Northwestern Institute on Complex Systems

Complexity Conference

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Speaker Bios

(Alphabetical Order)

Robert Axtell
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Robert Axtell is a Professor and Acting Director of the Center for Social Complexity at George Mason Computational Social Science and at the Krasnow Institute for Advanced Study of George Mason University. His expertise includes economic geography, environmental policy, industrial organization, discount policy, behavioral economics, and global change science. He specializes in building agent-based computational models in which each individual who participates in a social process is represented. His 1996 book with J. Epstein, "Growing Artificial Societies: Social Science from the Bottom Up," (MIT Press), introduced this modeling approach to a wide audience. His current research includes studies of firms (e.g., firm size, growth rate distributions), models of firm behavior in the presence of regulation (with C. Andrews), and a model of the adoption of smoking among adolescents (with Brookings colleagues). Rob is affiliated with the Santa Fe Institute where he is an External Faculty Member.

J. Doyne Farmer
Resident Faculty
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J. Doyne Farmer began his academic career doing research in dynamical systems theory, and particularly chaotic dynamics, as part of the UCSC Dynamical Systems Collective. He then worked at Los Alamos for ten years, where he was an Oppenheimer Fellow at the Center for Nonlinear Studies and founded the Complex Systems Group in the Theoretical Division. While at Los Alamos he did research on nonlinear time series prediction, artificial life, and theoretical biology. In 1991 he co-founded Prediction Company, a Santa Fe firm that does automatic trading of stocks using mathematical methods. He is currently a Professor at the Santa Fe Institute, where he studies economics and financial markets.

Marcus Kaiser
Assistant Professor of Complex Neural Systems
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Marcus Kaiser obtained a MSc (Biology, 2002) from the Ruhr-University-Bochum working on perception during saccadic eye movements. He received his PhD (Computational Neuroscience, 2005) from the International University Bremen (now Jacobs University Bremen). His main scientific interests are in the area of network analysis both of cortical and neuronal as well as of metabolic and protein-protein interaction networks. He has worked on spatial organization, activity spreading, modularity, development, and robustness of biological networks.

Dietmar Plenz
Chief of Neural Network Physiology
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Dr. Plenz attended college at the University of Tuebingen, Germany and received his Ph.D. in 1993 at the Max-Planck Institute of Biological Cybernetics and University Tuebingen, Germany. After a postdoctoral fellowship and assistant professorship with Stephen T. Kitai at the University of Tennessee, Memphis, Dr. Plenz joined the NIMH in 1999. Dr. Plenz explores the function of basic neuronal activity patterns and the conditions under which they emergence in large neuronal networks. In his work, Dr. Plenz developed and pioneered the first in vitro system that captured cortical gamma-oscillations and up- and down-state dynamics of cortical and the striatal networks in vivo. His work has defined a new pacemaker mechanism intrinsic to the basal ganglia as a possible generator for tremor in Parkinson's patients. Dr. Plenz's research at the NIMH focuses on information processing in cortical and striatal networks as a function of neuronal synchronization. His lab discovered 'neuronal avalanches', a previously unknown critical state dynamics of cortical networks, which arise at the border of epilepsy and hypo-excitability. His recent studies have identified new mechanisms of how the striatum processes time-critical cortical inputs, such as found in neuronal avalanches.

Felix Reed-Tsochas
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Felix Reed-Tsochas is a founding Co-Director of the CABDyN Research Cluster in Oxford, and an Associate Fellow of the James Martin Institute for Science and Civilization. His original research training in Cambridge (UK) was in theoretical condensed matter physics. Felix's research interests are closely linked with the activities of CABDyN, and focus on advancing an interdisciplinary approach to understanding the functional and dynamic properties of complex systems and networks, based on the analysis of large-scale empirical datasets and using tools such as agent-based modeling and simulation. Current research projects include the dynamic properties of decentralized supplier networks, similarities between biological and organizational consumption patterns (i.e. food webs and supply chains), the performance of high-tech innovation networks, generalizations of the NK model for organizational decision-making, and modeling the social impact of technological change. A longer-term interest which connects many of these individual projects is to try to develop novel dynamic conceptions of network robustness and resilience. Felix is the Scientific Coordinator for the MMCOMNET project, which has been funded by the European Commission under the NEST Pathfinder Initiative on *Tackling Complexity in Science*, and involves five European partner institutions in addition to Oxford. MMCOMNET is developing interdisciplinary tools which will allow complex networks in different application domains to be measured and modeled. Felix is also a member of the ONCE-CS and GIACS projects, which aim to link up complexity research and education in Europe, and is a joint Series Editor (with Neil Johnson) of a new book series on *Complex Systems and Interdisciplinary Science* which is being published by World Scientific. The first four volumes in this series are currently in the final stages of preparation for publication.

David Simchi-Levi
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Dr. Simchi-Levi holds a Ph.D. from Tel Aviv University, is an INFORMS Fellow, and is Editor-in-Chief of *Operations Research*. His research currently focuses on developing and implementing robust and efficient techniques for logistics and manufacturing systems. He has published widely in professional journals on both practical and theoretical aspects of logistics and supply chain management. He is the former Editor-in-Chief of *Naval Research Logistics*, an Associate Editor for several scientific journals including *Management Science, Networks, Transportation Science and Telecommunication Systems*, a former Area Editor of *Transportation for Operations Research and a former* Area Editor for IIE Transactions,. Dr. Simchi-Levi's books include *The Logic of Logistics*, *Designing and Managing the Supply Chain*, and *Managing the Supply Chain: The Definitive Guide for the Supply Chain Professional*.

Ivan Soltesz
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Ivan Soltesz obtained his Diploma in Biology and his Ph.D. in Comparative Physiology from L. Eötvös University in Budapest, Hungary. He is Professor of Anatomy and Neurobiology at the University of California, Irvine. His research interests are focused on the functionality, development and plasticity of hippocampal interneuronal networks, the physiological basis of hyperexcitability, and mechanisms of selective neuronal vulnerability. He is the author of the book, “Diversity in the Neuronal Machine: Order and Variability in Interneuronal Microcircuits”, published by Oxford University Press.

Duncan Watts
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Duncan Watts is professor of sociology at Columbia University, where he directs the *Collective Dynamics Group* (http://cdg.columbia.edu). His research interests include the structure and evolution of social networks, the origins and dynamics of social influence, and the nature of distributed social search. He is the author of *Six Degrees: The Science of a Connected Age* (W.W. Norton, 2003) and *Small Worlds: The Dynamics of Networks between Order and Randomness* (Princeton University Press, 1999). He holds a B.Sc. in Physics from the University of New South Wales, and Ph.D. in Theoretical and Applied Mechanics from Cornell University.
