



## Society for Chaos Theory in Psychology & Life Sciences NEWSLETTER

Vol. 5 No. 4, July 1998

William Sulis, MD PhD President & Editor

### EDITORIAL from Bill Sulis

It is with a sense of surprise that I find myself writing the last editorial as President of the Society. It is difficult to believe that two years have passed already. These have, I think, been good years for our Society. Thanks to the tireless efforts of Steve Guastello, our journal, *Nonlinear Dynamics, Psychology, and Life Science* is thriving. We are now into our second year of publication and have begun to establish ourselves as a leader in the application of nonlinear methodology to the study of psychology, economics and life science in general. The first of the abstracting services have begun to take notice and more, I am certain, will follow. This should help to solidify our presence on the academic scene.

Our reciprocity arrangement with the German Society for Complex Systems is now complete and we look forward to welcoming our new members in the coming year. Our relations with the Russian Synergetics Society and the Italian Society for Chaos and Complexity remain strong. We hope for a strong showing from our membership in October when all of our reciprocity partners will be hosting their annual conferences (see below). We have a cordial relationship with the New England Complex Systems Institute and were a co-sponsor of their conference last year.

We still need to expand our membership domestically, and to enhance our role in the education of researchers in nonlinear methodology. We also need to enhance our profile in the research community and to this end I would challenge those who follow me to develop and promote a series of focussed workshops dealing with various problems and issues in the application of nonlinear dynamics to both psychology and economics in particular. These workshops could focus upon methodology, clinical practice, identify salient questions for future study, or present an in-depth study of a specialized branch of current research. I would suggest that they be held in different locales across North America to build a sense of community and to advertise our expertise to the broader scientific community. We need to let people know who we are, and what we can offer. To this, I call on innovative, imaginative, and creative volunteers to step forward to fill the position of Director of Education, which I am creating, and to spearhead this initiative.

This has been a year of change for those dedicated people who make this Society work. Scott Clair has taken on the position of Director of Publications. Keith Clayton, who has served the Society admirably for several years as our Secretary, has resigned from this essential though unsung job. His will be big shoes to fill. I will continue for at least another year as Director of International Relations. A big round of thanks are

due to Elliott Middleton, who has volunteered to serve as Master of our Web site. We need nominations for the office of President, which are to be presented at the business meeting which is held during the Annual conference, as well as volunteers for Secretary, and Director of Research and Education. A prominent person to spearhead membership recruitment would also make a worthy addition to our fold. Interested individuals should contact either Bob Porter or myself.

All in all, I think that our Society is strong, and I look forward to passing the reigns of chaos to Bob Porter, who takes over as President shortly after the annual meeting. Having seen him in action at the recent APS summit in Santa Barbara, I know that the Society is in good hands and I encourage all of you to lend him your full support. May the coming year be our best ever! As for me, I am going to take the next year off to write my book.

### SOCIETY EXECUTIVES

PRESIDENT - Bob Porter

PAST PRESIDENT - Bill Sulis

PRESIDENT-ELECT - *Vacant; nominations are made at the  
Business Meeting at the Annual Conference*

TREASURER - Steve Guastello

SECRETARY - *Vacant*

DIR. INTERNATIONAL RELATIONS - Bill Sulis

DIR. PUBLICATIONS - Scott Clair

DIR. RESEARCH AND EDUCATION - *Vacant*

WEB MASTER - Elliott Middleton

### INTERNATIONAL AFFILIATES

GERMAN SOCIETY FOR COMPLEX SYSTEMS AND  
NONLINEAR DYNAMICS - Klaus Mainzer, *President*.

ITALIAN SOCIETY FOR CHAOS AND COMPLEXITY

Franco Orsucci, *President*; Tullio Minelli, *Pres-elect*.

RUSSIAN SYNERGETICS SOCIETY

- Irina Trofimova, *Head*



## OCTOBERFEST

October is shaping up to be a busy month for the Society. From October 11-13, the Russian Synergetics Society, our branch in Russia, will be hosting a two day conference and workshop. This will feature invited speakers from Russia, Europe, and North America and there will be opportunities to present submitted papers as well. The conference will focus upon recent developments in the applications of synergetic methods to psychology and the life sciences. For further information contact Dr. Irina Trofimova at [ira@church.dcss.mcmaster.ca](mailto:ira@church.dcss.mcmaster.ca).

The Herbstakademie will be hosting their Seventh conference at the Kloster Seon, near Munich, Germany, from October 13 to 16. Oral papers and posters are welcome. This conference brings together researchers in Europe interested in the application of synergetic methods to psychiatry, autonomous agents research and psychology, as well as to the social and life sciences. For further information contact Gunter Schiepek, Forschungsinstitut für Systemwissenschaften, Sandstrasse 41, D-80335 München. Tel (+49) 89 54212915, e-mail [uf341am@sunmail.lrz.muenchen.de](mailto:uf341am@sunmail.lrz.muenchen.de).

The Italian Society for Chaos and Complexity will be hosting its annual conference in Rome from October 21-23. This conference brings together researchers from southern Europe involved in the application of nonlinear dynamics to psychiatry, psychology, and the life sciences. For further information, contact Franco Orsucci at [SICC@earthling.it](mailto:SICC@earthling.it).

Finally the New England Complex Systems Institute will be hosting its annual conference in Boston from October 25-30. For more information contact Yaneer Bar-Yam at [yaneer@nesci.org](mailto:yaneer@nesci.org).

Hopefully our members will contribute actively to these events as they have done in the past and help to keep us at the forefront of this research.

## CHAOS IN TORONTO

The Rotman School of Management at the University of Toronto was host, from April 3-5, of the NESCI conference "Managing the Complex". 75 people were in attendance and several Society members participated. The conference began with an unusual telephone presentation on applications of the NK model to Organizations, by Stuart Kauffman, who had been unable to attend in person. The conference got under way on Saturday with an historical overview of the concept of Emergence by Jeff Goldstein. It is very beneficial to realize that the idea of emergence has a long history and that those of us working actively with this idea should really step back and review what has gone before lest in our arrogance and exuberance we find ourselves simply reinventing the wheel instead of antigravity travel. Johan Roos presented on "Knowledge landscapes", using the landscape metaphor as a vehicle for helping managers understand their perception of their relationship to their organization and its relationship to the larger economic community. Dinner that evening was followed by a presentation by Bo Peabody, a young Internet entrepreneur who demonstrated the value of self organization and adaptation in organizations with a story about the founding and growth of his own company. On Sunday, Max Boisot presented "Complexity in the

Information Space". Most interesting here was his description of various socioeconomic systems in terms of descriptive parameters related to information structure and dispersal. This provided a novel dynamical portrait of economic systems that I had not considered before. He has a book on this topic coming out in the near future and I think it would be well worth reading.

In addition to the oral presentations there were many posters and Society members present and past contributed strongly here. There were presentations by Irina Trofimova, Glenda Eoyang, Ben Goertzel, Pekka Aula, Bill Sulis, Lynda Woodman Keen.

## YOUR SOCIETY AND THE WORLD

### A MEETING OF THE MINDS

Robert J. Porter, President-Elect, Society for Chaos Theory in Psychology and Life Sciences

Your President Bill Sulis and I joined the leaders of nearly 100 psychological societies in Santa Barbara, California, for three days of meetings at the end of April, 1998. The objective of this *Summit of Psychological Science Societies*, sponsored by APS, APA, and various governmental and research institutes, was to gain the broadest possible perspective on the accomplishments of, and prospects for, psychology in the next century. It was hoped that this summit would be as productive as two similar summits held in 1990 and 1992. Those resulted in a series of white papers, referred to as the Human Capital Initiative. These white papers provided perspectives and goals for progress in a variety of psychological research and application areas, and influenced, for example, congressional funding decisions and research initiatives of institutes at NIH. The results of this recent summit may have comparable impact but, perhaps, in a different way.

In the context of the early 1990's, the first "summiters" were dealing with a crises in the funding of psychological science, conflicts between "research" and "clinical" camps, and the emergence of an increased focus on the biology of the nervous system with the threatened neglect of behavioral aspects. The product of their work was the highlighting of ways in which psychological science, in its many facets, could be applied to the real problems of individuals (e.g., aging) and society (e.g., violence).

The context of the 1998 meeting was quite different. I saw two major themes emerge. The first concerned the (re)definition of what psychology is and what psychologists do. Illustrative of this theme were discussions of the many different roles psychologists play in interdisciplinary work. As examples, psychologists may be statistical consultants or survey designers; they may study synapses with biochemists or the decisions of international financiers with economists; they may join psychiatrists, social workers, educators, or forensic specialists in the diagnosis and treatment of psychopathology; or they may work with physicians, nurses, epidemiologists, and pathologists, providing insight into the etiology and treatment of medical illnesses. There was concern expressed that, as a result of this diversity, psychology might lose its "identity" as a profession. "What, if anything," someone asked, "is the common feature of people who call themselves psychologists?"

## STREET SMARTS PHASE TRANSITIONS

A second theme concerned the future of psychology, expressed both in terms of the aging of its methods and perspectives, and in the concern for training of future psychologists. Frequently commented upon was the increasing inadequacy of the traditional statistical and mathematical training of psychologists. Researchers and clinicians both voiced concern about this inadequacy, in terms of interacting with other professionals, as well as in terms of how current training may not prepare psychologists for the increasingly complex conceptualizations of psychological processes.

As you may imagine, this second theme was particularly interesting to me as a nonlinear systems scientist. We, of course, believe our science to be in its infancy and can envision rapid development of nonlinear science in psychology as well as in other life sciences. What is particularly interesting to me is that this concern was expressed by people who do not take a nonlinear systems approach to their work but who, apparently, believe that the old psych-stat is not up to dealing with emerging complexities. The discussions reminded me of those a Decade-of-the-Brain-ago concerning the absence of sufficient training of psychologists in neuroscience. That discipline-wide concern certainly changed the face of much of psychology. Perhaps a Decade of Complexity is in the offing.

It was, however, the suggested answers to the question about psychology's potential loss of identity that surprised and delighted me the most about the meeting. I will set the stage by reminding you that this meeting had representatives from a very wide range of psychological research areas, as well as a smattering of clinical and practice areas. In my personal history, this type of mix has often lead to polarization along the dimension of "hard" and "soft" psychology. This polarization never emerged. In fact, I could not find a trace of it in either personal or public comments. This surprising (to me) observation was compounded by my astonishment at the popularity of one proposal for the "common feature" of psychologists. The proposal was made by Plenary Speaker Alan Leshner, Director of the National Institute on Drug Abuse, and the highest ranking psychologist in the government. In his address, Dr. Leshner reviewed many of the findings regarding brain function and its relation to (especially) addictive behavior. His conclusion, however, was that something very important (and essential) was missing from any brain-function based account of human behavior. He suggested that the missing component be re-emphasized in our discipline by proposing that we designate the first decade of the new millennium the "Decade of the Mind." I watched some nearby neuroscientists eyes for anxiety-induced flicker but noted nary a sign. I wonder if psychologists may indeed rediscover their identity by putting the "psyche" back in psychology!

Prof. Elizebeth Loftus, President of the APS, suggested a tongue-in-cheek headline for the press release to be issued at the end of the summit: "Psychologists Predict the Future." As I suggested to Prof. Loftus, after the meeting, the future of psychology is "a complex business and all in the mind." I meant, of course, a complex, nonlinear, and sometimes chaotic, business. On to a Millenium of Complexity!

Van Eenwyck (see last *Newsletter*) chose well when he asked for more information concerning the concept of the phase transitions. Those who read the general literature on chaos and complexity will find endless discussions about the idea of the bifurcation. To some, this concept has acquired almost mystical proportion and one finds it invoked in the most diverse of circumstances to explain the experience of change in the natural world. I suspect that this idea has captured the attention of so many because it is so accessible. After all, it is not too great a leap to go from one to two. However as an explanation of change, it is quite limited. Some of the most common changes in nature do not arise from bifurcations, but instead arise through changes of phase.

It is now spring (in the Northern Hemisphere) and I would imagine that at least 75% of you readers have had the pleasure of a winter day. You have likely observed that even on cold, but sunny days, there is a tendency for the level of the snow to disappear. It does not melt, it merely fades away. Where does it go? Simply, crystals of snow on the surface of the pile break apart, coverting themselves in water vapour. The transition occurs at the surface, is abrupt, and discontinuous. This stands in contrast to the behavior of the same pile of snow in early spring. Now one notices that the surface of the pile begins to wet, and a small puddle begins to grow around its base. At the temperature rises, the pile continues to shrink in size while the puddle steadily grows. Sometimes one notices, especially at the freezing point, that one can have piles and puddles of all sizes and these will co-exist for long periods of time. Both of these are examples of phase transitions, in which a substance changes from one form having particular properties, to a different form possessing a new set of properties. The first case, sublimation, is a solid-vapor phase transition while the second, melting, is a solid-liquid transition. Both are examples of so-called first order phase transitions, since the transition occurs piecewise.

Another type of phase transition occurs when a ferromagnet is heated. Below a certain temperature called the Curie temperature, the magnet will exhibit a magnetic field. As the temperature of the magnet is raised, the strength of this field will slowly diminish until, at the Curie temperature, the magnetic field will vanish and it will never reappear so long as the temperature remains above the Curie temperature. This particular second order phase transition is termed an order-disorder transition since it involves a transition between the highly ordered ferromagnetic state, in which all of the atoms have their local magnet fields ordered in the same direction, to the disordered state, in which these local magnetic fields are arranged more or less at random. Those of you possessing laptop computers with liquid crystal screen witness a different kind of order-disorder transition occurring as the crystals in the liquid crystal mixture change their orientation in response to the stimulation of an electric field. The result is the color change observed on the screen. The Curie temperature is called the critical temperature. The magnetization, which serves to track the transition is termed an order parameter, since it takes non-zero values below the transition and takes only a zero value above the transition.

None of these transitions can be considered as a 'bifurcation' in some dynamical system. Instead they involve a shift from one distinct dynamical regime to another as a function of some parameter. Mood bears many of the features of a phase. A mood is a long lasting state, associated with a rich dynamics, which is distinct from one mood to another. Moreover, mood varies as a function of many diverse parameters, so that there are many 'transitions'.

Most phase transitions occur at a specific value of the external parameter. This value is termed a critical value. About the critical value, many measurable physical quantities undergo characteristic changes, most often demonstrating scaling in the form of a power law. Furthermore, many of values exhibit a singularity at the critical point. By this I mean that the slope of the curve representing the physical quantity as a function of the critical parameter becomes nondifferentiable, i.e. singular, at the critical value. It turns out that, at least in the case of second order phase transitions, there is a generic theory available which shows how this critical behavior will occur. Systems possessing second order phase transitions subdivide into so-called universality classes, which depend more or less solely upon the mathematical character (eg. scalar, vector, tensor) and spatial dimension of the order parameter which describes the transition. Systems which possess the same formal type of order parameter lie within the same universality class, and therefore possess the same kind of singularity at the critical point, regardless of the nature of the processes which give rise to the transition in the first place. This is a far reaching result since it allows one to use models which possess similar properties to a natural system to provide insight into some of the behaviors of that system, even though the nature of the local interaction may be quite different.

The phase transitions that I have described above are all equilibrium phase transitions, that is, they all refer to systems which have been allowed to come to some equilibrium relationship with their environment. In the case of melting for example, the heating process is carried out very slowly so that the system exhibits its equilibrium or long term behavior at each recorder temperature. In this way, fluctuations are minimized. One can also observe transitions in nonequilibrium systems, but the problem is much more subtle. Since, in a nonequilibrium system, the behavior of the system fluctuates, there is no single average or steady state to which we can refer when speaking about a transition. Instead one looks to the nature of the probability distribution which describes the overall behavior of the system. In a so-called statistical phase transition, the parameter value is set and the system is observed, generating a (hopefully) stationary probability distribution over its set of states. As the parameter is varied, this distribution too varies. A simple example involves collective decision making in an ant colony. Given two paths from which to choose in order to travel from the colony to a food source, the ants will initially distribute themselves in a more or less uniform manner between the two paths. Over time however, the distribution will shift in favor of one path, until, eventually, most of the probability will be concentrated on this one path. Since the system is constantly in flux, a single observation will generally not suffice to detect a stochastic phase. Instead one must make repeated observations over time and look for structure in the resulting probability distribution. Order parameters can be found for statistical phase transitions just as for ordinary transitions, and a critical point

theory developed though such a theory is less well pursued than that for more ordinary transitions. It is important to note however that statistical phase transitions are far more common than people think, and likely underlie many of the more difficult concepts in psychology such as mood, and temperament.

For more detailed information about these topics, the reader might check out M. Zemansky, *Heat and Thermodynamics*, McGraw Hill, 1968 or Horsthemke and Lefever, *Noise Induced Transitions*, Springer-Verlag, 1992.

## BOOK REVIEW

**Dynamics of Complex Systems, by Yaneer Bar-Yam  
Addison-Wesley, Reading, MA 1997  
xvi + 848. ISBN 0-201-55748-7**

The present work by Bar-Yam fills a much needed gap in the literature of complex systems, namely, a textbook suitable for the teaching of novices to the field. Bar-Yam succeeds in doing so with a minimum of mathematical rigor, extensive discussion and exploration of eminently relevant problems, and a remarkable breadth of topics. Most useful is his attention to subjects drawn from outside of the confines of physics, making the book accessible to a much wider audience, especially those within the social sciences and humanities.

The introductory sections are by far the most difficult to master, but benefit from the inclusion of many problems to assist the student in consolidating their understanding of the material. These sections are the most mathematical and do draw heavily upon examples from the physical sciences. This is unfortunate, though understandable, but it does demand a great deal of patient effort from the student. Nevertheless, the student who perseveres will be rewarded in the long run. These introductory chapters cover such topics as: iterated maps, deterministic and stochastic modeling, thermodynamics, spin glasses, cellular automata, statistical fields, computer simulation techniques, information, computation, and fractality. The discussion is thorough and these sections, totalling almost 300 pages by themselves, could provide the material for an introductory course on mathematical methods for complex systems theory. The mathematics used is accessible to any student with a basic background in calculus and linear algebra but as the examples are mostly from physics, the social and life science major is likely going to find themselves struggling to develop an intuitive grasp of the material. Yet that is clearly the major audience towards whom this book is directed. This section would definitely require supplementation by tutorial material.

In the next section Bar-Yam discusses neural networks. He provides a thorough introduction to the Hopfield style neural network, which is a simple extension of the spin glass models so popular in physics. These models receive much attention in the journal *Network: Computation in Neural Systems*, but are less widely embraced within the more psychologically oriented literature on account of their biological naivety. Bar-Yam attempts to correct for this problem through a discussion of subdivided networks but the arguments will seem rather weak to anyone who has a knowledge of neurophysiology. He fails to discuss sparse networks and temporal networks which have been attempted to render these models more plausible. My major

with this section though is the lack of attention paid to the work of Stephen Grossberg. Grossberg has been developing sophisticated neural network models since the early 1970's. His models are informed by a thorough attention to both neurophysiological and psychological research and have been widely embraced by both the psychological and engineering communities, precisely because of their explanatory and predictive power. I suspect that the omission is due to the bias towards models of complex systems which are rooted in physics, to which the Hopfield models are kin. However in a book directed towards students of psychology and the social sciences I find it a serious historical and scientific omission.

Bar-Yam applies these models to explain a variety of psychological processes. The models presented will, I am sure, seem overly simplistic to students of psychology and the discussion of background material reflects a lack of experience with the psychological literature, again, I think, a serious shortcoming. In using this for teaching I would highly recommend supplementing the material with the work of Grossberg, especially a discussion of his ART architecture. I think these two chapters may be useful for stimulating discussion but they certainly could not serve as the final word on the application of complex systems theory to psychology. I suspect that the non psychologist may be easily misled by the apparent simplicity of the explanations offered and this would be most unfortunate.

The next two sections on Protein Folding are well written, but likely will appeal to a rather limited audience. The first chapter on Life, in fact, says little about life per se, but does offer a thorough exploration of the Kauffman landscape model of evolution. There is very little formal here, apart from a fairly standard discussion of predator-prey models. This chapter could well be supplemented by a reading of Stuart Kauffman's *Order Out Of Chaos*. The second chapter on Life provides a discussion of various mechanisms of pattern formation and is quite accessible. I think that the use of the heading, Life, might be overstating things just a little. Still, this section was an enjoyable read.

He ends with two chapters on Human Civilization. The first again seems to be mis-titled, since it seems to provide a rather detailed discussion of the varied definitions of complexity being discussed in the theoretical literature. In this Bar-Yam does an excellent job. However he undermines himself somewhat by extending his reach into theology and metaphysics. I found the section on the complexity of the human soul both trivial and irritating. The second chapter provides a metaphorical discussion of the application of complexity theory to the study of society. I found this to be interesting and a good setting for stimulating discussion. However I thought that he again overstates when he suggests that having finished this book, the reader will find themselves to be an expert in the field of complex systems theory. I think that the reader will have received a clear and cogent introduction to the literature on complex systems, but much work lies ahead before they should consider themselves as experts. There is simply too much metaphor and too little formal substance here to really satisfy. I felt as though I had sampled a delightful assortment of appetizers and now longed for the main course.

Still, in writing the first textbook to embrace the very broad field of complex systems theory, I think that Bar-Yam has

done a laudable job and has set a high standard indeed for those who follow in his footsteps. This is certainly a text that I can recommend highly for an introductory course.

## Publishing opportunity for Complexity Researchers

### Encyclopedia of Life Support Systems

The growing recognition of the importance of complexity as a field of study is evidenced by its inclusion in a major global research project jointly lead by UNESCO and EOLSS (Encyclopedia of Life Support Systems) publishers. The goal of this project is the production of an encyclopedic volume examining the future of life support systems on the planet. The impetus for this project stems from the concern for a sustainable future developed throughout the many UN earth summits and mini summits during the 1990s. The International Editorial Council providing advise and expertise on this project includes Ilya Prigogine and 13 other Nobel Laureates.

UNESCO and EOLSS define life support systems as "...any natural or human-engineered system that furthers the life of the biosphere in a sustainable fashion. The fundamental attribute of life support systems is that together they provide all of the sustainable needs required for continuance of life. These needs go far beyond biological requirements. Thus, life support systems encompass natural environmental systems as well as ancillary social systems required to foster societal harmony, safety, nutrition, medical care, economic standards, and the development of new technology. The one common thread in all of these systems is that they operate in partnership with the conservation of natural resources".

The UNESCO/EOLSS project includes 6 main subject areas. These are: (1) Global Sustainable Development; (2) Water; (3) Energy; (4) Environment; (5) Food and Agriculture; and (6) Knowledge Foundations. As editor of one of the themes in the Knowledge Foundations area entitled, " Knowledge Management, Organizational Intelligence and Learning, and Complexity" I invite you to examine opportunities to contribute to this very important international effort. Within the theme of "Knowledge Management, Organizational Intelligence and Learning, and Complexity" are six topic areas of : (1) General Features of Complex Systems; (2) Agent-Based Genetic and Emergent Computational Models of Complex Systems; (3) Implications of Complexity; (3) Bionomics and Sustainable Development; (5) The Learning Organization; and (6) Knowledge Management.

Each topic area includes up to 12 articles on subtopics that must be produced. Thus my editorial duties include the oversight of the production of 6 topic articles (10,000-15,000 words) and approximately 50 articles (5,000-10,000 words). Authors will be asked to sign a formal agreement with the publisher and remuneration for authors is \$30 per 1,000 words. Articles must be written in english. First drafts of manuscripts must be completed by mid-January 1999.

If you are interested in learning more about this important project see the EOLSS web site at <http://www.eolss.co.uk>. If you are interested in possibly contributing to the project as an author please visit my web site at <http://www.utdallas.edu/dept/socsci/kiel.htm#DougKiel>. This web site provides a detailed listing of the article topics that must be produced. Please know that I must make decisions based on both the author's recognized expertise and on producing an internationally representative group of contributors. Please also contact me via e-mail at [dkiel@utdallas.edu](mailto:dkiel@utdallas.edu) or by phone at (972) 883-2019. -- Doug Kiel, University of Texas at Dallas.

## BOOK ANNOUNCEMENT

**CHAOS FRACTALS MODELS**, Edited by F.M. GUINDANI & G. SALVADORI Italian University Press (Pavia, ITALY) 1998. ISBN 88-8258-002-4 536 p., cm 17 x 24 \$55.00 U.S.

*To order, please send your name, address and signature, and book title to: ARCADIA Bookseller s.r.l., Via Malaspina 2, 27100 Pavia (Italy). Contents:*

**LECTIO MAGISTRALIS.** - L. Pietronero: Fractals in physics and science.

**MATHEMATICS PHYSICS ENGINEERING.** - G. Salvadori: Multifractals in environmental pollution sciences - S. Lovejoy, D. Schertzer: Stochastic chaos and multifractal geophysics - D. Schertzer Et Al.: Beyond multifractal phenomenology: nonlinear dynamics and multifractal renormalization - Y. Chigirinskaya Et Al.: Chernobyl 137cs cumulative soil deposition in europe: chaotic or multifractal?

**MEDICINE & BIOLOGY.** - M. Meyer Et Al.: Fractal dynamics of heartbeat interval fluctuation - J.M. Hausdorff Et Al.: Fractal analysis of gait: long-range correlations in the stride interval and their breakdown with disease - N. Dioguardi: La medicina, l'incertezza e la complessita'

**ECONOMICS.** - A. Medio: The problem of backward dynamics in economics - S. Guastello: Coordination and creative problem solving dynamics for small groups - M. Egidi, M. Ricottilli: Co-ordination and specialisation - Y. Kaniowsky: Micro and macro in economics. Is there resemblance? - D. Lane: Increasing returns and economic theory - F. Schmitt et al.: Turbulent fluctuations in financial markets: a multifractal approach.

**PSYCHOLOGY.** - F. Orsucci: Non linear dynamics in language and psychobiological interactions - W. Sulis: Dynamical system in psychobiology - G.B. Schmid: Chaos theory and psychiatry: the six fundamental characteristics of chaos and their clinical relevance to psychiatry - A. Stein: Treatment implications of non linear dynamics - L. Ciompi et al.: Non linear models in psychiatry - M. Zanasi: Gli archetipi e il caos

**PHILOSOPHY.** - F. Papi: Per una genealogia del caos - E. Giannetto: Max born, il caos ed il mito del determinismo

meccanicista - M. Ceruti, T. Pievani: La contingenza delle forme. Caso, selezione e autorganizzazione nella scienza evolutiva - L. Magnani, M. Mangarro: Definire il caos: prevedibilita', determinismo, logica

**ART & MUSIC** - C. Ciancia: Trovare il frattale, provocare il frattale, pensare il corpo frattale: riti di evocazione caotica nella pittura. - M. Turno: Letteratura, inconscio e quarta dimensione - J.B. Schilingi: Composizione per modelli interattivi (dai sistemi chiusi ai sistemi aperti)

**OPEN DEBATE & CONCLUSIONS** - J. Goldstein: Simple or complex? Connotations of equilibrium in chaos and Complexity theories - F.T. Arecchi: Complexity in science: syntaxis versus semantics - A. Giuliani: Models portability: some considerations about transdisciplinary approaches - I. Trofimova: The definition of parametres for measurement in psychology.

**IN ADDITION 22 SELECTED SHORT PAPERS ON VARIOUS SUBJECTS** - G.O. Smith: Social anthropological considerations on the predictability and unpredictability of community outcomes - P. Galli: The chaotic transdisciplinary ridge of the fractal memory function in psychoanalytical psychoteraphy - F. Lisi: One-step prediction of chaotic time series by multivariate reconstruction - C. Miracco, G. Bianciardi, A. Perrone, A. Bruni, S. Lazzi, P. Luzi: Fractal analysis of epithelial-connective tissue interface in basal cell carcinoma - S. Dikova: Chaos versus causality - F. Scalzone, G. Zontini: Freud e i confini del caos (l'ombelico del sogno) - M.C. Dominguez: Il caos, l'io e la trappola degli specchi - A. Marazzi, P. Gamba, E. Costamagna, N. Piredda: Texture classification with fractal dimension and wavelet transform - J.L. Frank-Saraceni: Contributions to models of the counseling process from chaos theory, creativity, and gestalt therapy - Yoo Seung-Dong, Choi Chang-Hyeon: The empirical relationships of the characteristics of self-organizing systems to organizational commitment based on chaos theory - L. Salasnich: Quantum transition from order to chaos in the nuclear shell model - R. Ghignola, D. Liberati, E. Chiesa, R. Foroni, G. Andrighetto, G. Tridente, M. Colombatti: On the growth dynamics of multicellular tumor spheroids: a preliminar report - R. Di Lorenzo: Forecastability and tradability - G. Damiani: Why are fractals everywhere? - F. Vassallo: Complessita' e automi cellulari - G. Ruggiero, P. Scurti, G. Saladino, S. Iacone: Caos ed ordine nei sistemi familiari: complessita' e psicoterapia sistematico-relazionale - G. Bianciardi, C. Miracco, M.M. De Santi, A. Perrone, A. Bruni, P. Luzi: Fractal analysis of lymphocytic nuclear membrane and chromatin in mycosis fungoides and chronic dermatitis - M.P. Salatiello, G. Annaro, A. Barbagallo, V. Caleca, S. Messina, F. Vitrano: Dalla sensazione alla rappresentazione: un modello di sviluppo. - C. Gabrieli, F. Ferro Milone, G. Ferro Milone, T.A. Minelli, L. Turicchia: From the mathematical anatomy to the mathematical physiology of brain co-operative phenomena - E. Costamagna, L. Favalli, P. Gamba, P. Savazzi: Experiments in matching chaotic models to telecommunication digital channel bit error sequences. - F. Marinelli, R. Santoro, S. Santi, M. Riccio, A. Valmori, N.M. Maraldi: Fractal analysis of chromatin in hepatoma nuclear domains - M. Longo: Psicologia delle masse mediatiche.

## Conference Announcements

### Call for abstracts

**NONLINEAR DYNAMICS IN LIFE SCIENCES,  
MOSCOW, RUSSIA, 11-13 October, 1998.**

The Society for Chaos Theory in Psychology & Life Sciences (SCTPLS) and the Russian Synergetic Society (RSS) are organizing an International Conference and Workshops.

The conference invites researchers, theoreticians, practitioners and students interested in applying dynamical systems theory, far-from-equilibrium thermodynamics, self-organization, neural nets, fractals cellular automata, and related forms of chaos, catastrophes, bifurcations, nonlinear dynamics, and complexity theories to biology, psychology, sociology, medicine and the other life sciences. The best presentations from the conferences will be translated into Russian and published in an edited collection book.

A full day cultural program will be organized for foreign attendees on October 10, including a tour of the city, the Kremlin, and some of museums. Prices are tentative, but the complete program will be not more than 90-100\$ US. Payment in Moscow.

Additionally for people who are interested to visit other cities of Russia from 7-9 October, short seminars in Saint-Petersburg and Novosibirsk will be organized also with one-day cultural programs.

Proposals and abstracts (up to 500 words) should be submitted by JULY 15, 1998 to: Irina Trofimova, Ph.D. by e-mail: ira@church.dcss.mcmaster.ca; by snail-mail: 92 Bowman St., Hamilton, Ontario, Canada, L8S 2T6 or Russia, 111397, Moscow, Bratskaya 27-2-4, with the mark: Conference-98.

All presenters must register for the conference. Conference Registration Fees: Students and members of RSS, \$20; Other Russian citizens, \$35; Foreign citizens, \$85.

Accommodation: Moscow State University Campus, single rooms for 25-45\$ per day. Campus has 4 cafeterias and restaurant inside the building, that has a good selection of meals of good quality. Price for the package of 3 meals per day for 11-13th of October is \$45. **BOOKINGS FOR THESE ACCOMMODATIONS WILL BE MADE BEFORE AUGUST 1, 1998 THROUGH THE RSS (Also see SCTPLS' WWW site).**

**TRAVEL INFORMATION.** All foreign participants will be met in Sherementievo Airport of Moscow and delivered to the place of accommodation. To be able to do that the Program Committee asks everyone who needs assistance to inform about their arrival in advance.

### Call for papers:

**COMPLEXITY AND EVOLUTION IN THE LIVING WORLD  
-- 3rd Biannual Conference of the  
SOCIETA ITALIANA CAOS & COMPLESSITA - SICC  
(ITALIAN SOCIETY FOR CHAOS & COMPLEXITY)  
Rome, Italy , E.U., October 21-23, 1998, Rome  
University La Sapienza (Rome International University)**

Papers and programs are now requested pertaining to chaos theory, fractals, nonlinear dynamics and related principles applied to psychology, neuroscience, biology, medical research, ecology, sociology, anthropology, physics, mathematics, political science, economics, business, finance, art, philosophy, and literature. You should indicate which of the following methodological approaches your paper is related to: time series analysis, nonlinear dynamical systems, models, simulations, morphology, fractals, applications and technologies. An abstract should be approximately 200 words in length; included figures and tables as desired.

Submissions may be single papers or posters. Symposia, roundtable or workshops can be submitted in addition to the main sessions. Subject matter may be theoretical, empirical or methodology oriented. Oral presentations will be 30 minutes in duration. Posters will have two special sessions for presentations. The Conference core structure will be organized in these main Sessions:

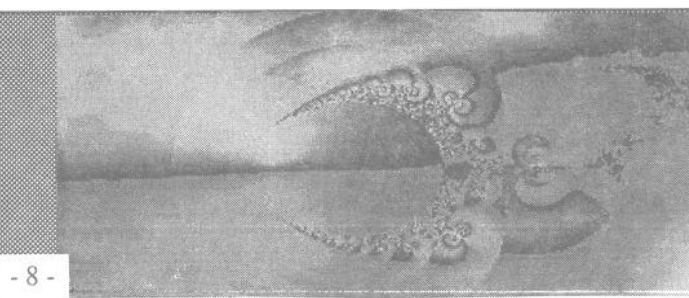
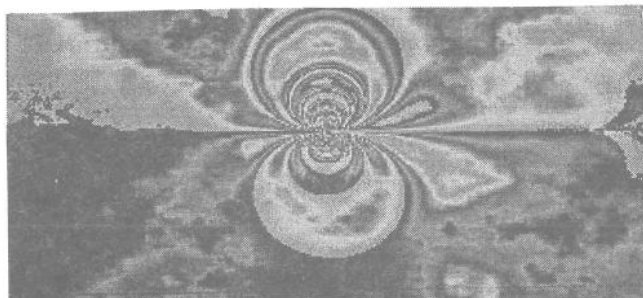
**21st Afternoon OPENING SESSION SPECIAL  
GUEST SPEAKERS: Walter J. Freeman**, University of California at Bekeley, USA **F.T. Arecchi**, Istituto Nazionale di Ottica, Florence, Italy, **EU Giulio Casati**, International Center for the Study of Dynamical Systems, University of Milan at Como, Italy, EU

**22nd Morning session: MODELS & SIMULATIONS  
Afternoon session APPLICATIONS & TECHNOLOGIES  
POSTERS SESSION**

**23rd Morning session: TIME SERIES & DYNAMICS  
Afternoon session MORPHOLOGY & FRACTALS  
POSTERS SESSION Evening session CONCLUSIONS &  
ARTISTIC EVENTS**

Additional Workshops and Symposia will be organized following this Call for Papers. Official languages are English and Italian. Proposals should be submitted by JULY 10, 1998 to: Prof. Franco F. Orsucci, Rome International University Via Leonida Bissolati 20, I-00187, Rome, Italy, EU Tel: 396-42001422 Fax: 396-42012577 Email: forsucci@riu.edu

**PUBLICATION:** All papers accepted for presentation at the Conference are invited as submissions to *Nonlinear Dynamics, Psychology, and Life Sciences* and *International Journal of Chaos Theory and Applications*, both sponsored by the SICC; Selected papers will be published as a special volume.



## Call For Papers

### 4th Pacific Symposium on BioComputing (PSB99, 1999) conference track on "Information-theoretic approaches to biology". 4-9 January, 1999, in Mauni Lani on the Big Island of Hawaii.

Specific technical area to be covered by this track: Approaches to biological problems using notions of information or complexity, including methods such as Algorithmic Probability, Minimum Message Length and Minimum Description Length. Two possible applications are (e.g.) protein folding and biological information processing. Kolmogorov (1965) and Chaitin (1966) studied the notions of complexity and randomness, with Solomonoff (1964), Wallace (1968) and Rissanen (1978) applying these to problems of statistical and inferential learning (and "data mining") and to prediction. The methods of Solomonoff, Wallace and Rissanen have respectively come to be known as Algorithmic Probability (ALP), Minimum Message Length (MML) and Minimum Description Length (MDL). All of these methods relate to information theory, and can also be thought of in terms of Shannon's information theory, and can also be thought of in terms of Boltzmann's thermodynamic entropy. An MDL/MML perspective has been suggested by a number of authors in the context of approximating unknown functions with some parametric approximation scheme (such as a neural network). The designated measure to optimize under this scheme combines an estimate of the cost of misfit with an estimate of the cost of describing the parametric approximation (Akaike 1973, Rissanen 1978, Barron and Barron 1988, Wallace and Boulton, 1968). This track invites all original papers of a biological nature which use notions of information and/or information-theoretic complexity, with no strong preference as to what specific nature. Such work has been done in problems of, e.g., protein folding and DNA string alignment. As we shortly describe in some detail, such work has also been done in the analysis of temporal dynamics in biology such as neural spike trains and endocrine (hormonal) time series analysis using the MDL principle in the context of neural networks and context-free grammar complexity.

To elaborate on one of the relevant topics above, in the last three years or so, there has been a major focus on the aspect of timing in biological information processing ranging from fields such as neuroscience to endocrinology. The latest work on information processing at the single-cell level using computational as well as experimental approaches reveals previously unimagined complexity and dynamism. Timing in biological information processing on the single-cell level as well as on the systems level has been studied by signal-processing and information-theoretic approaches in particular in the field of neuroscience (see for an overview: Rieke et al. 1996). Using such approaches to the understanding of temporal complexity in biological information transfer, the maximum information rates and the precision of spike timing to the understanding of temporal complexity in biological information transfer, the maximum information rates and the precision of spike timing could be revealed by computational methods (Mainen & Sejnowski, 1995; Gabbiani & Koch 1996; Gabbiani et al., 1996).

The examples given above are examples of some possible biological application domains. We invite and solicit papers in all areas of (computational) biology which make use of ALP, MDL, MML and/or other notions of information and information-theoretic complexity. In problems of prediction, as well as using "yes"/"no" predictions, we would encourage the authors to consider also using probabilistic prediction, where the score assigned to a probabilistic prediction is given according to the negative logarithm of the stated probability of the event.

PSB99 will publish accepted full papers in an archival Proceedings. All contributed papers will be rigorously peer-reviewed by at least three referees. Each accepted full paper will be allocated up to 12 pages in the conference Proceedings. The best papers will be selected for a 30-minute oral presentation to the full assembled conference. Accepted poster abstracts will be distributed at the conference separately from the archival Proceedings. To be eligible for proceedings publication, each full paper must be accompanied by a cover letter stating that it contains original unpublished results not currently under consideration elsewhere. See <http://www.cgl.ucsf.edu/psb/cfp.html> for more information.

**IMPORTANT DATES:** Full paper submissions due July 13, 1998; Poster abstracts due: August 22, 1998; Notification of paper acceptance: September 22, 1998; Camera-ready copy due: October 1, 1998; Conference: January 4 - 9, 1999.

**TRACK ORGANIZERS:** David L. Dowe ([dld@cs.monash.edu.au](mailto:dld@cs.monash.edu.au)) and Klaus Prank ([ndxdpran@rrzn-serv.de](mailto:ndxdpran@rrzn-serv.de)). More information about the "Information-theoretic approaches to biology" track, including a sample list of relevant papers is available on the WWW at <http://www.cs.monash.edu.au/~dld/PSB99/PSB99.Info.CFPs.html>. More information about PSB99 is available from <http://www.cgl.ucsf.edu/psb/cfp.html>

### "MOLECULAR STRATEGIES IN BIOLOGICAL EVOLUTION" A NEW YORK ACADEMY OF SCIENCES CONFERENCE JUNE 27-29, 1998, The Rockefeller University, New York City

**THEME:** A common assumption in biology is that mutations are completely random events - an ultraviolet ray hits a nucleotide, producing a point mutation which causes skin cancer - but there is increasing evidence that genetic alterations are not all that random. Recent advances in the mapping DNA sequences and in the development of computational tools make it possible to ask whether DNA encode information that modulates its rate of mutation.

This conference will address molecular strategies by which lineages of organisms respond to challenges, and to opportunities, in their environment, and will explore the idea that organisms have evolved the ability to modulate the rate, location, and extent of genetic variation. Jumps in efficiency, made possible by development of novel efficient evolutionary strategies, could fuel rapid, saltatory, expansion of species into novel niches as each innovation evolves.

Discussions at the conference will be grounded in an up-to-date assessment of biochemical mechanisms available to



modulate the rate of genetic change at specific sites within a genome, the induction, in certain environments, of enzymes with altered sequence-dependent recombination, mismatch repair and/or replication fidelity, and statistical evidence for nonrandom genetic events. The conference is divided into five sections: structured pathways for variation, new contexts for functional DNA sequences, modulation of fidelity and repair, sequence-directed genetic alterations, and information-guided evolution.

Conference sessions include: Structured pathways for variation; modulation of fidelity and repair; context-dependent genetic alteration; new contexts for functional DNA sequences; and, information-guided evolution.

This discussion of genomic strategies for evolution has profound implications for basic biology and evolutionary theory. It also raises very significant questions regarding medical research, including such challenges as the development and spread of antibiotic resistance, the progression of tumors, genetic disease, immunity, autoimmunity, and the design of drugs selective for individual members of large gene families.

CONFERENCE CHAIRS: Lynn Helena Caporale (Consultant, New York City) Werner Arber (University of Basel, Switzerland)

SPEAKERS AND SESSION CHAIRS: Stephen J. Benkovic, The Pennsylvania State University, University Park\* Giorgio Bernardi, Institut Jacques Monod, University of Paris 7 -C.N.R.S., France\* John W. Drake, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina\* Nina Fedoroff, The Pennsylvania State University, University Park\* Patricia L. Foster, Boston University School of Public Health, Massachusetts\* Hans-Joachim Fritz, Georg-August-Universität, Göttingen, Germany\* Abram Gabriel, Rutgers University, Piscataway, New Jersey\* Ruth M. Hall, CSIRO/Molecular Science, Sydney, Australia\* John P. Huelsenbeck, University of Rochester, New York\* Shigeru Iida, National Institute for Basic Biology, Okazaki, Japan\* Samuel Karlin, Stanford University, California\* Evelyn Fox Keller, Massachusetts Institute of Technology, Cambridge\* Amy Kenter, University of Illinois, Chicago\* Ben Koop, Centre for Environmental Health, University of Victoria, Canada\* Thomas A. Kunkel, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina\* Joshua Lederberg, The Rockefeller University, New York City Susanna Lewis, University of Toronto, David M. Prescott, University of Colorado, Boulder\* Miroslav Radman, Institut Jacques Monod, University of Paris 7 - C.N.R.S., France Alex Rich, Massachusetts Institute of Technology, Cambridge, Massachusetts Monica Riley, Marine Biological Laboratory, Woods Hole, Massachusetts\* Lynn S. Ripley, UMDNJ-New Jersey Medical School, Newark, New Jersey Susan Rosenberg, Baylor College of Medicine, Houston, Texas\* Chris Sander, Whitehead Institute, Massachusetts Institute of Technology, Cambridge, Massachusetts\* John Schimenti, The Jackson Laboratory, Bar Harbor, Maine\* David Searls, SmithKline Beecham, King of Prussia, James A. Shapiro, University of Chicago, Illinois\* Larry Simpson, Howard Hughes Medical Institute, UCLA, Los Angeles, California\* Richard R. Sinden, Institute of Biosciences and Technology, Texas A&M University, Houston\* Willem P.C. Stemmer, Maxygen, Inc., Santa Clara, California\* David Thaler, The Rockefeller

University, New York\*Edward N. Trifonov, The Weizmann Institute of Science, Rehovot, Israel\*

FOR PROGRAM AND REGISTRATION INFORMATION CONTACT: Science and Technology Meetings Department New York Academy of Sciences, 2 East 63rd Street, New York, NY 10021. T: 212.838.0230, ext. 324 F: 212.838.5640; E: conference@nyas.org W: www.nyas.org/BROCHMSB.html

## NEW JOURNAL ANNOUNCEMENT

A new international scientific quarterly journal "*Regular and Chaotic Dynamics*" has been founded by M.V. Lomonosov Moscow State University, Moscow Center for Continuous Mathematical Education (president Prof. V.I. Arnold) and Udmurt State University. The main objective of "Regular and Chaotic Dynamics" is publishing the results of analysis of regular and stochastic behaviour in determined dynamical systems that arise in the classical mechanics, theoretical physics and in other fields of science. In our journal we will study both classical problems of integrability as well as nonintegrability in dynamical systems, problems of qualitative analysis of differential equations, and the theory of determined chaos, principles of self-organization, and fractal dynamics.

The following directions of scientific researches compile the subjects of the journal - integrability and nonintegrability of dynamical systems; - determined chaos; - symmetries, Lie algebras and Hamiltonian formalism; - fractal dynamics; - self-organization theory; - celestial mechanics.

Well-known Russian and foreign scientists are the members of the Editorial Board: Editor-in-Chief V.V. Kozlov (Russia), Professor of the Theoretical Mechanics Department and Vice-president of Moscow State University, the corresponding member of the Russian Academy of Sciences.

A.V. Borisov (Russia) (managing editor), 119899, Russia, Moscow, Moscow State University Main Building, room 922, Office phone: 7(095)9391057, fax: 7(095)9390075; e-mail: borisov@uni.udm.ru

Andrzej J. Maciejewski (Poland) (managing editor); Torun Center for Astronomy, Nicolaus Copernicus University, 87-100 Torun, Gagarina 11, fax: (48-56) 654-46-92, e-mail: maciejka@astri.uni.torun.pl

Editorial Board: M.Adler, USA; J.E.Marsden, USA; H.Aref, USA; A.I.Neishtadt, Russia; V.V.Beletsky, Russia; L.P.Shil'nikov, Russia; S.V.Bolotin, Russia; C.Simo, Spain; G.Benettin, Italy; M.Szydowski, Poland; T.Bountis, Greece; M.Tabor, USA; A.T.Fomenko, Russia; D.V.Treschev, Russia; V.F.Lazutkin, Russia; A.P.Veselov, Great Britain; L.Gavrilov, France; S.Wiggins, USA; V.I.Guljaev, Ukraine; H.Yoshida, Japan; P.J.Holmes, USA; V.A.Zhuravlev, Russia;

If you want to receive more detailed information you can look at the homepage of the journal at: "<http://www.uni.udm.ru/rcd/>".

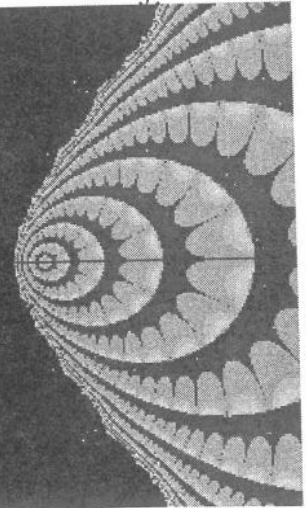
Final Program

**8 th Annual International Conference**

**The Society for Chaos Theory in Psychology & Life Sciences**

Boston University, Boston, MA

July 31 -- August 3, 1998



Friday, July 31

**Workshop: Confronting Complexity in the Wild: Principled Study of Real Nonlinear Dynamical Systems**  
Bob Porter, University of Florida, Tampa

9:00-12:00 Part 1

12:00- 13:00 LUNCH

13:00-16:00 Part 2

18:00-20:00 Opening Ceremonies

SATURDAY AUGUST 1, 1998

**SESSION A  
BEHAVIORAL NEUROSCIENCE**

8:30-9:00 Dimensional Analysis and Suroguate Data Testing of Task and No Task Human EEG. Shigenori Shirouzu, Yasutami Tsuda, and Hisanobu Sugano, MOA Health Science Foundation Fukuoka, Japan Masayoshi Inoue, Dept. of Physics, Faculty of Science, Kagoshima University.

9:00-9:30 Chaotic Analysis of Human Postural Sway. W. Lin and K.J. McLeod, SUNY, Stony Brook.

9:30-10:00 Comparative Analysis of Neural Behavior by Means of Informational and Algorithmic Measures of Complexity. M. A. Jimenez-Montano and G. Ruiz Riquer, O. Diez Martinez, Universidad de las Americas/Puebla, Mexico, L. Zamora Cortina, Universidad Veracruzana, Mexico, J.P. Segundo, University of California, Los Angeles.

10:00-10:30 A Dynamical Analysis of Action Selection in the Laboratory Mouse. Agnes Guillot & Jean Arcady Meyer, AnimatLab, Ecole Normale Superieure, Paris.

10:30-11:00 Using Ensembles of Short Time Series to Study the Nonlinear Dynamics of Behavioral Data Barbara Bruhns Frey and Keith Clayton, Vanderbilt University

11:00-11:30 How Brains Make Meanings and Represent them for Purposes of Communication Between Brains. Walter J Freeman, University of California, Berkeley

11:30-12:00 Scaling Properties of the Time Intervals Between Arrhythmic Events in the Heart Larry S. Liebovitch, Angelo T. Todorov, Daniela Scheurle, Laura Colgin, Florida Atlantic University, Michal Zochowski, Yale University, Mark A. Wood, Kenneth A. Ellenbogen, Medical College of Virginia, John M. Herre, Robert C. Bernstein, Sentara Norfolk General Hospital, Norfolk, VA

**12:00-13:00 LUNCH**

**PHYSIOLOGY AND PSYCHOPHYSICS**

13:00-13:30 Process analysis of heart rate variation: New empirical measures of novelty, complexity and diversity. L. Carlson Sabelli, H. Sabelli, M. Patel, A. Sugerman, Rush University, Chicago Center for Creative Development, University of Illinois at Chicago.

13:30-14:00 Using Fractal Dimension to Assess Changes in Breathing Patterns of Cetaceans Caused by Environmental Situations. Rifa Ros, X., Viader Junyent, M., Riba Campos, C. Universitat de Barcelona, Spain, Lopez Larrosa, A., Parc Zoologic de Barcelona, Spain

14:00-14:30 Resolving perceptual ambiguity in the Necker Cube: A dynamical systems approach D.J. Aks, T. Nokes, J and E. Keane, University of Wisconsin, Whitewater, J.C. Sprott, University of Wisconsin, Madison

14:30-15:00 The acquisition of syntax: a dynamical systems approach to generative linguistics Annette Hohenberger University of Frankfurt, Germany

15:00-15:30 BREAK

15:30-16:00 Fractal Geometry: A Useful Tool for Quantifying Liver Irregular Lesions in Needle Biopsy Specimens F. Grizzi and N. Dioguardi, Istituto Clinico Humanitas, Milano, Italy

16:00-16:30 Hearts and Minds: A Dynamical Approach to Emotions and Patterns of Physiological Responsiveness Carlos Antonio Torre, Southern Connecticut State University

16:30-17:00 The syllable as a unit of speech production. Pascal H.H.M. van Lieshout, University of Toronto, Marjolein Hijl, Wouter Hulstijn, University of Nijmegen, The Netherlands

17:00-17:30 Evidence for Self organization in Human Visual Cortex During Perceptual Skill Learning: A Functional Magnetic Resonance Imaging Study. Jian Cheng Zhuang, Xu Chu Weng, Kan Zhang, Institute of Psychology, Chinese Academy of Sciences, Beijing, China, En Zhong Li, The MRI Center, General Hospital of Capital Steel Group, Beijing, China

17:30-18:00 Regularity and Randomness in Physiological Tremor S. Morrison, Simmons College, Boston

## **SESSION B ORGANIZATIONS & ECONOMICS 1**

8:30-9:00 Deterministic Chaos and Rationality in Library Organizations: Elements of Choice and Decision Making in Nonprofit Organizations. Detlef Quast, University of Gøteborg, Sweden.

9:00-9:30 Chaos and nonlinearity in oil markets. S. Borovkova, Shell Research, Amsterdam, The Netherlands, J. Renkema, H. Dehling, University of Groningen, The Netherlands

9:30-10:00 Complexity Theory and It's Application to Organization Design: Focus on NK Model. Choi, Chang Hyeon, Kwandong University, Korea

10:00-10:30 A Qualitative Definition of Chaos. Kevin Dooley, Arizona State University

10:30-11:00 NATO Emergent: Adaptability and Stability in the Cold War and Beyond. Jeffrey Lewis

11:00-11:30 A CAS Approach to Public Policy Decision Making. Glenda H. Eoyang, The Union Institute, Lois Yellowthunder, University of Minnesota, Vic Ward, Metropolitan Council, St. Paul, MN

## **11:30-13:00 LUNCH**

## **ORGANIZATIONS & ECONOMICS 2**

13:00-13:30 Multifractals in economics and finance F. Schmitt, Royal Meteorological Institute, Bruxelles, Belgium, D. Schertzer, LMM, Universite Paris VI, France, S. Lovejoy, McGill University

13:30-14:00 No Sign of Low dimensional Chaos in the Foreign Exchange Market. Robert Hoehener, Universitaet Bern, Switzerland

14:00-14:30 Treasury Yield Curve Dynamics: Stability & Transition in Investor Perception. M. F. Halasz

14:30-15:00 Local Rules and the adaptive behaviours of agents in fitness landscapes. Tim Haslett

15:00-15:30 BREAK

15:30-16:00 A Study on Chaos Phenomena under the Market Regulation Mechanism of Marshall. Zhang Dexian, Chen Zhonghui, Lu Hui

16:00-16:30 Determinism and Positivism in the Applications of Chaos, Complexity, and Nonlinearity in Policy Analysis: Prospects for a Paradigmatic Shift. Goktug Morcol, Kennesaw State University

16:30-17:00 Novelty generating biotic patterns beyond chaos model psychocardiological and economic processes. Hector Sabelli and Louis Kauffman, University of Illinois at Chicago

17:00-17:30 Mass Behavior as Chaotic Dynamics to Display Democracy and Dictatorship Kan Lu, Southeast University, Nanjing, China

## **SESSION C CLINICAL 1**

8:30-9:30 Invited Speaker: The common Everyday Trance: Is hypnotic susceptibility a quasi-periodic function. Ernest Rossi, Psychological Perspectives

9:30-10:00 The Impact of the "New Sciences" on the Understanding of Psychological Type. Henry L. (Dick) Thompson, High Performing Systems, Inc., Watkinsville, GA

10:00-10:30 To Be or Not to Be: The Self, Fractal Boundaries, and Paradoxes of Self-Reference. Terry Marks-Tarlow

10:30-11:30 The Legacy of Gregory Bateson's Double Bind Theory in Light of Recent Developments in Nonlinear Dynamical Systems Modeling. Matthijs Koopmans, York College/CUNY

11:30-12:00 Theoretical Foundation for Jung's Mandala Symbolism V.Gontar, Ben-Gurion University of the Negev, Israel

## **12:00-13:00 LUNCH**

## **CLINICAL 2**

13:00-13:30 Satir's model from a process theory perspective J. Konecki, Chicago Center for Creative Development and Fielding Institute

13:30-14:00 S.O.C. And Morphogenetic Fields in Psychotherapy  
Franco F. Orsucci, Rome International University

14:00-14:30 Simple Versus Complex Systems in Personality  
Psychology Simon T. Jencius, University of Vienna

14:30-15:00 Process Methods in Psychiatry: combining  
neurohormone replacement with co-creative behavior. H.  
Sabelli, L. Carlson-Sabelli, M. Patel, J. Konecki, Chicago Center  
for Creative Development, Rush University, University of  
Illinois at Chicago, and Fielding Institute.

15:00-15:30 BREAK

15:30-16:00 Depression as Temporal Pathology: Mood Scaling  
via Self-Organized Criticality David M. Kreindler, Charles J.  
Lumsden, University of Toronto

16:00-16:30 Fear vs. Belief: A Cusp Catastrophe Model of  
Delusions Rense Lange, Illinois State Board of Education  
Springfield, IL

16:30-17:00 Creativity, Panic Attacks, and States of Awe: A  
Model from Nonlinear Dynamics. Tobi Zausner

17:00-17:30 Post-Traumatic Stress Disorder, Ultradian Rhythms  
and Chaos: a New Paradigm. Susan Mirow

17:30-18:00 The Emergency of Psychiatric Diagnosis:  
ADHD. Sean Hagberg

## SATURDAY AUGUST 1 EVENING PROGRAM

### BANQUET

PLENARY SPEAKER (Title TBA) **Michael Turvey**

## SUNDAY AUGUST 2,

### SESSION A COGNITIVE 1

8:30-9:00 The Dynamics of Thought Suppression. Scott Clair,  
Florida Atlantic University

9:00-9:30 The Role of Environmental Complexity in the Well-  
Being of the Elderly. Alice Davidson, Martin H. Teicher, and  
Yaneer Bar-Yam, NECSI

9:30-10:00 A Dynamic Systems Analysis of Socioemotional  
Development in Infancy Marc D. Lewis and Alex Lamey,  
OISE

10:00-10:30 Hysteresis: An Index of Treatment Progress Isabel  
Granic, OISE

10:30-11:00 Statistics and Self-Organization. Alex V. Lamey,  
OISE

11:00-11:30 The Self-Organization of Consensual Frames: Gaze  
Patterns and Affect as Two Constituents in the Co-regulation of  
a Dyadic Interaction. Jorge Sousa, OISE

11:30-12:00 Emotion Self Organization and The Stream of  
Consciousness. Jason T. Ramsay and Marc D. Lewis, OISE

### 11:30-13:00 LUNCH

### COGNITIVE 2

13:00-13:30 GEMCAT II : A Program for Bootstrap Tests of  
Catastrophe Models. Rense Lange, Illinois State Board of  
Education, Springfield, IL

13:30-14:00 Cusp Catastrophe Model for Turnover Among Air  
Force Recruits in Their First Term of Enlistment. Stephen J.  
Guastello, Marquette University

14:00-14:30 Using Approach/Withdrawal Temperament (A/W)  
as a Specific Instance of Temperament, a Theoretical Model of  
Temperament as a Complex Dynamical System. Ty Partridge,  
University of Kansas School of Medicine - Wichita

14:30-15:00 Dynamical Evolutionary Process of Learning and  
the Function of Intelligence (D.E.L.I.) Scott Noren.

15:00-15:30 BREAK

15:30-16:00 Dynamical Systems Theory and Pedagogical  
Practice. J.L. Abraham, P. Doolittle, W. Camp, M.S. Campbell,  
and G.E. Fox Virginia Polytechnic and State University

16:00-16:30 Symbolic Dynamic Patterns of Verbal Exchange:  
Hierarchical Structures in an Electronic Problem Solving Group.  
Stephen J. Guastello, Marquette University

16:30-17:00 The Dynamics of Visual Word Perception. Jay  
Rueckl, University of Connecticut, Storrs CT. Julie Brown,  
Haskins Laboratories

17:00-17:30 The Study of dynamic attitudes to economical and  
political reforms in Russia. Mitina, Olga; Petrenko, Victor;  
Moscow State University, Russia

17:30-18:00 Modelling brain function at self-organised  
criticality. David Rail. Department of Neurology,  
Campbelltown Hospital, Sydney

## **SESSION B PHILOSOPHY 1**

8:30-9:00 Complexity and Freedom: A Study in Their Evolving Relationship. Frank Mosca

9:00-9:30 Entropy increase drives evolution towards an infinite Cosmic Attractor. H. Sabelli, M. Patel, L. Kauffman, L. Carlson-Sabelli, A. Sugerman, J. Konecki, D. Afton Chicago Center for Creative Development, University of Illinois at Chicago, Rush University, Fielding Institute

9:30-10:00 The Complex Adapted Mind: Rediscovering the Mind with Complexity and Evolutionary Psychology. Mike Root, Springfield College

10:00-10:30 Complex Constructivism: A Theoretical Model of Complexity and Cognition Peter E. Doolittle, Virginia Polytechnic Institute & State University

10:30-11:00 Chaos, Cosmology and Three Concepts of Emergence. Carl Gillett, Illinois Wesleyan University

11:00-11:30 The Application of Vectorial Analysis to Literature And Drama. Cynthia Joyce Clay

11:30-12:00 Art as a Self-Organizing Complex System. Svetlana Apenova, Igor Yevin, IMASH, Russia

### **12:00-13:00 LUNCH**

## **PHILOSOPHY 2**

13:00-14:30 Panel: Mathematics and Metaphor in Chaos Theory. Fred Abraham, Blueberry Brain Institute & Chaos Cooperative, Jeff Goldstein, Adelphi University, Robin Robertson, Psychological Perspectives

14:30-15:00 Adaptation As A Complex System Simon T. Jencius, University of Vienna

15:00-15:30 BREAK

15:30-16:00 The Measure of Culture: A Potential for Stability in Human Heterarchical Alignment. Susan Aaron

16:00-16:30 The Plot Thickens: Experiencing the Complexity of Change in a Secondary School. Debra Kosemetzky, OISE

16:30-17:00 A theory of natural creation. H. Sabelli, Rush University

17:00-17:30 Toward Therapeutic Autopoiesis: Chaos, Complexity, and Narrative Therapy. Mei-wei Chen, Northeastern Illinois University

17:30-18:00 Characteristics of information that are required by a complex human system. Karl Toifl, Neuropsychiatric clinic for children and adolescents, University of Vienna

## **SESSION C ANALYTICAL PSYCHODYNAMICS**

8:30-10:00 The Value of the Irrational. Bill Sulis, McMaster University, Robin Robertson, Psychological Perspectives, Chris Hardy, LRIP, France

10:00-10:30 Quantum Computing and Models of Consciousness. Don Booker

10:30-11:00 Archetypal Dynamics. Bill Sulis, McMaster University

11:00-11:30 Synchronicity: A Transpersonal Dynamical Process. Dr. Christine Hardy, LRIP, France

11:30- 12:00 TBA  
Dianne Miller, McMaster University

### **12:00-13:00 LUNCH**

## **GENERAL**

13:00-13:30 Science and Democracy. Linda Dennard, Cal. State Univ., Hayward

13:30-14:00 Developing Knowledge through Dialog - The Sencorp Management Model. Kenneth R. Slocum and D. Scott Frondorf, SENCORP

14:00-14:30 Attractor Regimes in Conversations. Glenda H. Eoyang, The Union Institute, Circle Pines, MN

14:30-15:00 Detecting Chaos in Financial Time Series Using Validation and Verification Methods Drawn from Expert Systems and Neural Net Modeling Don Booker

15:00-15:30 BREAK

15:30-16:00 Animal spirits' and expectations.  
Elliott Middleton, University of Wisconsin. Madison, WI

16:00-16:30 Genesis of Complexity Cycles. Janice A. Black, New Mexico State University, Las Cruces Gerard F. Farias, Loyola University Chicago

16:30-17:00 Unraveling the Paradox of the Incongruent Perspective. Kenneth Bausch

17:00-17:30 Controlling Chaos in Software Development Project Management. Don Booker

17:30-18:00 An Immune-Type Detector of Differences Between Distributions. Renato Di Lorenzo

MONDAY, AUGUST 3

**SESSION A**

8:30 - 9:00 EXPLORING THE ATTRACTOR BASIN OF MIND: Chaopsychological Lessons Learned in Building a Self-Organizing Internet AI System. Ben Goertzel, IntelliGenesis Corp. and Computer Science Dept., College of Staten Island

9:00 - 10:00 SCTPLS Business Meeting

**Workshop:** Riding the Waves of Emergence: Self Organization in the Workplace Jeffrey Goldstein, Adelphi University

10:00-13:00 Part 1

**13:00- 14:00 LUNCH**

14:00-17:00 Part 2

**SESSION B**

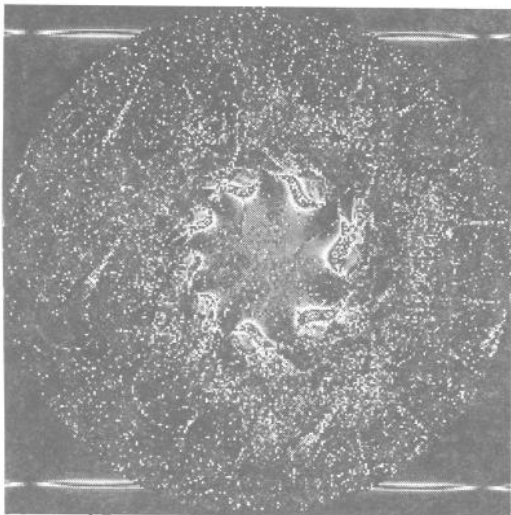
**Workshop:** Clinical Dynamics Workshop Michael Butz, author, "Chaos and Complexity: Implications for Psychological Theory and Practice"

10:00-13:00 Part 1

**13:00- 14:00 LUNCH**

14:00-17:00 Part 2

*That's all folks!*



Fractal graphics this issue by:  
DIANNE MILLER

An Invitation to  
All SCTPLS '98 Speakers

Dear Colleagues,

As you've probably heard, the Society would like to publish as many of your papers as possible in its research journal, *Nonlinear Dynamics, Psychology, and Life Sciences*. Thus I am writing to you today to invite you to join this venture by preparing a copy of your paper for consideration in the journal. All you need to do is to have a copy ready for me at the conference with "For NDPLS Review" marked on the cover page.

*NDPLS* is a forum for the publication of peer-reviewed original papers that augment the fundamental ways in which we understand, describe, and predict nonlinear dynamical phenomena in psychology and the life and social sciences. "Nonlinear Dynamics," for purposes of the journal purview, refers to a group of mathematical concepts that includes (but is not limited to), attractors, bifurcations, chaos, catastrophes, fractals, solitons, cellular automata, evolutionary computations, and processes of self-organization.

Regarding format, final versions of your papers will need to be in standard manuscript form. We use the American Psychological Association (APA) style, if you are familiar with that. Format details and other information about *NDPLS* can be found on the SCTPLS website. The same information is available from the Editorial Office as well. We won't need the disk for the paper until the final version of the paper is complete.

Of course, *NDPLS* accepts manuscripts throughout the year. If your paper is ready now, and you would like to send it sooner, please do so. If you have more material on nonlinear dynamics than what meets the eye, we would appreciate the opportunity to review it. In all cases, we can only consider papers that have not been published already, and that are not under consideration by any another journal. This is, of course, a familiar boundary condition.

I look forward to seeing you all in Boston.

Sincerely,

*Stephen J. Guastello, Ph.D.*

Editor in Chief

NONLINEAR DYNAMICS, PSYCHOLOGY AND LIFE SCIENCES

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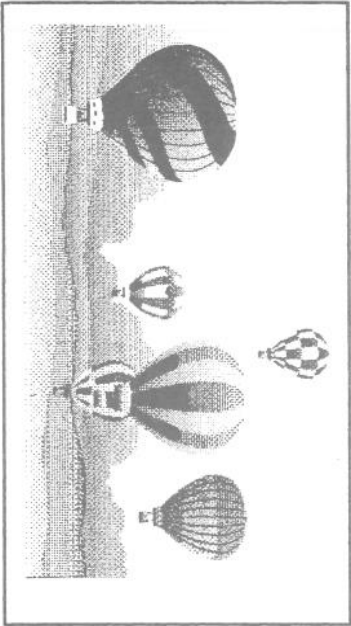
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