SNPD Prizes 2017

The **2017 EPS Statistical and Nonlinear Physics Prize** is awarded to

- **Peter Grassberger** "***for his seminal contributions to nonlinear physics, in particular for the development of the Grassberger-Procaccia algorithm to analyse nonlinear chaotic time series, and the development of highly innovative numerical simulation techniques for complex phenomena such as directed percolation, the dynamics of chain polymers, epidemic spreading, and transient chaos.***"

  Peter Grassberger got his PhD in Theoretical High Energy Physics at the University of Vienna in 1965. In the early seventies he switched his research area from high energy physics (bound state scattering theory) to statistical physics and nonlinear dynamics, where he made his best-known research contributions. After temporary positions in Kabul, Bonn, Geneva (CERN) and Nice he became a professor at the University of Wuppertal in 1977. During 1996-2005, while on leave of absence from Wuppertal, he was the Head of the Complex System Research Group, Forschungszentrum Jülich. During 2006-12 he was at the University of Calgary.

  Peter Grassberger's most-known breakthrough is the characterization of the fractal structure of attractors in dynamical systems, of their entropies and generalized dimensions including the famous method for the calculation of the correlation dimension (joint work with Procaccia). But he has also made pioneering contributions in many other fields, such as studies of the critical properties of percolation, epidemic spreading, and self-organized criticality. In particular, he was the first who realized the equivalence of these types of generalized random walk models with Reggeon field theory. In the area of chaotic dynamics, he developed novel approaches for the quantitative characterization of complex phenomena, such as the Kantz-Grassberger formula for transient chaos and symbolic dynamics techniques for non-hyperbolic systems. He is a world-leading expert in advanced numerical methods and highly innovative simulation techniques for a variety of complex systems in equilibrium and non-equilibrium statistical physics, including the dynamics of chain polymers and protein folding.

- **Itamar Procaccia** "***for his seminal contributions to nonlinear physics, in particular for the development of the Grassberger-Procaccia algorithm to analyse nonlinear chaotic time series, and the development of powerful theoretical approaches to describe complex phenomena such as multifractals, diffusion-limited aggregation, anisotropic turbulence and drag reduction in turbulent flows.***"

  Since his doctoral thesis, Itamara Procaccia always held a highly visible position at the frontiers of research in Nonlinear and Statistical Physics. He got his PhD in Theoretical Chemistry at Hebrew University, Jerusalem, in 1976, followed by a postdoctoral position at MIT (1977-79), a position at the Weizmann Institute (Rehovot), and a visiting professorship in Chicago 1984-85, where he wrote his famous paper on $f(\alpha)$ spectra joint with Kadanoff and others. He became a full professor at the Weizmann Institute in 1985 and has been Head of the Department of Chemistry and Dean of the Faculty for a long time. Itamar Procaccia obtained many prizes and recognitions during his career and he has educated more than 130 PhD students and postdocs. Currently he is Chair of the IUPAP C3 Commission.

  Itamar Procaccia's early research breakthrough in the 1980's was the Grassberger-Procaccia algorithm for the characterization of chaotic attractors and the estimation of the correlation dimension and other dynamical quantities. He made seminal contributions to understand fractal structures and their scaling properties, and took an eminent part in the early development of the theory of multifractals and of multifractal spectra, with particular applications to fractal measures at the onset of chaos and to the case of Diffusion Limited Aggregation. Later he concentrated on the physics of turbulent flows, where his seminal work has significantly improved our understanding of the anisotropy of small scale fluctuations, of the anomalous scaling exponents observed, as well as the drag reduction in turbulent flows by addition of a small concentration of polymers. During the last decade he made further important contributions to the statistical physics and mechanical properties of amorphous solids.