "The expected fraction of clonable genomic DNA", (with M. Waterman), Bulletin of Mathematical Biology 52 (1990), 455-475; "Competition in an n-vessel gradostat", (with H. Smith and P. Waltman), SIAM Journal of Applied Mathematics 51 (1991), 1451-1471.

Betty Tang was an important role model for women at ASU and for many other women mathematicians around the country. Shortly before her death, she received an NSF Visiting Professorship for Women Award that she used to visit Harvey Mudd College, where she had chosen Stavros Busenberg as her mentor. (Stavros died of Lou Gehrig's disease during Betty's visit to Claremont.) At ASU, she had many close friends in the Department of Mathematics. Betty had a deep love for Christian Ringhofer. She was also a good friend to our entire family, and we miss her deeply. When she was on her deathbed, our fifteen-year-old son wrote this poem to express his emotions:

Poem for Betty Tang by Carlos William Castillo-Garsow

A Poet's mind is Dark and Lonely
a single Light shining on his Art
his cluttered mind squeezes ideas
out of a bursting skull
in short, quick flashes of Inspiration.
I fear your world is similar
Dark, Lonely and Crowded,
but remember
There is always light
It is a Ray of Dreams, of Faith
and of Hope.

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Gordon Research Conference in Theoretical Biology and Biomathematics, Tilton, New Hampshire, June 9-14, 1996. Lisa Fauci and Bard Ermentrout, Chairs

We would like to extend a cordial invitation to you, your colleagues, post-docs, and students to the upcoming GRC.

POSTER SESSIONS:
In addition to the organized sessions, we plan to hold contributed poster sessions. Please submit an abstract and complete address (preferably by e-mail). There will also be opportunity for informal discussions, and self-organized workshops and presentations during the conference.

FINANCIAL ASSISTANCE:
Funding is limited, but we have applied to the NSF for support, and we encourage young people, women, and minority scientists to apply to us for financial help. In addition, we hope to have our colleagues in Theoretical Biology and Biomathematics from around the world join us. To qualify for support, please write us a letter, include a description of your work, or reasons for interest in the conference. If you are a student or a post-doctoral-fellow, please have a letter of recommendation sent as well.

If you are interested in having your name kept on the GRC mailing list, so that application and registration forms can be sent to you, please send a brief e-mail message (or letter) to either Lisa Fauci or Bard Ermentrout. You may also request an application form directly from the GRC office at the e-mail address: grc@grcmail.grc.uri.edu .

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PROGRAM: *Note change!!: Starts Sun PM, ends Thur PM*

Sun PM, 9/6/1996: **Session on Ecology:** (S. Gueron, chair)

Jim Cushing: Interdisciplinary Study of Nonlinear Population Dynamics: Models, Experiments, and Data Analysis.

Jim Powell: Local Projections for a Global Model of Mountain Pine Beetle Attacks.

Ignacio Barradas: Disturbed Competition and Coexistence.

Mon AM, 10/6/1996: **Calcium and Synaptic Transmission:** (Arthur Sherman, chair)

Sobhana Sivaramakrishnan: Calcium Channels, Calcium Transients, and Transmitter Release in Nerve Terminals.

Elis Stanley: The Single Domain Bound Calcium Model of Release and Facilitation.

Mon PM, 10/6/1996: **Session on Analysis of Encoding of Information by Nerve Cells and Networks:** (J. Miller, chair)

Tim Gawne: What are All of those Neurons in the Visual Cortex Really Doing?

Frederic Theunissen: Neural Encoding of Auditory Patterns.

Tue AM, 11/6/ 1996: **Molecular Motors:** (G. Oster, chair)

Steven M. Block: Nanometers and Piconewtons: Using Optical Tweezers to Study Biological Motors.

Charles R. Doering: Modeling Molecular Motors.

Alex Mogilner: Cell Motility Driven by Actin Polymerization.

Tue PM 11/6/1996: **Microbial Motility:** (Robert Dillon, chair)

Roseanne Ford: Quantitative Studies of Bacterial Motility and Chemotaxis.

John O. Kessler: Individual and Collective Locomotion of Swimming Microorganisms: Measurements and Modeling of Velocity Distributions.

Wed AM 12/6/1996: **Statistical Models, Neural Coding and Information:** (Larry Abbott, chair)

Yan Dan: Efficient Coding of Natural Scenes in the Lateral Geniculate Nucleus.

Emilio Salinas: Using Population Decoding to Understand Sensory-Motor Transformation.

Emery Brown: Statistical Model of the Human Biological Clock

Wed PM, 12/6/1996 **Pattern Formation and Immunology:** (Sharon Lubkin, chair)

Micah Dembo: Mechanics and Control of Cell Division.

Denise Kirschner: Modeling the Immunology of HIV Infections

Thur AM, 13/6/ 1996 **Biological Fluid Dynamics:** (Aaron Fogelson, chair)

Charles Peskin: Computer Simulation of Biological Systems Interacting with Fluid.

Nicholas Hill: Solving the Fokker-Planck Equation on a Unit Sphere and Applications in Bioconvection

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Thur PM, 13/6/ 1996 **Biological Fluid Dynamics II:** (Steve Vogel, chair)

Mimi Koehl: Smelling with Hairy Little Noses: The Fluid Dynamics of Olfactory Antenna.

Highlights of the 4th International Conference on Mathematical Population Dynamics

Contributed by Denise Kirschner (Texas A&M)

The 4th International Conference on Mathematical Population Dynamics was held at Rice University in Houston, Texas from May 23-27, 1995. The first conference, held in Oxford, Mississippi in 1986, was attended by 35 people. The second, at Rutgers University in New Jersey in 1989, was attended by 100. The third was held in 1992 in Pau, France and there were almost 200 there. This year, the meeting was attended by over 250 people. There have been a very successful refereed proceedings published from each meeting. This is certainly an indication that interest in mathematical biology is increasing.

The scientific program this year was outstanding. There was also much discussion (both during and after) generated by invited and contributed sessions.

Sessions this year included: optimization of cancer chemotherapy, epidemics, population genetics, cell population dynamics, branching processes, immune system and HIV modeling, cell cycle, cellular automata and others. Diseases were a main focus of the plenary talks. Perelson, Webb, Agur, Castillo-Chavez and Hadler all gave compelling new insight into key diseases we are faced with today - from HIV to Cancer. New approaches are necessary to address these issues, and each gave good examples of new techniques being used. Other plenary talks were given by R. Staudte, A. Bertuzzi, R. Cowan, O. Diekmann, L. Demetrius, B. Novak, C. Mode, R. Sachs, W. Stephen, Z. Taib, M. Mackey and R. Chakraborty.

There were many social events planned for the evenings. The first night there was an opening cocktail reception held in the Rice Memorial Center. The next evening, we all boarded a bus to a nature area south of Houston and had a wonderful Texas Barbecue. The final banquet was a lovely dinner served at the Faculty Club of Rice University.

Special thanks go to Meg Gelder-Ehm and Marek Kimmel for all their hard work in making this such a successful meeting! We look forward to future meetings (which will be held more often). The next meeting is in 1998 at Zakopane, Poland.
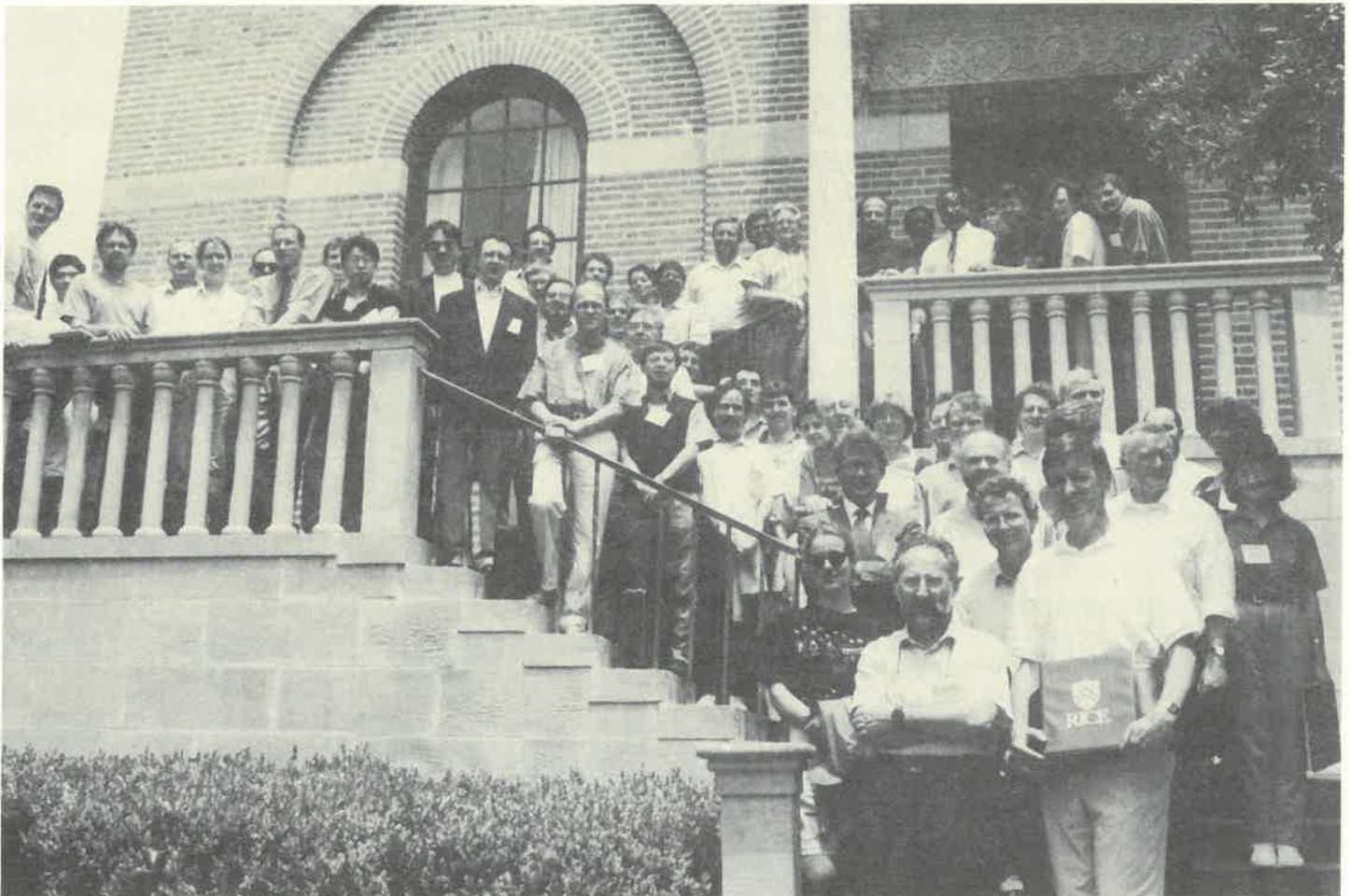
MONTREAL 96 Summer School on NONLINEAR DYNAMICS IN BIOLOGY AND MEDICINE
McGill University, Montreal, Quebec, Canada
20 May - 7 June, 1996

This three-week course will be taught by the faculty of the Centre for Nonlinear Dynamics in Physiology and Medicine. The program will include:

WEEK 1: Introduction to nonlinear dynamics. Taught at the level of the text: Understanding Nonlinear Dynamics by D. Kaplan and L. Glass. *Applications:* Behaviour of spontaneous and forced nerve and cardiac cells, control of respiration.

WEEK 2: Two Parallel Streams:
1) Intermediate nonlinear dynamics of systems with spatial dependence, delayed feedback and/or stochastic influences.
2) Linear and nonlinear time series analysis.
Applications: Excitable media, biological pattern formation, hematological cell regulation systems, analysis of data from physiological time series like heart rate.

WEEK 3: Five in-depth case studies of modeling and data analysis in biology: Stochastic resonance in temperature receptors, dynamics of the pupil light reflex, human tremor; firing patterns of the forced squid giant axon, travelling and spiral waves in cardiac tissue.

GOALS: If you are from the biological sciences, the 3-week program will provide familiarity with modern concepts in nonlinear dynamics. This will include insight into how one goes about formulating realistic mathematical models of biological phenomena, analyzing the behaviour of these models both analytically and numerically, and comparing the model behaviour to experimental data.

If you are from the physical sciences, the Summer School will give you a sampling of the areas of biological research in which mathematical modeling has had an impact in our understanding of underlying biological mechanisms. An important component will be the introduction of traditional and newer techniques for time series analysis.

FORMAT: The Summer School will consist of integrated lectures and computer laboratories/demonstrations, using a network of Pentium computers for the computer labs. Participants will work in groups of two per machine.

POTENTIAL ATTENDEES: Participants may come from either the Biological Sciences (including Medicine and Psychology) or the Physical Sciences (Physics, Mathematics, Engineering, Chemistry, etc.), but should have at least one year of calculus. Educational background may range from final-year undergraduates through graduate students, postdoctoral fellows, and professional scientists from both industrial and university settings.

The close involvement of faculty in the computer laboratory part of the course means that only 50 participants can be accepted. Early applicants will be given priority, and an attempt will be made to balance participants with biological and physical science backgrounds.

Participants can register for individual weeks, or for the entire 3-week course. The fees are:

	Before 1 March	After 1 March
One Week	US $320/ CAN $400	US $385/ CAN $480
Two Weeks	$600/$750	$720/$900
Three Weeks	$800/$1000	$960/$1200

To register, or for more information: Montreal 96 Summer School, Centre for Nonlinear Dynamics, McGill University, 3655 Drummond St., Montreal, Quebec, Canada, H3G 1Y6

WWW: http://www.cnd.mcgill.ca/Montreal96
e-mail: montreal96-info@cnd.mcgill.ca
tel: 514-398-2102,   fax: 514-398-7452

FACULTY: Anne Beuter, Jacques Belair, Sue Ann Campbell, Marc Courtemanche, Eusebius Doedel, Leon Glass, Michael Guevara, Danny Kaplan, Andre Longtin, Michael Mackey, John Milton, John Outerbridge, Alejandro Rey, Alain Vinet.

A PostScript copy of this announcement is available by anonymous FTP to: mines.cnd.mcgill.ca in directory /pub/montreal96/brochure.ps

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Spotlight on the History of SMB:
(Adapted from correspondence by Torcom Chorbajian)

The Bulletin of Mathematical Biology was originally called the Bulletin of Mathematical Biophysics, and was founded by Professor N. Rashevsky in 1939. Following Rashevsky's death in 1972, the members of the editorial board of the Bulletin of Mathematical Biophysics, consisting of Anthony Bartholomay, George Karreman and Herbert Landahl, undertook the related tasks of finding a publisher for the Bulletin and organizing a Society for Mathematical Biology.

The Society for Mathematical Biology was officially founded in 1973. During the period July 1972 through February 1973, Bartholomay, Karreman and Landahl performed those antecedent functions necessary to bring the Society into legal existence, and then in March of 1973 an organizational meeting, consisting of the founding members (above) and the charter members, was held.

In a future issue of this newsletter we would like to feature a more complete historical account of SMB. We call on our senior members to help us collect photos of past presidents and SMB notables, memorabilia, etc. We will gladly return any material that you lend us for this project. Contact L. Keshet if you can help.

3rd EUROPEAN CONFERENCE ON MATHEMATICS APPLIED TO BIOLOGY AND MEDICINE
Heidelberg, Germany, October 6. - 10., 1996

The 3rd Conference on Mathematics Applied to Biology and Medicine is being sponsored by the European Society of Mathematical and Theoretical Biology (ESMTB). The participation of young scientists is strongly encouraged.

Sections include: Biomechanics, Cell Modelling and Cell Signalling, Ecology, Epidemiology and Immunology, Evolution and Genetic Modelling, Metabolic Modelling, Modelling in Medicine and Applications, Modelling in Molecular Biology, Morphogenesis and Pattern Formation, Neuromodelling, Pathological Tissue Growth and Cancer, Physiology, Population Dynamics.

Scientific Committee (alphabetically): P. Colli Franzone, A. Goldbeter, M. Gyllenberg, U. An der Heiden, A. Kretzschmar, B. Lesyng, M. Loeffler, M. Mimura, F. Moran, J.D. Murray, L.A. Segel, J. Tyson. Local Committee (alphabetical order): B. Hess, W. Jaeger, J. Langowski, A. Stevens, P. Tautu.

Contact address:
Mrs. M. Althap, Universitaet Heidelberg, Institut fuer Angewandte Mathematik, Im Neuenheimer Feld 294, 69120 Heidelberg, Germany.

Phone: 0-(049)-6221-56-2997, Fax: 0-(049)-6221-56-5331 Attention: from February, 2nd, 1996, new tel & fax-no.: Phone: 0-(049)-6221-54-8997, Fax: 0-(049)-6221-54-5331.

email: ECMBM96@iwr.uni-heidelberg.de
WWW-Server: http://www.iwr.uni-heidelberg.de/ECMBM96/

Location:
Heidelberg, the romantic city on the Neckar, is one of the most beautiful cities in Germany. The ruins of its castle rise majestically high above the narrow lanes and picturesque maze of roofs of the Old Town. The "Ruprecht-Karls-Universitaet" is the oldest in Germany and bears the names of the Count Palatine Ruprecht I, who founded it in 1386, and Grand Duke Karl-Friedrich of Baden, who made it the University of the Grand Duchy of Baden in 1803.

Deadlines for Abstracts:
March 31st, 1996 (must be in TEX, and sent by e-mail). The deadline for the final abstract is June 30th, 1996.

We are looking forward to seeing you in Heidelberg. With kind regards,

For the ESMTB-Board: For the Local Committee:
J. Demongeot, K.-P. Hadeler   W. Jaeger, A. Stevens

Abstracts on the Internet:

SELF-ORGANIZATION OF COMPLEX STRUCTURES: FROM INDIVIDUAL TO COLLECTIVE DYNAMICS
Proceedings and abstracts; Berlin, Germany, 24-28 September 1995.

Communicated by: Frank Schweitzer

This conference took place two months ago, and focused on the emergence of collective phenomena from microscopic interactions with emphasis on dynamic models of self-organization in the following fields of application: (1) Biological and ecological dynamics, (2) Evolution of complexity and evolutionary optimization, (3) Dynamics of socio-economic processes, (4) Urban structure formation and transportation dynamics. Now, the abstracts are available on the internet at: http://summa.physik.hu-berlin.de:80/~soconf95/soconf.html (or) http://summa.physik.hu-berlin.de:80/~frank/index.html

The Abstract Book (123 pages) includes information about the aim of the conference, the complete scientific program (including poster sessions), the abstracts of all contributions, and the list of participants. You can download the Abstract Book (.ps) to view it or to print it out with ghostview.

The conference proceedings (Editor: Frank Schweitzer) will be published in two volumes: vol. 1: Evolution of Complexity and Evolutionary Optimization; vol. 2: Biological and Ecological Dynamics, Socio-Econonomic Processes, Urban Structure Formation and Traffic Dynamics.

For more information, kindly contact Frank Schweitzer: soconf95@summa.physik.hu-berlin.de   OR frank@summa.physik.hu-berlin.de

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Third Geoffrey J Butler Memorial Conference on Differential Equations and Population Biology:
University of Alberta, Edmonton, Alberta, June 26-29, 1996

The GJB memorial lecture will be given at this conference by Jack Hale. The conference will be preceded by a week-long workshop in differential equations and mathematical biology (June 17-21, 1996) featuring keynote speakers: K. Cooke, W. Langford, N. Lloyd, J.W. Macki (Edmonton), J. Mawhin, J.S. Muldowney, J. Selgrade, K. Sigmund, X.Q. Zhao.

There will be sessions of half-hour contributed papers. Some local support for the workshop may be available for researchers without grants.

Registration fees (which include several social events) are : Before May 1, 1996: $175; After May 1, 1996: $225; for students, retired or unemployed participants: $125.

Conference on Dynamical Systems in Biology and Medicine: Veszprém, Hungary, July 17-20, 1996

Aims: to bring together mathematicians, biologists, medical doctors, ecologists, epidemiologists, biomedical scientists, biomedical engineers working on theoretical and/or applied aspects of dynamical systems in biological and medical sciences. The conference will feature morning plenary lectures surveying recent advances and special sessions for twenty minute contributed research papers.

Chair: István Győri, Dept of Math & Computing, Univ of Veszprém, PO Box 158, 8201, Veszprém, Hungary, tel/Fax: (36) 88-423-239; biomath@almos.vein.hu .

Scientific Committee: O. Arino, P Auger, J Belair, V Capasso, K. Cooke, D. Greenhalgh, M. Gyllenberg, I Győri, K. Hadeler, M Iannelli, F Kappel, M. Kimmel, H. Smith, H. Thieme, G. Webb.

Deadlines: Feb 29, 1996: preregistration;
May 3, 1996 : submitting a contributed paper.

Registration: before June 10, 1996: $100 (students $70). After June 10, 1996: $110 (Students $80).

More details about the conference are available on the WWW at: http://www.vein.hu/~biomath/biomath.html
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The Fourth McGill University Conference on Regulation of Eukaryotic DNA Replication
St. Sauveur, Quebec, Canada, October 1996.

Organizers: Maria Zannis-Hadjopoulos and Gerald Price, McGill Cancer Centre, Department of Oncology, McGill University.

The meeting will include plenary lecture sessions and poster sessions.

TOPICS:
* Eukaryotic Origins of DNA Replication,
* Nuclear and DNA Structure in DNA Replication,
* Modulation of Eukaryotic DNA Replication.

Preliminary Program

The conference will be held at the Manoir Saint-Sauveur, close to Montreal, Quebec, in the Laurentians. The first session will begin in the evening of October 17 and the final session will end in the early afternoon of October 20. Poster and oral presentations will take place on October 18 and 19. All participants are encouraged to present a poster on any of the topics that will be covered in the conference.

Registration materials and information regarding abstract submission will be sent in early 1996. The abstract deadline date is: June 27, 1996. Web site for more information: http://www.mcgill.ca/mcgill/servers/Admin/UBO/dna.html

2nd CSIRO+ SYMPOSIUM ON "COMPUTATIONAL CHALLENGES IN LIFE SCIENCES"
Melbourn University, Melbourn, Australia, February 5-7, 1996

Organized by CSIRO SFUMC* and CSIRO supercomputing support group (http://www.mel.dit.csiro.au/LifeSci/cfp.html)

Aim of the Symposium: The main aim of the Symposium is to bring together CSIRO and other researchers in the life sciences to discuss current trends in computational approaches to complex biological problems. One of the outcomes of the Symposium is expected to be a better understanding of the capabilities and use of advanced computational systems in life sciences research.

Topics:
1 nervous system modelling and simulation,
2 organ and organism modelling: virtual plants, visible man,
3 traditional imaging methods and interpretation techniques: x-ray, NMR, MR imaging, etc; 3D and 4D visualisation,
4 bioinformatics,
5 drug design, biochemistry, molecular biology.

Contributed papers will be presented as short (20min) talks or posters. We plan to publish invited lectures in an archival proceedings volume. The contributed papers may be included subject to a referees review.
For more information: contact Dr M.T. Michalewicz, 723 Swanston Street, Carlton, Vic. 3053, Australia, fax : +61 3 9282 2600, e-mail: marek@mel.dit.csiro.au
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Theoretical and computational genome research: An International Symposium: Deutsches Krebsforschungszentrum (DKFZ), Heidelberg, Germany March 25-27, 1996

Organizing Committee: M. Bishop, Ph. Dessen, R. Haux, R. Hofestaedt, W. Jaeger, J. G. Reich, O. Ritter, S. Suhai, P. Tautu, M. Vingron.

TOPICS: Biomolecular sequence analysis, genome mapping and sequencing, modelling of protein structure, integrated genomic information management, complex genomic systems

Speakers: S Altschul, S Brunak, JM Claverie, R Cottingham, KH Fasman, P Karp, J Fickett, H Frauenfelder, M Geller, M Kanehisa, M Karplus, H Lehrach, VM Markowitz, TG Marr, EW Myers, L Nilsson, O Ritter, Ch. Sander, P Schuster, DS Searls, TF Smith, G Stormo, J. Sussman, WR Taylor, J Thierry-Mieg, J Thornton, D Weeks, S Wodak.

Closing date for POSTER ABSTRACTS: 15 February 1996

REGISTRATION: DM 250 (DM 100 for students).
Early registration is advisable due to space limitations.

For further information and registration please contact: Dr. Sandor Suhai, Deutsches Krebsforschungszentrum (DKFZ), Im Neuenheimer Feld 280, D - 69120 Heidelberg, Phone +49/6221/422369, Fax +49/6221/422333.

Literary Events:

* **Ecology of Infectious Diseases in Natural Populations**, B.T. Grenfell, A. P. Dobson, University of Cambridge Press, 1995/ 532 pp.

* **Calculating the Secret of Life: Applications of the Mathematical Sciences in Molecular Biology**, Eric Lander and Michael Waterman, Editors, National Academy Press, 1995 / 285 pp. $39.95

* **Biochemical Oscillations and Cellular Rhythms: The Molecular Basis of Periodic and Chaotic Behavior,** Albert Goldbeter, Cambridge University Press, 1995 /450 pp. $89.95

* **Introduction to Nonlinear Science**, G. Nicolis, Cambridge University Press, 1995 /254 pp.

* **Pattern Recognition and Neural Networks**, B.D. Ripley and N.L. Hjort. Cambridge University Press, 1995 / 500 pp. $79.95.

* **Neural Networks for Pattern Recognition**, Christopher Bishop, Oxford University Press, 1995 / 504 pp. $45.00 (paper), $98.00 (cloth).

* **The Alogorithmic Beauty of Sea Shells**, Hans Meinhardt, Springer Verlag 1995 / 204 pp. $49.95.

*Understanding Nonlinear Dynamics, D. Kaplan & L. Glass (Springer Verlag, 1995) is a new text introducing nonlinear dynamics to students in biology and mathematics. The text provides an accessible development of many concepts from contemporary dynamics including stability, cycles, cellular automata, excitable media, fractals and chaos. These topics are illustrated with concrete examples drawn from such areas as biochemistry, neurophysiology, cardiology, and ecology. A chapter on time series analysis provides an introduction to techniques for extracting information about dynamics from data. There are extensive sets of exercises, many with worked out solutions, as well as computer projects. The text is based on material that has been used for teaching dynamics at an elementary level and contains basic material essential for biology students and researchers.   More information on the text can be found in Web site http://www.cnd.mcgill.ca/Understanding.

* **Differential Equations and Applications to Biology and to Industry,** (Conf Proceedings, Claremont CA June 1-4, 1994) C. Castillo-Chavez, K. Cooke, E. Cumberbatch, M. Martelli, B. Tang, H. Thieme (eds), World Scientific, March 1996 / 550 pp. $147

* **Interdisciplinary Book Series on Mathematical Modelling and Computations in Biology and Medicine**

Series Editors: Pierre Auger* and   Roger Jean**
*University Claude Bernard Lyon 1, Lyon, France
**University du Quebec at Rimouski, Quebec, Canada

Aims and Scope : The series will publish advanced handbooks, textbooks and monographs in applications of exact sciences in biology and medicine.

Topics of interest include modelling biochemical kinetics, cellular dynamics, population dynamics, community structures, environmental modelling, physiological modelling, and modelling the spread of diseases. Proposals (consisting of table of contents, summary and author vita) and manuscripts must be submitted to either of the series editors for publication consideration. (See addresses below.).

Handbooks and monographs planned include the following: **Handbook on Environmental Modelling,** O. Arino and M. Kimmel. **Handbook on cell automata, lattice gas and coupled map lattice models applied to Biology and Medicine** .Tentative monograph : **Aggregation and Emergence in Complex Dynamical Systems : Population Dynamics**, Pierre Auger and Jean-Christophe Poggiale.
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*The Journal of Biological Systems, RV Jean, PM Auger, editors, World Scientific, is a young journal, published quarterly, dedicated to promoting interdisciplinary approaches to Biology and Medicine. Original research papers and survey articles are sought in areas such as General systems theory, environmental studies, evolutionary biology, medical systems, numerical simulations and computations, epistemology.

For information:RV Jean, Dept of Maths & Comp Sci, U. Quebec,PQ,, G5L 3A1 RIJEAROG@UQAR.UQUEBEC.CA) or PM Auger, URA CNRS 243, Univ. Claude Bernard-Lyon 1, IASBSE, F-69622 Villeurbanne Cedex, France, (email: PMAUGER@BIOMAC.UNIV-LYON1.FR)

The Americal Institute of Biological Sciences (AIBS)
(W. Hardy Eshbaugh, president)

AIBS is a federation of 45 scientific societies and research laboratories representing more than 80,000 biologists in academe, industry, and government. The primary mission of AIBS is to enhance biological education and research and to provide national representation on pressing biological issues. Those of you who are not already members of AIBS are encouraged to join. (An application form in enclosed.) Members receive the journal **Bioscience.** For additional information please contact the membership dept (tel 800-992-2427; email: washington@AIBS.org).

Canadian Society for Theoretical Biology invites you:
- To share your interest in theoretical biology;
- Keep informed of conferences, schools, funding, books, science policy, green issues, opinions, who's who and many other matters of concern to those practicing or learning about theory in the biological sciences;
- Gain a voice which supports research and teaching throughout not only Canada but the entire world;
- Keep in contact with members and the executive via Internet, through mailing lists and file servers, and our occasional published Bulletin by becoming a member.

Any person who is interested in the study and furthering of the field of theoretical biology, or in the application of the exact sciences to biology and medicine is welcome to apply for membership. Non-Canadians are most welcome to apply, and the CSTB in recent years has become a truly international organization.

Annual fees include a subscription to the CSTB Bulletin. All members, no matter where they live, are eligible to vote and hold office. Members can also receive discounted subscription rate to the "Journal of Biological Systems". Students, retired scientists, and residents of developing countries qualify for reduced membership fees.

To join the CSTB list, send the message " subscribe cstb". To send a message to everyone on the CSTB list, use the address: <cstb@scotia.dfo.ca>. CSTB now has a home page at http://biome.bio.ns.ca/science/cstb/cstb.html
For more information, contact: Dr. William Silvert (CSTB), Secretary / Treasurer, CSTB, Habitat Ecology Division, Bedford Inst. of Oceanography , P. O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2 (Email: silvert@biome.bio.ns.ca)

Society for Mathematical Biology Digest

You can receive the SMB Digest via email. To subscribe, send mail to LISTSERV@fconvx.ncifcrf.gov with the line "subscribe SMBnet <your name> " in the body of the mail.

Submissions to the Digest should be mailed to the address: SMBnet@fconvx.ncifcrf.gov.
The SMB Digest is available via gopher under "Grants and Research Information" in the National Institutes of Health (NIH) Gopher at gopher.nih.gov port 70, as well as via World Wide Web under Society for Mathematical Biology, URL: gopher://gopher.nih.gov/11/res/SMBdigest.
Back issues of the Digest are also available.

SMB is grateful to Ray Meija for maintaining and updating this electronic communication network for SMB.
For more information, please contact Ray Meija at ray@helix.nih.gov.

Subject: Minority Biomedical Research Training Program
National Heart, Lung, and Blood Institute
Minority Biomedical Research Training Program

The National Heart, Lung and Blood Institute (NHLBI) has established a Minority Biomedical Research Training Program (MBRTP). This program represents an opportunity for underrepresented minority undergraduate and graduate students to receive training in fundamental science and clinical disciplines for the purpose of enhancing career opportunities in the biomedical research field. Training is also offered in the principles and methods of biomathematics, epidemiology and biostatistics and their application to areas of etiology and treatment of heart, vascular, pulmonary and blood diseases.

The MBRTP offers each participant the opportunity to work closely with leading NHLBI research investigators. The Training Program is designed to provide the trainees with hands-on-training in an intramural environment, either with the Division of Intramural Research or the Division of Epidemiology and Clinical Applications. Upon completion of an application and interview process, selected trainees will work summers and at least one other period during the year. The initial training agreement will be between (12) and twenty-four (24) months. The total training will not exceed thirty-six (36) months over a five (5) year period. With the permission of the trainee's academic institution and the granting of leave of absence, opportunities would be available for the trainee to spend a full year in training. A mentor, who will be responsible for designing a carefully planned training program, will be appointed for each trainee.

Students must: 1) be enrolled full-time in an accredited undergraduate or graduate institution; 2) have a major in biological, physical, mathematical or behavioral sciences; 3) have completed a minimum of twelve hours of academic training of science related course work relevant to biomedical or behavioral research; 4) have a cumulative grade point average (GPA) of 3.0 or better; and 5) be U. S. citizens or non-citizen nationals of the United States, or resident aliens who will be eligible for U.S. citizenship within four years with proof of residency status.

All applicants for the MBRTP may obtain information and apply directly to the:

National Heart, Lung, and Blood Institute, Office of Special Concerns, 31 Center Drive MSC 2490, Bethesda, MD 20892-2490, USA. tel: 301-496-1763

DON'T FORGET !!

Keep your SMB membership current by: (1) Responding with payment to Pergamon invoices (pays for the Bull. Math Biol as well as your SMB fees), (2) Informing us of changes of address, phone, fax, and email. (Send email to keshet@math.ubc.ca), (3) Updating your student/full status !!

Feature Article:

About the European Biomathematics Newsletter

Interview with Wolfgang Alt (University of Bonn)
Aug 8, 1995 Vancouver, BC

This summer, Prof Wolfgang Alt visited Vancouver. While there, he agreed to be interviewed about the some aspects of mathematical biology in the European community. Due to space limitations, this article could not be printed in our September issue, and appears here for the first time.

SMB: Please tell us a little bit about the European Biomathematics Newsletter and how it got started.

WA: The European Biomathematics Newsletter was started in June 1988 in Bonn. Since then it has focused on disseminating information about conferences, working groups, theses completed, and communication between Europeans working in mathematical and theoretical biology. About seven or eight people from several countries initially put together lists of European scientists working in biomathematics (from conference proceedings, local groups, etc). Our first mailings and newsletters were sent to everyone on the list but eventually, only respondents who informed us of their research interests, publications, etc continue to receive the newsletter. We now have about 300-400 European and Israeli participants. (See our March 1992 issue for a breakdown into countries.)

SMB: Who actually puts the newsletter together, and how is it financed?

WA: Beate Pfistner of Bonn and Hans Heesterbeeck from Amsterdam have been doing most of the work of assembling the data and editing the text. This has largely been a local effort, as not too many contributions come in from other groups. One of our difficulties has been financing the mailing and printing expenses in the face of rising costs.

Though these expenses were initially covered by book companies such as Springer and Birkhauser (whose flyers were included in our mailing), more recently other funds (both personal and institutional) had to be obtained. We are currently under negotiation with the European Society for Mathematical and Theoretical Biology (ESMTB) to determine whether a formal sponsorship may be possible.

SMB: Can you tell us something about the European community of mathematical biologists? For example, what are the main differences between the European and the North American communities?

WA: One difference is the diversity. The historical roots in multi-national Europe have not been as unified as here in North America and at SMB. In Germany, for example, there are groups working on biophysics, or biomechanics (eg flight of birds, membrane biophysics), which have their own scientific communities and cannot easily be reached. We also have numerous separate biological and theoretical biology societies, such as the Dutch and the French Societies for Theoretical Biology. That makes it hard for us to form a single European organization. We also have a problem defining our scope within mathematical versus theoretical biology.

SMB: What are some of the steps being taken to bring together European bio-mathematicians ?

WA: The European Society for Mathematical and Theoretical Biology is in the process of formation. Its board of directors include Vincenzo Capasso , Jaques deMongeau, Philip Maini, Odo Diekmann, and Karl Hadler.
I personally see an opening to East Europe as an important opportunity for the Europeans. Now a much wider possibility of interaction exists. Regional aspects of interaction within amplified Europe has intrinsic value and needs time to grow.

SMB: Does the European Society have interests which overlap or are shared by SMB in your opinion?

WA: Clearly arrangements for joint memberships, sharing of information, and common workshops would be advantageous to both, but it may take some time for such steps to be taken.

Mehr-Grossman Fund: A Reminder

If you have been intending to donate to the Fund established for Ramit Mehr-Grossman and her children and have not had a chance, please do so by Jan 31st. Please make checks payable to: SMB/Mehr-Grossman Fund and send them to

Denise Kirschner
2908 Cortez Court
College Station, TX 77845

You will receive a receipt for your tax-deductible contribution after February 1st, 1996. For details about the fund, please refer to the announcement in Sept 1, 1995 issue of the SMB newsletter.