Society for Chaos Theory in Psychology & Life Sciences
NEWSLETTER

TRAVEL SUGGESTIONS!

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Vol. 10, No. 3, March, 2003
Robert J. Porter, Ph.D., Editor -- Stephen J. Guastello, Ph.D., Publisher



***Mark Your Calendars***

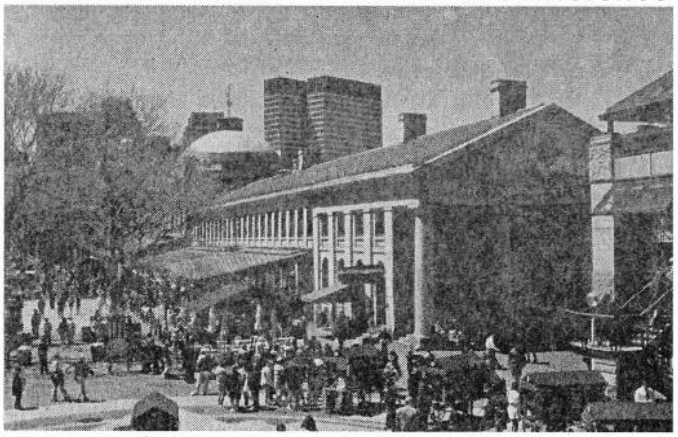
# SCTPLS-BOSTON: August 8-10, 2003

**Conference Registration Materials Inside**

## Also inside: INSC 2003 Report
## NDPLS Impact Report on Citations in Scientific Journals

## BOSTON CONFERENCE PLANS

### Thirteenth Annual International Conference



**CONFERENCE THEME:**

*Big Questions, Tough Problems*

President Elect, and Summer Conference Coordinator, Holly Arrow reports exciting progress in the development of the Summer Conference program. This year's conference focus is how nonlinear dynamics, complexity science, and chaos theory have helped us ask "Big Questions" in new ways and tackle "Tough Problems". What are the successes, the failures, the new directions? SCTPLS will meet at Boston University for a day of workshops followed by two and a half days of talks, symposia, roundtable discussions, and many other opportunities to meet people, share ideas, and generate new ones. The conference schedule is designed to provide ample time for discussion, with a maximum of three simultaneous tracks of papers, and several plenary gatherings, including the sunset session on Friday, the banquet on Saturday night, and poster sessions.

**The Call For Papers is open until May 1, 2003.**
**For instructions see the January, 2003 *SCTPLS Newsletter* or visit http://www.societyforchaostheory.org**

### *Boston Keynote Speakers*

**Dr. H. Eugene Stanley**

(Friday Sunset session)

Dr. Stanley, from Boston University, studies the nonlinear dynamics in such phenomena as the economy, heartbeats, other physiological signals, Alzheimer disease, and liquid water critical points.

**Clifford T. Brown, Ph.D.**

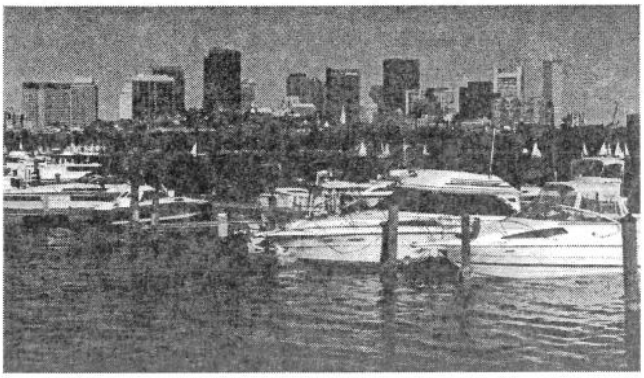
(Saturday Banquet speaker)

Dr. Brown, a Research Fellow at the Middle American Research Institute, Tulane University, studies the social and economic organization of the Maya Culture. His topic will be: "Dynamics and Patterns in the Rise and Fall of States: Problems and Data"

***And Honoring***

**Walter Freeman, Ph.D.**

For his pioneering work in neurocognitive nonlinear dynamics.



## *Key Dates for Conference Schedule*

**MAY 1. SUBMISSION DEADLINE for ABSTRACTS.**

May 19. Authors will be contacted about status of their submission. If you haven't heard by then, e-mail harrow@darkwing.uoregon.edu to inquire.

May 26. List of accepted Abstract Titles and Presenters posted on the SCTPLS webpage http://www.societyforchaostheory.org

June 16. Schedule of dates and times, with Abstracts, posted on the SCTPLS webpage

July 1. Deadline for authors of accepted abstracts to register. After this date *your abstract may be purged from the program.*

July 8. Drop dead date for speaker registrations. Speakers and poster authors who have not registered by this date will be deleted from the program. Cancellation of registrations and lodging are subject to a 50% service charge.

July 20 . Early registration ends. On-site prices are in effect. All requests and payments for Boston University lodging are due. Cancellations of registration and BU lodging are subject to a 75% service charge.

July 25 All requests for BU parking passes are due. Cancellations of registration and BU lodging are subject to a 100% service charge.

August 7. Arrive if attending morning workshop next day.

August 8. (Friday) Workshops (8:30-12:30, 1:30-5:30) Registration, and Sunset Session (5-7)

August 9. (Saturday) Conference Day 2, Banquet.

August 10. (Sunday) Conference Day 3, Business Meeting

August 11. (Monday) Departure day

## Workshops – Fri. Aug. 8.

Three "all-new" workshops will be offered on Friday: Rates are $125 per workshop for regular attendees, $75 for students. To encourage members to take full advantage of this opportunity, there is a special rate of $200 if you take two of the three workshops. In addition, Dr. Steve Guastello will be offering a (free) extended session **on Accident Analysis & Prevention** during the regular conference schedule.

### Drawing Conclusions From Time Series

*Instructors:* Mary Ann Metzger & Dick Bird
*Time:* 8:30 AM–12:30 PM

*Aims:* This workshop is designed to get results from your time series. Open that file-drawer and get your data into action! The emphasis will be on analyzing time series, including very short series, that are suspected to be nonlinear and nonstationary and performing meaningful analyses of time series data.

Part 1: Time series analysis: Finding and evaluating models (MAM): Definitions and summary of ARMA analysis; Role of linear approximations for short-term prediction; Methods for describing attractors and summarizing dynamics of nonlinear nonstationary time series: Bayesian multiprocess models; Using results for prediction, classification, and comparison; Examples from operant conditioning, Attention Deficit Hyperactive Disorder in children and from two-person conversations.

Part 2: Issues in Chaos Analysis (DB); Stationarity v non-stationarity of time series; Reconstruction of the attractor - Takens Theorem; Programs for extraction of chaos parameters (CDA, Santis & Skinner's D2); The importance of surrogating. Surrogating methods. Non-linear prediction from time series. Examples from EEG, economics and climate data.

In both parts of the workshop, participants are invited to bring their own empirical time series for exercises.

*Mary Ann Metzger* has degrees in Mathematics and Psychology from the University of Connecticut, and postdoctoral work in Mathematical Psychology at the Rockefeller University, New York. She was a member of the Psychology Department faculty at UMBC from 1973 to 1999 and is now Emerita. Her specialty is the application of systems dynamics to understanding psychological processes, including intellectual development, developmental disorders, and patterns of family relations. Relevant reading for the workshop: Mary Ann Metzger (1995), Tracking sequences of attractors in cognitive state-space. In R. Post and T. van Gelder (Eds.) *Mind as Motion: Dynamics, Behavior, and Cognition*, MIT Press.

*Dick Bird* is Senior Lecturer in Psychology at Northumbria University, UK and has degrees in mathematics and in psychology. Dick is the author of two books on the use of computers in experimental psychology and teaches an option on Chaos theory applications to the B Sc Hons Psychology degree.

Useful advance reading might be: Paul A. Waters (1999), "Psychophysiology, Cortical Arousal and Dynamical Complexity," *Nonlinear Dynamics, Psychology and Life Sciences*, Vol 5 No. 1 pp. 211-229. Handouts will be provided at the workshop.

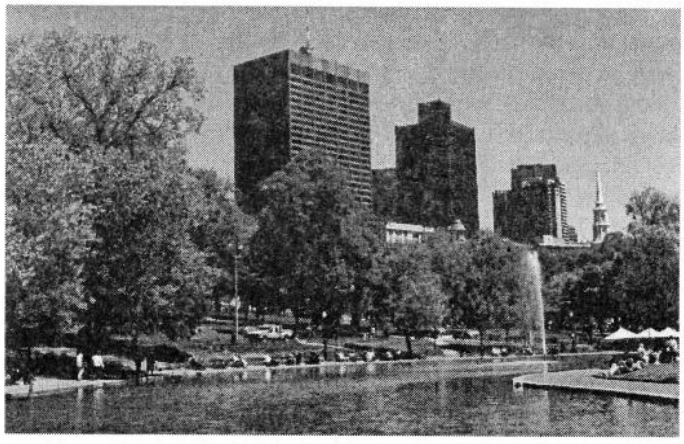
## Introduction To Fractals And Chaos

*Instructor:* Dr. Larry S. Liebovitch
*Time:* 1:30-5:30 PM

This workshop will present an introduction to fractals and chaos and their applications to biological data in a way that even those with a limited background in mathematics can understand. Fractals are things that have pieces that are ever smaller copies of the bigger pieces. A tree is fractal. It has ever finer branches that are smaller copies of the larger branches. Fractals can be used to better understand the structure and function of proteins, cells, the heart, and the brain.

Chaos means simple systems that do surprisingly complex things. Chaos can be used to better understand the surprising things that molecules, cells, and people do. The topics covered will include 1) FractalsIntroduction, Self-Similarity, Scaling, Dimension, Statistical Properties, 2) ChaosIntroduction, Phase Space, Sensitivity to Initial Conditions, Bifurcations, Analyzing Data, and Control of Chaos. The presentation will be based on the book, Fractals and Chaos Simplified for the Life Sciences, by L. S. Liebovitch, Oxford University Press, 1998, which consists of facing pages, the left one with words, the right one with pictures, that lead you, one thought at a time, through this material.

*Dr. Liebovitch* is a Professor at Florida Atlantic University with appointments there in the Center for Complex Systems and Brain Sciences, the Center for Molecular Biology and Biotechnology, and the Department of Psychology (http//www.ccs.fau.edu/~liebovitch/larry.html). He has used nonlinear methods, including fractals, chaos, and neural networks to study molecular, genetic, cellular, physiological, and information systems such as motions in proteins, the timing of heart attacks, the swimming of one-cell organisms, and the spread of computer viruses. He has also been developing a CD-ROM with curricula materials for a mathematics course for non-science students who never liked and never did well in math which uses fractals to show how mathematicians think about mathematics. He is the author or co-author of 2 books, 64 articles, and has given presentations in the U.S., Austria, Belgium, Brazil, Canada, China, Denmark, Finland, France Germany, Israel, Poland, and Sweden.



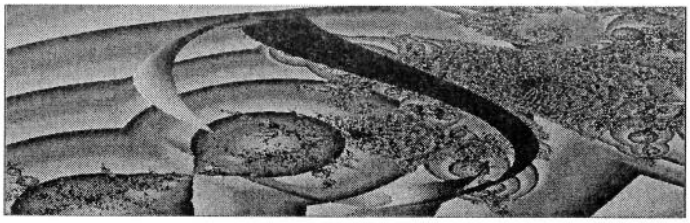
## Agent-Based Computational Laboratories

*Instructor:* Dr. Catherine Dibble
*Time:* 1:30-5:30 PM

This workshop is for anyone interested in agent-based research strategies. The workshop emphasizes computational laboratory modeling and science. Research thinking and interests are far more important than programming skills for this workshop. Nontechnical researchers are welcome and encouraged to attend.

After a brief historical overview of agent-based approaches and platforms, the workshop will focus on RePast (from U Chicago Social Science Research Computing, a 2nd generation clone of Swarm that has especially strong support for social science modeling), GeoGraphs (which allow for agent simulations on network landscapes, including small-world and scale-free networks), and Genetic Algorithms (which mimic natural evolutionary processes to find adaptive solutions to highly complex problems, and which work as complements to agent-based simulations at several levels), with an emphasis on model design, experimental design, and on how agent-based computational laboratories complement other approaches to research. Application examples will illustrate the utility of this research approach in exploring topics such as the evolution of organizations, epidemiology, settlement patterns, globalization processes, the effects of social and spatial structures on the evolution of conflict and cooperation, and the evolution of inequality. Handouts will be provided, along with a web site from which to download and install computational laboratory software and related development software.

*Dr. Catherine Dibble* is an economic geographer at the University of Maryland. She has decades of experience and training in evolutionary systems and scientific method, formal economic theory and game theory, computer science, theoretical geography, and especially computational laboratories. She has been working professionally with simulation models of many types since 1980, with genetic algorithms since 1993, and with agent-based simulations since 1995. Her publications so far cover new designs for handling spatial structure and solving location-allocation problems using genetic algorithms, for representing absolute and relative space and time in genetics based machine learning, and for genetic evolution of optimal organizational designs under disparate conditions. She is the inventor of the general purpose GeoGraph library for Swarm and RePast, which supports the construction of agent-based models on richly structured network landscapes such as organizations, social institutions, and geographic landscapes. Dr. Dibble teaches advanced PhD seminars in Computational Laboratories and leads an active Computational Laboratory research group at the University of Maryland.



# LETTER TO THE MEMBERSHIP

### Postscript to INSC 2003, Vienna, Austria, by Dick Bird, President

To be in Vienna in February is to see the city at the best time. Without a flock of tourists the art galleries, concert halls, opera houses and public buildings are still open, and can be enjoyed to the full. The weather was cold but bracing and the hotels warm and welcoming.

The International Nonlinear Sciences Conference (INSC) 2003 was a first for Europe and a first for the Society for Chaos Theory. As principal sponsors of the event SCTPLS has helped to inaugurate what will hopefully become a series of European-based international events to complement the USA-based summer conferences.

The Conference was welcomed to Vienna by the deputy Mayor at a "Heurigen Evening" – an entertainment based around the tasting of the new wine. On the social side many delegates attended a performance of the Magic Flute at the Opera House (followed by a light meal at Sacha's café restaurant where the names of every performer of note over the years autograph their pictures.)

The old University building was a very fitting background for INSC. Dignified, grandiose and roomy, its slightly faded opulence contrasted well with the avant garde content of the conference program. Keynote addresses from three distinguished speakers punctuated the proceedings: Prof Karl Haken, who gave a brilliant overview of his own field of Synergetics, Prof Tonu Puu who gave an inspiring account of nonlinear dynamics as applied to economic theory and Prof Jack Cohen who delivered a ringing denunciation of the Second Law of Thermodynamics, replacing it with a fourth law: "Things Self-Organize." Around and between these three fine addresses the standard of papers was uniformly high, with much outstanding work unveiled here for the first time.

The international representation was impressive, with delegates from twenty eight countries including Asia, East and Central Europe, Scandinavia, Africa and North America. Foremost in representation was Austria followed by Italy and the USA. Russia, Japan, China and the United Kingdom were also well represented.

The conference owes a great debt of gratitude to all those who worked sop hard to make it a success. The Presidents of the host bodies, Gunther Schiepek, Sergio Rinaldi and Karl Toifl, the program committee and its Chair, Richard Heath; the people of SCTPLS especially Mary Ann Metzger and Steve Guastello who acted as registrants and the many, many helpers. Most of all I feel we owe thanks to the dynamism of one person, Bob Porter whose inspiration sparked the conference, whose continued initiative sustained it and whose energy saw it through to its highly successful conclusion.

Altogether INSC 2003 was an unforgettable experience. Let us hope it is the first of many such events to follow.

Dick Bird
March 2003.

# Big Questions, Tough Problems (or) My Love Affair with Chaos

### A Note from Holly Arrow, President Elect

It was the summer of 1993, and I had just completed my second year of a PhD program in social psychology. I had yet to complete my masters thesis, although I had a rich data set and what seemed like an interesting problem: I wanted to understand how the evolving interactions among people created and transformed structure. Yet the methodological tools I had been given seemed completely inadequate for exploring this topic. I was stuck. I was also reading for my comprehensive exams, wading through stacks and stacks of articles, and I noticed that reading most of this literature left e mentally exhausted, rather than stimulated and excited--the way I felt, for example, when reading popular books about science, or when reading philosophy, my first love. I was disillusioned.

Then I went to Orillia, to my first Chaos Society conference, and fell in love again. There was no pre-arranged schedule of presentations for the conference-instead, Fred Abraham had asked everyone to send in a paragraph describing their research interests, which were printed up for participants. The task of the first "session" was to self-organize the program. It worked beautifully. The conference was itself a manifestation of just the phenomenon I wanted to study.

A key memory from the conference was talking to a physicist about the topic of my stalled masters thesis, after a session about chaos and art that was held out on the lawn as the sun went down and we passed a big jug of red wine around the circle. He was intrigued by the topic and helped me see that I was having trouble because I was tackling a very hard problem indeed, a problem that others, in their own way, were grappling with in many different areas of science. The people and resources I discovered there and on the Society discussion list, chaopsyc, opened the way for me to finish my thesis without retreating to an easier (and more trivial) question or mutilating the data to fit inappropriate methods.

How could I retreat when others, like Chris Langton, were writing work that dared to tackle questions such as "What is life?" Reminiscing on-line with other members of the Society about the "early days" confirmed for me that my "falling in love" experience was not an isolated event. Robin Robertson recalled the scene in 1992, when "Larry [Vandervert], Sally Goerner, Mike Butz and I presented at APA. Chaos theory was so hot that year that people jammed every session. We had room for about 50 and there was about 75 in the room and, believe it or not, people outside just trying to listen. Afterwards they pawed all over us, trying to get any scrap of paper we could offer them on the subject."

Jeff Goldstein wrote "Reading these recollections . . . I had a very clear memory of how incredibly important I found Fred's work on dynamics and psychology, his talks at the early workshops, discussions . . . I remember it all as completely mind-expanding, like a whole other world opening up."

For the 2003 Boston Conference, one goal is to create the conditions for as many participants as possible to have a "mind-expanding" experience. I hope that we all are inspired to share our best ideas, to engage one another in heated debate, to

applaud the successes and scrutinize the ways in which our attempts to apply the methods and ideas of this "new science" still fall very short. If we are indeed tackling big questions and tough problems, making progress matters.

Holly Arrow
March, 2003

# INSC 2003 REPORT

## Society-Sponsored International Conference Exceeds Expectations

The first International Nonlinear Sciences Conference was held in Vienna, Austria form 7th – 9th February, 2003. This was a joint effort between our Society and two European professional societies, Societa Italiana Caos e Complessita and Wissenshaftliche Gesellshaft: Dynamik – Komplexität – menschliche Systeme. The Conference was very successful, having attracted 161 participants. Of that number 26 came from North America (US, Canada, Mexico), or 16%. The most frequently appearing country was Austria with 27 people, followed next by Italy with 22, and USA with 21. A total of 28 countries were represented. Highlights of the Scientific Programme included Keynote addresses by Professors Haken, Puu and Cohen, all well-known pioneers in the application of nonlinear technology to their respective fields. There were several high level Symposia in which participants were exposed to state-of-the-art techniques in areas such as Language Acquisition, Self-organising networks, and Clinical applications including a specialist symposium on Epilepsy. Other Symposia and Workshops discussed a variety of applications including Arts and Architecture, Work Organisations and Virtual Worlds.

The paper sessions were quite full, with up to four parallel sessions being run at various times. A wide range of applications of nonlinear dynamics was represented including chaos in the brain, physiological issues, mathematical modeling, medical applications, applications in economics and management, as well as a variety of psychological applications, including mental health. The poster session on the first evening of the conference attracted 26 participants with a lively discussion ensuing around many of the posters.

The Conference Dinner was held at a small winery a short distance from the City. Delegates were treated to typical Austrian fare including new wine and entertainment from a small folk music group. Other conference highlights included Mozart's The Magic Flute at the Wiener StaatsOper followed by late evening gourmet dinner at the famous Sacher Hotel. There was just enough time for many delegates to see a little of Vienna's tourist highlights in cold crisp but snow-free winter weather.

Negotiations are under way to publish the Conference Proceedings and an email request for submission of papers for review will be sent out in April.

Richard Heath
Scientific Program Chair, INSC 2003

# Accident Analysis and Prevention Workshop Planned for Boston

Stephen J. Guastello, Ph.D. has recently responded to an invitation from Boston Conference organizers to offer an extended workshop presentation on Accident Analysis and Prevention at the August meeting. The goal of the workshop is to make a bridge between conventional thinking on this topic and what has been learned from studies in nonlinear dynamics and complex systems. Although much of the system-related knowledge has been gained from occupational accident situations, the principles generalize well to accident situations in transportation, health care, and public situations.

Steve tells us that the program will begin by considering several concepts of causation that permeate the risk analysis literature: the single cause and risk ratio, chains of events, fault tree analysis, factorial models, and catastrophe models. Basic ergonomics and stress variables can be important contributors to any of the foregoing causal structures.

Fault trees, which have become known as dynamic fault trees in recent years have the capacity to track complex events as they unfold over time. Catastrophe models, one of Steve's specialties, can also be used to help us understand and model nonlinear and dynamic changes, and to describe and predict discontinuous changes of events over time.

The catastrophe models characterize single accidents as well as collective accident experience. Statistical properties of accidents and catastrophes will be addressed and will be of particular interest to participants with actuarial or other research objectives.

The workshop will also address issue on the frontiers of accident analysis and prevention, involving complex systems with multiple human and machine agents. As examples, how can task groups become coordinated or destabilized? What properties of human-machine interaction lead to stabilization? How is the concept of chaos relevant?

Prevention techniques range from those that are centered on the individual human agent to those that affect complex systems. Levels of effectiveness for some benchmark systems are considered along with emergency management systems.

Stephen J. Guastello received his Ph.D. from Illinois Institute of Technology in Industrial-Organizational Psychology, and his BA in Psychology from the Johns Hopkins University. He is the author of two books (*Chaos, Catastrophe, and Human Affairs*, and *Managing Emergent Phenomena*) and nearly 100 journal articles and book chapters, a substantial portion of which are on nonlinear dynamics topics. He is also the Editor in Chief of *Nonlinear Dynamics, Psychology, and Life Sciences* and serves on the editorial board of *Theoretical Issues in Ergonomic Science*.

## NDPLS Has Impact!

Impact and Immediacy factors are now available for *NDPLS*. At the present time, we are not any closer to an acceptance from ISI for inclusion in *Social Science Citation Index*. Because we are a small journal, however, it was not brutally difficult for Casey Hanson, the Editor's research assistant, to compute those indices for us. *Journal Citation Report* produces Immediacy and Impact factors for the Science edition journals (4500 journals), but not for the Social Sciences edition (1400 journals). With that in mind, our manual computation of the factors based on *SSCI* citations should be compared with values for journals that are listed in the JCR. It appears that some prominent psychology journals are listed in both indices. The results for NDPLS are encouraging.

**Impact Factor** -- This is the number of citations of *NDPLS* articles over a 5 year period divided by the number of articles published during that period. We had 86 regular articles published from 1998-2002. We had 75 citations of *NDPLS* articles in SSCI journals during the SSCI reporting period 1998-2002. We also had 49 citations to NDPLS articles in NDPLS 1998-02. The total of 124 citations divided by 86 articles gives an impact factor of 1.44 for the 1998-02 period.

**Immediacy factor** -- This is the number of citations of NDPLS articles within one year of the date of publication of each article. For articles published in 1997-01, there were 35 citations within a year, which appeared 1998-02. There were 14 additional citations within NDPLS for NDPLS articles. The total of 49 citations divided by 78 articles renders an average immediacy factor of 0.63. Neither of the foregoing indices includes citations in journals that are not in SSCI (except NDPLS for obvious reasons), nor does it include citations in books or in journals outside the social sciences that might be included in other journal citation indexes.

The most frequently cited article is Richard Heath's 2002 contribution, which garnered 11 citations outside of NDPLS before it was actually published. Those citations contributed greatly to the immediacy factor that we currently experience. The second most frequently cited article is Kevin Dooley's 1997 contribution with 9 citations outside of NDPLS.

| JOURNAL | IMPACT | IMMEDIACY |
|---|---|---|
| Psychological Bulletin | 6.81 | 0.88 |
| Psychological Review | 5.76 | 1.50 |
| Psychological Science | 2.71 | 0.53 |
| Psychological Methods | 2.07 | 0.26 |
| Journal of Applied Psychology | 1.97 | 0.16 |
| Chaos: An International J. | 1.94 | 0.44 |
| Physica D | 1.62 | 0.30 |
| **NDPLS (in SCCI)** | **1.44** | **0.63** |
| Journal of Mathematical Psyc | 1.20 | 0.11 |
| Biometrika | 1.18 | 0.16 |
| Psychometrika | 0.85 | 0.13 |
| Chaos, Fractals, & Solitons | 0.84 | 0.44 |
| Int. J. Bifurcation & Chaos | 0.84 | 0.16 |
| Brit. J. Math & Stat Psyc | 0.83 | 0.09 |

The next three most frequently cited authors were: Stephen Guastello with 10 citations outside of NDPLS to 7 articles, Rense Lange with 7 citations to 2 articles, and Douglas Vickers with 5 citations to 2 articles. Other authors garnered up to 4 citations each. The foregoing author-specific citations are allocated to first authors. Individual authors who wish to compile their personal citation counts need to add up the citations to all articles in which a co-author was the first author together with citations to their own first-author appearances.

It is reasonable to expect NDPLS' ratings to improve overall in the next few years. JEL/Econlit and Medline were added late in the 1997-02 period and their distribution of our abstracts can only have a positive effect. Meanwhile, NDPLS' ratings can be compared against some benchmark journals in the table (left).

## New Society Web Page Editor Named

SCTPLS President Dick Bird recently announced the appointment of Terrill L. Frantz as the editor for the Societies web pages. Terrill is Managing Director, Organization Simulations Asia Ltd., Hong Kong (www.org-sim.com). We asked Terrill to introduce himself to the membership. He writes:

I'm an Ed.D. in Organization Change student at Pepperdine University (Malibu, California) who is about to pass (hopefully) my comps and move on to dissertation. My profession has been computer software development (applications level) for about 20+ years. Most of the time I have been working in Wall Street firms. I hold an MBA from New York University (1998); BS in Computer Systems Management from Drexel University (Phila., PA) (1984).

Last November I shifted to completing the degree and starting a management consulting business specializing in applying computer simulations to humanistic issues.

I am primarily from the Northeast region of the USA, but I have been living in Hong Kong for over 4 years. My wife and I have a 5 year old daughter

I am early in the learning about chaos, even though I've been surrounded by it all my life, but look forward to where a better understanding might take my mind. Getting involved is the best way to learn, but can be difficult in the beginning without something specific to offer. I saw Kevin's posting to CHAOPSYC listserv a few days ago looking for help...and here I am.

I'll look forward to meeting folks face-to-face sometime down the road. Boston in August is unlikely, but 2004 most likely. ***Cheers, Terrill!***

## ANNOUNCEMENTS

### *Complexity Digest* Features INSC 2003

The Virtual Conference Network of the Complexity Digest recently released a set of audio and video excerpts from the recent INSC 2003 meeting in Vienna. The links are listed below. For direct linking go to:

http://www.comdig2.de/Conf/INSC2003/

**AUDIO RECORDINGS OF PRESENTATIONS**

H. Haken, **Synergetics: How Does Self-Organization Work?**

Tönu Puu, **Oligopoly Dynamics – A Traditional Area for Complex Dynamics in Economic Theory.**

Jack Cohen, **"Why is Negentropy, like Phlogiston, a Privative?" or "Life must be natural, not negentropic"**

Bondarenko, V., Yevin, I., Koblyakov, A., **Music and Controling Chaos in the Brain**

Huett, M-T., **How can noise-induced nonlinear patterns be detected in biological data sets?**

Kirlangic, M., Ivanova, G., & Henning, G., **The DC-level: An order parameter of the brain complex open system?**

Arrow, H., **Bubbles, Eruptions, Stagnation, and Floods: How Energy Flows in Small Groups**

Remondino, M., **Agent Based Process Simulation and Metaphor Based Modelling for Social Sciences**

Mayer-Kress, G., & Newell, K. , **Time-Scales in Stochastic Map Models of Chaos in Isometric Force Production**

Mirow, S. & Porter, R., D, **Inter-relationships of temporal patterns in simultaneously recorded measures of movement and heart rate before and after psychotherapeutic interventions**

Renaud, P., Décarie, J., Gourd, S.-P., Paquin, L.-C. & Bouchard, S., **Computing perceptual and motor invariants in immersive environments**

Mens-Verhulst, J., & van Dijkum, C.,**The Dynamics of Fatigue: Insights From Simulation in Self-Regulation**

I. Schwarz, **Noise Induced Chaos and Transport in Population Dynamics**

Celestino Soddu, Enrica Colabella, Gabriele Maldonado, **Generative Art is the Idea Realized as Genetic Code of Artificial Objects**

Mauro Annunziato, Piero Pierucci, **Emerging Structures in Artificial Societies**

L. Liebovitch, **How Genes Regulate Other Genes**

Schiepek, G., Trump, T., Eckert, H., & Weihrauch, S., How to Identify Critical Phase Transitions in Human Development Processes – Complementary Information from Complexity Resonance Plots and Recurrence Plots .

**SHORT VIDEO STATEMENTS**

Robert Porter, **Conference Background**

Holly Arrow, **Using Complexity Tools to Organize the Upcoming Conference in Boston (13th Ann Intl Conf, Soc f Chaos Theory in Psych & Life Sciences,** Boston, MA, USA, 03/08/08-10)

Karl Toifl, **Application of Complex Systems Concepts in Daily Medical Practice** (video in German, English transcript)

Kaisu Koski, **Non-Linear Storytelling in Environmental Installations**

L. Liebovitch, **Current Research Interests**

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For more information contact **Complexity Digest** editor, Gottfried Mayer at gxm21@psu.edu

## NEWS FROM MEMBERS

No news submitted this issue.

## WHO'S WHO in the SOCIETY

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Fred Abraham, **abraham@sover.net**

# Nonlinear Dynamical Bookshelf

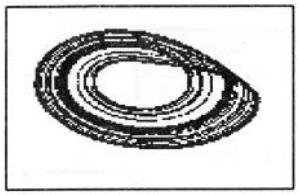
**Crutchfield, J. P., & Schuster, P. (2002). Evolutionary Dynamics: Exploring the interplay of selection, accident, neutrality, and function. NY: Oxford University Press.** Today evolution is analyzed at very different levels, from paleontology to molecular biology and even computer science; from the commercial use of evolutionary drug design to the innovation of new and highly abstract mathematics. Nonetheless, common phenomena and common problems relate evolutionary behaviors as they appear in these different arenas. Examples include stepwise rather than gradual time courses of evolutionary adaptation, the role of selectively neutral variants in optimization, the destabilization of evolutionary memory as a function of parameters (error thresholds), the emergence of novel dynamical behaviors induced by finite populations, and the lack of a theory for genotype-phenotype relations and for emergent functionality. New paradigms and metaphors--such as self-organization, complex adaptive systems, phase transitions, and stochastic dynamical systems--will help to achieve progress and, hopefully, a new level of integration in analyzing these difficult problems. This book collects a wide range of research on these cross-cutting topics. The workshop out of which they came brought together researchers from different disciplines: physicists and computer scientists, on the one hand, and molecular, developmental, and macroevolutionary biologists on the other. The resulting contributions present conflicting views on a number of outstanding problems in order to stimulate and provoke multifocused discussions. Though a final integration of the deeper conflicts--such as those between selectionists, neutralists, and structuralists or those between macroevolutionists and microevolutionists--is still some distance in the future, the dialogue that emerges from the collection as a whole sheds new light on the richness and difficulty of evolutionary dynamics. A primary goal of the collection is to begin articulating a comprehensive dynamical theory--one that incorporates structural constraints, variational attainability, nonlinear population dynamics, neutrality, function, and modularity, all on an equal footing.

**Griffeath, D., & Moore, C. (Eds.). (2002). New Constructions in Cellular Automata. NY: Oxford University Press.** Cloth ISBN 0195137175. Paper ISBN 0195137183. This book not only discusses cellular automata (CA) as accoutrements for simulation, but also the actual building of devices within cellular automata. CA are widely used tools for simulation in physics, ecology, mathematics, and other fields. But they are also digital "toy universes" worthy of study in their own right, with their own laws of physics and behavior. In studying CA for their own sake, we must look at constructive methods, that is, the practice of actually building devices in a given CA that store and process information, replicate and propagate themselves, and interact with other devices in complex ways. By building such machines, we learn what the CA's dynamics are capable of, and build an intuition about how to "engineer" the machine we want. We can also address fundamental questions, such as whether universal computation or even "living" things that reproduce and evolve can exist in the CA's digital world, and perhaps, how these things came to be in our own universe.

**Haken H. (2002). Brain dynamics: Synchronization and activity patters in pulse-coupled neural nets with delays and noise. NY: Springer-Verlag.** ISBN: 3-540-43076-B. This book addresses a large variety of models in mathematical and computational neuroscience. It is written for the experts as well as for graduate students wishing to enter this fascinating field of research. The author studies the behaviour of large neural networks composed of many neurons coupled by spike trains. He devotes the main part to the synchronization problem. He presents neural net models more realistic than the conventional ones by taking into account the detailed dynamics of axons, synapses and dendrites, allowing rather arbitrary couplings between neurons. He gives a complete stability analysis that goes significantly beyond what has been known so far. lie also derives pulseaveraged equations including those of the Wilson--Cowan and the Jirsa--Haken-Nunez types and discusses the formation of spatio-temporal neuronal activity patterns. An analysis of phase locking via sinusoidal couplings leading to various kinds of movement coordination is included.

**Haken H. (2002). Information and self-organization: A macroscopic approach to complex systems. (2nd Edition). NY: Springer-Verlag.** This book presents the concepts needed to deal with self-organizing complex systems from a unifying point of view that uses macroscopic data. The various meanings of the concept "information" are discussed and a general formulation of the maximum information (entropy) principle is used. With the aid of results from synergetics, adequate objective constraints for a large class of self-organizing systems are formulated and examples are given from physics, biology, and computer science (pattern recognition by parallel computers). The extensions contained in the second edition show how, based on possibly scarce and noisy data, unbiased guesses about processes of complex systems can be made and the underlying deterministic and random forces determined. This procedure allows probabilistic predictions of processes, with applications to numerous fields ranging from technology through biology and medicine to economy. The relationship to chaos theory is also addressed.

**Kohler, T. A., & Gumerman, G. J. (2000). Dynamics of Human and Primate Societies. NY: Oxford University Press.** **Contents:** Putting Social Sciences Together Again: An Introduction to the Volume Timothy A. Kohler ; Nonlinear and Synthetic Models for Primate Societies Irenaeus J. A. te Boekhorst and Charlotte K. Hemelrijk; The Evolution of Cooperation in an Ecological Context: An Agent-Based Model , John W. Pepper and Barbara B. Smuts ; Evolution of Inference Brian Skyrms; Trajectories to Complexity in Artificial Societies: Rationality, Belief, and Emotions Jim E. Doran ; MAGICAL Computer Simulation of Mesolithic Foraging Mark Winter Lake; Be There Then: A Modeling Approach to Settlement Determinants and Spatial Efficiency Among Late Ancestral Pueblo Populations of the Mesa Verde Region, US Southwest, Timothy A. Kohler, James Kresl, Carla Van West, Eric Carr, and Richard H. Wilshusen ; Understanding Anasazi Culture Change Through Agent-Based Modeling Jeffrey S. Dean, George J. Gumerman, Joshua M. Epstein, Robert Axtell, Alan C. Swedlund, Miles T. Parker, and Steven McCarroll ; Anti-Chaos, Common Property, and the Emergence of Cooperation J. Stephen



# Society for Chaos Theory in Psychology & Life Sciences

## Registration and Membership for
### 2003 Annual International Conference and Workshops

*To ensure proper credit, please complete the following and return with your payment. Please print clearly. Complete address section only if (a) you are a new member (b) you are registering as a non-member or (c) you are currently a member but your address has changed. Thanks!*

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Students: What is your institution and program of study? _____

Please check your registration choices on the form below. If you are paying by check, the check must be payable in US Dollars, drawn on a US Bank, to: Society for Chaos Theory in Psychology & Life Sciences (or SCTPLS). Return this form with your payment to **Mary Ann Metzger, Ph.D. SCTPLS Secretary, 1010 Dyre Street, Philadelphia, PA 19124. USA. FAX: 831-309-6442.** E-mail metzger@umbc.edu.

**1. CONFERENCE REGISTRATION (includes banquet) – Before 20 July, 2003**

_____$175 Regular members
_____$145 Student members
_____$230 Non-members (You can join now and receive membership discounts)
_____$ 25 Additional starting 20 July, 2003

**2. WORKSHOPS – Regular Members: 2 workshops for $200.00 !**

**Drawing Conclusions from Time Series**
_____$125 Regular
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**Introductions to Fractals and Chaos**
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_____$ 75 Students

**Agent-Based Computational Laboratories**
_____$100 Regular
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**3. MEMBERSHIP—New and Renewals**

_____$75 **2002-2003 Regular membership** includes Vol. 7 of NDPLS, Membership thru 31-August-03, Newsletters, and annual poster.

_____$65 **2002-2003 Student membership** includes Vol. 7 of NDPLS, Membership thru 31-August-03, Newsletters, and annual poster.

_____$120 **SPACE ODYSSEY NEW MEMBER-SHIP PLAN**: Includes membership through 31-August-04, Newsletters, 2001 program abstracts and back Newsletters as available, NDPLS volumes 7 and 8. Annual posters.

_____$200 **JET PROPULSION PLAN FOR NEW MEMBERS**: Includes everything in the Space Odessey plan ***plus:*** NDPLS volumes 3-6 – over 1000 additional pages. Get caught up on a fast-moving trajectory!

_____$65 **EARLY RENEWAL**: Active members can renew their membership and NDPLS subscription early thru 31-August-04. *Limited time offer.* All the usual goodies are included.

4. **LODGING AT BOSTON UNIVERSITY.**
Prices quoted below are per person. Reservation and payment are due before 20 July, 2003. Rooms are 2-bedroom suites (see page 11), shared bath, maximum of 2 persons per suite. To request a particular suitemate, write in the name. Suitemate must also make the request.

- **Check type of accommodation required:**

_____Half Suite.

Suitemate preference: ___Male ___Female

Suitemate request _____

_____Full suite (2 bedrooms, maximum of 2 people.

***CONTINUE NEXT PAGE:***

- **Check 3-night package. Also check early arrival or late departure, as desired.** 3-night package: $175 per person; 8, 9, & 10 August cannot be subdivided. Prices for additional nights are listed @ $60 per person per night.

_____Early arrival Wed. 6 Aug. (Add $120 to lodging total)

_____Early arrival Thurs. 7 Aug. (Add $60 to lodging total)

_____3-night package Aug 8-10, departing Monday Aug 11 (Add $175 to lodging total)

_____Late departure Tues. 12 Aug. (Add $60 to lodging total).

_____Late departure Wed. 13 Aug. (Add 120 to lodging total)

- **Parking Permits**

_____With lodging ($30 for 8, 9, 10 Aug. cannot be subdivided, plus $10 per night each additional night of lodging.)

_____For commuters ($30 for 8, 9, 10 Aug. cannot be subdivided.)

**5. PLEASE TOTAL YOUR SELECTIONS**

_____ **Subtotal Conference & Workshops**

_____ **Subtotal Membership**

_____ **Subtotal Lodging and parking permit**

_____ **Σ Above**

**6. PAYMENT TYPE**

_____ Check (in USD drawn on a US bank)

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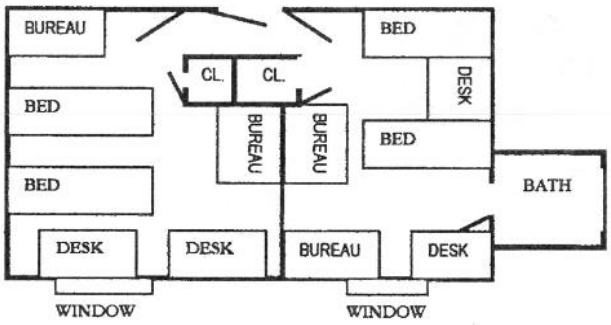
_____Mastercard _____ Visa

Card # _____

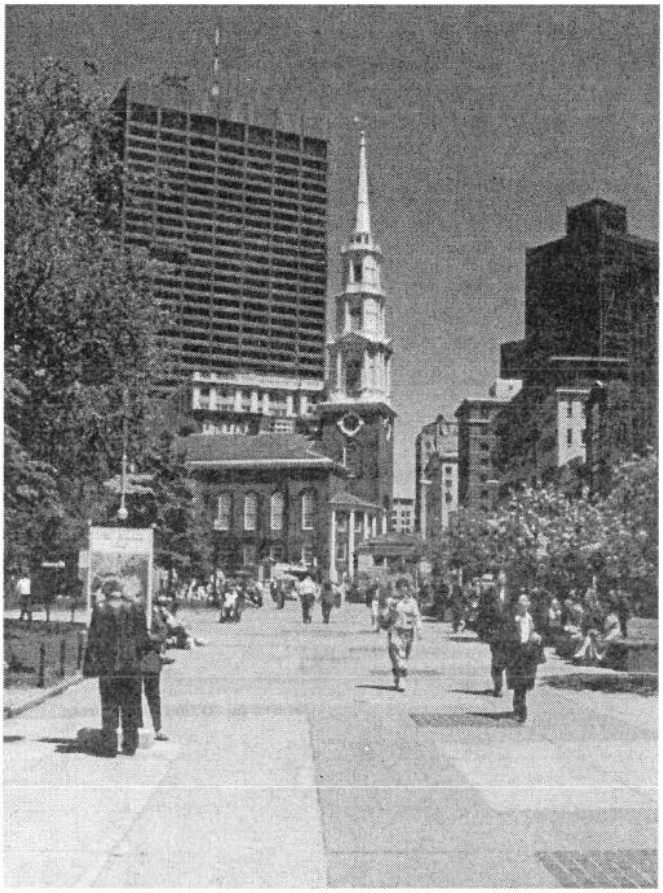
Exp date _____

Signature _____




**Above:** Suite layout. Diagram provided by BU Office of Conference Services.

**Below:** Colonial Boston in a Modern World. All Boston photos this issue by Michael Radin.



**Cancellation Policy:** Our cancellation policies are predicated on our contractual agreements with the host facilities for our conferences. Thus they vary from year to year. For critical dates and amounts of refunds available for this year, please see the Key Dates on page 2 of this *Newsletter*. Thank you for your understanding on all points.

Lansing; The Political Impact of Marriage in a Virtual Polynesian Society Cathy A. Small ;The Impact of Raiding on Settlement Patterns in the Northern Valley of Oaxaca: An Approach Using Decision Trees Robert G. Reynolds ; The Fractal House of Pharaoh: Ancient Egypt as a Complex Adaptive System Mark Lehner ; Modeling Sociality: The View from Europe Nigel Gilbert; Concluding Statement, Henry Wright; Index.

**Mantegna ,R.N. & Stanley, H.E. (1999). Introduction to Econophysics: Correlations Complexity in Finance, Cambridge, UK: Cambridge University Press.** Statistical physics concepts such as stochastic dynamics, short-and long-range correlations, self-similarity and scaling, permit an understanding of the global behavior of economic systems without first having to work out a detailed microscopic description of the system. This pioneering text explores the use of these concepts in the description of financial systems, the dynamic new specialty of econophysics. The authors illustrate the scaling concepts used in probability theory, critical phenomena, and fully-developed turbulent fluids and apply them to financial time series. They also present a new stochastic model that displays several of the statistical properties observed in empirical data. Physicists will find the application of statistical physics concepts to economic systems fascinating. Economists and other financial professionals will benefit from the book's empirical analysis methods and well-formulated theoretical tools that will allow them to describe systems composed of a huge number of interacting subsystems. The book is intended for students and researchers studying economics or physics at a graduate level and for professionals in the field of finance.

**Puu, T. (1997). Mathmatical location and land use theory. NY: Springer-Verlag.** ISBN: 3-540-61819-B. This book starts out from the classical models of the space economy, associated with such names as: von Thuenen, Launhardt, Weber, Christaller and Loesch. The theories are stated in terms of precise mathematical models, and are generalized by the use of results from modern topology. The mathematical tools needed - variational calculus, vector analysis, and differential equation theory -are stage by stage developed in the context of applications, and the reasoning Is supported by a lavish supply of elaborate computer graphics, making even topics considered tough intuitively digestable. The reader will therefore not only acquire an understanding for the importance of including geographical space in economic models, but he will also learn to handle the mathematical tools needed for working with such models.

**Puu, T., & Sushko, I. (2002). Ogliopoly dynamics. NY: Springer-Verlag.** ISBN: 3-540-43186-1. This book has its focus on the dynamics of oligopoly games. Several contributions show how easily the unique Nash equilibria in some most traditional oligopoly models may lose stability, giving way to complex phenomena, such as periodic/chaotic processes, and to multi stability of coexistent attractors. The bifurcations producing these phenomena are studied by means of recently accumulated global methods, based on the use of critical curves. These tools are explained in a separate methodological chapter. The book also contains some historical background of the present theory. In this way the book becomes suitable also as an advanced text for industrial organisation courses. The various models presented in the book focus both classical Cournot types, and Hotelling' s "ice cream vendor" problems, including location choice. The author list comprises some of the most prolific contributors to current dynamic oligopoly modelling.

**Sprott, J. C. (2003). Chaos and Time-Series Analysis. New York: Oxford University Press.** This book provides a broad coverage and has acessible style of exposition. Emphasis is on physical concepts and useful results, rather than rigorous mathematical proofs. Completing this volume is free and user-friendly software. – *Publisher.* "...well balanced,...excellent style." --*W. Kinsner, University of Manitoba* **Contents:** *1.*Introduction 2.One-dimensional maps 3.Nonchaotic multi-dimensional flows 4.Dynamical systems theory 5.Lyapunov exponents 6.Strange attractors 7.Bifurcations 8.Hamittonian chaos 9.lime-series properties 10.Nonlinear prediction and noise reduction 11.Fractals 12.Calculation of the fractal dimension 13.Fractal measure and multifractals 14.Nonchaotic fractal sets 15.Spatiotemporal chaos and complexity A.Common chaotic systems B.Useful mathematical formulas C.Journals with chaos and related papers. Bibliography. Index.

**Watts, D. (2003). Six Degrees: The Science of a Connected Age. NY: W. W. Norton.** Duncan Watts wrote a wonderful book. His lively and accessible description of his journey through the world of networks is captivating, honest, touches deep concepts and raises big questions. Some might compare Six Degrees to another great book about networks, Albert-Laszlo Barabasi's Linked. The two books are complementary in several ways. First, *Six Degrees* is a lot more autobiographical and personal than Linked and is as much about how science is made as it is about networks. Second, the focus of Watts' books is by and large social networks--although he does talk about other networks--that is, networks made out of people: networks of friends, acquaintances, colleagues, co-authors, etc. Third, the main recurrent theme in *Six Degrees,* as its name indicates, is small world networks, whereas Linked is big on scale-free networks. I have great respect for both authors and cannot help but feel jealous of their ability to express complex ideas with simple words. Thanks to them, the science of networks is moving beyond the scientific community; everyone can now start looking at the world with the new lenses of network science. -- *Eric Bonabeau*

**Yaniguichi, Y., Stanley, H. E., & Ludwid, H. (Eds.) (2000). Structure and Function of Biological Systems under Extreme Conditions. Heidelberg, Germany: Springer-Verlag.** Biological systems are regulated by the thermodynamic parameters of pressure and temperature. With the help of new spectroscopic methods it is now possible to study the structure and function of such systems under extreme pressures and temperatures. This book described the resulting theory and applications of these pressure and temperature effects. The subjects covered include the use of high pressure in food processing and even the theory of the origin and evolution of life. Readers exploring the world of biology in extreme environments will find this book particularly useful.

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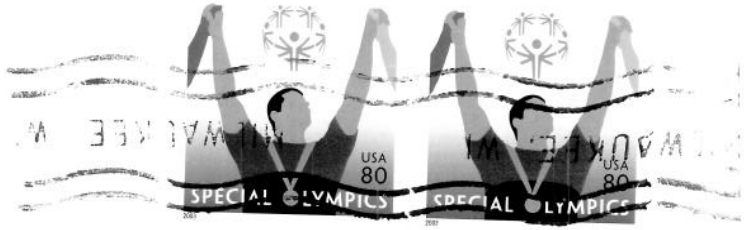


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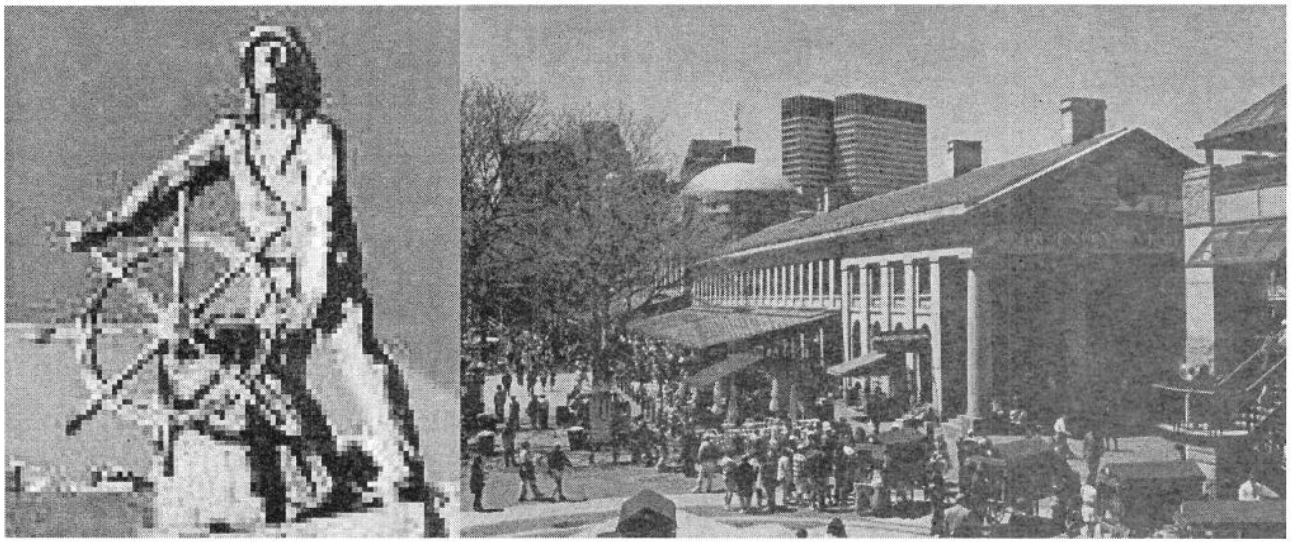

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## *INSIDE ---*
## 13TH ANNUAL SCTPLS BOSTON AUG. 8-10 2003
## *Special Features, Registration Materials And More!*

### *Meet the Members!*

Please plan on arriving Friday so you will be able to attend our "Sunset Session," with a catered registration and mingling time from 5-6, opening remarks at 6:15, and Dr. Stanley's keynote address at 6:30. Following the talk, everyone is invited to gather for dinner at a nearby restaurant where we will have space reserved. On Saturday evening, Dr. Brown will speak during the conference banquet (included as part of your registration).