THE AUSTRALIAN NATIONAL UNIVERSITY

Econophysics: inside the complexity of markets

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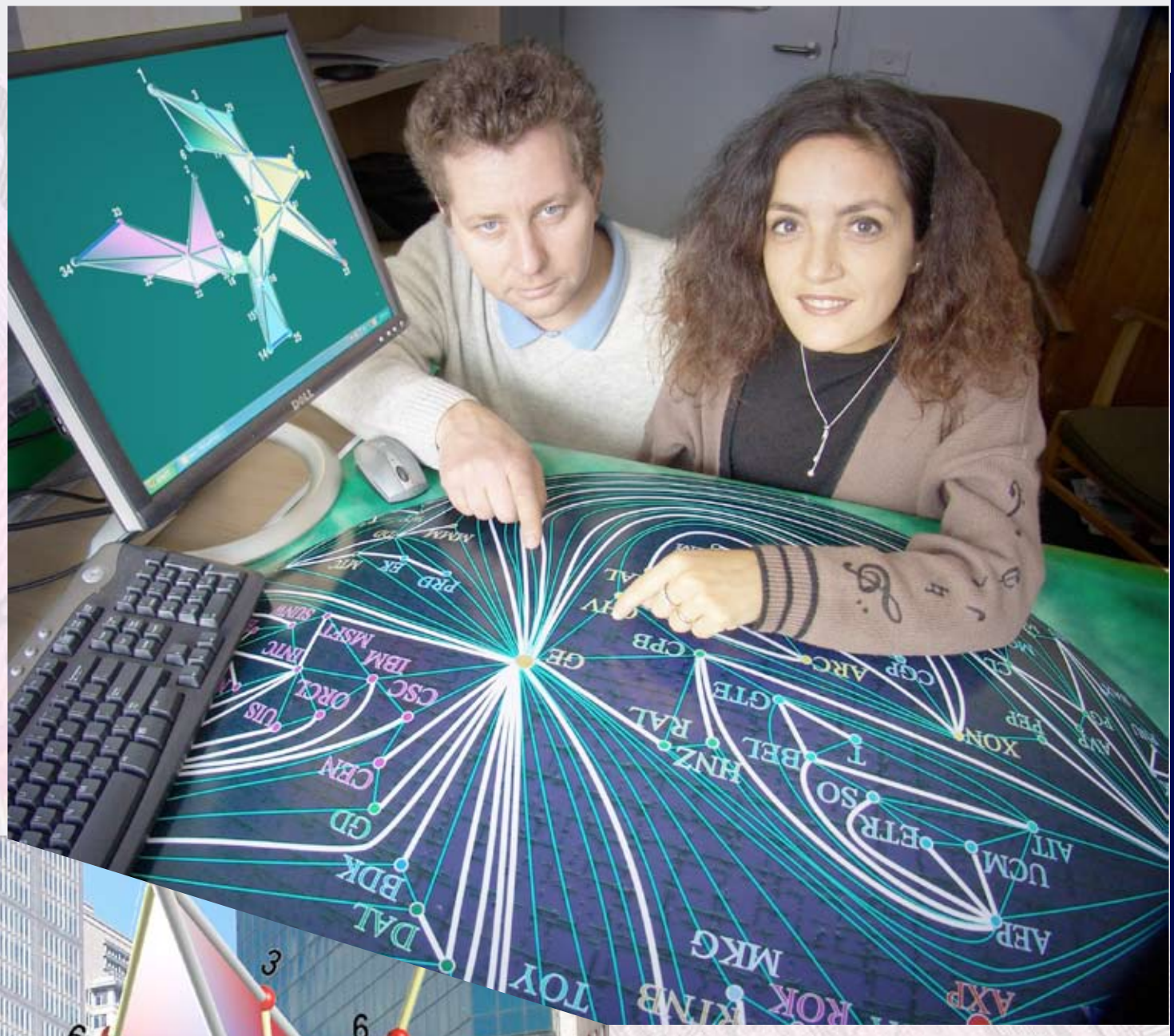
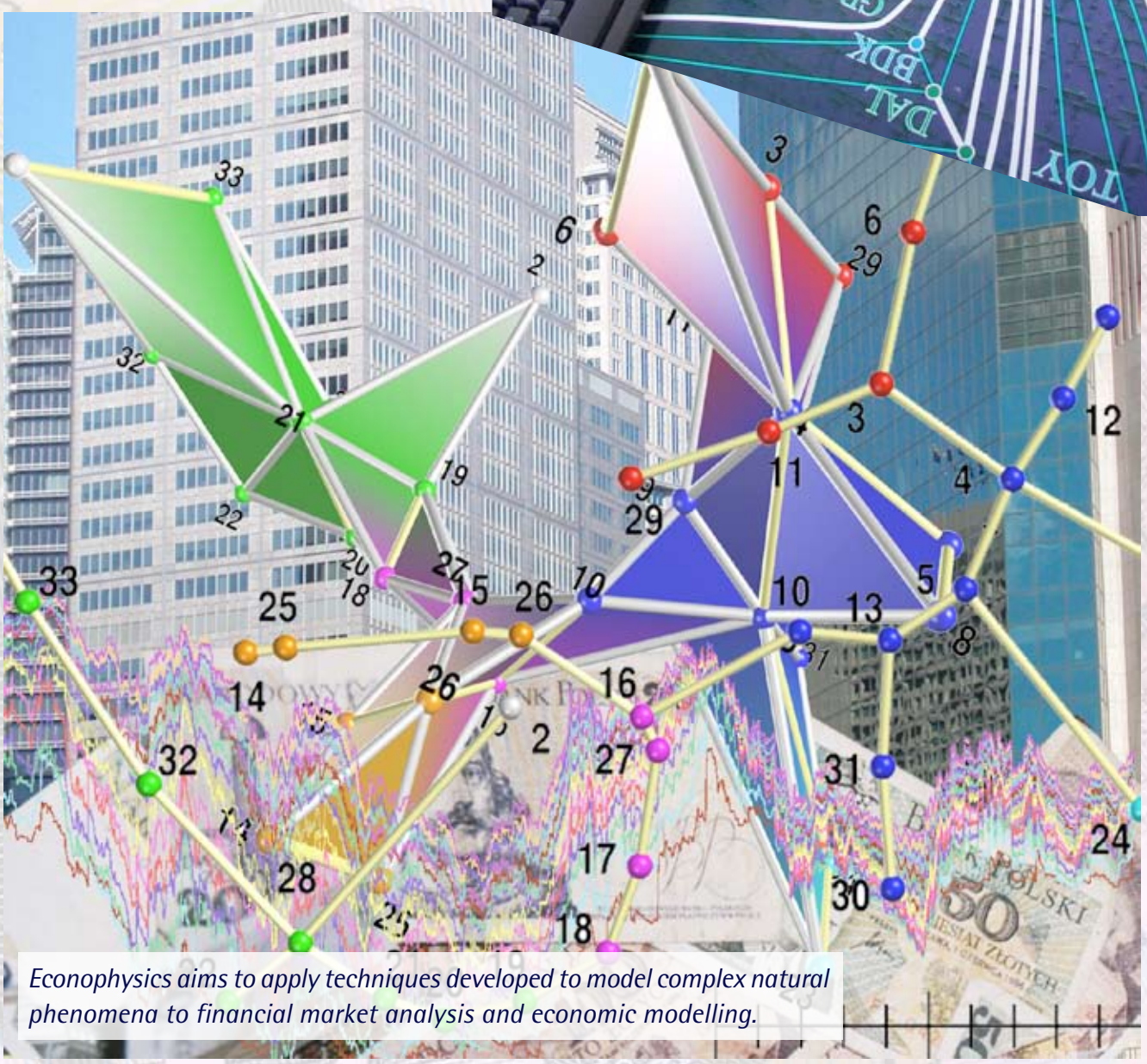
Financial markets are intrinsically complex systems in which a large number of agents interact in an interdependent way, generating actions that span several orders of magnitude in size and time. A surprising and fascinating aspect is that from such intricate systems there emerge behaviors and patterns that appear to be universal and common to several other complex physical systems. The disentanglement of such complexity and the understanding of the mechanisms underlying the emerging pattern behaviors are challenging, and potentially rewarding, research area.

A better understanding of the properties of financial markets is of great importance: the lives of most of us depend on the dynamics of financial markets that affects investments, savings, business, employment, growth, wealth and – ultimately – the daily functioning of our society.





Econophysics aims to apply techniques developed to model complex natural phenomena to financial market analysis and economic modelling.

Scientists at ANU are applying conceptual and computational methods from statistical physics to explore the structure and dynamics of financial markets.

Breakthrough results have been obtained by a new technique which allows them to map complex systems into graphs with controllable inter-connectedness. This allows them to uncover hidden mechanisms that lead to the emergence of patterns in the markets.

It has been shown that the so-called multifractal properties of price fluctuations are deeply related to the stage of development of the markets. This fact can be used to differentiate between the maturity of markets and help investors to hedge their risk.

The general aim of these researches is to contribute to the understanding of the fundamental aspects of the science of complex systems. Specific goals concern the development of tools to analyse the collective behavior of complex systems to understand their structure, to manage and control risk.