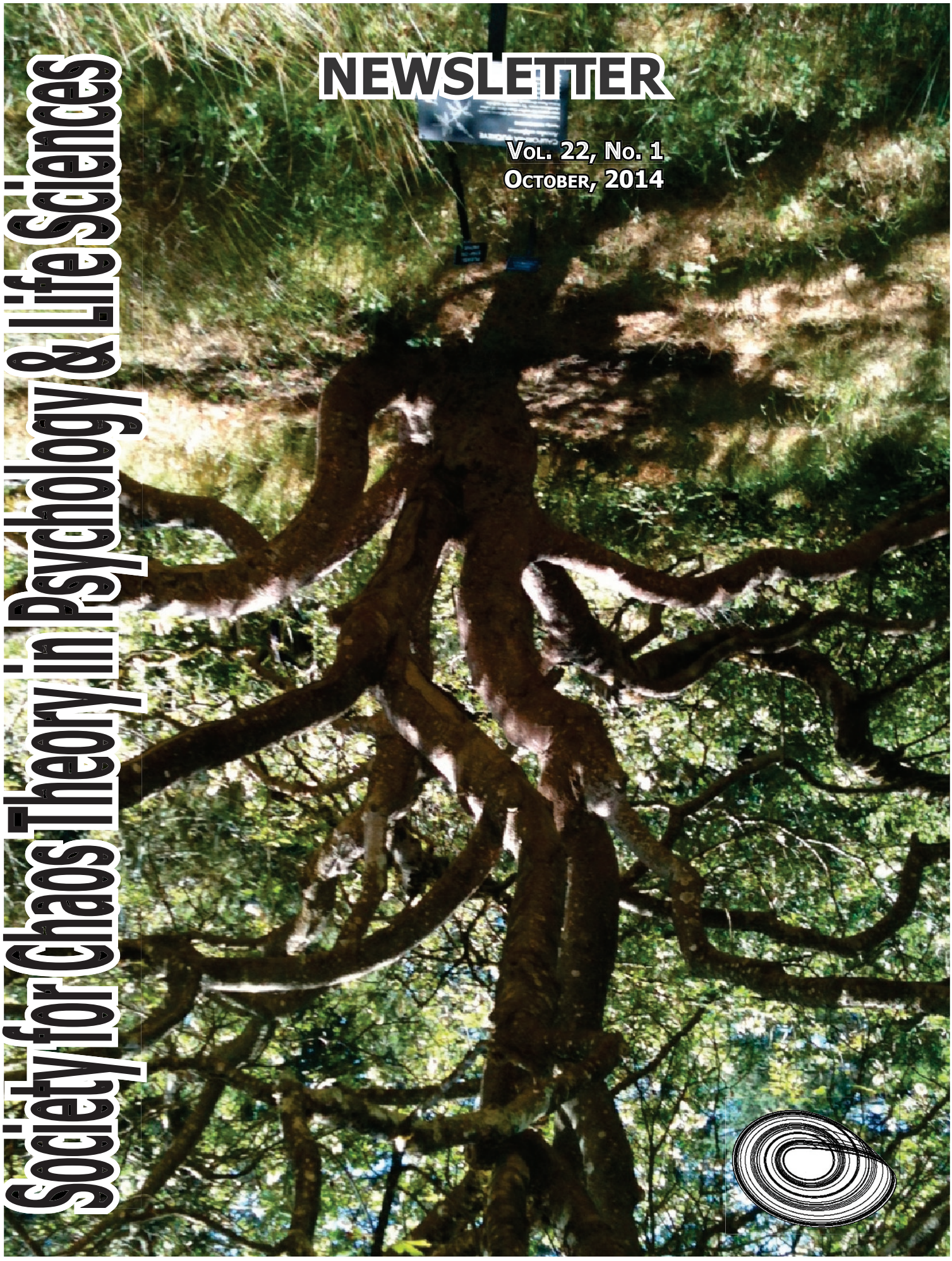


Society for Chaos Theory in Psychology & Life Sciences

NEWSLETTER

Vol. 22, No. 1
October, 2014

Society for Chaos Theory in Psychology & Life Sciences

2014 Election

SCTPLS President Candidates' Statements

Candidate Statement of Keith Owen

My name is Keith Owen and I am a candidate for the office of President for the Society of Chaos Theory in Psychology and the Life Sciences. I received my Ph.D. from the University of Texas at Austin in Experimental and Physiological Psychology. As a graduate student and later as a post-doctoral fellow, I was focused on figuring out how endocrine hormones (especially those secreted from the pituitary and gonads) mediated behavior. This focus gradually shifted to an interest in understanding the stress response, especially the role of beliefs and expectations in this response, and eventually to trying to figure out how organizations (complex dynamic human systems) contribute to the stress response.

I am still interested in the relationship between organizational dynamics, employee health, and organizational performance and have remained true to this calling for the last 25 years, both as an academic and as a consultant. During this time, I have had the opportunity to observe numerous large and small organizations and the observations I (and my colleagues) made during these engagements led to the publication of nine books, all of which have been devoted to understanding the inner workings and dynamics of these complex human inventions. This work has led me to learn many new and exciting things, including complexity theory and models.

I have attended just two of the annual conference meetings and I must say I have thoroughly enjoyed both. The keynote speakers have been excellent and I think we should continue to engage this type of person. In addition to continuing the excellence of the keynote addresses, I think we should work hard to get more variety in our presentations, especially in the area of the application of complexity theory and concepts to the analysis of complex human systems. And obviously, I would like to see the Society continue to grow and improve and to do this, I would like to engage members in a dialogue to see how to best accomplish this aim.

Candidate Statement of Sara Ross

I've been active in SCTPLS since joining this good group in 2003, serving in diverse roles from membership committee member to that committee's chair, to editor of our quarterly newsletter for several years, to these more recent years as Society secretary and member of its executive committee. I'm happy to put this background to work as I offer my readiness to serve as president of the Society.

I believe my inter-disciplinary background is a good fit in SCTPLS, and it's one of many reasons I love our diverse membership and our conferences (my Ph.D. is in Interdisciplinary Studies in Psychology and Political Development). It underlies my passion for helping others see and work with the patterns of not only complexity dynamics in general but also the increasing behavioral complexity in nonlinear behaviors of living systems.

If I'm elected as the next Society president, in addition to fulfilling normal responsibilities, I will want to experiment with how our annual conferences can implement a suggestion we've heard from participants the last 2-3 years. Members have asked us to build in options for synthesizing the diverse presentations of theory and practice within the conference itself. As interdisciplinary as we are, this can be an opportunity to model some good stuff for ourselves and others. For example, we can name and trace connections across presentations and their scales of attention and synthesize *what those mean to us and our work*, and we can articulate how we're mutually informed even better when we synthesize—not just listen to—our collective knowledge.

I believe we can, and really must, do more to promote the pattern-finding and pattern-using of chaotic complexity. I would like to work for the Society to play more roles in getting nonlinear knowledge and practice more widely informing how individuals, organizations, governments, and international agencies address the very serious social and environmental conditions of this 21st Century.

August 2, 2014 10 a.m., SCTPLS Annual Business Meeting Minutes
At 24th Annual Conference, held at Marquette University, Milwaukee, WI

Submitted by **Sara Ross,** Secretary

President A. Steven Dietz called the meeting to order. It was attended by a quorum of members participating in the conference.

1. First order of business was debriefing the conference thus far, at the beginning of the second day. Logistical feedback item was to use a venue where the Sunday sessions can start earlier (Marquette opened doors here at 10a.m.). The bulk of the discussion focused on approaches to conference design that could foster more cross-fertilization of ideas for their own sake, for collaborations, and for applications (e.g., math with non-math), theory-practice integration, support synthesis of information via "thread weaving" throughout conference, across papers and sessions. Specific suggestions to support such dynamics included:
   a. Pre-conference web location for participants to post about their work, early starts to relationships among works and people before conference in-person meetings;
   b. Build in talk times during lunch hours; build in longer between-session breaks to foster more conversation; use poster sessions more often, not only to help manage tracks if too many papers but also as attractors that support greater discussion time between sessions and on meal breaks.
   c. Mine some of the design ideas from Pincus' Datapalooza.
   d. Consider separate track for the cross-fertilization, concurrent schedule's discussion times, recognizing we have inherent tensions to juggle. If a single track conference would be longer, and a number of those present emphasized a longer conference would be difficult to participate in.
   e. Consider return to more variety in pre-conference workshop day (have kept that day on methods in very recent years, could expand variety again).
   f. Consider shorter sessions (e.g., 20 mins.) to ensure more discussion time *and* an inherent tension with that idea is that, as interdisciplinary as we are, presenters often truly need a decent enough time up front to orient participants to the theory/practice context of their work, which is often unfamiliar territory to a number of those present.
   g. Innovate with adult games that create most interaction on meaningful topics, improvise to foster mining of ideas and applications across members' contexts (integration, synthesis, cross-scale applications, etc.)
2. *Treasurer's Report.* Stephen Guastello verbally reported highlights from the financial report, which will be published in the fall Newsletter. One highlight was that the Datapalooza organized by Dave Pincus at Chapman University will be supported by SCTPLS as an investment in furthering nonlinear science and build the field by attracting and supporting young researchers.
3. *Publications Committee.* Stephen Guastello reported for the committee, with full report to be published in the fall Newsletter. One highlight was that the impact factor of our journal NDPLS, calculated from Thomson Reuters in Journal Citation Reports, increased over last year based on articles published in 2011. News of members' labs and other activities should be sent to Newsletter editor (Tano) for publication.
4. *Membership Committee.* As an ad hoc committee, we annually constitute the committee by vote of members present at annual meeting. Sara Ross moved we constitute the committee, Herb Maier seconded, approved unanimously. Adam Keifer chairs the committee. Herb suggested LinkedIn is underutilized for promoting SCTPLS and nonlinear science, perhaps facebook could be used to better advantage, and that our links page on website should be updated.
5. *Nominations Committee.* The floor was opened to nominations for president-elect for term of office as President to begin at 2015 business meeting. Sara Ross nominated Barkley Ross, Stephen Dietz seconded; Barkley declined due to press of schedule this year but will entertain nomination in a future year, and in the meantime, will support the Membership Committee. Steven Dietz nominated Sara Ross, Barkley Ross seconded, Sara accepted the nomination. Herb Maier nominated Clint Sprott in absentia, Dave Pincus seconded. Sara, in her role as Nominations Committee member, confirmed she would notify Clint and seek his acceptance. Carlos Torre moved to close nominations, seconded by those present. Nominations were closed. Post meeting addenda: After the meeting, a nomination was received for David Schuldberg, and another was received for Keith Owen. Sara Ross contacted Clint, David, and Keith. Keith accepted nomination; each was gratified by the nomination but Clint and David felt unable to accept nomination this year. Ballots will be mailed to all members in September, due by October 20 to Jeff Goldstein for ballot counting.

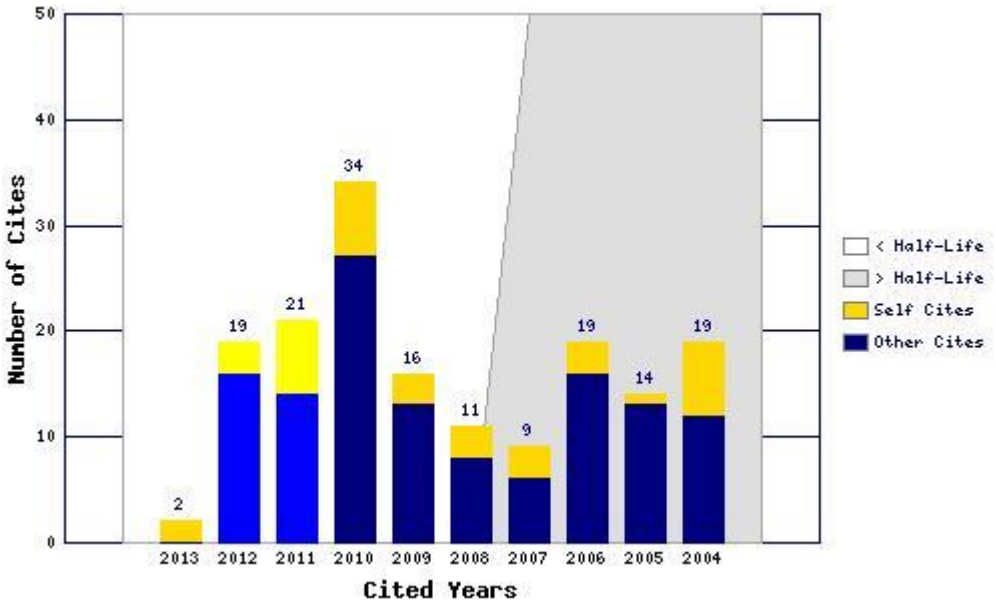
President Steven Dietz adjourned the meeting.

Publication Committee Report

The members of the committee are Stephen Guastello (chair and Editor in Chief of NDPLS), Gaetano Aiello (Newsletter Editor), Terrill Frantz (web manager), David Pincus (NDPLS Permissions Editor), and Steven Dietz (ex-officio).

NDPLS – Our impact factor, which is computed by ISI/Thomson Reuters in Journal Citation Reports for 2013 is 0.800. This is the total number of citations in NDPLS and other journals in 2012 and 2013 to articles published in 2011. This year's impact factor represents an uptick over last year's factor of 0.731. NDPLS is classified as "Psychology, Mathematical" for comparison purposes, and currently ranked 10 out of 13 journals in that category. This year's ranking represents an upward movement from the #11 position that we held for the first two years of being included in the Citation Reports data base.

The reports from ISI/TR contain a bar chart showing the years of publication on NDPLS to which citations have been recorded. This format of information is used to compute the half-life of the journal's publications. The spike for 2010 publications did not conform to the drop in Impact Factor that was reported last year relative to the year before. The probable explanation is that that were many citations to the material that did not reach publication until after the two-year window for which Impact Factors are computed.



The cover artwork for 2014 features still frames of multi-media compositions by Richard Downing from the UK. The 2015 art feature will showcase a comparison of styles of nonlinear artists who have contributed to SCTPLS designs works over the years.

NDPLS published a special issue on "Nonlinear Dynamics in Education" in January 2014, which was guest-edited by Dimitrios Stamovlasis and Matthijs Koopmans. A new call for review articles was released in July 2014. The initial positive responses to the call have been promising. The call was intended for a stream of articles rather than a special issue, material might self-organize into one or more special issues later on this year.

NEWSLETTER – The one specific trend to report is that the feature, News from SCTPLS Labs, has been very well subscribed by SCTPLS members. We all appreciate the news about projects everyone else is working on. The column was organized by David Pincus last year. This year, members should send their news items to Sara Ross, SCTPLS Secretary. Reminder messages will go out to SCTPLS members periodically.

WEB SITE – In addition to the usual updates, we are in the middle of overhauling the page "Resources for Students and Teachers." The updates will include a more extensive narrative and links to downloadable software and other goodies.

Treasurer's Report

This report summarizes the financial results for the Society for the fiscal year 2013 ending 31 March, 2014. The net returns for this year were $14,912 before applying encumbrances and $2570 after applying allocations for the next year. SCTPLS has been running at a modest surplus consistently since June 1994.

The three main areas of operation were the annual conference in Portland, OR (Line A in Table 1), the International Nonlinear Science Conference (INSC; Line C) and the membership-journal activities (Line D). A positive net was recorded for all three areas. The total attendance at the 2013 annual conference in Portland was 64. The attendance for the 2014 conference in Milwaukee was 45. SCTPLS does not fund travel expenses for the Executive Committee members to the annual conference. Plans for the next INSC will resume after the Society's 25th Anniversary conference.

Table 1. Financial results for FY 2013.

Project	**Net Income**
A. 2013 Conference in Portland OR	$1816
B. Deposit on 2014 Conference in Milwaukee, WI	0
C. INSC conference	4544
D. Membership fees, institutional subscriptions, book sales, minus production costs and expenses.	4113
E. Donations to special funds	330
F. Advertising	(362)
G. Royalties, permissions, special sales	545
H. Interest on accounts and investments	5926
I. General finance and accounting office	(2000)
Net before encumbrances	**$14,912**
J. Donations to special funds (same as E)	(330)
K. Membership fees for 2014-15 and later years received before 4-1-14	(4420)
L. 2012 Conf revenue received before 4-1-14	(0)
M. Planned advertising	(1562)
N. Planned new event, nonlinear methods workshop	(6000)
Final net	**$2,570**

Line D contains receipts from membership fees, institutional subscriptions to *NDPLS*, individual book sales, minus expenses to produce the journal and *Newsletter*, produce the annual art poster, purchase books that are resold at the annual conference, and related membership operations. Our membership stands at 211 active members as of August 30, 2014.

Line E: The Society established two special funds in April 2004. The Student Scholarship Fund provides for waivers of conference registration fees for student members who have a technical presentation accepted for the annual conference. The International Hardship Fund provides for reductions in conference registration fees for members who have a technical presentation accepted for the annual conference and who have made a reasonable claim for hardship; travel from a currency-impaired country is the primary example of hardship addressed by the fund program. Other than the qualifications described above, applicants are given awards on a first-come first-served basis to the extent that resources allow for a given year. New donations are needed to continue the program.

Line G: Special sales consist of single issues and articles in PDF form to individual requestors.

Line H: Interest on accounts and investments consists of bank interest on certificates of deposit, and proceeds from a conservative investment account that was opened in August 2011.

Line M: SCTPLS has started a series of ads on the inside back cover of *Psychological Methods*, which is published by the American Psychological Association.

Line N: SCTPLS is not planning a new workshop project featuring nonlinear analytic methods. Further information will be announced in the Fall 2014.

SCTPLS has no outstanding debts in the form of bank or other loans, bonds, or accounts payable in excess of 60 days.

Submitted by: **Stephen Guastello**, Ph.D.
Treasurer and CFO for SCTPLS

Feature Article

Lessons Learned from Twenty Years of Chaos and Complexity

J. C. Sprott, University of Wisconsin -- Madison

This article is a condensed version of an invited lecture given at the 24th Annual Conference of the Society for Chaos Theory in Psychology and Life Sciences on August 1, 2014.

In this article I'll describe the different approaches researchers have taken to understanding the world, make some general observations about the prospects and limitations of their methods, and share some of my views about the future of humanity. It will necessarily be personal and somewhat subjective, and thus probably controversial.

Either explicitly or implicitly, most people, both scientists and non-scientists, are trying to understand the world by making models. Some people have a model in which events are determined by God or perhaps by the position of the planets at the moment of one's birth. A model is a simplified description of a complicated process, ideally amenable to mathematical analysis. However, as the late George Box says, "all models are wrong, but some are useful." Furthermore, the usefulness of a model may not relate to how realistic it is. A simple model is usually more informative and sometimes more predictive than one that includes every effect that one can imagine.

Typically a model involves one or more agents. Although "agent" suggests a person, it could also be a whole society, an industry, an organism, a neuron, or even an individual atom. Agents are exposed to stimuli and exhibit corresponding responses. Sometimes we know the stimuli and are trying to determine the response; other times we observe an action and seek to understand its cause. Science could be defined as the study of such cause-effect relationships.

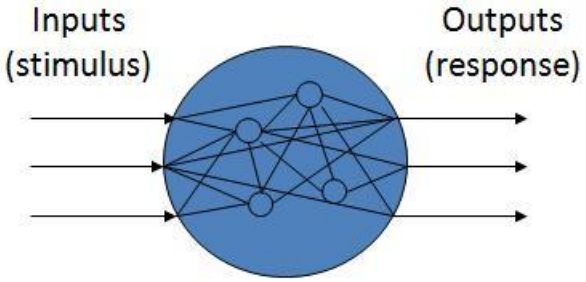


Fig. 1. Science is the study of cause-effect relationships for agents, whose internal workings usually involve other agents.

Consider an example. Somewhere I read that people who floss every day live six years longer than those who don't. The flossing is the stimulus, and the increased longevity is the response. The agent could be an individual, or it could a statistical statement about a whole society.

In fields like physics, we have the luxury of going into the laboratory and doing a controlled experiment on the agent. Even psychologists experiment with human subjects, but more often, when the agent is something like a galaxy, a society, or an economy, the best one can do is to make observations, attempting to correlate stimuli with responses. The difficulties are a paucity of data, a lack of adequate control, and the inability to distinguish correlation from causality. Those who floss are probably also engaging in other healthy activities.

A third approach is to use reductionism, in which one looks at the inner workings of the agent, where other simpler agents are found, and then try to develop a theory relating the response to the stimulus. Scientists are sometimes attacked for their theories by people who equate "theory" with "speculation" and who instead want to know the "facts." However, theories are much better than facts, since they provide understanding and prediction even outside the realm where they have been tested. If we had a theory for why flossing increases longevity, it might suggest alternate ways to achieve the same or even better result.

I'm glad there are people willing to devote their whole professional career to looking for the Higgs boson or understanding the nervous system of a worm. Reductionism has been a powerful scientific method, but it takes enormous patience, perseverance, and financial and human resources. Furthermore, even a complete understanding of the inner workings of an agent may not shed much light on the emergent behavior of the agent because of the multiple levels of complexity.

A common difficulty is that responses sometimes occur in the absence of any apparent cause, and there are many reasons for such nonstationarity. The agent may be remembering some event in the past, or perhaps the causes are not adequately identified or controlled, or there is noise or measurement error. However, even in a perfect experiment, the agent can exhibit a time-varying behavior due to some internal dynamic even when all the external stimuli are constant -- a common occurrence to which I will return shortly.

The simplest cause-effect relationship is linearity. Linearity does not mean a chain of causality in which *A* causes *B* which causes *C*, and so forth, but rather that the response is proportional to the stimulus. In the flossing example, it means that I would gain about one year of life by flossing weekly, or sixty years by flossing ten times a day. If I accepted the fact about flossing and believed in a linear model, I'd probably be flossing right now.

Furthermore, linearity means that the response to two or more stimuli is the sum of the responses to each individually. Doctor Mehmet Oz, a cardiothoracic surgeon, author, and television personality, claims that those who have 200 orgasms a year live six years longer, which sounds like more fun than all that flossing. Now maybe he means 200 orgasms a year is an optimum, and some of you need to cut back, but my point is that linearity says that I could gain twelve years by appropriately manipulating two parts of my anatomy.

If linear models make such nonsensical predictions, why would one even consider them? First of all, they are simple and provide a good starting point. Secondly, it turns out that most things are linear if the stimulus is sufficiently small. Finally, linear systems of equations can be solved exactly and unambiguously for any number of variables, although, as a practical matter, a computer may be required if the system is large.

It often happens that an agent is stimulated by its own response in a feedback loop, either directly or indirectly through other agents. Thus the effect becomes the cause, and the cause becomes the effect, like the chicken and the egg. The feedback can be either positive (reinforcing the response) or negative (inhibiting it). In such a case, time-varying dynamics can occur because of the inevitable time delay around the loop, and that time delay determines the time scale for the dynamics.

In a linear system with feedback, only four things can happen. Negative feedback leads to exponential decay or a decaying oscillation, while positive feedback leads to exponential growth or a growing oscillation. Positive feedback implies a source of energy or other resource from outside the system. A public address system exhibiting audio feedback will go silent if the power is removed. These four linear behaviors are rarely seen, especially unlimited exponential growth, because resources are limited and nature is not linear.

There are many possible nonlinearities. In two simple examples, the response increases monotonically with the stimulus but either slower than linear (diminishing returns) or faster than linear (economy of scale). An example of a mathematical function that is slower than linear is the square root, and one that is faster than linear is the square. I would argue that the former is more common since the response usually cannot increase without bound. Even if I could gain six years by flossing daily, it's unlikely that I could gain 144 years by flossing hourly or by having 13 orgasms a day. As someone said, "too much of anything is bad; otherwise it wouldn't be too much."

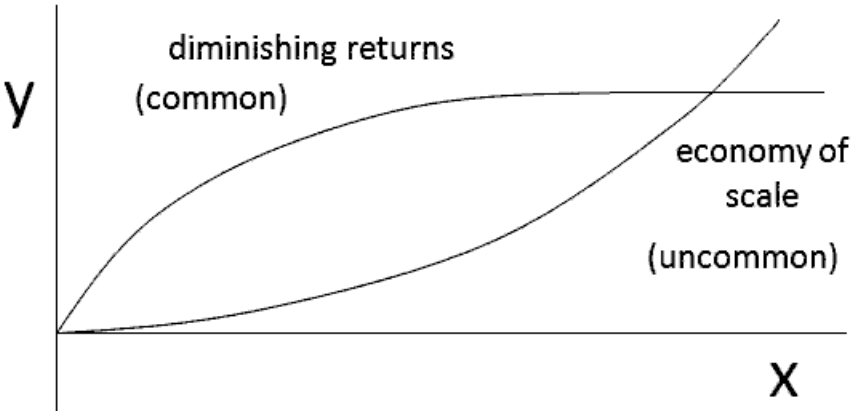


Fig. 2. Two simple examples of nonlinearities, one slower than linear and the other faster than linear.

Nonlinear agents with feedback can exhibit a wide variety of dynamics including the four linear behaviors already mentioned. They can have multiple stable equilibria. They can have stable periodic cycles. They can exhibit quasiperiodicty, which means a combination of periods. They can have bifurcations in which a small change in a parameter causes a completely different dynamic -- what Al Gore and others call a "tipping point." They can exhibit hysteresis, a form of memory in which the original behavior cannot be recovered after a bifurcation without making a large change in the opposite direction. They can have coexisting (or hidden) attractors, meaning that different dynamics are possible even for a given set of conditions, depending on the

past history of the system. And, of course, they can exhibit chaos in which a small change in the initial condition completely changes the future.

Most systems in the real world involve large networks of nonlinearly interacting agents. The ecological system, the climate system, the political system, and the economic system each involve numerous agents and are strongly coupled to one another. Of necessity, most scientists are studying a small part of a much larger network, hoping that the part not being studied can be treated as a fixed external stimulus. I think this often leads to erroneous conclusions and predictions, as does the implicit assumption of linearity and the disregard of feedback loops.

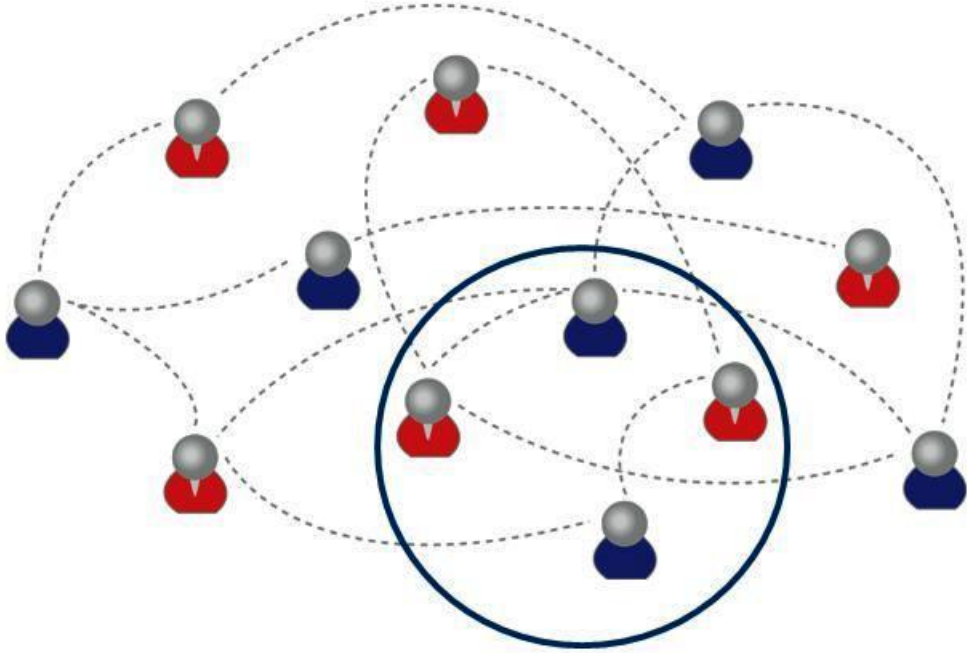


Fig. 3. Most scientists, of necessity, are studying a small part of a much larger network, hoping that the part not being studied can be treated as a fixed external stimulus, often leading to erroneous conclusions and predictions.

For example, if some species of animal consumes some species of plant as its primary food supply, and the abundance of that plant is suddenly reduced to half, we might naively assume that half the animals would die. However, it is much more likely that they would find a different source of food somewhere. Similarly, if global warming causes the sea level to rise a meter over the next century, it's unlikely that the hundred million people who now live along the coast will drown as a result, and much more likely that they (or rather their descendants) will simply migrate to higher ground, or perhaps they will build some simple dikes as the Dutch have done.

An alternate approach is to characterize the general behaviors of large nonlinear networks without regard to what they are modeling. This is an extension of the method used by mathematicians to characterize the nonlinear dynamics of simple systems. The task is made difficult (and interesting) by the fact that the architecture of a network (the connection strengths between the agents) can change in time even while the network is exhibiting dynamics, and the two types of dynamics are coupled. This distinction is sometimes called the dynamics OF the network as opposed to the dynamics ON the network. The neurons in the brain slowly reconnect even while the brain is actively performing tasks and in response to those activities. Curiously, an evolving network can always be exactly represented by a (sometimes much) larger network with static connections. What we need is a set of laws governing the behavior of large networks analogous to the laws of thermodynamics that describe the behavior of gases without the necessity of knowing what the individual molecules are doing or why or even that the gas is made up of molecules.

If I may digress for a moment, I would like to mention one accomplishment of which I'm especially proud. Twenty years ago, I became interested in the question of what is the simplest network that is capable of exhibiting chaos. One would think that question had long ago been asked and answered, but apparently not. I didn't originally think of the question in that way, but rather I was trying to find the simplest ordinary differential equation whose solution is chaotic, and it was only in preparing this lecture that I realized it was the same question. It has long been known that at least three agents are required and that at least one of them must be nonlinear, but I was able to show that only three feedback loops are required and how they are arranged (Sprott, 1997). Two years later Stefan Linz and

I found another equally simple arrangement (Linz & Sprott, 1999).

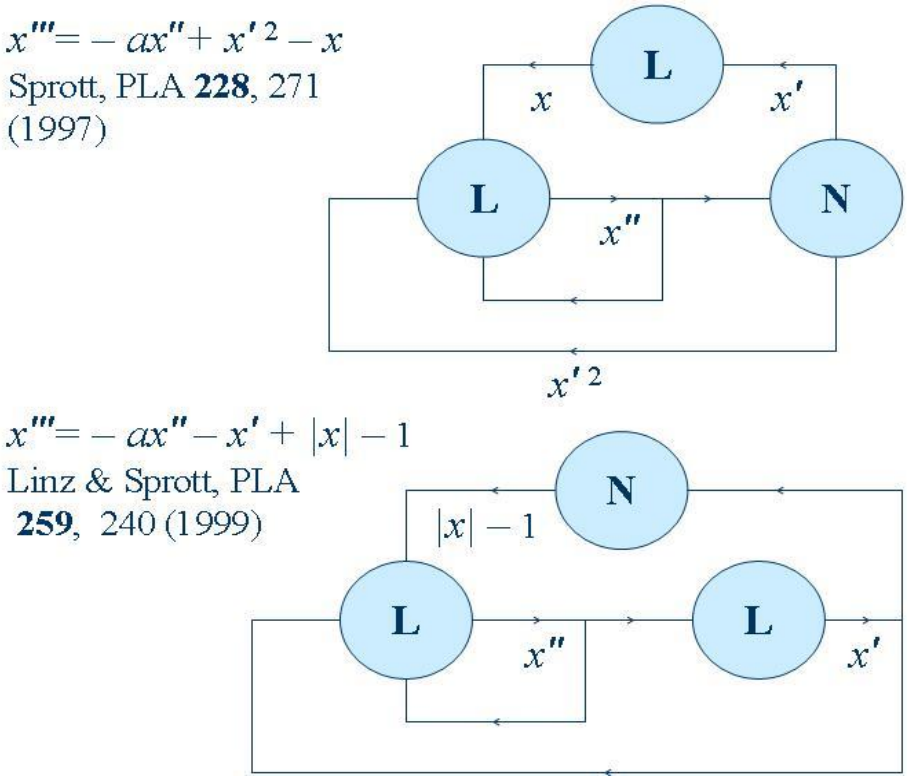


Fig. 4. The simplest nonlinear networks that are capable of exhibiting chaos.

Large nonlinear networks are appropriate models of complex adaptive systems of the type that occur throughout nature, and much has been learned recently about their behavior. In particular, they are usually chaotic, although only weakly so, and thus they are inherently unpredictable but sensitive to small changes in both the state of the system and the parameters, and thus potentially easily controllable. More interestingly, such systems can self-organize, adapt, and learn -- qualities we normally associate with human intelligence, but that are observed in physical systems as well. Witness the organization of the Universe into galaxies and stars and planets that ultimate gave rise to life on Earth.

In recent years, many people have made dire predictions, especially regarding the climate, the economy, and the ecology, but I am more optimistic than most about our future for five fundamental reasons:

(1) Negative feedback is at least as common as positive feedback, and it tends to regulate many processes.

(2) Most nonlinearities are beneficial, putting inherent limits on the growth of deleterious effects.

(3) Complex dynamical systems self-organize to optimize their fitness.

(4) Chaotic systems are sensitive to small changes, making prediction difficult, but facilitating control.

(5) Our knowledge and technology will continue to advance, meaning that new solutions to problems will be developed as they are needed or, more likely, soon thereafter in response to the need.

Whether it's fusion reactors, geoengineering, vastly improved batteries, self-driving cars, halting of the aging process, memory implants, de-extinction, or some other game changer, things may get worse before they get better, but humans are enormously ingenious and adaptable and will rise to the challenge of averting disaster. This is not a prediction that our problems will vanish or an argument for ignoring them. On the contrary, our choices and actions are the means by which society will reorganize to become even better in the decades to follow, albeit surely not a Utopia.

References

J. C. Sprott (1997), Simplest dissipative chaotic flow, *Physics Letters A 228*, 271-274.

S. J. Linz & J. C. Sprott (1999), Elementary chaotic flow, *Physics Letters A 259*, 240-245.

NONLINEAR DATAPALOOZA:

A New Kind of Conference for a New Kind of Science

January 28–31, 2015

Location: Chapman University, Orange CA, USA

About the Conference

David Pincus, Chairman

Most conferences are designed for presentations of completed or in process scientific or technical work. The goals for attending are for dissemination, citation, and critical feedback on a presenter's work. Secondary goals are networking to build colleagues with different skillsets or from different disciplines, exploring new methods, and coming up with new and creative avenues to explore. Traditional conferences are hierarchical, with experts presenting keynote talks and workshops in a didactic format.

The Nonlinear Datapalooza turns this process upside-down: no hierarchy, no finished work, and no boundaries to forming new collaborations and learning new methods. As the name suggests – the Nonlinear Datapalooza is all about getting together to analyze data. Who will be attending: (A) methods experts to obtain new data sets to analyze (B) people with data sets who would like to learn new approaches to analysis and (C) content experts and students who want to learn new methods and contribute as co-authors on some high quality publications. In the process, methodologists will learn about other disciplines and further validate their tools, while content experts and students will learn how to apply new methodologies to their work. Each attendee should be able to try out at least one new method and become an author on at least one original publication produced during the conference. At the same time, the work produced should make a serious impact on the field of nonlinear science, as we produce multiple papers with the potential to combine different methodologies.

Because of the novel incentives and goals of this conference, abstracts will not describe any completed work. Instead, abstracts will come in one of two forms: (1) An existing data-set owned by a researcher that would be appropriate for some sort of nonlinear analysis (i.e., time-series are obvious candidates, but other types of data can also be used to test structural hypotheses like catastrophes or dimensionality); (2) Knowledge of and access to a particular type of nonlinear analytic technique. More detail will follow in the official call. The conference will begin with a welcome banquet on Wednesday evening January 28 and run through Saturday morning January 31. Short presentations (15 minutes max) will run in one track through the day on Thursday, and groups will be formed based on each attendees rated interests that evening. Friday's activities will provide structure for each group to develop a research plan and for everyone to get a chance to analyze some data. The final Friday night closing banquet will allow each group to present their preliminary results to the larger group. Completed projects originating from the Nonlinear Datapalooza are strongly encouraged for submission to the 25th annual conference of SCTPLS in summer 2015 and for submission to the society's journal: Nonlinear Dynamics, Psychology, and Life Sciences.

CALL FOR ABSTRACTS

We invite interested researchers to share data, nonlinear methodologies, and content expertise in a comfortable, productive and unique collaborative environment. Abstracts will NOT describe completed work. Instead, abstracts will describe either: (1) a data set to share that would be ideal for testing some nonlinear hypothesis; (2) a nonlinear methodology in which you have expertise and the ability to teach to others; (3) a content area relevant to nonlinear science for which you could share your expertise. The primary goal of the Nonlinear Datapalooza is to connect people in each of these three roles to work together during the

conference on at least one publishable empirical paper within the 6 months following the conference. In the process, methods experts will be able to disseminate and train other researchers in their favorite nonlinear analyses; participants with data will get results and a hands on practical training in new nonlinear methodologies; and content experts will share their expertise with others as they gain hands on access to methods and data that will drive their scientific discovery. Our goal is for all participants to gain a significant bump in their productivity, through publication co-authorship, new analytic abilities, shared data, and ongoing collaborative relationships. Beyond the benefits to those participating, we expect that the Nonlinear Datapalooza will make a significant impact within the paradigm of nonlinear science by creating these productive collaborations, and by producing solid empirical results - ideally that employ a variety of converging nonlinear methodologies.

The Society for Chaos Theory in Psychology and Life Sciences is a multidisciplinary organization. The data sets and topics at the Nonlinear Datapalooza will ideally come from a variety of different areas of the behavioral, social and life sciences including psychology, sociology, economics, econophysics, management sciences, anthropology, aesthetics, education, biology, physiology, ecology, neuroscience and medicine. One or more of the following nonlinear concepts must be an explicit part of each participant's abstract: attractors, bifurcations, chaos, fractals, solitons, catastrophes, self-organizing processes, cellular automata, agent-based models, network analysis, genetic algorithms and related evolutionary processes, dynamical diseases, or closely related constructs. The broad mixture of the disciplines represented here indicates that many bodies of knowledge share common principles - which we hope will be one of the most rewarding parts of the Datapalooza Experience.

The program will be Spartan in its simplicity, one track of 15 minute presentations running through the first full day to allow other participants to gain an introductory sense of either your data set, your method, or your area of content expertis. An affinity rating system will be employed to allow each participant to determine the team(s) they would most like to join. Selected abstracts will also be posted the conference web-site to facilitate infrmal networking and pre-conference planning. The second full day of the conference will be filled with structured work activity to produce a plan of research, data analysis experience for each group member, and hopefully some interesting initial results to share with the other teams at the closing banquet. Selected abstracts will also be posted by late November to facilitate informal exchanges and pre-conference planning.

Because of the special nature of this conference, it will be limited in size to a maximum of 30 participants, which will allow for the emergence of between four and six research teams.

VENUE

Our meetings will be held at the beautiful campus of **Chapman University, Orange CA**. Additional information about these facilities and local attractions will be posted to the lodging page or the local logistics page of this conference web site.

INSTRUCTIONS FOR ABSTRACTS

Abstracts should be between 250-500 words, covering the following areas: (1) a very brief bio; (2) a clear and simple description of either your expertise you would like to share (i.e., your method, your data-set, or your content area). In the process be sure to include clear connection to nonlinear dynamical systems, a detailed description of any additional resources you would need, and a description of the types of team-mates you would most like to work with (e.g., someone with expertise in this or that area, access to this or that methodology, data of this type or variety). Links to additional information (e.g., papers, web-sites) that would help to contextualize your most desired role within a team are also welcome.

IMPORTANT: Anyone submitting an abstract for a methodology must be able to bring that methodology in full working order and in a format that would allow others to share in its use (e.g., on his or her own computer or software that can be downloaded quickly during the conference). Similarly, any participant

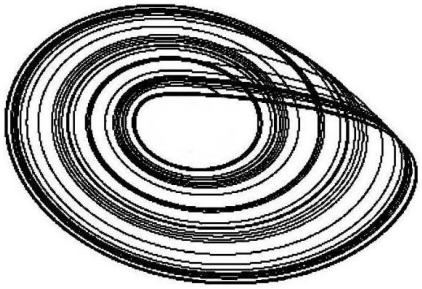
bringing data to share must have their data in an easily sharable format (e.g., a basic spread-sheet) and be rightfully and ethically able to share with other researchers (e.g., de-identified).

Each person submitting is limited to a maximum of three abstracts (e.g., two methods and one content area), and it is possible that more than one team-role would be accepted for any single conference participant.

www.societyforchaostheory.org/event/datapalooza2015

****Trouble submitting?****

If your submission is recieved successfully you will be taken to a confirmation page, with a link to follow for any future edits. If you have repeated trouble making your submission, as a back-up option please feel free to send all of the relevant submission information directly to David Pincus: pincus@chapman.edu, the conference chair, who can make sure that your submission is successfully loaded into the system.



News from SCTPLS Labs

Arnold Fleishman

I invite you to take part in the 5th All-Russian school with international participation «Nonlinear dynamics and innovative technologies in medicine and physiology" and VII all-Russian Symposium "Heart rate variability and slow oscillatory processes in human body," May 26th - 29th 2015. The Symposium and School are held with the purpose of further development of fundamental bases of this direction and for solving applied problems in the field of health preservation and preventive measures. Theoretical and methodological aspects will be addressed within the School by the leading experts in this field. Applied clinical aspects will be addressed in the reports of participants of the 7th All-Russian Symposium "Heart rate variability and slow oscillatory processes in human body" within neuroautonomic regulation of the organism functions, in particular neurocardiology. **A.N.**

Fleishman, MD is head of laboratory of physiology of slow wave processes. FSBI "Research Institute for Complex Problems of Hygiene and Occupational Diseases" SB RAMS. Novokuznetsk, Russia.

David A Katerndahl, M.D.,M.A.

I am working on two research studies on intimate partner violence. The first, funded by the National Science Foundation, seeks to understand the nonlinear nature of decision-making among women in violent relationships. The second, funded by the National Institute on Alcohol Abuse and Alcoholism, seeks to use state space grids to understand the relationship between alcohol intake and violence in violent couples.

The Dr. Mario E. Ramirez Distinguished Professor,
Family and Community Medicine,
University of Texas Health Science Center at San Antonio, Email: katerndahl@uthscsa.edu

Krystyna Laycraft

Krystyna Laycraft has two new book announcements. The first is the second edition of: Title: ***Creativity as***

an Order through Emotions **(2014).** Look for further description in the Nonlinear Dynamical Bookshelf, this issue. The second is:
Laycraft, K. C. ***Feeling life: Patterns of Emotions*** **(2014), Victoria, BC.** She tell us: The book has emerged through the process of reflective meditation. I reflected on and deeply explored my actions, choices, and decisions. My persistence in the process of understanding, interpreting and evaluating led to the discovery of unexpected and surprising aspects of my life. I discovered a richness of emotions I had experienced during these significant events in my life and how these emotions guided me through complex, and very often difficult and challenging situations. I organize this book into twenty chapters and at the end of each chapter, I summarize and analyze the emotions that were experienced during the specific episode, and then generate the emotional patterns by applying Plutchik's Theory of Emotions. These patterns served as a conceptual tool to enhance an understanding of the role of emotions in my life.

Alan McDonnell

This summer I had a review of emotional contagion in groups published in the Journal of Brain and Behavioral Science in July with a hypothesis of stochastic resonation being amplified by para magnetic proteins above a certain metabolic level implicitly activated in unconscious danger responses.Stochastic processes are hypothesized as involved in both internal brain data flows in neuronal processing of emotional data content and interpersonal data transfers. Experimentally likely to be both a larger team effort due to all the different disciplines involved, as well as very challenging for anyone interested in taking it on and probably likely to lead to hair loss - from experimenters pulling their own hair out.
Next area of interest is evolution, epigenetics and societal behaviours although I will be a bit short of time over the year to come due to other obligations, so publication date is uncertain.

Emergent Dynamic Technologies Ltd
alan@emergentdynamictechnologies.co.uk

Gail R. Williams, MD, MSc
grwhnh@charter.net

At the Orange, CA SCTPLS meeting I presented some thoughts about the implications of chaos theory for suicide prediction. I continue to work full-time as Chief of Psychiatry, Mississippi State Penitentiary, Parchman, MS. We have 3,400 inmates at all levels of security, including death-sentenced inmates, and our mental health team is expected to prevent suicides. We have had no suicides for several years. How come? That is what I am trying to learn more about! Who predicted the suicide of Robin Williams? He had a high score on deterministic risk factor analysis, but so did many others, like Beethoven and Verdi, who died of natural causes. I would appreciate help from nonlinear science experts to deepen our understanding of suicide prediction and prevention.

Job Posting

Nick Stergiou

ASSISTANT/ASSOCIATE PROFESSOR - CENTER FOR RESEARCH IN HUMAN MOVEMENT VARIABILITY

The University of Nebraska at Omaha (UNO) invites applications for two tenure track positions as assistant/associate professor. These positions became available due to our recent Center of Biomedical Research Excellence (COBRE) award. The objective of our COBRE is to establish a Center for Research in Human Movement Variability. The University of Nebraska at Omaha has a strong commitment to achieving diversity among faculty and staff. We are particularly interested in receiving applications from members of under-represented groups and strongly encourage women and persons of color to apply for this position. Anticipated Starting Date is August 17, 2015. Duties: Conduct biomedical research and participate in scholarly activity with a defined focus on human movement variability as it relates to health related issues such as falls in the elderly, movement disorders, sensorimotor disabilities, etc.; supervise graduate students; obtain external funding; develop effective collaboration with clinical partners; teach courses in area of preparation; complement the research of existing Center members; provide departmental, university and professional service. Required Qualifications: Doctoral degree in biomechanics, motor control, biomedical engineering, or related area. ABD Considered. Preferred Qualifications: Post-doctoral experience; established record of scholarly activity with a strong commitment to biomedical research with respect to human movement variability; established record of external funding. Salary and Start-up: Salary is competitive and commensurate with qualifications and experience. An excellent start-up package is included as part of our COBRE.

General Information:The Center for Research in Human Movement Variability resides in the School of Health Physical Education and Recreation. Within the School, the Exercise Science/Physical Education Program offers undergraduate degrees in Exercise Science, Teacher Preparation, and Athletic Training. It offers Master's degrees in Exercise Science, Physical Activity in Health Promotion, Pedagogy and Coaching. A PhD in Exercise Science is available with concentrations in Biomechanics, Exercise Physiology, Motor Development/Control and Physical Activity. The

Biomechanics Research Building (BRB) is located on the campus of the University of Nebraska at Omaha. The two-story building boasts 23,000 square feet of laboratory, office and collaboration space. The new building features seven laboratories, patient evaluation room, changing rooms, machine shop, washroom, two conference rooms, data processing room, a library, numerous faculty offices and student workstations. The BRB was established for the purpose of developing a new understanding of the dynamical aspects of human movement. This is an excellent environment where engineers, scientists and clinicians get together to gain additional insights on healthy and abnormal movement patterns. The BRB has strong ties with the University of Nebraska Medical Center, the Omaha Veteran Affairs Medical Center, the Creighton University Medical Center, and the University of Nebraska Lincoln College of Engineering. These strong relationships and the close proximity of these facilities provide the laboratory with immediate access to patients with neuromuscular disorders, clinicians in various domains, and engineers. Application: Apply online at www.unomaha.edu attach a letter of application, curriculum vita, research plan, and names of five references, including addresses, e-mail addresses, and telephone numbers. Review of applications will continue until filled. Additional information contact: Dr. Nick Stergiou, Director of the Center for Research in Human Movement Variability and the Biomechanics Research Building, University of Nebraska at Omaha, Omaha, NE 68182. E-mail: nstergiou@unomaha.edu Telephone: 402-554-3247

Phil Salem

Phil Salem announces his new book: *The complexity of human communication* (2nd ed.). Cresskill, NJ: Hampton Press. Look for further description in the Nonlinear Dynamical Bookshelf, this issue.

Ken Ware

Ken opened his new NeuroPhysics Institute in metro Brisbane, Australia in January, 2014. The Institute specializes in training for elite athletes and rehabilitation (for everyone). His recent accomplishments in the rehabilitation area were featured on the Australian edition of the TV news show *60 Minutes*. More information about Ken's unique approach and video links can be found in his discussion entries on SCTPLS' discussion board on Linked-In.

Argyros, I. K., & Hilout, S. (2013). Computational methods in nonlinear analysis: Efficient algorithms, fixed point theory and applications. Singapore: World Scientific. The field of computational sciences has seen a considerable development in mathematics, engineering sciences, and economic equilibrium theory. Researchers in this field are faced with the problem of solving a variety of equations or variational inequalities. We note that in computational sciences, the practice of numerical analysis for finding such solutions is essentially connected to variants of Newton's method. The efficient computational methods for finding the solutions of fixed point problems, nonlinear equations and variational inclusions are the first goal of the present book. The second goal is the applications of these methods in nonlinear problems and the connection with fixed point theory. This book is intended for researchers in computational sciences, and as a reference book for an advanced computational methods course in nonlinear analysis. We collect the recent results on the convergence analysis of numerical algorithms in both finite-dimensional and infinite-dimensional spaces, and present several applications and connections with fixed point theory. The book contains abundant and updated bibliography, and provides comparison between various investigations made in recent years in the field of computational nonlinear analysis.

Bosma, H. A., & Kunnen, E. S. (Eds.). (2005). *Identity and emotion : Development through self-organization*. New York: Cambridge University Press. Identity and Emotion focuses on the individual development of identity and the processes involved. By

working from a dynamic systems perspective the book offers a new and exciting approach to human identity and its development across the lifespan. The contributors to the book are specialists in this new approach, and offer new and challenging ideas on the development of identity as a self-organizing process. The book offers a wealth of new ideas and insights, but also concentrates on the ways these insights can be translated into research.

Byrne, D., & Callaghan, G. (2014). *Complexity theory and the social sciences: The state of the art*. Routledge/Taylor and Francis. For the past two decades, "complexity" has informed a range of work across the social sciences. There are diverse schools of complexity thinking, and authors have used these ideas in a multiplicity of ways, from health inequalities to the organization of large-scale firms. Some understand complexity as emergence from the rule-based interactions of simple agents and explore it through agent-based modeling. Others argue against such "restricted complexity" and for the development of case-based narratives deploying a much wider set of approaches and techniques. Major social theorists have been reinterpreted through a complexity lens and the whole methodological programme of the social sciences has been recast in complexity terms. –Back cover.

Farmer, M. F. (2014). *Application of chaos and fractals to computer vision*. Sharjah, UAE: Bentham Books. ISBN: 978-1-60805-901-0. This book provides a thorough investigation of the application of chaos theory and fractal analysis to computer vision. The field of chaos theory has been studied in dynamical physical systems, and has been very successful in providing computational models for very complex problems ranging from weather systems to neural pathway signal propagation. Computer vision researchers have derived motivation for their algorithms from biology and physics for many years as witnessed by the optical flow algorithm, the oscillator model underlying graphical cuts and of course neural networks. These algorithms are very helpful for a broad range of computer vision problems like motion segmentation, texture analysis and change detection. The contents of this book include chapters in biological vision systems, foundations of chaos and fractals, behavior of images and image sequences in phase space, mathematical measures for analyzing phase space, applications to pre-attentive vision and applications to post-attentive vision.

Jadczyk, A. (2014). *From Heisenberg's uncertainty to Barnsley's fractality*. Singapore: World Scientific. Starting with numerical algorithms resulting in new kinds of amazing fractal patterns on the sphere, this book describes the theory underlying these phenomena and indicates possible future applications. The book also explores the following questions: What are fractals? How do fractal patterns emerge from quantum observations and relativistic light aberration effects? What are the open problems with iterated function systems based on Mobius transformations? Can quantum fractals be experimentally detected? What are quantum jumps? Is quantum theory complete and/or universal? Is the standard interpretation of Heisenberg's uncertainty relations accurate? What is Event Enhanced Quantum Theory and how does it differ from spontaneous localization theories? What are the possible applications of quantum fractals?

Kazumufi, I., & Bangti, J. (2014). *Inverse problems: Tikhonov theory and algorithms*. Singapore: World Scientific. ISBN: 978-981-4596-19-0. Inverse problems arise in practical applications whenever one needs to deduce unknowns from observables. This monograph is a valuable contribution to the highly topical field of computational inverse problems. Both mathematical theory and numerical algorithms for model-based inverse problems are discussed in detail. The mathematical theory focuses on nonsmooth Tikhonov regularization for linear and nonlinear inverse problems. The computational methods include nonsmooth optimization algorithms, direct inversion methods and uncertainty quantification via Bayesian inference. The book offers a comprehensive treatment of modern techniques, and seamlessly blends regularization theory with computational methods, which is essential for developing accurate and efficient inversion algorithms for many practical inverse problems. It demonstrates many current developments in the field of computational inversion, such as value function calculus, augmented Tikhonov regularization, multi-parameter Tikhonov regularization, semismooth Newton method, direct sampling method, uncertainty quantification and approximate Bayesian inference. It is written for graduate students and researchers in mathematics, natural science and engineering.

Laycraft, K.C. *Creativity as an Order through Emotions,* Promontory Press, Victoria, BC, Canada

The book contains three parts. In the first part, the basic concepts of chaos theory and the idea of self-organization are introduced. Some contemporary approaches to emotions are also discussed. In the second part, the lives of young people are presented and by applying these theories, their psychological development and creative processes are interpreted and analyzed. Finally, in the third part, a conceptual model of creativity development is discussed. The book shows how studying the creativity of adolescents has contributed to research on the psychological development of young people as a self-organizing process.

Lichtenstein, B. (2014). *Generative Emergence: A New Discipline of Organizational, Entrepreneurial, and Social Innovation*. New York: Oxford University Press. How do organizations become created? Entrepreneurship scholars have debated this

question for decades, but only recently have they been able to gain insights into the non-linear dynamics that lead to organizational emergence, through the use of the complexity sciences. Written for social science researchers, *Generative Emergence* summarizes these literatures, including the first comprehensive review of each of the 15 complexity science disciplines. In doing so, the book makes a bold proposal for a discipline of Emergence, and explores one of its proposed fields, namely Generative Emergence. The book begins with a detailed summary of its underlying science, dissipative structures theory, and rigorously maps the processes of order creation discovered by that science to identify a 5-phase model of order creation in entrepreneurial ventures. The second half of the book presents the findings from an experimental study that tested the model in four fast-growth ventures through a year-long, week-by-week longitudinal analysis of their processes, based on over 750 interviews and 1000 hours of on-site observation. These data, combined with reports from over a dozen other studies, confirm the dynamics of the 5-phase model in multiple contexts. By way of conclusion, the book explores how the model of Generative Emergence could be applied to enact emergence within and across organizations.

Lines, **Marji (Ed.) (2005). *Nonlinear Dynamical Systems in Economics*. New York: Springer.** Many problems in theoretical economics are mathematically formalized as dynamical systems of difference and differential equations. In recent years a truly open approach to studying the dynamical behavior of these models has begun to make its way into the mainstream. That is, economists formulate their hypotheses and study the dynamics of the resulting models rather than formulating the dynamics and studying hypotheses that could lead to models with such dynamics. This is a great progress over using linear models, or using nonlinear models with a linear approach, or even squeezing economic models into well-studied nonlinear systems from other fields. There are today a number of economic journals open to publishing this type of work and some of these have become important. There are several societies which have annual meetings on the subject and participation at these has been growing at a good rate. And of course there are methods and techniques avail able to a more general audience, as well as a greater availability of software for numerical and graphical analysis that makes this type of research even more exciting. The lecturers for the Advanced School on Nonlinear Dynamical Systems in Economics, who represent a wide selection of the research areas to which the theory has been applied, agree on the importance of simulations and computer-based analysis. The School emphasized computer applications of models and methods, and all contributors ran computer lab sessions.

Lucas, K., & Roosen, P. (Eds.). (2012). *Emergence, Analysis and Evolution of Structures*. New York: Springer. ISBN 978-3-642-00869-6. The study of structures and structure generating processes is a common concern of all scientific and technical disciplines. The present volume presents an interdisciplinary investigation of the different methods of analysis and modelling which, while differing considerably in detail, usually have evolutionary adaption or development schemes at their core. The book naturally falls into three parts - a first part summarizing the transdisciplinary fundamentals, a second part discussing in detail case studies from various fields (production engineering, medicine, management, molecular biology, energy engineering, civil engineering, logistics, sociology, physics) and a shorter outlook on the transdisciplinary perspective.

Ma, **J.**, **& Wohar, M. (Eds.). (2014). *Recent Advances in Estimating Nonlinear Models: With Applications in Economics and Finance*. New York: Springer.** This edited volume provides a timely overview of nonlinear estimation techniques, offering new methods and insights into nonlinear time series analysis. The focus is on such topics as state-space model and the identification issue, use of Markov Switching Models and Smooth Transition Models to analyze economic series, and how best to distinguish between competing nonlinear models. Most economic theory suggests that the economic relationships among economic variables in the real world are fairly complex and nonlinear. Nonlinear models are necessary to capture these important channels through which economic variables can influence each other and various policies can affect economic activities. This volume features cutting-edge research from leading academics in economics, finance, and business management. The principles and techniques used here will appeal to econometricians, finance professors teaching quantitative finance, researchers, and graduate students interested in learning how to apply advances in nonlinear time series modeling to solve complex problems in economics and finance. *Contents:* Chapter 1 Stock Return and Inflation: An Analysis Based on the State-Space Framework.- Chapter 2 Diffusion Index Model Specification and Estimation: Using Mixed Frequency Datasets.- Chapter 3 Testing for Neglected Nonlinearity Using Regularized Artificial Neural Networks.- Chapter 4 On the Use of the Flexible Fourier Form in Unit Roots Tests, Endogenous Breaks, and Parameter Instability.- Chapter 5 Testing for a Markov-Switching Mean in Serially-Correlated Data.- Chapter 6 Nonlinear Time Series Models and Model Selection.- Chapter 7 Nonstationarities and Markov Switching Models.- Chapter 8 Has Wealth Effect Changed Over Time? Evidence from Four Industrial Countries.- Chapter 9 A Simple Specification Procedure for the Transition Function in Persistent Nonlinear Times Series Models.- Chapter 10 Small Area Estimation with Correctly

Specified Linking Models.- Chapter 11 Forecasting Stock Returns: Does Switching between Models Help?.- Chapter 12 The Global Joint Distribution of Income and Health.

Mazza C., & Benaim, M. (2014). *Stochastic dynamics for systems biology*. Boca Raton, FL: CRC Press. Get Insight on Simulating Biological Processes. This is one of the first books to provide a systematic study of the many stochastic models used in systems biology. The book shows how the mathematical models are used as technical tools for simulating biological processes and how the models lead to conceptual insights on the functioning of the cellular processing system. Examples cover the phage lambda genetic switch, eukaryotic gene expression, noise propagation in gene networks, and more.

Mortad, H. M. (2014). *Introductory topology*. Boca Raton, FL: CRC Press. ISBN: 978-981-4583-81-7. The book offers a good introduction to topology through solved exercises. It is mainly intended for undergraduate students. Most exercises are given with detailed solutions. Contents: Exercises and Solutions: General Notions: Sets, Functions et al., Metric Spaces, Topological Spaces, Continuity and Convergence, Compact Spaces, Connected Spaces, Complete Metric Spaces, Function Spaces.

Nicolis, G., & Basios, V. (Eds.). (2014). *Chaos, information processing, and paradoxical games: The Legacy of John S Nicolis*. Singapore: World Scientific. This volume provides a self-contained survey of the mechanisms presiding information processing and communication. The main thesis is that chaos and complexity are the basic ingredients allowing systems composed of interesting subunits to generate and process information and communicate in a meaningful way. Emphasis is placed on communication in the form of games and on the related issue of decision making under conditions of uncertainty.

Nicolis, G., & Nicolis, N. (2014). *Foundations of Complex Systems: Emergence, Information and Prediction* (2nd Edition). Singapore: World Scientific. ISBN: 978-981-4366-60-1. This book provides a self-contained presentation of the physical and mathematical laws governing complex systems. Complex systems arising in natural, engineering, environmental, life and social sciences are approached from a unifying point of view using an array of methodologies such as microscopic and macroscopic level formulations, deterministic and probabilistic tools, modeling and simulation. The book can be used as a textbook by graduate students, researchers and teachers in science, as well as non-experts who wish to have an overview of one of the most open, markedly interdisciplinary and fast-growing branches of present-day science.

Novikov, D. A., & Alexander G. Chkhartishvili (2014). *Reflexion and control: Mathematical models*. Boca Raton, FL: Chapman & Hall/CRC. Intended for experts in decision making and control of systems, this book is dedicated to modern approaches to mathematical modeling of reflexive processes in control. The book discusses development of modern trends in game theory, Integrates mathematics, psychology, and other cognitive sciences, uses uniform methodology and mathematical framework to describe and analyze various situations of collective decision making, and considers reflexive games that describe the game theoretical interaction of agents making decisions based on a hierarchy of beliefs.

Rosser, J. B., Holt, R. P. F. & Colander, D. (2010). *European economics at a crossroads*. Cheltenham, UK: Edward Elgar. As Europe moves toward an integrated academic system, European economics is changing. This book discusses that change, along with the changes that are happening simultaneously within the economics profession. The authors argue that modern economics can no longer usefully be described as ǹeoclassical', but is much better described as complexity economics. The complexity approach embraces rather than assumes away the complexities of social interaction. The authors also argue that despite all the problems with previous European academic structures, those structures allowed for more diversity than exists in US universities, and thus were often ahead of US universities in exploring new cutting-edge approaches. The authors further argue that by trying to judge themselves by US-centric measures and to copy US universities the European economics profession is undermining some of the strengths of the older system - strengths on which it should be building. While the authors agree that European economics needs to go through major changes in the coming decade, they argue that by building on Europe's strengths, rather than trying to follow a US example, Europe will be more likely to become the global leader in economics in the coming decades rather than a second-rate copy of the US. The book consists of two chapters spelling out the authors' view of the changes in economics and European economics. This is followed by 11 interviews with a diverse set of innovative European economists from a range of European countries. In the interviews these European economists reflect on the ongoing changes in economics generally and in European economics specifically. These interviews demonstrate how the economics profession is moving away from traditional neoclassical economics into a dynamic set of new methods and approaches (incorporating work in behavioral economics, experimental economics, evolutionary game theory and ecological approaches, complexity and nonlinear dynamics, methodological analysis, and agent-based modeling) that the authors classify as complexity economics.

Ruth, M., & Hannon, B. (2012). *Modeling Dynamic Economic Systems* (2nd ed.).New York: Springer. Models in this book were created using STELLA software. Economists model the ways in which humans meet their needs using given endowments of resources and technologies. This book explores the dynamic processes in economic systems, concentrating on the extraction of resources that are required to meet economic needs. Using the STELLA® software, *Modeling Dynamic Economic Systems* applies methods of computer modeling to a wide range of real-world economic phenomena, demonstrating how to make informed decisions about economic performance and environmental quality. Sections of the book cover: methods for dynamic modeling economics with special emphasis on the microeconomic models of firms, modeling optimal use of both nonrenewable and renewable resources, and chaos in economic models. The book does not require a substantial background in mathematics or computer science and encourages all students and scholars to actively incorporate modeling into their education and research. A save-disabled version of STELLA and the computer models of this book are available at www. iseesystems.com/modelingeconomicsystems.

Salem, P. J. (2013). *The complexity of human communication* (2nd ed.). Cresskill, NJ: Hampton Press.

Most communication research and most applications of that research acknowledge the process nature of communication. However, the material following that acknowledgment conforms to traditional linear and static approaches treating communication as little more than printed text. This Print Paradigm persists despite repeated calls to explore the more dynamic nature of communication. In this second edition, the author updates and expands his argument that communication is a process analogous to the complexity of other living systems. The author reviews material stretching over three centuries leading to the development of paradigmatic principles. He describes human information processing as an autocatalytic process and provides a model of human communication as a socially emergent process. The author then applies the model to current thinking across a range of common communication topics. The second edition concludes with two glossaries: a communication glossary for complexity researchers and a complexity glossary for communication researchers.

Sibani, P., & Jensen, H. J. (2013). *Stochastic dynamics of complex systems from glasses to evolution.* Singapore: World Scientific. ISBN: 978-1-84816-993-7. Dynamical evolution over long time scales is a prominent feature of all the systems we intuitively think of as complex — for example, ecosystems, the brain or the economy. In physics, the term ageing is used for this type of slow change, occurring over time scales much longer than the patience, or indeed the lifetime, of the observer. The main focus of this book is on the stochastic processes which cause ageing, and the surprising fact that the ageing dynamics of systems which are very different at the microscopic level can be treated in similar ways. The first part of this book provides the necessary mathematical and computational tools and the second part describes the intuition needed to deal with these systems. Some of the first few chapters have been covered in several other books, but the emphasis and selection of the topics reflect both the authors' interests and the overall theme of the book. The second part contains an introduction to the scientific literature and deals in some detail with the description of complex phenomena of a physical and biological nature, for example, disordered magnetic materials, superconductors and glasses, models of co-evolution in ecosystems and even of ant behaviour. These heterogeneous topics are all dealt with in detail using similar analytical techniques. This book emphasizes the unity of complex dynamics and provides the tools needed to treat a large number of complex systems of current interest. The ideas and the approach to complex dynamics it presents have not appeared in book form until now.

Tsonis, A. A. (2008). *Randomnicity: Rules and randomness in the realm of the infinite*. Singapore: World Scientific. ISBN: 978-1-84816-197-9. This unique book explores the definition, sources and role of randomness. A joyful discussion with many non-mathematical and mathematical examples leads to the identification of three sources of randomness: randomness due to irreversibility which inhibits us from extracting whatever rules may underlie a process, randomness due to our inability to have infinite power (chaos), and randomness due to many interacting systems. Here, all sources are found to have something in common: infinity. The discussion then moves to the physical system (our universe). Through the quantum mechanical character of small scales, the second law of thermodynamics and chaos, randomness is shown to be an intrinsic property of nature — this is consistent with the three sources of randomness identified above. Finally, an explanation is given as to why rules and randomness cannot exist by themselves, but instead have to coexist. Many examples are presented, ranging from pure mathematical to natural and social processes, that clearly demonstrate how the combination of rules and randomness produces the world we live in.

Vallacher, R.R., Coleman, P.T., Nowak, A., Bui-Wrzosinska, L., Liebovitch, L., Kugler, K., Bartoli, A. (2013). *Attracted to conflict: Dynamic foundations of destructive social relations*. New York: Springer. ISBN 978-3-642-35279-9. Conflict is inherent in virtually every aspect of human relations, from sport to parliamentary democracy, from fashion in

the arts to paradigmatic challenges in the sciences, and from economic activity to intimate relationships. Yet, it can become among the most serious social problems humans face when it loses its constructive features and becomes protracted over time with no obvious means of resolution. This book addresses the subject of intractable social conflict from a new vantage point. Here, these types of conflict represent self-organizing phenomena, emerging quite naturally from the ongoing dynamics in human interaction at any scale—from the interpersonal to the international. Using the universal language and computational framework of nonlinear dynamical systems theory in combination with recent insights from social psychology, intractable conflict is understood as a system locked in special attractor states that constrain the thoughts and actions of the parties to the conflict. The emergence and maintenance of attractors for conflict can be described by means of formal models that incorporate the results of computer simulations, experiments, field research, and archival analyses. Multi-disciplinary research reflecting these approaches provides encouraging support for the dynamical systems perspective. Importantly, this text presents new views on conflict resolution. In contrast to traditional approaches that tend to focus on basic, short-lived cause-effect relations, the dynamical perspective emphasizes the temporal patterns and potential for emergence in destructive relations. Attractor deconstruction entails restoring complexity to a conflict scenario by isolating elements or changing the feedback loops among them. The creation of a latent attractor trades on the tendency toward multi-stability in dynamical systems and entails the consolidation of incongruent (positive) elements into a coherent structure. In the bifurcation scenario, factors are identified that can change the number and types of attractors in a conflict scenario. The implementation of these strategies may hold the key to unlocking intractable conflict, creating the potential for constructive social relations.

Vialar, T. (2009)*. Complex and chaotic nonlinear dynamics: Advances in economics and finance, mathematics and statistics*. New York: Springer. Presents comprehensive and interdisciplinary knowledge on complex dynamics. Complex dynamics constitute a growing and increasingly important area as they offer a strong potential to explain and formalize natural, physical, financial and economic phenomena. This book pursues the ambitious goal to bring together an extensive body of knowledge regarding complex dynamics from various academic disciplines. Beyond its focus on economics and finance, including for instance the evolution of macroeconomic growth models towards nonlinear structures as well as signal processing applications to stock markets, fundamental parts of the book are devoted to the use of nonlinear dynamics in mathematics, statistics, signal theory and processing. Numerous examples and applications, almost 700 illustrations and numerical simulations based on the use of Matlab make the book an essential reference for researchers and students from many different disciplines who are interested in the nonlinear field. An appendix recapitulates the basic mathematical concepts required to use the book.

SCTPLS 2015

SAVE THE DATE: The 25th Annual International SCTPLS Conference is scheduled for Gainesville, Florida (USA) July 29-31, 2015. Watch this space for the CALL FOR PAPERS, impending special guests, dinner with a woolly mammoth, and other good stuff.

Wonderful Webbage

The RESOURCES FOR STUDENTS and TEACHERS on the SCTPLS web site have been overhauled. So much so that it needed a new table of contents at the front end. The "page" contains four menus of additional resources, including readings lists, tutorial powerpoints, software downloads, etc.

If undeliverable, return to:
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And if we're all good boys and girls,
we get to meet Bobbi the Fractal Dog.
Newsletter Editor: Gaetano Aiello