

Society for Chaos Theory in Psychology & Life Sciences NEWSLETTER

Vol. 8, No. 1, October, 2000

Robert J. Porter, Ph.D., Editor

Stephen J. Guastello, Ph.D., Publisher

Philadelphia Conference Pleases Kevin Dooley New Society President, "Mad City is Next!"

PHILADELPHIA MEETING

The 10th Annual Summer Conference of the Society was held in Philadelphia, PA, July 20 to 23, 2000. There were over 80 presentations and a broad collection of workshops and special events. Details and summaries are provided at the Society website and in other news items in this newsletter.

This conference marked the end of two presidential terms for Bob Porter who turned the reins over to Kevin Dooley, the President Elect and new president for 2000-2001. Bob thanked the other officers of the Society for two years of hard work and especially recognized the many contributors to the Society's conferences and publications: "The creativity and insight of our members are the true key to our success."

NEW PRESIDENT'S MESSAGE

Hello everyone! This is my first communiqué from me to you since taking over as President of the Society, so I'd like to spend some time bringing you up to date with society news, and also share some perspective on what our society is about, and how it operates.

First, you'll want to note that our Past-President, Bob Porter, has remained on board in a very important and significant way. Bob will continue to edit the newsletter, and will also continue in his role as "guru" of the society's Internet listserv discussion board. Keith Clayton is stepping down as the society's Webmaster, and I'll be taking over that function. Keith got us on the map in the world of the Internet, and he has developed the web pages very aggressively over the past several years. I know that you will want to join me in thanking Bob and Keith for their excellent service to SCTPLS; and make Bob's job easier by continuing to send him news, briefs, book reviews, etc. for inclusion in the newsletter.

IN THIS ISSUE...

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Dues are due, but you know that already

Vote for President-Elect

I also want to thank others who make SCTPLS operate so well, and also make it a fun place to be around. Steve Guastello continues on as Editor of our journal, *Nonlinear Dynamics, Psychology, & Life Science*. Steve also acts as treasurer of SCTPLS, and produces the newsletter. Mary Ann Metzger acts as SCTPLS secretary, which means she plays the all-important role of membership director. Steve and Mary Ann pulled over-time duty during this year's conference in Philadelphia, and I want to thank them for that. Finally, I give a note of thanks to all of you who participated as presenters, session chairs, and observers at this year's conference.

The Philly conference was, in a word, way-cool. We had over 80 participants, including presenters from Austria, Brazil, Canada, England, France, Germany, Italy, Japan, Mexico, New Zealand, Russia, Spain, and a large contingency from Australia. It was a time to catch up with old friends and meet some new ones; to learn what new and exciting research was happening in the world of chaos and complexity; and to check out the local restaurants and pubs. I think this year's conference

presentations demonstrated two things. First, the field has matured greatly in terms of its rigor, for both qualitative and quantitative research. Even the metaphorical applications are formed from very deep intellectual reasoning. Second, we are just barely realizing all of the potential applications for our science. There seems to be no end as to the variety of questions that we can address anew with chaos and complexity.

We have decided to have next year's conference in Madison, Wisconsin, home of the main campus of the University of Wisconsin, on August 3-6, 2001. For those of you who have been to Madison before, I don't have to convince you of the charms of the city; for those who haven't been, hold those calendar dates! Madison is a great college town with just enough-a touch really, no more-of "big city" that you get the best of both worlds. The campus is situated besides a great, big city lake, and campus town is appropriately hip to meet all of your entertainment needs. We hope to see you there!

There are a couple of other happenings that I want to bring you attention to. First, upon the suggestion of one of our most esteemed members, Robert Gregson, and others on the listserv, SCTPLS will be working towards making numerous data sets available on our web site. The purpose of such public data will be to help us benchmark our methods against one another, so we can better determine the practical strengths and limitations of the tools that we use. We also believe the data may be useful for training and teaching purposes. The archive will eventually include both qualitative and quantitative data, and will be open for all to use. Please watch the web site and the listserv for more information over the coming months.

Second, I am excited about the special issues of NDPLS that Steve is putting out. One special issue will focus on leading edge and radical ideas, and I hope this issue plays a role in shaping our collective research activities. To the extent that members of the society can coalesce and make progress on a few key areas of theory and practice, we could indeed have a quite significant impact on the discipline. NDPLS will also have special issues on Biocomplexity and Evolutionary Economics.

I became quite nervous several months ago, knowing that I was going to step into an important role for the society. What do I really know about the society? I'm not a psychologist or a "life scientist", I'm an engineer-turned-management-junkie, so can I really be a spokesperson and leader of this interdisciplinary group of psychologists and other life scientists? I came to be comfortable with my role, however, when it finally dawned to me what SCTPLS is all about: we are a community of practice... and communities of practice are the ultimate example of self-organization and emergence.

We don't do some of the things that a lot of professional societies do. We don't have any placement service for students, and we don't try very hard to increase our membership roles into the thousands. We don't have our conferences at sexy and expensive hotels, and we don't try to lobby government for the interests of our members. Of course, we don't do some of the other things that a lot of professional societies do. Our conferences are not so boring that the only interesting thing you can do is talk to people in the hallway. Our clique is not so tight that even the greenest newcomer cannot feel immediately at home talking to the old guard. Our journal is not so full of normal science that it is used as a doorstop. Our doors are open to the most quantitative and the most qualitative... how could you possibly have one without the other?

We are a community of practice-and that practice happens to be applying the methods and metaphors of chaos and complexity to living systems. We are a place to come home to friends... good people that you don't mind meeting once a year and catching up with. A place where students and researchers and practitioners new to the field can come and learn, and immediately participate, and make a difference. A place where there are still people who were there at the very beginning of all this, like living dinosaurs of the nonlinear era. A place where you expect to be blown away by someone's ideas-it's the norm; it's not an occasion to celebrate, it's the reason we are here. Welcome to our community of practice.

Kevin Dooley, Arizona State University, Dept. of Industrial Engineering, Dept. of Management, Kevin.Dooley@asu.edu, <<http://www.eas.asu.edu/~kdooley/>>

Review the Philadelphia Program at
<http://www.vanderbilt.edu/AnS/psychology/cogsci/chaos/Conf00/Conf00.html>

MINUTES OF THE BUSINESS MEETING PHILADELPHIA, JULY 23, 2000

President Bob Porter called the meeting to order with brief remarks.

Motion. Minutes for the 1999 meeting approved as published in the Newsletter. **Approved.**

The Presidential Matryoshka was passed to the newly installed President, Kevin Dooley, who conducted the remainder of the meeting.

President-elect Dooley asked for feedback on the conference. A discussion ensued during which members expressed concerns about lodging and parking, both very expensive at UPENN and in some cases not as good as described in the brochure. There was a suggestion that more information be made available about alternative lodging in local hotels. Except for the acoustics in the Recital Hall, Irvine Auditorium was a very good venue for sessions.

With respect to content, discussion concerned problems of redundancy, parallel tracks, and theory vs. application. Members also suggested specific ways to welcome newcomers: an introductory course, or a Q&A session.

Other matters discussed were scheduling the meeting for Friday to Monday, scheduled speakers who do not show up, linking poster and discussion sessions, and joining other conferences. It was suggested that future program coordinators might adjust the registration schedule to prevent no-shows from appearing on the final printed program.

A discussion topic arose with pro and con related to an interchange on CHAOPSYC and whether the Society should officially take a position with regard to important matters of ecology.

Stephen Guastello reported on the Journal. Kevin Dooley solicited creative, short pieces for the *Newsletter*.

Motion. The 2001 meeting will be held in Wisconsin, either Milwaukee or Madison. **Approved.**

Motion. Bob Porter and Karl Toifl will develop a proposal for a meeting in Vienna in 2002. Several options were discussed. **Approved.**

For president for 2001-2002, **nominees were named: Kevin Dooley and Tim Haslett.**

Submitted: Mary Ann Metzger, Secretary

WHO'S WHO IN THE SOCIETY

President 2000-2001: Kevin Dooley, kevin.dooley@asu.edu
Immediate Past-President and Newsletter Editor: Bob Porter, rjporter@mindspring.com

Treasurer and Journal Editor: Stephen Guastello, stephen.guastello@marquette.edu

Secretary: Mary Ann Metzger, metzger@umbc.edu

Web Site Manager: Kevin Dooley, kevin.dooley@asu.edu

ANNOUNCEMENTS

We received an announcement that the 19th International Conference of the System Dynamics Society will be held July 23 - 27, 2001. The conference will bring together about 400 participants and practitioners interested in system dynamics and systems thinking. Presentations by practitioners and world leaders in the field will cover a wide variety of topics.

The program will include various formats. Plenary sessions will feature presentations on topics of general interest. Parallel sessions will be organized by theme and will feature the full range of work being done in the field. Poster sessions will provide an opportunity for participants to engage authors directly on subjects of particular interest.

Acceptances will be based on preliminary version materials received by January 31, 2001. Several categories of submissions will be considered including papers, abstracts without papers, session proposals and workshop proposals. Authors of accepted materials will have until May 15th to submit final versions for inclusion in the conference proceedings.

For further information and updated details, please visit the Society website at: www.albany.edu/cpr/sds/



We also note the announcement of the second International ICSC Congress on COMPUTATIONAL INTELLIGENCE: METHODS & APPLICATIONS (CIMA 2001) which will be held in cooperation with the University of Wales in Bangor, U.K., on June 19-22, 2001. CIMA 2001 will include four symposia and the GrC workshop. More information may be obtained from CONGRESS ORGANIZER ICSC International Computer Science Conventions 5101C - 50 Street Wetaskiwin AB, T9A 1K1 / Canada of CIMA*2001, or from the website:

<http://www.icsc.ab.ca/cima2001.htm>

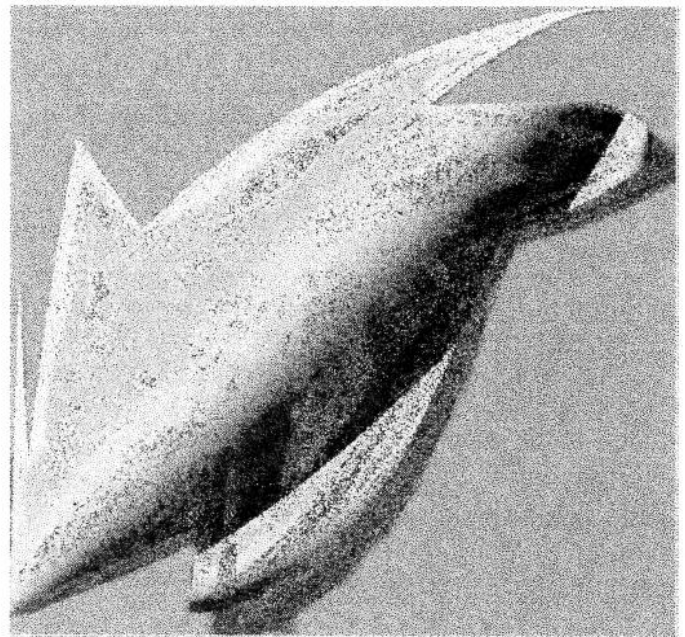


A fourth Nijmegen Speech Motor Conference continues the tradition established by the first three Nijmegen conferences in 1985, 1990 and 1996. As before, the main purpose will be to bring together recent developments in the fundamental science of speech production and research on speech motor disorders. Perhaps most importantly, the conference intends to stimulate a dialogue between these two fields.

In contrast to the earlier Nijmegen conferences, the 2001 conference will not only deal with fluency disorders but will give special emphasis to neurogenic motor speech disorders. Special sessions and several keynote addresses will be organized around this topic. This emphasis on neurogenic speech disorders creates another theme for the upcoming 4th conference: the search into the neural systems involved in speech motor production and speech disorders. Brain imaging data will be evaluated, both in speech motor disorders and in fluency disorders. Also, speech motor development will be a special topic.

To stimulate a lively interaction, all presentations will be plenary. Because of time limits thematic poster sessions form a major part of the conference program. As with the previous conferences, a book, based on the conference contributions, will be published afterwards.

On behalf of the organizing committee, Herman F.M. Peters Wouter Hulstijn Raymond D. Kent Pascal H.H.M. van Lieshout Ben Maassen. For more information, please check <http://www.nici.kun.nl/speechmotconf/>



REPORTS FROM THE CUSP

*Editor's Note: Short research articles, book reviews, and other items of interest are solicited from all members for consideration for publication in **REPORTS FROM THE CUSP**. Articles are reviewed by the editor and those selected may be edited for length. Ordinarily, only one item will appear per newsletter.*

CONTRIBUTIONS ARE WELCOME

NEWS FROM MEMBERS

Marios Kittenis of the Physiological Laboratory, University of Cambridge, writes that he has recently finished his MPhil thesis which looks at nonlinear methods of EEG analysis. He examined correlations between the random variability of reaction times (saccadic RTs) and chaotic measures of the EEG. The idea was to investigate the possibility that a nonlinear chaotic neural mechanism may be involved in randomizing reaction times. The results were inconclusive, although a significant positive correlation was found between RT variability and Lyapunov exponent estimates of the EEG. Marios invites correspondence: Marios Kittenis <mk291@cam.ac.uk>.



Jelle van Dijk, currently at the Max Planck Institute for Psycholinguistics, recently completed an MA thesis examining cognitive development, theory model and mechanism. The thesis deals mainly with the discussion of a recurrent back-propagation network theory of cognitive development, and the possible applications of the concepts of embodiment and embeddedness in a dynamical systems perspective on cognition. Email: Jelle van Dijk <Jelle.vanDijk@mpi.nl>



Anatoliy Shiyan, Head of the Institute for Social Technologies, Khmelnik, Ukraine, reports the opening of the Institutes website: <http://soctech.narod.ru> (in Russian). The website includes analysis of the social and economic phenomena in chaotic conditions of Ukraine and Russia as well as overviews of the use of chaotic paradigms in election technologies. Dr. Shiyan suggests that the members SCTPLS might be interested with the description of methods used to investigate the psychological structures of political figures during the practice of negotiation and decision of conflicts.

Preliminary versions of books describing a new theory for the typology of management are available at the website and at <http://ru.laser.ru/authors/shiyan>. These theories describe processes at the individual and group level. E-mail: sim@hmel.vinnitsa.com



Gus Koehler and co-workers were awarded a Biocomplexity Incubation grant to begin to develop an approach for examining how the timing of public policy interventions affect industry clusters. The concept of "time-ecology" is central to the work.

The project title is: VISUALIZING DYNAMICS RESULTING FROM THE POLITICAL REGULATION OF TIME-ECOLOGIES. The project team includes: Paul Wohlmut, Institute for Law and Systems Research, San Diego University Law School, Kevin Dooley, Arizona State Univ. Victoria Koehler-Jones, Time Structures Gerard Medioni, Integrated Media Systems Center, USC.

Gus also made a presentation, "Simulating the Timing of Public Policy Interventions," at a recent RAND conference, "Complex Systems and Policy Analysis: New Tools for a New Millennium", sponsored by the White House Office on Science and Technology.



Kevin Dooley, along with colleagues Tom Choi and Nong Ye at Arizona State University, obtained a National Science Foundation Grant, Scaleable Enterprise Systems program, on the topic "Scaleable Theory of Enterprise: Control versus Emergence". Their study will develop a theory of enterprise-one that is scalable and generic, and provides new theoretical insight into nature of the supply networks. At the core of such a theory lies the tension between control and emergence. Their initial industry partners include Honda of America, Daimler-Chrysler, Motorola, and IBM.



Leslie Hendickson presented a paper at the RAND workshop on Complex Systems and Policy Analysis, "Trends in the Use of Chaos and Complexity Theories and Computer Simulation for Social Science Researchers."

RAND Conference on Complexity and Public Policy

RAND held a conference, "Complex Systems and Policy Analysis: New Tools for a New Millennium", sponsored by the White House Office on Science and Technology and the Rand Corporation in the Last week of September, 2000.

Attendees and speakers represented a wide spectrum of both the complex systems and policy making communities. The conference surveyed many of the most recent modeling methods re complex systems (including include multi-agent models, cellular automata, distributed learning methods, chaotic or nonlinear dynamic models, network analysis methods, system dynamics, and visualization technologies) and included focused dialogue about how one might go about making these models and methods specifically applicable to current real-world policy analysis and decision-making problems. The conference began with presentations of the general topics (policy and complexity), moved on to the survey of modeling methods, and thence to the dialogue about policy in the light of complex systems methods.

Presenting were: Congressman Mike Doyle, Bruce Don (RAND), David Campbell (Boston U.), Chris Meyer (Ernst & Young), Rob Axtell (Brookings), Laura Gilliom (Sandia Lab), Tom Maxwell (U. Maryland), Ken Baskin (ISCE), Kathleen Carley (Carnegie-Mellon U.), Dan Hastings (MIT), Nigel Gilbert (U. Surrey), Al Brandstein (USMC), Ron Smith Los Alamos, Dave Meyer (UCSD, IPS), Mark Tilden, Joseph Eash, Deputy Under Secretary of Secretary of Defense (Advanced Systems & Concepts), Carl Simon (U. Michigan), Mike North (Argonne), Bill Reynolds (Least-Squares Inc.), Thad Brown (Los Alamos, IPS), Robert Bernard (Price-Waterhouse-Coopers), Dianne Barton (Sandia), Leslie Hendrickson (UCLA), Chris Owens (BIOS), Steve Bankes (RAND), Rob Lempert (RAND), Gus Koehler (Cal. Research Bureau), Tom Czerwinski, Mike Lissack, Steven Popper, Steve Rinaldi, and Len Troncale.

The conference's final afternoon was devoted to attempts at promoting (and provoking) dialogue across the complex systems and policy making communities. While it would be premature to report success with these attempts, an important first step was reached (1) in that the policy making

community was exposed to the concept that ideas and models derived from a complex systems approach can raise valuable questions, which are a necessary input to the process and (2) complex systems modelers were exposed to the concept that the model alone is not enough and that questions about implications and alternate mappings are a requisite part of the policy making process. This conference was an essential step in getting two disparate communities to engage.

Rand is preparing a set of follow-up workshops and will publish a full conference proceedings. An edited transcript of the conference will be published next summer as a special issue of the journal *Emergence*. Rand also has video tapes of each of the sessions. More information can be found at <http://www.rand.org/centers/stpi/events/complexagenda.html> or from Jim Kadtko at (james_kadtko@rand.org). --M. Lissack

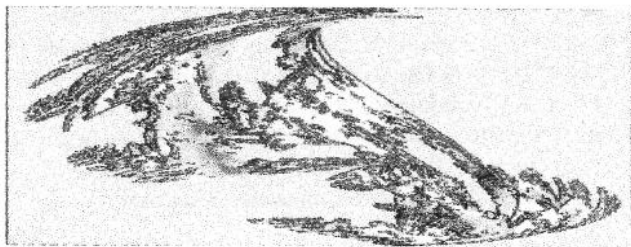
SCTPLS Philadelphia Conference: Influential Terms

Presentations were great in variety at the SCTPLS conference this summer 2000 in Philadelphia, and were arranged into tracks such as economics, experimental psychology, new methods, sociology, etc. Despite the variation in base discipline, we have commonalities between us, because of the language that we use.

I aggregated all of the abstracts into a single file and subjected them to CRA, or centering resonance analysis. CRA is a form of network text analysis being developed at Arizona State University by the Laboratory for Organization, Communication, and Knowledge Studies (LOCKS; locks.asu.edu). CRA measures the "influence" of words in text, where influence is operationally defined by a word's position in a word network.

The most influential terms, in order, were: system, model, theory, pattern, time, process, human, use, study, change, data, different, new, analysis, dynamics, social, complexity, chaos, structure, attractor, level, nonlinear, problem, group, development, interaction, American, series, research, activity, fractal, complex, nature, organization, science, application, function, network, method, brain, life, measure, behavior, paper, result, individual, dimension, bacon, state, insight, number, approach, map, family, linear, expression, evolution, philosopher/scientist, field, sequence, part, paradox, form, way, work, chaotic, Bruno, year, relationship, cycle, nonlinear, memory, rule, personal, bind, algorithm, dynamic, paradigm, William, organizational, understand, phase, implication, communication, modern, astronomer, condition, simple, phenomenon, society, signal, need, case, participant, procedure, they, certain, express, paint, boundless, fear, channel.

Why "bacon" and "Bruno"? We have Robin Robertson's abstract to thank for that! Robin managed to mention Lao Tzu, Plato, Xenophanes, Alain de Lille, Dante, Giordano Bruno, Francis Bacon, Ralph Waldo Emerson, and Blaise Pascal in his abstract for "Self-Referential Tools". --Kevin Dooley



DUES ARE NOW DUE, PLEASE....

Dear Colleagues,

Your continued involvement as an active, dues-paying member of the Society for Chaos Theory in Psychology & Life Sciences is important to our continued success. Since its founding in 1991, SCTPLS emerged as the primary interdisciplinary, international forum for the exchange of scientific developments in nonlinear dynamics science applications. Our purview includes not only psychology, but also a wide range of disciplines from microbiology to macroeconomics.

Our latest conference and workshop series at University of Pennsylvania provided programs for all members -- from those who have just recently discovered nonlinear dynamics to those who have been involved for some time. *NDPLS*, our refereed research journal, is achieving broad recognition for its top-quality original works. The American Psychological Association's PsycINFO indexing service, Social Science Index and other important indexing services, are now including *NDPLS* papers. We are proud of the progress we have made, and we are optimistic for our continued growth and development in the coming decade.

Please check your address label on this Newsletter. If the number in the upper right-hand corner is not 2001, then you need to renew your member now. We want to make sure you do not miss any *NDPLS* issues, *Newsletters*, or special announcements planned for this year. We are looking forward to hearing from you soon and hope to see you at our next conference, which we are busy arranging right now. Watch the *Newsletter* for details. As always, please contact any of us if you have questions or suggestions about Society work. Our success rests on the support and participation of all our members.

With very best wishes for 2000 -01,

Kevin J. Dooley, Robert J. Porter,

Mary Ann Metzger, Stephen J. Guastello,

SPECIAL NEWS!

Kluwer Academic has announced that they are reprinting the early volumes of *NDPLS*. Complete your collection today! Don't miss out on the single most important source of nonlinear dynamics applications in the life and social sciences. PLEASE USE THE FORM on p. 17.

Articles of Organization

THE SOCIETY FOR CHAOS THEORY IN PSYCHOLOGY & LIFE SCIENCES

This document is also known as the Society's Constitution and Bylaws. It was installed as the Society's organizing document by a vote of the members at the business meeting portion of the Annual Conference in August, 1993. At that time the Society's headquarters were located in the State of Vermont, USA. This document reflects an upward compilation of amendments passed by the members by vote, either at the annual meeting or through mail ballot. This document contains additional provisions to maintain compliance with US Internal Revenue Service code pertaining to non-profit tax-exempt organizations. The Society for Chaos Theory in Psychology & Life Sciences is organized as an Association according to the US Internal Revenue Service definition.

Article I. Name and Purpose.

1. The name of the organization shall be the Society for Chaos Theory in Psychology & Life Sciences. It will be referred to as "the Society" in the remainder of these Articles. The acronym SCTPLS is an acceptable form for occasional use in Society communications.
2. The Society is organized exclusively for scientific and educational purposes within the meaning of Section 501 (c) (3) of the Internal Revenue Service Code.
3. The Society shall concern itself with the scientific and professional problems in psychology insofar as they pertain to nonlinear dynamical systems theory. The Society's scientific interests and commitments shall include but not be limited to: (a) integration of data and theory across specialty boundaries, (b) the relationship between psychology and other areas of human knowledge, particularly regarding ecological matters and other important human concerns; (c) the historical, systemic, and methodological aspects of psychology as a whole.
4. To promote the above, the Society shall initiate and encourage constructive interaction and integrative efforts, including the development of publications.
5. No substantial part of the activities of the Society shall be the carrying on of propaganda or otherwise attempting to influence legislation. The Society shall not participate in or intervene, including the publishing or distribution of statements for any political campaign, on behalf of any candidate for public office.
6. Notwithstanding any other provisions of these Articles, the Society shall not carry on any other activities not permitted to be carried on (a) by an Association exempt from Federal Income Tax under section 501 (c) (3) of the Internal Revenue Code of 1986 (or the corresponding provision of any future United States Internal Revenue Law), or (b) by an Association, contribution to which are deductible under section 170 (c) (2) of the Internal Revenue Code of 1986 (or the corresponding provision of any future United States Internal Revenue Law).

Article II. Membership.

1. The Society shall consist of a single class of membership.
2. Members must have an interest in the concerns of the Society as stated in Article 1, Section 2, and meet the minimum standards pursuant to Article 1, Section 2.
3. New Members: Those persons who have requested membership and who meet the above criteria shall be made members upon receipt of the yearly dues. The Secretary-Treasurer of the Society shall notify new members of their acceptance.
4. Except when otherwise specified in these Articles, all decisions calling for an action by the membership of the Society shall be by majority voting at the annual Society Business Meeting, or in the absence of a quorum, by mail ballot of the voting members. Voting by proxy shall not be allowed.
5. The membership year begins September 1st, and ends on August 31st of the following calendar year.

Article III. Officers.

1. The officers of the organization shall be a Society President, a Society President-Elect, a Society Past President, and a Secretary-Treasurer. The functions of Secretary-Treasurer may be divided between two members should the workload evolve to a sufficient quantity.
2. The President-Elect shall be chosen by vote of the members of the Society. The Secretary-Treasurer shall be appointed by the Executive Committee.
3. It shall be the duty of the President to preside at all the meetings of the Society; to be Chair of the Executive Committee and to exercise supervision over the affairs of the Society with the approval of the Executive Committee; to serve ex-officio as a member of the Nominations and Elections, Program and Publications Committees; and to perform such other duties as are incident to his or her office or as may properly be required of him or her by vote of the Executive Committee. (See also Article IV-2).

4. It shall be the duty of the Secretary-Treasurer to issue calls and notices of meetings; to receive and transmit applications for Society membership; to keep records of the Society; to have custody of all funds and property of the Society; to collect any special dues that may be voted in accordance with Article VII-1 of the Articles; to make disbursements as authorized by the Executive Committee; to serve as Secretary and member of the of Nominations and Elections and Program Committees; and in the name of the Chair of the Nominations and Elections, to issue calls for nominations of officers and members-at-large of the Executive Committee, or to arrange with the Executive Committee for the issuing of such announcements.

5. It shall be the duty of the Society President-Elect to serve as a member of the Executive Committee of the Society and to perform the duties of the Society President in the event of the absence or incapacity of the latter. The President-Elect shall automatically become President at the close of the membership year in which the President-Elect was elected, as stipulated in Article VII-3 of the Articles, and will serve on the current Program Committee.

6. It shall be the duty of the Society Past-President to serve as a member of the Executive Committee of the Society and to perform the duties of the Society President in the event of the absence or incapacity of the latter and the Society President-Elect. The President shall automatically become Past-President at the close of the membership year in which that member began the term as President.

7. In case of the death, incapacity, or resignation of any of these officers (except the President), the Executive Committee shall elect a successor to serve until the close of the membership year after the next scheduled elections.

8. The Board of Trustees will consist of three persons who have held offices in the Society and who are among the initial signatories of this document. It is the duty of the Board to ensure the Society's compliance with its Articles, its obligations to the Internal Revenue Service, and other legal obligations that might pertain to the Society's operation. The term of appointment terminates with death, incapacity, or resignation. Replacements are appointed by the Executive Committee.

Article IV. Executive Committee.

1. There shall be an Executive Committee of the Society consisting of the Society President, President-Elect, Past-President, and the Secretary-Treasurer.

2. The Executive Committee shall have general supervision of the affairs of the Society, performing the duties and abiding by the limitations specified in these Articles. All actions of the Committee affecting Society policy shall be put to the vote of the membership at the annual Society Business Meeting (providing a quorum is present) or by a special mail ballot.

3. All decisions of the Executive Committee shall be made by majority of the committee members present, except that on a

mail ballot, the majority of those returning their ballots within 21 days of its mailing shall decide the issue(s).

Article V. Nominations and Elections.

1. Officers of the Society shall be elected by a preferential vote of the members on a secret mail ballot.

2. The Secretary-Treasurer shall issue a call for nominations in the name of the Chair of the Nominations and Elections Committee, for the office of Society President-Elect. The nominations ballot shall have spaces for at least three names for President-Elect.

3. All officers and membership of the Executive Committee shall assume office at the beginning of the membership year as defined in Article II-5 above, and will continue to do so until their successors are installed according to the procedures stated in Article III above.

Article VI. Meetings.

1. The Business Meeting of the Society shall take place during the annual convention and in the same locality for the transaction of business, the presentation of scientific papers, and the discussion of questions of interest to nonlinear dynamical systems in psychology and the life sciences.

2. A quorum shall consist of 10 voting members.

3. The time and place of the annual conference will, as often as feasible, be contiguous with the dates and locations of one of the major psychology conventions in North America.

Article VII. Committees.

1. The committees of the Society shall consist of three standing committees: (a) the Nominations and Elections Committee, (b) a Program Committee, and (c) a Publications Committee. The Executive Committee may also charter special committees as needed and ratified by Executive Committee vote.

2. The members of the Nominations and Elections and Publications Committees shall serve for terms of three years. The members of the Program Committee shall serve for a term of two years. Appointments shall be made during and take effect at the end of the Annual Convention of the Society.

3. The Nominations and Elections, Program, and Publications Committees shall each consist of three members appointed by the Elections Committee. The Chairs of these Committees shall be designated by the President.

4. It shall be the duty of the Program Committee to make arrangements for the program at the annual meeting of the Society in accordance with Article VI of these Articles. The Program Committee shall consist of two members: (a) Chair designated by the President, and the (2) Past Chair of that committee

5. It shall be the duty of the Publications Committee to encourage development of journals, books and articles of relevance to the Society and to establish policies for all publications.

6. Committee Chairs shall present oral reports to the Executive on committee activities during the preceding year. In the absence of the Chair, another member of the committee may appear to present the report. In either case, written copies of the report should be submitted to the Society's President and Secretary-Treasurer by the time of the Executive Committee's meeting at the annual conventions of the Society.

Article VIII. Dues and Income.

1. Changes in annual dues and assessments of any special dues shall be recommended by the Executive Committee and shall be voted on at an annual Business Meeting or by mail ballot of the members.

2. No part of the net earning of the Association shall insure to the benefit of, or be distributed to, its members, trustees, officers or other private persons except that the Association shall be authorized and empowered to pay reasonable compensation for services rendered.

Article IX. Amendments.

1. The Society at any annual Business Meeting by a vote of two-thirds of the members present, providing a quorum is present, or by a majority vote of the members of the Society voting by a mail ballot, may adopt such amendments to these bylaws as have been: (a) presented and read at the preceding annual Business Meeting, or (b) mailed to the last known post office address of each member, or published in the official journal of the Society, two months prior to the final vote on the proposed amendments.

Article X. Demise of the Society.

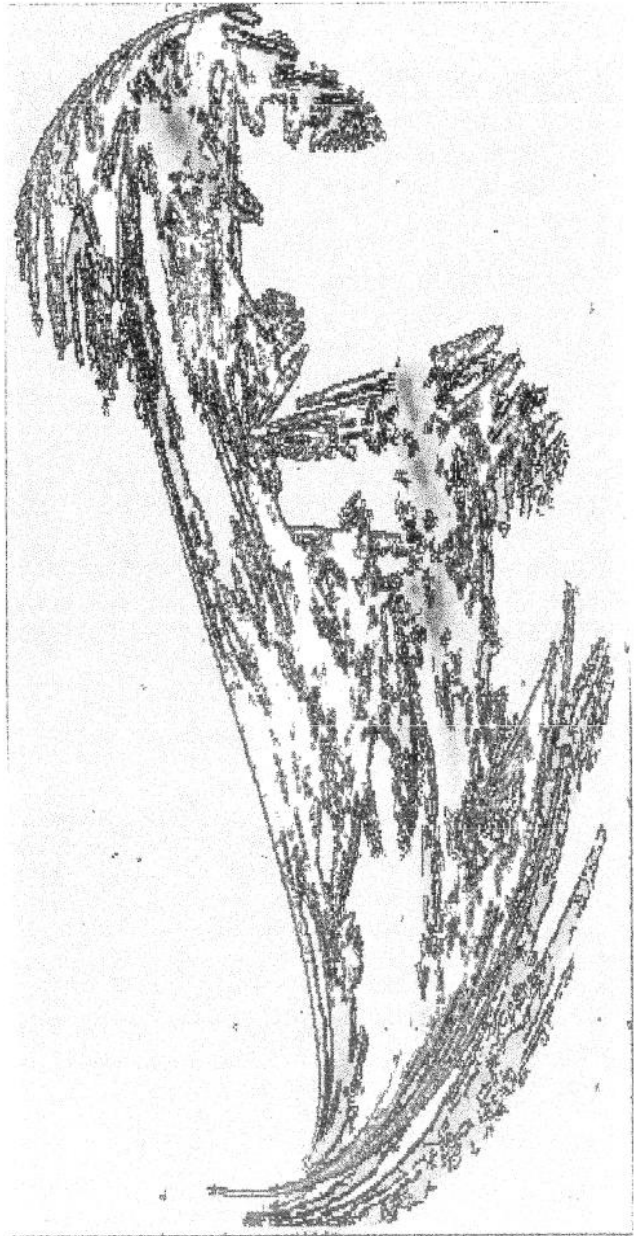
1. Conditions for determining the demise of the Society are subject to the provisions of these Articles concerning actions by members as stated in Article III.

2. In the event of the dissolution of the Society, the Board of Trustees shall, after paying or making provisions for the payment of all the liabilities of the Society, dispose of all assets of the Society exclusively for the purposes of the Society in such manner, or to such organization or organizations organized and operated exclusively for educational and scientific purposes as shall at the time qualify as an exempt organization or organizations under section 501 (c) (3) of the Internal Revenue Code of 1986 (or corresponding provision of any future United States Internal Revenue Law), as the Board of Trustees shall determine. Any such assets not so disposed of shall be disposed of by the Court of Common Pleas of the county in which the principal office of the Society is then located, exclusively for such purposes, or to such organization or organizations, as said court shall determine,

which are organized and operated exclusively for such purposes.

These Articles were signed and dated on behalf of the Society by its officers and trustees in the State of Wisconsin, USA. April 27, 1997 by William Sulis, MD., Ph.D., President & President-Elect; Stephen J. Guastello, Ph.D., Past President, Treasurer, Trustee; Keith Clayton, Ph.D., Membership Secretary, Trustee; and Jeffrey Goldstein, Ph.D., Trustee.

In June, 1997, the U. S. Internal Revenue Service approved the Society for Chaos Theory in Psychology & Life Sciences' application for status as a tax exempt, non-profit organization. This disposition is subject to review.



For individual e-mail
subscriptions send requests to:
subscriptions@comdig.org.
Archive: www.comdig.org,
European Mirror: www.comdig.de
Asian Mirror:
<http://www.phil.pku.edu.cn/resguide/comdig/> (Chinese GB-Code)
"I think the next century will be the
century of complexity." Stephen
Hawking

Complexity Digest 2000.19 edited by Gottfried J. Mayer

1. Cosmic g-Rays From Intergalactic Structure Formation, Nature

Excerpt: The Universe is filled with a diffuse background of g -ray radiation¹, the origin of which remains one of the unsolved puzzles of cosmology. Less than one-quarter of the g -ray flux can be attributed to unresolved discrete sources, such as active galactic nuclei; the remainder appears to constitute a truly diffuse background. Here we show that the shock waves induced by gravity in the gas of the intergalactic medium, during the formation of large-scale structures like filaments and sheets of galaxies, produce a population of highly relativistic electrons. These electrons scatter a small fraction of the cosmic microwave background photons in the local Universe up to g-ray energies, thereby providing the g -ray background. The predicted diffuse flux agrees with the observed background across more than four orders of magnitude in photon energy, and the model predicts that the g -ray background, though generated locally, is isotropic to better than five per cent on angular scales larger than a degree. Moreover, the agreement between the predicted and observed background fluxes implies a mean cosmological density of baryons that is consistent with Big Bang nucleosynthesis.

*Cosmic g-Ray Background From Structure Formation In The Intergalactic Medium <http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v405/n6783/full/405156a0_fs.html&content_filetype=pdf> , Nature 405, 156 - 158 (2000)

2. Reduction of Tropical Cloudiness by Soot, Science

Abstract: Measurements and models show that enhanced aerosol concentrations can augment cloud albedo not only by increasing total droplet cross-sectional area, but also by reducing precipitation and thereby increasing cloud water content and cloud coverage. Aerosol pollution is expected to exert a net cooling influence on the global climate through these conventional mechanisms. Here, we demonstrate an opposite mechanism through which aerosols can reduce cloud cover and thus significantly offset aerosol-induced radiative cooling at the top of the atmosphere on a regional scale. In model simulations, the daytime clearing of trade cumulus is hastened and intensified by solar heating in dark haze (as found over much of the northern Indian Ocean during the northeast monsoon).

*Reduction of Tropical Cloudiness by Soot, <<http://www.sciencemag.org/cgi/reprint/288/5468/1042>> A. S. Ackerman, O. B. Toon, D. E. Stevens, A. J. Heymsfield, V. Ramanathan, E. J. Welton. Reference

3. Lie Detection And Language Comprehension, Nature

Excerpt: People are usually no better than chance at detecting lies from a liar's demeanour^{1, 2}, even when clues to deceit are evident from facial expression and tone of voice³. We suspected that people who are unable to understand words (aphasics) may be better at spotting liars, so we tested their performance as lie detectors. We found that aphasics were significantly better at

detecting lies about emotion than people with no language impairment, suggesting that loss of language skills may be associated with a superior ability to detect the truth.

*Lie Detection And Language Comprehension <http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v405/n6783/full/405139a0_fs.html&content_filetype=pdf> , Nancy L. Etcoff, Paul Ekman, John J. Magee, Mark G. Frank, Nature 405, 139 (2000)

4. Interacting Molecular Loops in the Mammalian Circadian Clock, Science

Abstract: We show that, in the mouse, the core mechanism for the master circadian clock consists of interacting positive and negative transcription and translation feedback loops. Analysis of Clock/Clock mutant mice, homozygous Period2Brdm1 mutants, and Cryptochrome-deficient mice reveals substantially altered Bmal1 rhythms, consistent with a dominant role of PERIOD2 in the positive regulation of the Bmal1 loop. In vitro analysis of CRYPTOCHROME inhibition of CLOCK: BMAL1-mediated transcription shows that the inhibition is through direct protein:protein interactions, independent of the PERIOD and TIMELESS proteins. PERIOD2 is a positive regulator of the Bmal1 loop, and CRYPTOCHROMES are the negative regulators of the Period and Cryptochrome cycles.

*Interacting Molecular Loops in the Mammalian Circadian Clock <<http://www.sciencemag.org/cgi/content/abstract/288/5468/1013>>, Lauren P. Shearman, Sathyanarayanan Sriram,

David R. Weaver, Elizabeth S. Maywood, In s Chaves, Binhai Zheng, Kazuhiko Kume, Cheng Chi Lee, Gijbertus T. J. van der Horst, Michael H. Hastings, Steven M. Reppert, Science, Volume 288, Number 5468 Issue of 12 May 2000, pp. 1013 - 1019

5. Senator Proposes Tax Credit for Telecommuters, NYTimes Excerpts: (...) Sen. Rick Santorum's bill, the Telework Tax Incentive Act, will provide a \$500 tax credit for every worker who telecommutes at least 75 days per year. (...) Supporters argue that telecommuting reduces traffic congestion, air pollution, gas consumption and dependency on foreign oil. They say the arrangement also benefits working parents, retirees and people who may find it difficult to commute to or work in a traditional office. (...) However, companies have shied away from allowing employees to work from home because of traditional business values and the extra cost of building home offices.

*Senator Proposes Tax Credit for Telecommuters <<http://www.nytimes.com/library/tech/00/05/biztech/articles/13telecommute.html>>, CNET News.com, NYTimes, May 13, 2000

6. The Web Is A Bow Tie, Nature Excerpt: A study of the web's structure, five times larger than any attempted previously, reveals that it isn't the fully interconnected network that we've been led to believe. The study suggests that the chance of being able to surf between two randomly chosen pages is less than one in four. Researchers from three Californian groups - at IBM's Almaden Research Center in San Jose, the Altavista search engine in San Mateo and Compaq Systems Research Center in Palo Alto - have analysed 200 million web pages and 1.5 billion hyperlinks. Their results, which will be presented next week at the World Wide Web 9 Conference in Amsterdam, indicate that the web is made up of four distinct components.

*The Web Is A Bow Tie <http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v405/n6783/full/405113a0_fs.html&content_filetype=pdf>, News Feature, Nature 405, 113 (2000)

*See also: Souped-Up Search Engines <http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v405/n6783/full/405112a0_fs.html&content_filetype=pdf>, Declan Butler, Nature 405, 112 - 115 (2000)

7. Digital Mechanics (DM), Sciences of the Interface DM is the name we give to models of fundamental processes in physics that are entirely discrete and finite. We will illustrate the power of DM models by defining a particular model, assigning a small number of properties to the elements of the model, and then deriving a large number of physically correct properties from the model. In particular, we will start with a simple binary 3+1D lattice, where the time dimension has extent 2 and some further complexity. In a sense, this model has 10 dimensions, a 3+1D space time lattice with 6 extra dimensions of time. We then define just one conserved element, B. Bs can occupy sites in the lattice. Each site either is occupied by a B or is empty. Of course, there must be a rule that determines what happens to the Bs. In this model there are 3 fundamental units, B, Length and Time. That's it, BL&T; that's all we put into the model. Here's what we get out: We will show in simple terms exactly how the model represents space, time, energy! momentum, force, charge, temperature, QCD color, why (within the model) particles are colorless, why there are

particles and antiparticles, why there are conservation laws, how things move, why there is CPT parity, how angular isotropy arises despite angular anisotropy at the most microscopic level and finally why so many fundamental numbers exist in the standard model. It even offers a yet unheard of explanation of Bell's inequality. To understand and absorb all these explanations, the listeners must tolerate an inordinate amount of hand waving and in addition must be able to temporarily suspend many of their most cherished beliefs. If you can force yourself to swallow a byte of the BL&T theory of physics, you might not like it, but it will be good for you. *Digital Mechanics (DM) <<http://193.197.168.165/symposium/abstracts/20/efredkin/?SID=z000001>>, Edward Fredkin, Sciences of the Interface Symposium

8. Scale Relativity, Fractal Space-Time and Morphogenesis, Sciences of the Interface The theory of scale relativity extends Einstein's principle of relativity to scale transformations of resolutions. It is based on the giving up of the axiom of differentiability of the space-time continuum. Three consequences arise from this withdrawal. (i) The geometry of space-time must be fractal, i.e., explicitly resolution-dependent: this allows one to describe a non-differentiable physics in terms of differential equations acting in the scale space. The requirement that these equations satisfy the principle of scale relativity leads to introduce scale laws having a Galilean form (constant fractal dimension), then a Lorentzian one (in which the Planck length-time scale becomes a minimal scale, invariant under dilations), and finally to attempt constructing a generalized scale relativity which includes non-linear scale transformations and scale-motion coupling. (ii) The geodesics of a non-differentiable space-time are fractal and in infinite number: this leads one to use a fluid-like description and implies adding new terms in the differential equations of mean motion. (iii) Time reversibility is broken at the infinitesimal level: this can be described in terms of a two-valuedness of the velocity vector, then by jumping to a complex representation. These three effects can be combined to construct a covariant time derivative operator, which transforms the fundamental equations of classical dynamics into a generalized Schrodinger equation. This provides us with a theory of morphogenesis and self-organization, since the solutions of this equations yield probability densities, which are interpreted as a tendency for the system to make structures. Several new theoretical predictions can be made by applying this approach to the equations of motion of test-particles in various gravitational potentials of astrophysical relevance. These predictions are successfully checked by a comparison with observational data on a wide range of scales, ranging from planetary systems to large scale cosmological structures.

*Scale Relativity, Fractal Space-Time and Morphogenesis <<http://193.197.168.165/symposium/abstracts/18/Inottale/?SID=z000001>>, Laurent Nottale, Sciences of the Interface

2000.36 _____

1. Oil Price Dynamics, Economist/NYTimes/CNN

Traditional feedback control applied to nonlinear, complex systems often induces transitions to chaos with unpredictable outcomes. Chaos typically occurs for parameter configurations that correspond to high stress levels. The demonstrations of truckers in

Europe in response to high gas prices were the response of a complex economic systems to changes of one critical system parameters into unstable ranges. The demands (not only by the protesters) were for the government to change the gas taxes (a form of evolutionary fitness parameters in the economy) and for the oil producers to change the rate at which they deplete their resources, another critical systems parameter. "Europe could lower tax rates on fuel. America could draw oil from its strategic reserve. The best solution would be a steep increase in production by oil producers, especially Saudi Arabia."(NY Times <<http://www.nytimes.com/2000/09/13/opinion/13WED1.html>>)

In general terms the latter demand seems rather peculiar in a market economy where not only limited natural resources typically increase their price when the demand is higher than the supply. The response of a complex system to changes in systems parameters typically is adaptation, often coupled with innovation. As a matter of fact that appears to have happened in the European economies in response to the increased oil prices thirty years ago:"During earlier shocks, developed economies were grossly inefficient in their use of oil; since then, governments have used such tools as energy taxes to make their economies more efficient and less reliant on oil. They have largely succeeded, except in transport where, despite soaring petrol taxes, oil remains king because the alternatives are expensive and impractical. Most of OPEC's oil now goes to a sector that cannot at present live without it."(Economist <http://www.economist.com/editorial/freeforall/current/index_wb1712.html>).

On the other hand the development of many technologies that would reduce the consumption of oil have been put on hold or canceled in the recent past because of the low oil price. In the sense of evolutionary fitness perhaps alternative energies and energy saving technologies become more competitive again. That also could have a beneficial side effect on our global environment. It is also quite possible that seemingly unrelated factors such as the recently discussed road-safety problems of sports utility vehicles (SUV, which happen to be a major consumer of gas) can lead to a significant impact on the (US) oil market. (See Dean LeBaron's commentary <<http://real8.playstream.com:8080/ramgen/virtualquest/sep00/091500-ss.rm>>).

The complex connectivity of the energy sector within -not only- the global economy should make it a challenging area of research for the complexity community.

* Oils Taxing Times <http://www.economist.com/editorial/freeforall/current/index_wb1712.html> , Editorial, The Economist, 9/16/00

* Need for A Complexity Interpretation Of Oil Pricing Today <<http://real8.playstream.com:8080/ramgen/virtualquest/sep00/091500-ss.rm>> , Dean LeBaron's Video Commentary, 9/15/00 (Download viewer <<http://www.real.com>>)

* The Latest Oil Shock, Editorial, NYTimes, 9/13/00

* Gas Prices in Europe and the US <<http://www.cnn.com/2000/WORLD/europe/09/07/france.fuel.03/prices.tabel.exclude.html>> , CNN, 09/07/00

* Pricing Fuel <<http://www.cnn.com/interactive/specials/0003/oil.pricing/frame.eset.europe.exclude.html>> , CNN, 09/07/00

2. System Lets Traffic Lights Wave Buses Through, NY Times

In highly populated metropolitan areas public transport systems

can be an efficient alternative to congested car traffic especially when infrastructures like subways are available. In cities like Los Angeles where public transport is essentially confined to buses that share the same roads with cars, the situation is a little more complex. Simulation of road traffic has been for a number of years an area of intense research and simulations where concepts from complex adaptive systems could be successfully applied. It could be shown that often very small changes in systems parameters could lead to dramatic changes in traffic throughput. There have been a number of attempts to give buses an advantage in the form of traffic lights turning green for approaching buses. The problem is that if the green phases are extended too long it will reduce efficiency again because of increased congestion in the direction that has a prolonged red-phase as a consequence.

In a new experiment of the Metropolitan Transportation Authority of Los Angeles a system similar to one that was successfully introduced in 1997 in Curitiba, Brazil a slight modification of the traffic light priority for buses is tested: In a networked system the green phase for approaching buses will be extended but for not more than about ten seconds. In order to determine the position and speed of the buses approaching an intersection hundreds of sensors in the form of induction loops had been embedded in the pavement. A detector on the bus picks up the signal which then through some network controls the traffic lights ahead. While the idea of improving traffic performance through some form of distributed control systems is quite attractive it is surprising that in the year 2000 one still operates with pavement embedded induction loops, a technology that must have been around at least since the fifties of the last century. With the price of GPS (global positioning systems) coming down and the accuracy now being in the 10m range one might wonder if this really is the most cost-effective technology. Since GPS systems continuously calculate the speed of a vehicle buses could also serve as a distributed sensors for traffic speed and thereby also act as early traffic jam indicators.

* Rolling On: System Lets Traffic Lights Wave Buses Through <<http://www.nytimes.com/2000/09/14/technology/14HOWW.html>> , Eric Taub, NY Times 9/14/00

3. Human Population And The Future Of Biodiversity, UCS

Excerpt: For the first time, human activities are affecting species of all types and habits, at all points of the globe, and pushing many toward extinction. Scientists project that at least half of all living species could ultimately disappear due to habitat loss alone, creating a mass extinction on a scale comparable to those that have ended past geologic eras. Apart from habitat loss, other agents of human-caused extinction are now at work. Even more species could disappear as a result of pollution, overhunting, overfishing and inadvertent introduction of exotic species into weakened ecosystems. Hanging over the future of all life is the puzzle of how global climate will change in coming centuries as a result of human influences, and how these changes will affect ecosystems and the species they support. Not all species are at risk, however. Evolution is resilient. A small percentage of species-from pigeons, to weeds, to microbial parasites-have proliferated beyond their pre-human numbers or ranges. Rapidly evolving pests and disease-causing organisms could swell their ranks. Humanity itself, with more than 30 times the population density it ever could have achieved without

agriculture, now appears to have become the central organizing reality around which non-human life will evolve.

* Human Population And The Future Of Biodiversity
<http://www.ucsusa.org/resources/pop_bio.pdf> , UCS Population-Environment Linkages Eries, No. 4, August 2000

* Human Population And The Future Of Biological Diversity
<<http://www.populationaction.org/pubs/biodiv00/html/summary.htm>> , R.P.Cincotta, R.Engelman, Population Action International, 2000

* See also: Biodiversity Hotspots For Conservation Priorities
<http://www.nature.com/cgi-taf/dynapage.taf?file=/nature/journal/v403/n6772/abs/403853a0_fs.html> , Nature, Complexity Digest 2000.08.03 <<http://www.comdig.org/ComDig00-08/#3>>

4. Year 2000 Corruption Perceptions Index, Transparency Intl./CNN

Excerpt: Transparency International, stating that its Corruption Perceptions Index (CPI) <<http://www.transparency.de/documents/cpi/2000/cpi2000.html#cpi>> is a valuable reminder that corruption remains widespread in very large numbers of countries, today issued the year 2000 CPI ranking 90 countries.

"Corruption takes many forms and is a universal cancer," said Peter Eigen, Chairman of Transparency International (TI), the world's leading anti-corruption organization. He stressed that: "Our new index again shows that corruption is widely seen to be very high in many countries. On the eve of the Olympic Games, too, it is worth recalling the bribery scandal that enmeshed the International Olympic Committee (IOC) and the fact that some of the leaders of the bribe-scarred IOC are still running the show. Then, we must not forget as we publish our new index here in Germany that all the details of the secret party political payments in Chancellor Kohl's era have still not been disclosed." TI, founded in 1993, now has National Chapters in more than 70 countries. The Corruption Perceptions Index, which TI first launched in 1995, ranks countries in terms of the degree to which corruption is perceived to exist among public officials and politicians. The 2000 CPI is a composite index, drawing on 16 surveys from 8 independent institutions. The surveys embrace the perceptions of business people, the general public and country analysts. The surveys were undertaken over the last three years and no country is included in the CPI unless there are results from a minimum of three surveys.

* The Year 2000 Corruption Perceptions Index
<http://www.transparency.de/documents/cpi/2000/cpi2000.html>
Transparency International

* Finland 'Least Corrupt Country In The World'
<<http://www.cnn.com/2000/WORLD/europe/09/13/germany.corruption/index.html>> , CNN 9/13/00

* See also: A Tax Of The Worst Kind
<<http://www.worldlink.co.uk/articles/250100180310/15.htm>> , Worldlink Complexity Digest 2000.06.1
<<http://www.comdig.org/ComDig00-06/index.html#1>>

5. Fairness Versus Reason In The Ultimatum Game, Science

Abstract: In the Ultimatum Game, two players are offered a chance to win a certain sum of money. All they must do is divide it. The proposer suggests how to split the sum. The responder can accept or reject the deal. If the deal is rejected, neither player gets

anything. The rational solution, suggested by game theory, is for the proposer to offer the smallest possible share and for the responder to accept it. If humans play the game, however, the most frequent outcome is a fair share. In this paper, we develop an evolutionary approach to the Ultimatum Game. We show that fairness will evolve if the proposer can obtain some information on what deals the responder has accepted in the past. Hence, the evolution of fairness, similarly to the evolution of cooperation, is linked to reputation.

* Fairness Versus Reason In The Ultimatum Game
Martin A. Nowak, Karen M. Page, Karl Sigmund, Science, Vol. 289, No 5485, 9/8/2000, Pp. 1773-1775

6. Individual Interactions, Group Conflicts, and the Evolution of Preferences, SFI Working Papers

Abstract: This paper provides a unified framework for studying the effects of economic (and other) institutions on the evolution of preferences, taking account of conformist cultural transmission, social segregation, and the simultaneous operation of selection processes at the individual and group level. Price's equation (1970) for the decomposition of selection processes into within- and between group-effects is used to take account of inter group conflicts, group extinctions, and the emergence of new groups. The resulting multi-level selection process is illustrated by emergence and consolidation of the modern national state (along with the cultural traits supporting it) through a process of inter group warfare in the four centuries after 1500. In the penultimate section I use the model to study the effects of social institutions (and by implication economic policies) on the evolution of preferences. Some implications for constitutional and policy analysis are addressed in the conclusion.

* Individual Interactions, Group Conflicts, and the Evolution of Preferences
<<http://www.santafe.edu/sfi/publications/Working-Papers/00-08-047.pdf>> , Samuel Bowles, SFI Working Papers 00-08-047

7. Ants Algorithms, Bios Group

Abstract: Ants algorithms use a colony of artificial ants that cooperate to solve complex problems. In real world ants are able to find the shortest path from the nest to a food source to efficiently foraging. The mechanism is to encode the information not in a population of individuals, but in a modification of the local environment, or a shared space of pheromones. Artificial ants, moving in parallel over the solutions' space, examine the pheromones around them and weight their choice of next step by the pheromones left by other ants in situations similar to the one they find themselves in. Once an ant has completed a solution, it calculates the fitness of that solution, the measure of how good that solution is. Then increment the pheromones on the path proportionally to the fitness, then updating local information (the pheromones) proportionally to a global measure. Pheromones also evaporate over time, so paths not used became less and less important. A procedure such as this, iterated many times over a population of ants moving in parallel, will result in two things (a) convergence towards optimal solutions and (b) a space of pheromones. Clearly (a) is very important for all optimization problems. However, we will show that for real-world optimization of dynamic, uncertain, and adaptive problems (b) is of equal importance. Briefly the importance of the space of pheromones is

CONTINUED ON PAGE.16



Nonlinear Dynamical Bookshelf

Left: "Fast and Slow Dynamics"

NEW BOOK ANNOUNCEMENTS

Arnol'd, V. I. (Ed.). (1999). Bifurcation theory and catastrophe theory. New York: Springer-Verlag, 280 p. Bifurcation theory and catastrophe theory are two well-known areas within the field of dynamical systems. The authors of this book have given a masterly exposition of these two theories with penetrating thought --*Publisher's remarks.*

Basar, E. (2000). Brain functions and oscillations II: Integrative brain function, neurophysiology, and cognitive processes. New York: Springer-Verlag. This is the second of a 2-volume set; vol. I was released in 1999. "This book establishes a brain theory based on neural oscillations with a temporal relation to a well-defined event. New Findings about oscillations at the cellular level show striking parallels with EEG and

MEG measurements. The authors embrace both the level of single neurons and that of the brain as a whole, showing how this approach advances our knowledge about the functional significance of the brain's electrical activity." -- *Back Cover.* Sixteen out of 33 chapters were written by E. Basar; others are variously co-authored with A. Ademoglu, C. Basar-Eroglu, T. Bullock, T. Demiralp, R. Parnefjord, O. Sakowitz, M. Schurmann, A. Schutt.

Bausch, K. (2000). The emerging consensus in social systems theory. Boston: Kluwer. This an up to date compendium on the premier thinking on general systems theories. Contents. Introduction: The emerging Systemic paradigm, Five social contexts; 1. The historical context. 2. Physical and life evolution: Kauffman, Laszlo, Prigogine, Eigen, What is life? Complementary theories, Dancing choreographing, Component systems, Maturana and Varela, Emergence of the observer. 3. Social and cognitive evolution. 4. The Habermas/Luhmann debate. 5. Habermas since the debate. 6. Differentiation theory. 7. Soft systems theory: Churchman, Checkland, Fuenmayor. 8. Critical systems theory: Jackson, Ulrich, Flood. 9. Banathy. 10. Warfield. 11. Luhmann (1) Meaning, subject, and communication. 12. Luhmann (2): Systems and environments. 13. Luhmann (3) Structure and time. 14. Luhmann (4) Contradiction and self-reference. 15. Kamps. 16. Goertzel. 17. Metaphors and maps: Cognitive maps, Artigiana, Treumann, Allen and Lesser, Laszlo, Masulli, Kamps, Campanella. 18. The practice and ethics of design. 19. Structure of the social world. 20. Communication. 21.

Cognition. 22. Epistemology. 23: Conclusion. References. Index.

Chen, (1999). Controlling chaos and bifurcations in engineering systems. Boca Raton, FL: CRC Press. US \$89.95. 688pp. ISBN 0-8493-0579-9. So far as I can deduce from the summaries of the contents, this book might be useful because it starts with a treatment of constructing dynamics from time series, but the total coverage is indeed prodigious. -RAMG

Comfort, L. K. (2000). Shared risk: Complex systems in seismic response. New York & Amsterdam: Pergamon, div. Elsevier. *Shared Risk* is an unparalleled study of how communities at risk respond to major hazards. This major new book explores the elastic boundary between structure and flexibility that enables modern organizations to function effectively under uncertain, dynamic conditions. Through a comprehensive analysis of earthquake case studies, Louise Comfort shows how communities and organizations cope with dynamic and unpredicted events. Drawing upon the concept of shared risk, she examines the

self-organizing processes by which communities act in their own interest to mitigate and reduce risk. Placing shared risk within a theoretical framework consistent with disaster situations, Professor Comfort presents policy-relevant analysis of disaster response systems. The practical, theoretical and methodological issues involved in the study of shared risk are addressed in the first part of the book which also sets this problem in the global context of seismic risk. This is followed by comparative analysis of eleven different case studies of rapidly evolving response systems following earthquakes. The final part of the volume compares different classes of response systems and presents a preliminary model for a sociotechnical system to mitigate seismic risk and facilitate response when earthquakes occur. Examining the relationship between information, action and theory and theories of organizational adaptation, this book will be applicable to a wide range of organizational change efforts, as well as being a strong and distinctive contribution to the literature on seismic policy and crisis management. -- *Publisher's blurb*

CONTENTS: Part I: Shared Risk in Theory: Context, Concept and Methods of Analysis. Shared risk and self-organizing processes. Models of transition in complex, dynamic environments. Measuring change in nonlinear social systems. The 'Edge of Chaos': creative response in dynamic environments. **Part II: Shared Risk in Practice: The Evolution of Response Systems.** Nonadaptive systems: San Salvador, Ecuador and Armenia. Emergent adaptive systems: Mexico City, Costa Rica, and Erzincan, Turkey. Operative adaptive systems: Whittier Narrows, California; Loma Prieta, California; and Maharashtra, India. Auto-adaptive systems: self organization or dysfunction in Northridge, California and Hanshin, Japan. **Part III: Future Strategies: Managing Risk in Complex, Adaptive Systems.** Adaptation to disaster: evolving response systems. Sociotechnical systems and the reduction of global risk.

Dietrich, E., & Markman, A. B. (Eds.). (2000). Cognitive dynamics: Conceptual and representational change in humans and machines. Mahwah, NJ: Lawrence Erlbaum Associates. "This book is based on the notion that, although new tools and approaches for understanding cognition are valuable, representational approaches do not need to be abandoned in the course of constructing new models and explanations. Rather, models that incorporate representation are quite compatible with the kinds of complex situations being modeled with the new methods. This volume illustrates the power of the explicitly representational approach -- labeled "cognitive dynamics" -- in original essays by prominent researchers in cognitive science. Each chapter explores some aspect of the dynamics of cognitive processing while still retaining representations as the centerpiece of the explanations of the key phenomena." -- *Back cover.* **FOUNDATIONS: E. Dietrich & A. B. Markman:** Cognitive dynamics: Computation and representation regained; **M. H. Bickhard:** Dynamic representing and representational dynamics; **J. J. Prinz & L. W. Barbalou:** Steering a course for embodied representation. **G. F. Marcus:** Two kinds of representation. **WORDS AND OBJECTS: R. E. Remez:** Speech spoken and represented; **C. Burgess & K. Lund:** The dynamics of meaning in memory; **J. E. Hummel:** Where view-based theories break down: The role of structure in human shape perception.

CONCEPTS, CONCEPT USE, AND CONCEPTUAL CHANGE. **R. L. Goldstone, M. Steyvers, J. Spencer-Smith, & A. Kersten:** Interactions between perceptual and conceptual learning. **K. J. Holyoak & J. E. Hummel:** The proper treatment of symbols in a connectionist architecture. **E. Dietrich:** Analogy and conceptual change, or you can't step into the same mind twice. **D. Gentner & P. Wolff:** Metaphor and knowledge change. **A. B. Markman, S. Zhang, & C. P. Moreau:** Representation and the construction of preferences.

Grigsby, J., & Stevens, D. (2000). Neurodynamics of personality. New York: Guilford Press. "Rather than adopting extant psychological theories of personality and grafting neuroscience onto them, the volume takes cognitive neuroscience and biology as its starting points. The first section establishes the conceptual underpinnings of the model. The authors present current theories of brain plasticity and the modularity of the brain's multiple memory systems. Subsequent chapters draw upon dynamic systems theory to trace how personality emerges from a vast array of hierarchically organized neural processes. Next, the book examines the contribution of biology to our understanding of such core psychological phenomena as self-representations, conscious and nonconscious functioning, behavioral self-regulation, and interpersonal relationships. The final chapter presents an integrative theory of the dynamics of stability and change in personality. Significant issues elucidated include the apparent stability of personality across time, why change does or does not occur, and what conditions are likely to facilitate or retard change. -- *Cover flap.*

Haller, G. (1999). Chaos near resonance. New York: Springer-Verlag. 448 pp. Resonances are widely studied in most areas of engineering and physics, but the approach remains mostly computational or experimental because even reduced models of resonant interactions are typically higher dimensionally and exhibit great complexity; therefore, they are inaccessible to textbook techniques from dynamical systems theory. [This is the] first systematic exposition of recent analytic results that can be used to understand and predict the global effect of resonances in phase space. The geometric methods discussed here enable one to identify complicated multi-time-scale solution sets and slow-fast chaos in physical problems. This self-contained monograph should be useful to mathematicians interested in the geometric theory of multi- and infinite-dimensional dynamical systems, as well as to the applied scientist who wishes to analyze resonances in physical problems. -- *Publisher's remarks.*

Heath, R. A. (2000). Nonlinear dynamics: Techniques and applications in psychology. Mahwah, NJ: Lawrence Erlbaum Associates. "Although nonlinear methods are being used more frequently in psychology, a comprehensive coverage of methods, theory, and applications, with a particular focus on human behavior, is needed. Between these covers, the reader is led through various procedures for linear and nonlinear time series analysis, including some novel procedures that allow subtle temporal aspects of human cognition to be detected. Analyses of reaction times, heart rate, psychomotor skills, decision making, and EEG are supplemented by a contemporary review of recent dynamical research in developmental psychology, psychopathology, and human cognitive processes. A consideration

of nonlinear dynamics assists our understanding of deep issues such as: Why is our short-term memory capacity limited? Why do chronic disorders and also cognitive development, process through stage-like transitions? Why do people make irrational decisions?" -- *Back Cover.*

CONTENTS: Dynamic psychology: An introduction to time series analysis. The analysis of nonstationary time series. Linear and nonlinear systems in psychology research. Nonlinear systems identification using a gradient-descent. Graphical representation of nonlinear dynamics. Quantitative indices of nonlinear dynamics. Noise reduction methods and hypothesis testing for nonlinear systems. Control of chaos and its psychological applications. Complexity theory and psychology. Applications of nonlinear techniques in psychology.

Kaiser, R. & Montaldi, J. (Eds.) (2000). *Peyresq lectures on nonlinear phenomena.* Singapore: World Scientific. US\$68.00. ISBN 981-02-4315-4.

Kaneko, K., & Ichiro, T. (2000). *Chaotic scenario of complex systems.* New York: Springer-Verlag. 273 pp. While carefully distinguishing between complexity, holism, randomness, incompleteness, non-determinism, and stochastic behavior, the authors show that, although many aspects of chaos have been phenomenologically understood, most of its defining principles are still difficult to grasp and formulate. Demonstrating that chaos escapes all traditional methods of description, the authors set out to find new methods to deal with this phenomenon and illustrate their constructive approach with many examples from physics, biology, and information technology. While maintaining a high level of rigor, and overly complicated mathematical apparatus is avoided in order to make this book accessible to a sufficiently large interdisciplinary readership. -- *Publisher's remarks.*

Korsch, H-J., & Jodl, H.-J. (1999). *Chaos: A program collection for the PC.* New York: Springer-Verlag. 311 pp. + CD-ROM. An outstanding collection of executable programs with introductory texts to chaos theory and its simulation. Many numerical experiments and suggestions for further study help the reader to become familiar with this fascinating topic. CD ROM is Windows 95 compatible. -- *Publisher's remarks.*

Lehnert, K., Elger, C. E. Arnold, J., & Grassberger, P. (2000). *Chaos in the Brain?* Singapore: World Scientific. ISBN 981-02-4222-0. US\$ 86.00 384 pp. hardbound. Importantly there is section on Detection of Deterministic Dynamics in Short Discrete Time Series which is a recurrent and central problem. -- RAMG

Loye, D. (2000). *Darwin's Lost Theory of Love: A Healing Vision for the New Century.* You can scroll through and view it in its entirety on www.iuniverse.com. A beautiful low cost edition can be ordered through this source and U.S. bookstores, but this book is most easily available worldwide through www.amazon.com and other internet booksellers. The astounding story covered in Part I -- including Darwin's discovery of what we know in chaos theory as "the butterfly effect" -- is of how and why the second half for Darwin's theory of evolution has

been lost to us for over 100 years. Part II provides a reconstruction of Darwin's humanistic, systems scientific, and witty and remarkably engaging completing half in page after page long ignored in both his private notebooks and published writings. Here Darwin specifically rejects the disastrous picture we have been given of human evolution by the prevailing so-called Darwinian paradigm. Rather than being "naked apes" driven by "survival of the fittest," "selfish genes," and a "blind watchmaker" in a world devoid of meaning or direction, Darwin tells us the prime drivers for human evolution are such obvious things to most of us as love, cooperation, reason, and education. He finds both meaning and direction to our lives through his major emphasis on moral evolution. Part III compares the "old" theory with the "new" theory and looks at the great new hope for science and for humanity that Darwin's lost vision offers the 21st century. -D. Loye.

Mandelbrot, B. B. (1997). *Fractals and scaling in finance.* New York: Springer-Verlag. 551 pp. This is a collection of BBM's article-sized contributions to the topic. Papers are grouped into five categories: Nonmathematical presentations. Mathematical presentations. Personal incomes and firm sizes. The M 1963 model of price variation. Beyond the M 1963 model.

Mandelbrot, B. B. (1999). *Multifractals and 1/f noise: Wild self-affinity in physics.* New York: Springer-Verlag. 442 pp. Ian Stewart described the book as "a typically Mandelbrotian mix of reprinted papers, commentary, unpublished results and new work hot off the press." Papers are organized into four groups: Introductions and short pieces. Unifractal errors and Levy dusts. Intermittent 1/f noises and conditioned random processes. Turbulence and multifractal measures.

Portugali, J. (2000). *Self-organization and the city.* New York: Springer-Verlag. 352 pp. "This book integrates the theories of complex self-organizing systems with the rich body of discourse and literature developed in what might be called "social theory of cities and urbanism." This is done in several ways: First, by an explicit comparative discussion of the two theoretical bodies in conjunction with some classical issues such as the nature of cities., the urban process, urban and regional planning, decision making, and the urban revolution(s). Second by developing a new family of heuristic models and using them to study the issue of socio-cultural spatial reaggregation in cities. We term these models FACS models (Free Agents in a Cellular Space). Third, by developing a synergetic pattern recognition theory of cities and of decision-making in the context of city planning. -- *Back cover.*

Rosser, J. B. Jr. (2000). *From catastrophe to chaos: A general theory of economic discontinuities. (2nd edition). Vol. 1: Mathematics, microeconomics, macroeconomics, and finance.* Boston Kluwer. 309 pp. Rosser's landmark opus of 1991 is reincarnating into a three volume set. The material in Volume 1 corresponds to the topics of the first eight chapters from the previous edition. It "presents an unusual perspective on economics and economic analysis. Current economic theory largely depends upon assuming that the world is fundamentally continuous. However, an increasing amount of economic research has been done using approaches that allow for discontinuities such as catastrophe theory, synergetics, and fractal

geometry. The spread of such approaches across a variety of disciplines of thought has constituted a virtual intellectual revolution in recent years." -- *Back Cover*. Volume 2, which should be appearing shortly, will cover topics in urban development and spatial economics. Volume 3 will pertain to the international economy and economics in transition.

Sornetto, D. (2000). Critical phenomena in natural sciences chaos, fractals, self-organization and disorder: Concepts and tools. Springer-Verlag, July 2000. ISBN 3-540-67462-4

Coming Soon from NDPLS

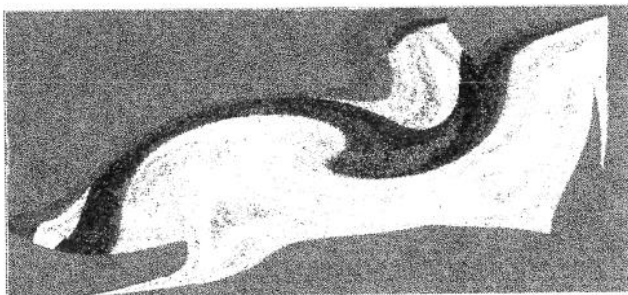
The following articles have been accepted for publication. This list continues from the May, 2000 issue of the *Newsletter*.

- Dushanova, J., & Popivanov, D. Nonlinear dynamics estimation of EEG signals accompanying self-paced goal-directed movements.
- Goldstein, J. Mathematics of philosophy or philosophy of mathematics?
- Gregson, R. A. M. Responses to constrained stimulus sequences in nonlinear psychophysics.
- Koopmans, M. From double bind to N-bind: Toward a new theory of schizophrenia and family interaction.
- Rosser, J. B., Jr., Rosser, M. V., Guastello, S. J., & Bond, R. W. Jr. Chaotic hysteresis and systemic economic transformation: Soviet investment patterns.
- Stamovlasis, D., & Tsapralis, G. An application of complexity theory to an information processing model in science education.

A SPECIAL ISSUE entitled, "Fundamental Problems in Biocomplexity" is scheduled to appear in the January, 2001 issue. Special issues for Evolutionary Economics and Creative Theory Papers are currently in preparation.

What am I looking at?

The photograph that appeared in the May, 2000 issue of the *Newsletter*, "SCTPLS Conferees do lunch at Miss Katie's Diner, Milwaukee, WI, 1997" was taken by Walter Eiden. The photograph that appears in this issue of the *Newsletter*, "Fast and Slow Dynamics" was taken by Andrea Guastello. Fractals this issue were generated by J. C. Sprott, "Fractal of the Day Website".



MAD CITY PREVIEW

Lodging for the next SCTPLS conference in Madison Wisconsin is being arranged through the Howard Johnson's Plaza Hotel. They made us an offer we couldn't refuse that includes: King sized beds (or two queens), swimming pool, data ports, in-room coffee makers, nice atmosphere all around, Society-friendly rates. Watch the next Newsletters for future developments.

Complexity Digest, Continued from p. 12

the following: if we change the problem with some local modification, like to reflect a change in demand, a network traffic congestion, a breakdown/delay or a glitch in a manufacturing plant, the information contained in the pheromones is still mostly relevant to the new problem. Hence it is possible to rapidly discover a new optimal solution to the new problem. More traditional optimization procedures have to start over from scratch on the new problem. This is a great advantage, considering that most of these optimization problems are NP (non polynomial) complete, and known to be intrinsically hard in terms of computation times.

The ants-algorithm developed at BIOS has a number of enhancements with respect to the original version in [1]. On one hand, the search of solutions has a "reinforcing" component by boosting good solutions found so far, an "exploring" component by promoting more random exploration. To allow ants to make mistakes/arbitrary choices, at a given level, is an essential condition for a) incentive exploration, so when the population has found a good solution, keep searching for better, b) more rapidly discovering the existence of new optimal solutions when changes occurred in the system. Using these enhancements, the process of learning is constant and faster, and with the proper choice of the parameter set the optimal solutions are found within few hundred iterations. We found that ants devote their resources very effectively to exploring a variety of high fitness solutions, while it is crucial to maintain the balance between learning and reinforcement.

At Bios Group ants-algorithms have been applied to the following problems:

1. Technology Graphs Searches of manufacturing processes,
2. classic Traveling Salesman Problem,
3. some variation of the TSP, including having obstacles,
4. the Multi TSP, where there are multiple traveling salesmen and they have a set of different skills, and cities/locations have particular need of some kind of service, so a partition or assignment of traveling salesman has to be done maximizing the match between skills and need of service.
5. Flow Shop Scheduling Problem
6. Multi Stage Flow Shop Scheduling Problem (this work has been referenced in the Scientific American, March 2000).
 - o Ants Algorithms, Alberto V. Donati, Bios Group <<http://www.biosgroup.com/>> , 10-Sept-2000
 - o The Ant System: Optimization by a Colony of Cooperating Agents, M. Dorigo, V Maniezzo, A. Colorni, IEEE transactions on Systems, Man, and Cybernetics, part-B, vol.26, no.1, pp.1-13.
 - o Contributed by Vlada Kitsello <<mailto:vlada.kitsello@biosgroup.com>> , Bios Group <<http://www.biosgroup.com/>>

Society for Chaos Theory in Psychology & Life Sciences

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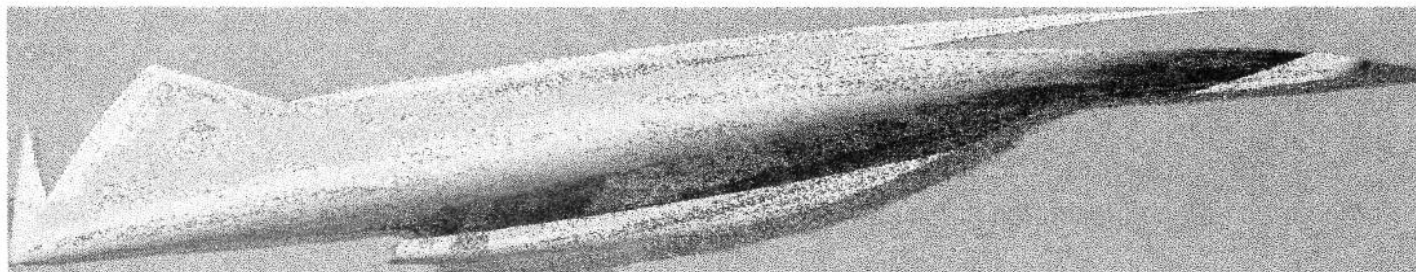
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President-Elect Candidates' Brief Biography, Election of Fall, 2000.

Please use the Ballot on Page 19.

KEVIN DOOLEY

Prof. Kevin Dooley has a joint appointment with the Department of Industrial Engineering and the Department of Management at Arizona State University. He was previously at the University of Minnesota, where he was director of the Industrial Engineering program. He has a Ph.D. in Mechanical Engineering from the University of Illinois, in 1987. Prof. Dooley has been an active member of SCTPLS (almost) since its inception, and is also on the editorial board of *Nonlinear Dynamics, Psychology, & the Life Sciences*. Prof. Dooley's interests in complexity primarily lie in applying the quantitative and qualitative concepts and techniques of nonlinear dynamics and complexity to business organizations. Recently he has been working with the VHA health care organization, helping doctors, nurses, and hospital administrators learn and apply complexity concepts to managerial practice. He is also involved in projects that are applying complexity to the study of conversations and other forms of discourse (<http://locks.asu.edu>). Other research interests lie in the areas of quality management, innovation & new product development, and knowledge management. He is on the editorial boards of *Journal of Operations Management*, *Quality Management Journal*, *Journal of Quality Management*, *Production and Operations Management*, and *Emergence*.

He writes, "I think SCTPLS is in relatively good shape and part of my responsibility would be to simply keep the engine running smoothly. On the membership side, I would like to try to increase our membership roles in some of our secondary disciplines (e.g. organizational behavior, sociology, political science, economics). The main points of influence for the president of the society are the conference and the newsletter. I would like the conference to feature more "panels" than it has in the past, focusing on increasing multi-person dialogue; I would also like to design a session whereby attendees could identify key issues for research in the upcoming year, and then have a special session on that topic in the conference's following year, to see how far we have progressed. I think Bob has done a great job with the *Newsletter* and I would attempt to continue to solicit creative pieces, especially around methodological issues.

TIM HASLETT

Tim Haslett is a Senior Lecturer in the Department of Management at Monash University in Australia. His PhD was in the field of Local Rule theory, a subject on which he has presented a number of papers at the Society's conferences. His research interests are in applications of nonlinear theory to the business environment. He combines his academic work with consulting work in the areas of Systems Dynamics Modeling and Complex Adaptive Systems theory.

He has held a wide range of positions with the University sector including membership of the governing council as a staff representative, Head of Department, Director of Post graduate teaching Programs and President of the Staff Union.

He writes, "I was pleased to accept nomination for the position of President of the Society and would be happy to serve in that capacity in the future. At present I would wish to indicate my strong support for Kevin Dooley as the next President and would look forward to being able to support him in that role in the future."

Vote

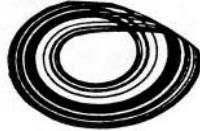
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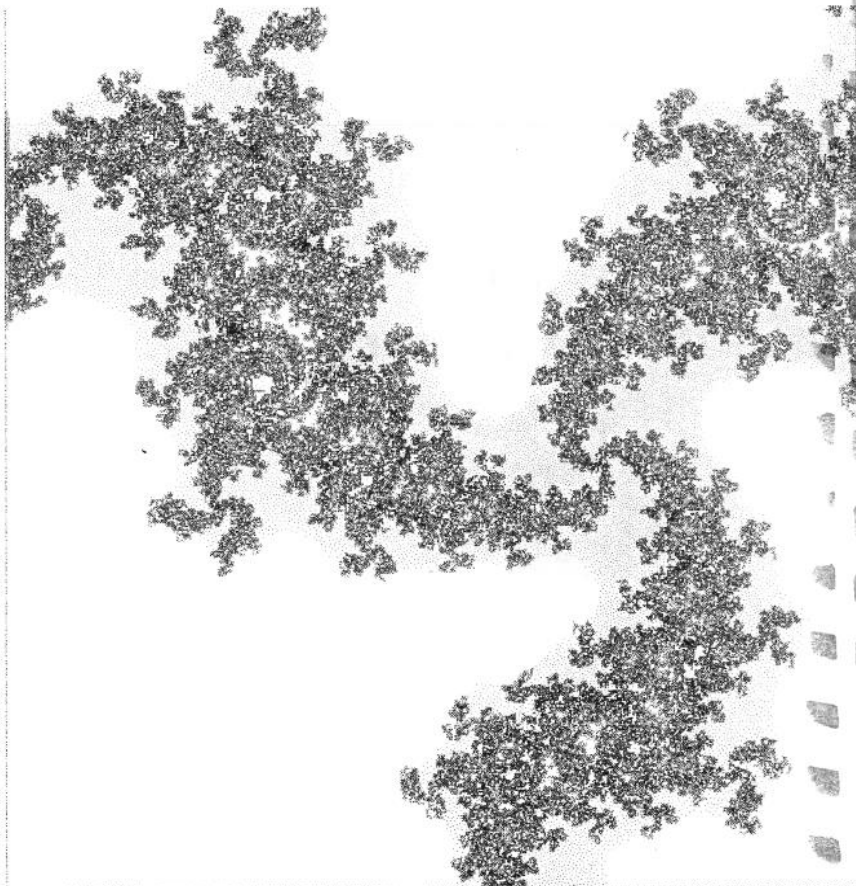
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