Society for Chaos Theory in Psychology & Life Sciences

NEWSLETTER

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Dave Pincus 2011 Conference Chair

21st Annual International Conference

THE SOCIETY FOR CHAOS THEORY IN PSYCHOLOGY & LIFE SCIENCES

August 4-6, 2011
Chapman University, Orange California USA

This year, August 4-6 2011, will bring the 21th SCTPLS international conference to sunny Orange, California. For our 20th anniversary celebration, we are expecting a large and particularly diverse turnout, as our founding members come home to serve as our foundation, and newer members revitalize the program with novelty and curiosity. The keynote speakers are prepared to bring you up to date on the state of nonlinear science in human development and human coordination dynamics. Our full day nonlinear methods workshop will provide you with the tools you've needed to understand and apply nonlinear measures to your own areas of interest. While the meat of the conference is emerging right now, with dozens of workshops, symposia, paper and poster sessions – including your sessions. You will not want to miss the chance to consult and collaborate with your international colleagues in psychology, physics, medicine, mathematicians, biology and business who will be gathering in southern California for our 20th anniversary. Submit your abstract today. Go to: www.societyforchaostheory.org/conf/2011 and visit our conference page to submit your abstract through our on-line portal, and begin your plans to participate in the best conference in nonlinear dynamics ever held.

All published abstracts are invited to submit their papers to Nonlinear Dynamics, Psychology, and Life Sciences, our top tier interdisciplinary journal focusing on nonlinear science, which has reached its highest impact and immediacy ratings on record, 2.596 and .817 respectively. Outside of our own journal, top journals across the disciplines have continued to expand their content in nonlinear dynamics over the past academic year, and top book publishers are continuing to solicit single author and edited volumes from our members. The 20th anniversary of SCTPLS is the ideal time for publishing in nonlinear science and applications; don't miss the chance to meet and collaborate with your co-authors this summer.

Some critical conference dates: March 8 (Tuesday), early-bird abstract submissions will receive a reply after this date; April 29 (Friday), call for proposals closes; May 17 (Tuesday), all acceptances finalized by Program Chair. Everyone is looking forward to seeing you at the conference this summer.

Full Day Workshop on Nonlinear Methods

Methodologies provide a doorway to new information, the advancement of theory, and development of new applications. The Society for Chaos Theory in Psychology and Life Sciences (SCTPLS) is pleased to announce a full day pre-conference workshop covering a range of nonlinear methodologies that are well suited to broad and interdisciplinary applications across psychology, social sciences, and life sciences.

The workshop is scheduled from **8:30 AM to 5:00 PM, Thursday, August 4, 2011** – kicking off the 21st Annual International Conference at Chapman University in Orange, CA: http://www.societyforchaostheory.org/conf/2011/

For Beginners: This workshop is ideal for individuals who want to move forward to design and conduct a research project involving nonlinear dynamics, and also have a better understanding of the works of others using related methodologies. We recommend that participants should have a basic familiarity with concepts of attractors, bifurcations, chaos, complexity, and related nonlinear concepts. This is an excellent training opportunity for graduate students, especially those who plan to do a dissertation with impact. See: http://societyforchaostheory.org/ for recommended sources and on-line tutorials on these topics.

For Experts: Each workshop module will provide up to date developments on fast-moving topics and software

options. Advanced researchers will gain: a deeper understanding of the theoretical coherence among the various approaches along with detailed information regarding empirical design and interpretation of results.

The workshop will begin with a brief introduction followed by five one-hour modules covering: Phase space diagrams & correlation dimensions; Recurrence analysis; Power laws; Nonlinear regression; and Symbolic dynamics/orbital decomposition. The day will conclude with an open group discussion with the training panel.

Topics and Presenters

Phase-space diagrams and correlation dimensions
Mark Shelhammer, Sc.D., Associate Professor, Department of Otolaryngology – Head & Neck Surgery and Associate Professor, Department of Biomedical Engineering, The Johns Hopkins University, School of Medicine

The main topic will be time-delay reconstruction of trajectories in the state space: how to do it correctly, basics of the underlying topology, and applications. One application is determination of the dimension of the reconstructed attractor, and use of the correlation dimension for this will be discussed, including computational procedures and interpretation of dimension estimates.

Recurrence Analysis
Deborah J. Aks, Ph.D., Research Professor, Center for Cognitive Science, Rutgers University.

This module will describe how Recurrence Quantification Analysis (RQA) can be utilized to understand temporal dynamics of behavioral sequences. Using eye movement behavior from different object tracking tasks, I will show how RQA quantifies dynamics such as general recurrence, and the extent to which a string of behaviors recurs over time, and is stable. I will further describe how tracking dynamics can be represented more simply in a 3D state space. Finally, I will show how recurrences in eye-position sequences can account for the memory required to sustain effective tracking over time and when tracking undergoes intermittent but natural interruptions.

Power-laws
Bruce J. West, Ph.D., Chief Scientist Mathematics (ST), Information Science Directorate, US Army Research Office, Research Triangle Park, NC 27709. This talk will explain why the normal distribution is irrelevant for the description of data from complex phenomena and why the inverse power-law distribution

is ubiquitous in the physical, life and social sciences. We will discuss a number of simple data processing procedures for determining the scaling properties of data with examples drawn from fractal physiology, habituation and decision making. If time permits we will also discuss why some of the more popular methods for determining scaling are misleading if not just wrong.

Nonlinear Regression
Stephen J. Guastello, Ph.D., Professor of Industrial Organizational Psychology, Marquette University.

Nonlinear regression is a statistical procedure that allows the user to test hypotheses concerning any nonlinear structure for degree of fit and to estimate model parameters for a sample or a time series. This section of the workshop covers how to use nonlinear regression on SPSS software, how it contrasts with multiple linear regression, and a series of structural equations that capture attractors, bifurcations, chaos, Lyapunov exponents, and compound dynamics.

Markov Chains
Stephen J. Merrill, Ph.D., Professor of Mathematics and computational science, Marquette University.

This talk involves building and using Markov chains and their cousins, hidden Markov models (HMM), to describe and explore time series data. Topics include simulating models constructed from data, using the definition of "state" to extend applicability of the models, and developing tools to describe the dynamical nature of these models (and thus the original data).

Symbolic Dynamics and Orbital Decomposition

David Pincus, Ph.D., Associate Professor of Clinical Psychology, Crean School of Health and Life Sciences, Chapman University

Categorical time-series data are produced by many phenomena in social, behavioral and life sciences, in any situation involving the unfolding of a series of unique events. Using an example data set of therapeutic conversation patterns, this section of the workshop will demonstrate how patterns may be identified in such data sets and how one may derive a variety of quantitative indices characterizing complexity, stationarity, and part-to-whole relations underlying emergence.

We are honored to announce our featured speaker
Polmnia G. Amazeen, Arizona State University

who will present

"Crossing Boundaries with Dynamics"

Biography. Polemnia G. Amazeen is an Associate Professor in the Department of Psychology at Arizona State University. She received her Ph.D. from the Center for the Ecological Study of Perception and Action at the University of Connecticut in 1996 and completed a three-year postdoctoral fellowship in the Faculty of Human Movement Sciences at the Vrije Universiteit, Amsterdam before joining the faculty at ASU in 1999. Dr. Amazeen's research is concerned with the treatment of coordination as a complex, dynamical system. She looks for general principles in coordination patterns across people (social interactions) and within people (bimanual and motor-respiratory coordination) using the tools of dynamical systems analysis. Dr. Amazeen's research is naturally collaborative. Recent projects include: the detection of team coordination patterns in real time; oscillations in pain prediction accuracy in rheumatoid arthritis patients; and dynamical analysis of dyadic interactions in elementary schoolchildren. Dr. Amazeen's work appears in over 50 articles, chapters, and published abstracts and has been presented at numerous workshops, conferences, and invited colloquia. She is a currently an Associate Editor for Research Quarterly for Exercise and Sport and a Consulting Editor for Ecological Psychology. Dr. Amazeen's research has been funded by the National Science Foundation and the Office of Naval Research.

Dynamical systems analysis offers a cohesive, interdisciplinary approach to science. This powerful tool comes from theoretical physics and engineering, but it can be used to analyze patterns of change in psychology and other social sciences. In this talk, I will present a strategy for dynamical application that centers on the idea of dynamical similitude: the same behaviors are observed across very different systems. That concept allows us to adopt dynamical models from outside of psychology to study the phenomena that interest us in psychology. I will show how this strategy has been used successfully in such diverse fields as motor coordination and clinical psychology. In some cases, there is no apparent model fit. I will illustrate how (social) team dynamics can be extracted using more exploratory techniques. As the dynamical literature in the social sciences grows, so do the possibilities for application and collaboration.

Dr. Thomas J. Dishion will be delivering the Banquet Keynote Address. If you are already familiar with Dr. Dishion's accomplishments, you will appreciate the quality of the work he has done in applying nonlinear dynamical systems theory to child, family and peer relationship development. In addition to his rigorous, deep and pioneering empirical work in these areas, Dr. Dishion is broadly respected in clinical circles, among each of the varying disciplines that work with troubled youth and families. His applied textbooks are loved by teachers and students involved in helping children and families in distress, many of whom may be unfamiliar with Dr. Dishion's work using nonlinear theories and methodologies.

Applying Dynamic Systems Analyses to Understanding Adolescent Psychopathology and Health

Thomas J. Dishion

Child and Family Center, University of Oregon,and Department of Psychology, Arizona State University

Abstract: For the past two decades considerable progress has been made in studying relationship dynamics of families and peers in understanding the development of antisocial behavior, and then in turn, applying that understanding to the design of effective intervention programs. The emergence of dynamic systems analyses has buttressed this progress by deepening our understanding of rigidity, flexibility, attractors and entropy within relationship interactions. This presentation will provide four illustrations of the application of dynamic systems analyses to friendship and family interactions of adolescents, considering the joint focus on the process dynamic as well as the content of the interaction in predicting future adjustment. Implications of this work for the design of interventions that prevent psychopathology and promote health will be discussed.

Bio: Tom Dishion is currently a professor in psychology and school psychology at the University of Oregon, and soon to be a professor in psychology at Arizona State University. He founded the Child and Family Center at the University of ORegon, and was the director until recently. He conducts research in developmental psychopathology and prevention science. Dr. Dishion is interested in understanding how children's relationship dynamics with parents and peers influence the development of problem behavior and depression in children and adolescents. More recently, he is interested in exploring the basic socialization process and mechanisms from a dynamic systems perspective, and translating developmental findings to the design of new prevention and intervention strategies for children and families. He and colleagues use the Family Check Up model as a preventive and treatment strategy, and as a venue for translating developmental findings into improved services for children and families. He collaborates on several developmental and intervention research studies funded by NIH and IES.

Feature Article

Chaos and Complexity: Mainstream Science, Fad, Paradigm, or What?

Kyle Findlay, *TNS Global Brand Equity Centre, Cape Town, South Africa*
Karen Detweiler, *The George Washington University, Washington, DC*
Stephen J. Guastello, *Marquette University*

Is it Mainstream?

Just how close are the concepts of chaos and nonlinearity to becoming "mainstream"? It's very difficult to gauge this point accurately as many of us are too close to the ground in this regard. Obviously, because these areas are of particular interest to us, we are more likely to be attuned towards examples and applications in the mainstream media. Those of us who are deeply entrenched are always on the look out for examples of chaos theory, network theory, nonlinear dynamics, etc. and, as a result, we find them everywhere! The question is whether there has been an increase in recent times and whether the scale of this increase is notable.

Is the nonlinear paradigm infecting the global zeitgeist? A few examples: Network theory is an incredibly hot topic thanks to social media and social networks. It's all over the place these days, especially in the business world, part of which could be a watershed for new ideas entering the mainstream, whether we like it or not. In addition, as the area matures and crystallizes in people's minds, social networking is being stretched even further into the realm of herding and swarm theory, which again are based on nonlinear concepts such as phase transitions, emergence, etc. (recent NY Times articles and books such as *The Nature of Marketing: Marketing to the Swarm as well as the Herd* spring to mind (http://www.amazon.com/Nature-Marketing-Swarm-well-Herd/dp/0230203361).

Nonlinearity is a very popular topic due to the collapse and the recession. Authors like Nassim Nicholas Taleb and his book, *The Black Swan*, are highlighting these ideas. Taleb even recently advised the US Senate on the financial collapse (http://www.youtube.com/watch?v=ujTANpSXIvY).

Similarly, people are using nonlinear terminology to describe climate change. Terms such as "tipping point," "phase transition," and "feedback loops" are commonplace. These terms are also popping up in sustainability discussions when it comes to ethical business practices (an area that is quite topical in the business world).

TED Talks (the mecca for pop-science) come to mind on the following topics: synchronicity by Stephen Strogatz; how terrorist attacks follow power laws by Sean Gourley; knitting fractal coral designs by Margaret Wetheim; Ross Lovegrove creating organic designs using fractals.

So, the question is: Is nonlinear thinking becoming mainstream? Or, will it ever become

mainstream? Perhaps the concepts are just too counterintuitive for most? My impression is that nonlinear ideas collectively are straining against the attractor currently keeping them in their basin of obscurity. The question is whether there is enough momentum behind them to lift them out into a new part of the landscape? Finally, what are the implications of wide-spread adoption of a nonlinear paradigm? In some ways, it's quite nice being part of a non-mainstream 'club' like the SCTPLS.

Is it a Fad?

We should also consider the possibility that chaos and nonlinearity could become faddish. That may actually be a greater risk to our work than them becoming "mainstream" (i.e., embedded in the "general knowledge and practice"). Fads burn briefly and brightly...until the air is gone. Then the "marketplace" opens the box, lets in more air, and ignites a new fad. When something is truly mainstream, it is taught in schools, reinforced by scholarly and professional practices, and gets some fairly consistent, significant level of funding for research and continued development as a field.

The concern is realistic because there is a phenomenon of "rock stars" in academic work--those who make a big and important splash with a "great hit." They sometimes are "one hit wonders," but even that can be enough to profoundly alter the field. They create a trend that extends beyond the lifespan of a fad, but is not sufficiently institutionalized to be a very long-term phenomenon.

We saw the fad phenomenon in the organizational learning community when Senge published the bestselling book *Fifth Discipline*. While it was very worthwhile and raised many organizations' awareness of learning and knowledge retention, it took the air out of the room for many other scholars and practitioners. There is still much work to be done on how organizations develop, change, and apply knowledge, but the resources went to a very small part of the community. The community was arguably weakened by the "elephant and flea" economy that emerged.

We also saw that phenomenon in linguistics when Deborah Tannen published her bestseller, *You Just Don't Understand* on the gendered aspects of human communication. Although she turbocharged popular interest in linguistics, many other good research topics in linguistics suffered. (IMHO, she did a great service in tackling a topic that the field's leaders considered marginal and politically fraught, but that's a sidebar).

In both of these cases, good people did good work that resonated incredibly well with the general public. They made scholarly knowledge accessible and it was financially beneficial for them. However, the presence of these popular works seemed to engender a sense that "that problem was now well enough understood " that public attention could go to other topics inside or outside the field.

Indeed there have been disruptive events in a field of scholarship, and they have had consequences. Perhaps we should think in terms of disruptive change dynamics – a disruptive shock that focuses energy in a brief period (like a fad) – and then extinguishes, leaving few resources to move the field. After that kind of event, the surviving researchers are left with economic crumbs and little audience – rather like the golfers other than Tiger Woods who are on the pro circuit. They really only get endorsements or publicity in relation to Tiger, such as when they come closer to him than expected, edge him out for a few holes, or pick up an endorsement client that Tiger no longer serves.

If this happens in our work, there is a possibility that Chaos, Nonlinearity, and Complexity could become practitioner shorthand for explaining why things went awry, rather than according to the practitioner's plan. They could also be used to justify unnecessary or ill-considered practitioner interventions along the lines of: "I am supposed to have a 'bias for action' and have no idea what to do or when to appropriately do it. So, I'll just conduct some interventions and see what happens." Either of these scenarios could enable organizational managers to abdicate responsibility and misuse authority. Some of us have seen some indicators of that happening in some business decision making already – by people who have taken a "short course" in Complexity or Chaos. If things go the way they want, they take credit for managing successfully despite extraordinary complexity. If not, chaos and complexity can be trotted out as explanations that are more palatable than saying "It was fate," or "I screwed things up."

Chaos and complexity scholarship provides a foundation, however, for "think first, then act" managerial behavior. Because we know that complex systems are exquisitely sensitive to initial operating conditions and that interventions can have disproportionately large or small implications depending upon timing, etc., we can justify thinking deeply about foreseeable and unintended consequences before we commit to a programme of action or intervention. We can also be more conscious of context and invest (with justification) in understanding our changing operational context. That is something worth institutionalizing and making mainstream.

However, we're very concerned that Chaos and Nonlinearity could become faddish. When concepts can be used successfully to excuse poor management and leadership, they're at risk of going viral...since many managers want excuses and "safety nets". They could also be used to justify centralization of resource controls to "get a better handle on the whole system" before intervening in it. The concepts could be hijacked by

people who seek more power and control in a traditional sense of those terms.

If that happens, the fad could "salt the garden" or "poison the well" for serious scholars and researchers in the field. We just hope that if someone is to write "The" book that makes them rich and famous, it is someone in our immediate community. If we had to pick a contender right now, it'd probably be Melanie Mitchell, since her *Complexity: A Guided Tour* is so incredibly accessible. So is the DVD course created by Steven Strogatz and Scott E. Page for The Teaching Company.

Some of our colleagues asked us to consider a few additional observations: (a) Chaos and complexity will probably not be immune from fads, particularly if it really to have a widespread impact on mass consciousness. (b) One of the barriers to new scientists and interested others from digging into the topic at a technically accurate level is the ramp-up time to learn the new mathematical concepts. On the other hand, the opportunities for acquiring the new skills and the core concepts are growing. (c) It would be a strong selling point if the scientific method could substantiate ideas that were only supported by tradition previously. Here we would add (d): Some of us are only doing this because we see that nonlinear dynamics can solve problems that cannot be solved in other ways.

Which mainstream?

There's the broader scientific community within a discipline, e.g. all of psychology or economics, or the wider range of scientific communities that meet in interdisciplinary contexts, and the general population, which can have any sort of relationship to the concepts or none at all. If movies like *The Butterfly Effect* induce people to think differently and productively about something, perhaps it's all good. We are reminded of Kevin Dooley's (2009) delightful paper in the Lorenz issue of NDPLS on the Butterfly Effect of the Butterfly Effect.

A little story: While browsing a bookstore one of us came across a relatively new book called *Exploiting Chaos*. It was essentially about creative thinking in business contexts, with lots of pictures and such. No math. In one theme the author told the story of the violinist who performed the solos in the movie, *The Red Violin*, and who apparently owns a million-dollar instrument. Said performer is paid $1000/hr when he works. So his promo team wondered what would happen if he played on a streetcorner close to a subway station in New York, where 1000 people could be hanging out at any one time? How many would stop to listen? 500? 100? The answer was 7. He made $35 that hour, mostly from one woman who knew who he was. The point is, the two worlds were very different and one didn't fit into another. There was also a message about packaging in the story too, but hopefully the analogy to the present question is obvious.

Is it a Paradigm?

Fleener and Merritt (2007) concluded that if there was a paradigm afoot of renaissance proportions that could be affecting the entire society it was postmodernism, and not nonlinear dynamical systems (NDS). Postmodernism is often friendly to ideas from nonlinear dynamics, but not always using them in their intended fashion or meaning. Postmodernism itself is often hostile to scientific achievement.

Within specific scientific areas nonlinear dynamics is still regarded most often as a curious specialty within a specialty. The inhabitants do not necessarily notice that such a specialty has been popping up in many subject areas or seeing the connection across scientific disciplines. NDS' role in physics is acknowledged most often, although some of us have had to say that the isomorphisms are in the math, not the physics.

In mainstream scientific journals anything can happen. An NDS article could pop up or not, and then not produce a flow of them. Some editors would give lip service to supporting NDS material, but the reviewers could have some very unusual axes to grind. One can debate whether it is worse to encounter reviewers who are clueless, or those who imagine they know what they're doing and make up for some of the cluelessness by being just plain wrong. Sometimes the approach is to try to squeeze an NDS concept and analysis into the popular linear box. By doing so half the meaning that is conveyed by the dynamics is lost.

The Fad Factor

McKelvey (1999) already considered whether complexity was a fad. Thirteen years later, we are still here. If chaos was the topic of any fad, the fad started with the publication of Gleick's (1987) book, *Chaos: The Making of a New Science*. By the mid 1990s, the fad had given way to complexity, followed by power laws, followed by networks, with another science journalist, appearing to proclaim the death of everything. When the fad wanes, there is some sticking power in the scientific community that is left behind to do the hard work of developing and testing new theories of interesting phenomena and trying to solve unsettled problems. The editors of *Chaos and Complexity in Psychology* (Guastello, Koopmans, & Pincus, 2009) made this point in their preface. The next 500 pages explained the mainstay of what really has been accomplished, which is quite a bit.

Somewhere between a fad and a new mainstream phenomenon is a "growing trend." Figure 1 is a chart showing a growing use of the key word "chaos" in psychology (updated from Guastello, 2009, p. 291) based on a search of PsycINFO. Uses of the word range from literal studies of chaotic phenomena to common language uses of the word in the context of something else. On a related theme, there was an article in *Psychological Science in the Public Interest* (Kozlowski

& Ilgen, 2006) that reviewed a vast literature on group dynamics. The article was excellent by most standards. The word "emergent" was used more times than anyone would want to count by hand, but there were no empirical studies of emergence as we know it cited.

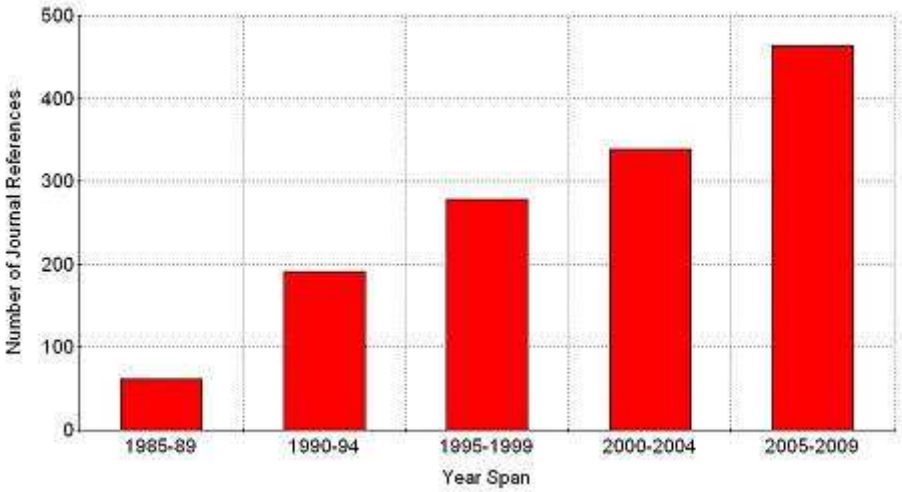

Fig. 1. Distribution of appearance of the search term "chaos" in PsycINFO, journals only.

In economics there's more of a direct clash between neo-classical thinking and NDS thinking that can only be appreciated by reading Dore and Rosser's (2009) article in the *Paradigm* issue of *NDPLS*. In other words, add politics and ideology to ordinary scientific debate and you get something else.

Baggage

We would agree that there are a lot of people with large vested interests, or baggage, in projects that are framed in the conventional fashion and who do not have the time or resources to make the leap. Perhaps they have not experienced the need to make the leap just yet. The ramp-up time to learn this material is steep compared to a lot of other new ideas, at least to the depth that a researcher would need to use it. Yes, this situation provides an ideal setting for graduate students would like to launch their careers with a dissertation that will have impact. Numerous graduate students have taken advantage of it this year alone.

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News from Members

Ecology and Psychoanalysis
From Joseph Dodds

See "Nonlinear Dynamical Bookshelf," this issue, for details on a new book contribution from an SCTPLS member.

Flood in Queensland
From Rob Harle

Rob sent a couple of photos of the floods in SE Qld. "Yes the media, as usual, blew it out of all proportion, but nevertheless it was and is a disaster. We sustained significant damage as a result of land slip ourselves."

***Wallaby rescue in Queensland*.**

Ecological Engineering
From Joseph Jacobsen

See "Nonlinear Dynamical Bookshelf," this issue, for details on a new book contribution from an SCTPLS member.

New Appointment
From Matt Koopmans

I am working now at the Strategic Education Research Partnership Institute, a collaboration between Harvard University and a number of public school systems including Boston. It's good work, solidly funded by the US Dept. of education, but very time intensive.

***Frog and snake self-rescue in Queensland*.**

Electromagnetics
From Tullio Minelli

I am still working in bio-mathematics but my interest is now mainly devoted to the electrophysiology and bio-electromagnetics. After the retirement from my Academic position I am presently lecturer of this matter to the PhD Engineering students. Other works in progress are the mathematical modeling of tumor growth and the electromagnetic pain therapy.

Fractal Opera
From Terry Marks-Tarlow

I was contacted last year by a Julliard professor and composer named Jonathan Dawe. He puts fractals in his music and asked me to put fractals in the words of the libretto for an opera in progress. Called *Cracked Orlando*, it is based on Vivaldi's *Orlando Furioso*, which was originally inspired by an Ariosto poem. The opera, along with accompanying ballet, premiered in mid-October in New York City at Columbia's Italian Academy. Eerily, this was the eve after Mandelbrot's death (he was a friend of Jonathan's and invited to the performance). I found the event extraordinarily beautiful! The piece was very well received, including a standing ovation on Sunday night.

I now have press kits that include the video of the full opera (one hour and 8 minutes long), a CD of the music, and descriptions of the major players. Jonathan envisions this as a contemporary form of opera more accessible to the general public. We now seek future venues for the piece, including in other American cities and in Europe and other places abroad. If any of you have connections with the opera world in your respective areas, please let me know by back channel. To see a written description of the piece, including how I used Fibonacci numbers to do the libretto, go to the

composer's website: www.jonathandawe.com To hear a 12 minute selection of opera highlights, anyone is welcome to befriend me on Facebook, where this is posted on my wall.

New Article on Psychoanalysis
From Terry Marks-Tarlow

I'm very pleased to announce a new paper currently in print in *Psychoanalytic Dialogues*.
It's called "Merging and Emerging: A Nonlinear Portrait of Intersubjectivity During Psychotherapy." The article is in the same issue as Allan Schore's most recent on the Implicit Self, and so the issue is very strong with neurobiology. There are two commentaries on my piece by a Robert Galatzer-Levy and Bill Coburn. If you would like a copy of the paper or both commentaries, please let me know (markstarlow@hotmail.com)

Symposium on Envy
From Ugo Merlone

Ugo and colleagues at the University of Turin, Italy, are planning a symposium on Envy at Work" for September 22-24, 2011. The call for papers and related information can be found at www.envy2011.org .

New Masters Degree Program in Organizational Psychology
From José Navarro

Take advantage of this opportunity and join the Master on Work, Organization and Personnel Psychology (WOP-P). Now you can study the whole program in English! The two-year European Master on Work, Organization and Personnel Psychology (WOP-P) has been awarded again within the Erasmus Mundus Program. After five years of existence, WOP-P master continues to be considered one of the best programs in its professional and academic area. Some changes have been introduced in the second round of the WOP-P Program such as the possibility to study the whole program in English and to develop exchange periods of study in the new WOP-P partnership with Non-European Universities Studies will be developed in at least two of any of the five universities of the consortium: Universitat de València (Spain), Universitat de Barcelona (Spain), Université René Descartes Paris 5 (France), Alma Mater Studiorum-Università di Bologna (Italy) and Universidade de Coimbra (Portugal). New partnerships have been developed with the Universidade de Brasília (Brazil) and University of Guelph (Canada).

For next academic year 2011-2012 there is a new call for scholarships for students and scholars (teachers) from all over the world aiming to study/teach at the Master in Work, Organizational and Personnel Psychology (WOP-P). Call for application for students is open from 15th November 2010 to 15th January 2011. Call for application for scholars (teachers) is open from 15th November 2010 to 30th September 2011. Please, for further information visit our website http://www.erasmuswop.org

Hierarchical Cluster in the Hippocampus
From Ichiro Tsuda

Ichiro alerted us to his new publication in Cognitive Neurodynamics (Vol. 3, pp. 205-222), "Iterated function system in the hippocampal CA1" with colleagues at Hokkaido University. In earlier research they observed hierarchical clusters in the distribution of membrane potentials of CA1. The new study investigated the dynamical mechanisms that gives rise to those clusters using map analysis.

Cardiovascular and Cardiopulmonary Dynamics
From Tarynn Witten

Tarynn is chairing the **2011 NHLBI-VCU-WM World Conference on Mathematical Modeling and Computational Simulation of Cardiovascular and Cardiopulmonary Dynamics** to take place at the College of William & Mary, 31 May – 3 June 2011, Williamsburg, Virginia. This conference is the culmination of a five year grant to the Center for the Study of Biological Complexity, Virginia Commonwealth University from the National Heart Lung and Blood Institute. For those of you that have attended our past workshop series (links are available at the web address below), you know how much fun we have had and how great the presentations have been. Conference details and registration can be found at the following website: http://www.vcu.edu/csbc/nhlbi/world11/index.html

Capitol Chaos

Reported by Stephen Guastello

Protests in Mad City. Photo courtesy of John Weeks

The news media have been calling it CAPITOL CHAOS, referring to Madison, capitol city of SCTPLS' home state of Wisconsin. The Event broke loose on Feb. 18 when the Republican state senate brought the new state

budget, strongly supported by the new governor, Scott Walker, to a vote. The budget not only contained provisions to cut teachers' salaries and pension benefits, but also rescinded the contract with labor unions representing State workers. The budgetary and anti-union provisions affected teachers at all levels . The same provisions affected most other unionized State works, except for police and fire personnel.

Democratic State Senators, who were in enough of a minority to lose in an actual vote, did not show up for the vote, leaving the rest of the Senate unable to vote for lack of a quorum. The senators took up temporary residence in Illinois where they were out of reach of any attempts by state police to forcibly pull them in for a vote. A sudden epidemic of flu among teachers early in the next week shut classes and some schools in Wisconsin, and the flu spread instantaneously to the Chicago Public School System. Meanwhile labor protests have been frequent around the State Capitol building and elsewhere in the state in the past two weeks. The TV news showed a few-second video shot of hands holding a sign that read, "Egypt Supports Wisconsin."

Three weeks later, 14 senators still have not returned. One who did was blocked from entering met the State Capitol Building, which has been under heavy security since the event started. A minor physical altercation was recorded on security cam and broadcast on the nightly TV news. Governor Walker has threatened to lay-off (euphemism for "dismiss") 1500 state employees to make up for the budget reduction he would not be getting from passing the budget bill if the Senators do not return. The average annual wage of those workers is about US$20,000/yr. Meanwhile up to 70,000 protestors continue to surround the capital, some camping indoors on mats. According to one camper who is among the 1500 workers slated for dismissal, "This is a publicly-owned building, and we are the public." The events in Wisconsin are being watched closely because other states such as Ohio have similar legislation in the queue.

The UW-Madison administration has taken a stand, nonetheless. They informed the legislature this week that if the budget provisions are passed before April 19, they will be compelled to cancel courses for the rest of the semester and refund all tuition. If the budget provisions are passed after April 19, they will give all the students their course credits and end the semester early, according to a student informant. The UW-Madison campus is within walking distance of the Capitol building. Imagine 30,000 (more) students who are closed out of classes, and who already have problems graduating on time because of lack of faculty to teach required courses, with suddenly nothing to do.

Although the police did not extricate the campers mentioned earlier, they actively prevent new protestors from entering the capitol building. In the third week of the discord, protestors found a window on the ground floor of the building and were apprehended by police trying to enter while the growing crowd chanted. Meanwhile, the ex-patriated legislators have indicated a willingness to return, but are still waiting for a good offer from the Republican majority.

In a surprise retaliation on March 9, the Wisconsin Senate passed a bill that prohibited State Employees from collective bargaining for wages beyond inflation and required increases in employees' contributions to retirement funds and health care insurance; the net effect was is an 8% reduction in income combined with the principle of labor representation. The labor bill was separated from the rest of what was the Budget Repair Bill. By voting separately on the union item, the Senate was able to avoid the legal requirement of having a quorum of 20 members to hold a vote on a budget bill. Democratic Sen. Mark Miller was quoted by MSNBC news saying,

"In 30 minutes, 18 state senators undid 50 years of civil rights in Wisconsin. Their disrespect for the people of Wisconsin and their rights is an outrage that will never be forgotten."

One can speculate that a next logical move would be for the unions to file a federal suit against the State of Wisconsin and get an injunction against putting the law into effect. It could be possible to tie up the State in court for more than the two years needed to re-elect a new governor and legislature.

John Weeks, a political economist from the UK, whose web site reflects knowledge of Wisconsin history, regards the Wisconsin Events as something deeper than a labor dispute. It speaks to basic first amendment rights to petition the government for redress of grievances. "While McCarthy for the most part restricted himself to alleged communists and the alleged 'fellow travelers' of those alleged communists, the neo-venal Walker has broadened the assault to the population as a whole (except, of course, capital and its agents)."

A legislator who supports the Wisconsin budget was captured in a news soundbite [close paraphrase]: "In times of financial emergency, the employer needs the flexibility to deploy its personnel in the way it sees fit. The labor unions prevent us from doing that." What kind of "flexibility" would administrators need in schools and universities that are often understaffed? Reassign a Philosophy professor to the Biology department? English to Physics? Professors of Finance to teach child psychopathology? Academic labor contracts include provisions for tenure. Faculty in both private and state-supported institutions are aware of management antics to dissolve the tenure system slowly by degrees if they are unable to do it outright. The most prevalent method is to make new job categories for faculty such as "non-tenure track position," "teaching faculty," "research professor," and other limited-time contracts with questionable renewal provisions while offering fewer tenure-track positions.

Those who are new to the academic game should be aware that the tenure system is not simply a matter of job security. It is a protection of academic freedom of speech, which is how and why the system consolidated in the US in the early 20thcentury and in Europe in the late 19th century.

Adaptive Action

Adaptive Action

By Glenda Eoyang, Ph.D., *Executive Director, Human Systems Dynamics Institute*

Sometimes, prediction and control are not possible. You cannot collect enough data; you cannot anticipate possible shocks to the system; you cannot control the free will of clients, competitors, vendors or partners. In these situations, the future is not just unknown, it is unknowable. Nevertheless, you have to make decisions and take action, even when your understanding is incomplete and your picture of the future is fuzzy. What are your options for action when you're confronted with radical uncertainty?

The prime action is to mitigate your risk. In stable, predictable times, risk mitigation means planning. What are all the things that might happen? How will we respond to each of these possible scenarios? How can we prepare ourselves for predictable bumps in the road? What actions will increase control and decrease surprise? The problem is that when you work in complex, emergent environments, these activities intended to minimize uncertainty actually increase risk of failure. As you invest time and resources into imagining the unknowable, opportunities sweep right past you. As you strive to control the uncontrollable, you miss weak signals that hint at winning strategies. As you plan for an unpredictable future, you are helpless in response to the present.

In 1976, Karl Weick provided an alternative to planning paralysis when he wrote *The Social Psychology of Organizing*. He explained that you cannot wait to know before you act, because you cannot know until you act. The concept and practice of *adaptive action* grew from this simple and profound insight. It has become a keystone of our work at Human Systems Dynamics Institute.

Adaptive action is easy to learn about, but quite challenging to practice. It involves three simple questions: "What?" "So what?" And "Now What?"

What is going on? What patterns do we observe? What seems to be constant, and what is changing?
So what does it mean? What implications can we see? What conditions are shaping the current pattern, and what do they mean for the patterns we intend? What are the diverse interpretations of observations? So what are options for meaningful action? Now, what will we do to shift the pattern? What are pros and cons of possible options? What is within our ability, scope of influence, time and resource constraints? How will we know whether the action was successful, and when will we begin our next cycle of adaptive action?

This sounds simple, and it is simple to talk about. The challenge comes when day-to-day busy-ness distracts us, when our desire to predict and control distorts our views, when powerful others ask for definitive answers about things that are unknowable.

Adaptive action is an implicit skill, it requires situation specific training and practice over time. For example, our training program begins with ten intense days, where attendees learn the basic principles and practices of HSD, receive the designation of Human Systems Dynamics Professional, and become Associates in the HSD Network. In the days and months that follow, they practice adaptive action and the other approaches and tools in the context of a diverse learning community. Working with others in communities of practice, product development and research projects, learning circles, and formal and informal training contexts, Associates share their experiences and insights. Learning from each other, in the context of their own business and personal challenges, Associates develop their individual and collective adaptive action "muscles." They adapt HSD tools to their own environments or create new ones to support the adaptive actions they and their clients take. Over time, each Associate develops his or her own process to observe, assess, and influence the patterns that contribute to productive and innovative work and play.

Over the years, we've seen how the adaptive action process informs institutional and community change in education, evaluation, conflict resolution, public policy, training, and process improvement. In all of these contexts, we've noticed some key ways that adaptive action process changes in response to unique and thorny challenges. Sometimes the adaptive action cycle is short, and sometimes it is long. A single meeting or phone call leads one into multiple cycles of inquiry and action as data becomes available, shared meaning is made, and collective action is defined.

Sometimes the adaptive action is private, and sometimes it is public. As Associates balance individual and shared agendas, they become sensitive to what is best addressed by the person and what should be conscious for a group. Sometimes the adaptive action process is formal, and sometimes it is informal. While individual learning and growth can move forward in

informal and intimate ways, scaling the work up for institutional and community change often requires formal policies and procedures.

In every case, the adaptive action process adapts to the immediate and local demands of the situation. When they share their experiences, Associates become adept at shifting the cycle time, explicitness, and formality of each step to meet the emerging and unpredictable needs of their colleagues and clients. With practice, we become more agile as we support the agility of our organizations. So, we have a game plan that keeps us productive even in unpredictable and uncontrollable situations. Try it. You, too, will find that adaptive action is an efficient and effective approach to dealing with uncertainty of complex human systems.

Cognitive Chaos

COGNITIVE ASPECTS OF CHAOS IN RANDOM NETWORKS

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Brain functions and behavior depend on the simultaneous activation of large populations of neurons. Cortical networks of 1000 to 20,000 cells have been extensively studied in slices of hippocampal tissue (Traub & Miles, 2008). The results confirm that spontaneous collective activities are relevant to the normal (memory formation) and abnormal (epilepsy) functions of this region of brain. Collective dynamics are associated with various cortical functions and brain behavior (e.g., theta rhythms, EEG, seizures), confirming that behavior is inseparable from collective neuronal activity. In addition, a wealth of biologically-inspired models of artificial neural networks (ANN's) has grown in the last decade, mainly around the issue of artificial intelligence. ANN's models, in fact, aim at increasing computing power rather than at providing novel computational models of the mind. Thus a variety of functional architectures exists, depending on the functions they are designed for. On the same line, but at the opposite end, lay *small-world* networks, where the connection are chosen at random, even though complying with some statistics (Barkay, Kanter, Sompolinsky, 1990; Pham, Pakdaman *et al*. 1998; Brunel, 2000). The output of such network is indeed a "sample" of a stochastic process (Deco, Rolls, Romo, 2009), therefore its dynamics is studied as such.

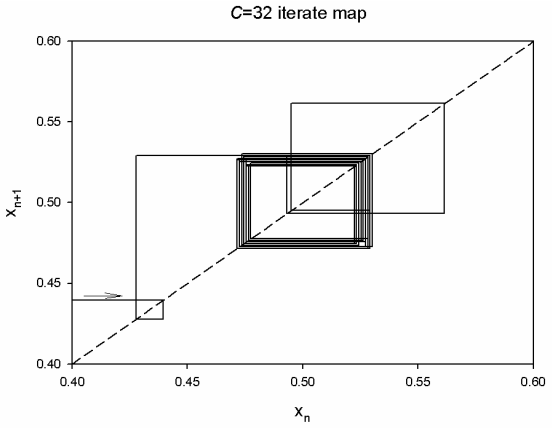
A network exhibiting "random" connectivity is apparently the worst choice for representing any brain mass-function, for any function supposedly have a specific architecture, i.e., an appropriate neural correlate. That suits the *form-function* paradigm. The problem, however, is that the paradigm, although accepted in principle, has never been substantiated for functions of cognitive type, such as *qualia*, for example (Crick & Koch, 2003). In Crick's words "No one has produced any plausible explanation as to how the experience of redness could arise from the action of the brain." Even if we knew the wiring scheme of a living sample *exactly* we could never be able to foresee the collective dynamics associated with that scheme, neither we could associate any "function" to it. Rather, it is likely that a *multitude* of dynamics is possible, each one sharing the same neural support. In such a lack of intellectual bias, a random connectivity would do as good as any other. In this short article some evidence in favor of this "economical" hypothesis will be given. The possible dynamics of a random network are analyzed as functions of a control parameter governing the degree of sparsity of the network.

Chaos and connectivity

Connectivity (C) is defined as the number of neurons to which a single neuron is linked. The effects of C is tested on a 1024-cell, integrate & fire excitatory network featuring spatial and temporal integration. In spite of a random connectivity, the network is capable of spontaneous synchronized firing, with various oscillations, as a response to a "flash" stimulus. With X_n the percent of active cells at the nth iteration, spontaneous periodic oscillations are observed for $C>16$, of period-12 ($C=32$) and period-6 ($C=64$) (Fig. 1,a,b). For $C \leq 16$ chaos onsets (Fig. 2).

Among the solutions of this dynamical system there are two fixed points ($X_{n+1}=X_n$): X*=0 and X*=1, corresponding to *quenching* and saturation, or *hyper-synchronization*, respectively. For $C>C_1$, X*=1 is stable, then at $C=C_1$ it becomes unstable, and the solution splits into a stable oscillation. As C decreases further, more stable oscillations, of incrementally larger periods follow, until for C=(say)16 chaos onsets.

(a)



(b)

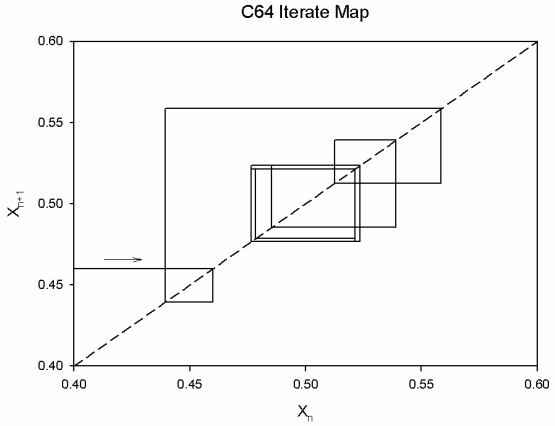


Fig.1 (a): Cobweb diagrams for the iterated map C32 showing a period-12 cycle. (b): C64 iterated map of period-6.

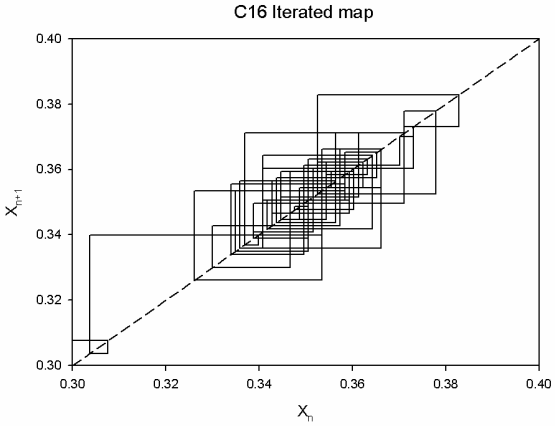


Fig.2 Cobweb diagram of the iterated map for C=16. No stable orbit could be detected within the time-frame of 1000 iterations, thus chaos is claimed.

A detailed bifurcation diagram is not available at this time. However, at some value C_0 a transition from chaos to quenching occurs, i.e., for $C<C_0$ the fixed point X*=0 is stable. At $C>C_1$ =16(?) bifurcation are to be sought.

Cognitive aspects

From the point of view of information theory, chaos is the state of the highest entropy, that's it, the richest in information. We naturally associate a brain function with some *ordered* state, not for a moment with *chaos*. However, we can play with the "knob" C in a narrow range around C=16, thus switching the system back and forth at leisure from chaos to a number of different ordered states and vice versa. And *that* would be the *quickest* transition possible. The concept of "transitions" associated with bifurcations opens up an entirely novel scenario, where "chaos" acts like a substrate running in the background, and the "function" results from a chaos-to-order transition. Such *non* -algorithmic strategy of realizing a brain function (i.e., an *ordered* state) would provide the benefit of a fast actuation, in reality faster than any algorithmic strategy.

The above scenario applies to any low entropy states: while the substrate remains the same, the functions are picked up by "fishing" in this chaotic pool by playing with C. Chaos itself might be viewed as the superposition of all possible ordered states, a sort of an "unconscious primer" in support of brain functions. This brings to mind the "readiness potential" (*bereitschaftspotential*) that is evoked "in preparation" of a sensory response, which suggests a metaphor for chaos as "cognitive readiness". The heuristic power of the metaphor relies entirely on those mechanism responsible for modulation of synapses' strength (like downgrading and upgrading), which – incidentally - are particularly active in the hippocampus. The author's point of view is that chaos should not be necessarily associated with a cognitive disease, but rather considered a natural *dynamic state of the cortex*, which runs undetected "behind the scenes" in support of cognitive functions. The model could cast further insight into those brain pathologies in which connections between neurons are disrupted (e.g., in Alzheimer's disease), possibly helping to better understand the pharmacodynamics of new drugs.

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Nonlinear Dynamical Bookshelf

Dodds, J. (2011). *Psychoanalysis and Ecology at the Edge of Chaos: Complexity theory, Deleuze|Guattari and psychoanalysis for a climate in crisis.* Abbington, Oxon, UK: Routledge. This book argues that psychoanalysis has a unique role to play in the climate change debate through its placing emphasis on the unconscious dimensions of our mental and social lives. Exploring contributions from Freudian, Kleinian, Object Relations, Self Psychology, Jungian, and Lacanian traditions, the book discusses how psychoanalysis can help to unmask the anxieties, deficits, conflicts, phantasies and defences crucial in understanding the human dimension of the ecological crisis. Yet despite being essential to studying environmentalism and its discontents, psychoanalysis still remains largely a 'psychology without ecology'. The philosophy of Deleuze and Guattari, combined with new developments in the sciences of complexity, help us to build upon the best of these perspectives, providing a framework able to integrate Guattari's 'three ecologies' of mind, nature and society. This book thus constitutes a timely attempt to contribute towards a critical dialogue between psychoanalysis and ecology. In our era of anxiety, denial, paranoia, apathy, guilt, hope, and despair in the face of climate change, this book offers a fresh and insightful psychoanalytic perspective on the ecological crisis. As such this book will be of great interest to all those in the fields of psychoanalysis, psychology, philosophy, and ecology, as well as all who are concerned with the global environmental challenges affecting our planets future.

Jacobsen, J. (2011). *Sustainable business and industry: Designing and operating for social and environmental responsibility.* Milwaukee, ASQ. Joe Jacobsen's first book is a comprehensive overview of how an enterprise, private or public, large or small, can improve social, environmental and financial performance, concurrent. For the first time in one volume, this author brings together a confluence of business and industry designs, technologies and practices with the social, biological and physical sciences to offer solutions to the most important problems of our time. The book draws together a variety of continuous improvement tools and methods and applies them to a series of social, environmental and financial measures. One example is Joe's FESUP (financial, environmental and social unity project). A FESUP uses well established research methods like operations research and Six Sigma to improve social, environmental and financial performance to reduce ecological footprints and increases social and financial performance.

Zimmermann R. E. (2010). *New Ethics Proved in Geometrical Order: Spinozist Reflexions on Evolutionary Systems*. Litchfield Park, AZ: Emergent Publications. ISBN 9780984216512 (148 p.). The context within which Spinoza once developed his theory has clearly changed. However, most of Spinoza's general approach to conceptualizing the world can still be utilized, albeit with a slight change in terminology. Spinoza's approach has many advantages as compared with the approaches of his contemporaries, such as Descartes and Leibniz. Conceptualization today also requires taking fields such as physics and mathematics explicitly into account. This is very much in the sense of Spinoza's original intention that led him to speak in his main work of an ethics to be proved in geometrical order (which actually means: according to mathematical methods). This book is about a mathematical machinery which, is based on a strict logical structure, as well as on a not so strict hermeneutic structure—and is even representable in terms of algebraic expressions of a considerable symbolic quality. Eventually, this may be capable of shedding a completely new light on the ancient problem of the relationship between human beings and the rest of nature. As the book shows, the theory of evolutionary systems is a prime candidate for a conceptualization that might be useful in order to concretely develop this new insight.

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