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SIMULATING COMPLEX NETWORKS: FROM MOLECULES TO MANKIND

We live in a complex world and are surrounded by complex systems: from a biological cell, made of thousands of different molecules that seamlessly work together, to millions of computer systems that should work together, to our society, a collection of six billion individuals that try to work together.

These complex systems display endless signatures of order, disorder, self-organization and self-annihilation. Understanding, quantifying and handling this complexity is one of the biggest scientific challenges of our time.

Most complex systems are not made of identical and indistinguishable components, as for instance gases or magnets are; each gene in a cell, each computer in a network or individual in a country has its own characteristic behavior and provides unique value and contributions to the systems in which they are constituents. More importantly in complex systems the interactions form exquisite networks, each component being in non-linear contact with many selected interaction partners. It is not just complicated, it is complex.

In this talk I will present some results on modeling infectious diseases with Agent Based Complex Networks and introduce a theoretical framework to understand information dissipation in such complex networks. Part of this work was done within the European 'Dyanets' project: www.dyanets.org

BIOGRAPHY

Peter Sloot heads the inter-disciplinary research group on computational science and complexity within the University of Amsterdam. He has published over 460 papers, books and edited volumes. He has given over 20 Radio and TV interviews on various scientific results, including two documentaries of his work.

He is Editor in Chief of two International Journals of Elsevier Science (JoCS and FGCS) and Scientific chair of the International Conference of Computational Science since 2002. In 1996 he was awarded the NNV Distinguished Professor in Computational Physics and recently in 2010 he was

given the prestigious Leading Scientist Award (St. Petersburg, Russian Federation).

He holds a chair at the University of Amsterdam on Computational Science, a chair at the St. Petersburg State University in Complex Systems Simulation and a visiting professorship at the NTU in Singapore. For more information: <http://staff.science.uva.nl/~sloot/>.