



Stockholm Seminars

Focusing on the dynamics and stewardship of social-ecological systems

Correlation and Causation

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Linné Hall, The Royal Swedish Academy of Sciences
Lilla Frescativägen 4A, Stockholm

While everyone knows Berkeley's 1710 dictum "correlation does not imply causation" few realize that the converse "causation does not imply correlation" is also true. This conundrum runs counter to deeply ingrained heuristic thinking that is at the basis of modern science. Ecosystems are particularly perverse on this issue by exhibiting mirage correlations that can continually cause us to rethink relationships we thought we understood.

This seminar examines a minimalist paradigm, empirical dynamics, and a method based on Taken's theorem that can distinguish causality from correlation in dynamic systems. It is a radically different empirical approach for leveraging time series information from complex systems of interacting parts (ecosystems). The approach is a departure from equilibrium-based classical theory and turns the apparent liability of complex nonlinear interconnections into an asset that allows real prediction.

About George Sugihara

George Sugihara is a professor of biological oceanography in the Physical Oceanography Research Division at Scripps Institution of Oceanography, UC San Diego. Sugihara was named the inaugural holder of the McQuown Chair in Natural Science. His current research at Scripps is aimed at finding solutions to environmental problems through a combination of scientific and financial market innovations, two areas which reflect his unusual background as a scientist and investment banker.

Prior to joining Scripps, Sugihara was the Wigner Prize Fellow at Oak Ridge National Laboratory and concurrently associate professor of Mathematics at the University of Tennessee. He has been a visiting professor at Cornell University, Imperial College London, Kyoto University and the Tokyo Institute of Technology. He held the UC San Diego John Dove Isaacs Chair at Scripps Oceanography, and was a visiting fellow at Merton College, Oxford University. He is recipient of several national and international awards, and is currently a member of the National Academy of Sciences Board on Mathematical Sciences and its Applications, a National Research Council advisory board that advises government agencies and guides the nation's mathematics agenda to better serve national needs.

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