Research on the origins, development, and dynamics of complexity in biological systems has been a core topic of inquiry at the Santa Fe Institute since its founding 30 years ago in 1984. SFI’s scientists have worked to develop an understanding of a dizzying array of biological phenomena, from the origins of life, to transitions from single-to multi-cellularity, to evolutionary innovation at different levels of biological organization, to the relationship between ecological complexity and dynamical stability.

The intertwined concepts of energy and information are fundamental to any understanding of biological complexity. Biological systems are far from equilibrium, requiring a constant flow of energy to maintain their organization and functionality. The processing and encoding of information provides a means for life to manage and maintain energy acquisition, use, and dissipation.

The work of former resident professors and current external faculty members Jessica Flack and David Krakauer (and their many colleagues) highlighted in this issue of the SFI Bulletin addresses the intimate dance between energy and information processing in biological systems – a dance they suggest gives rise to the complex, multi-scale structure we observe.

This computational-thermodynamic view of biology provides a powerful, potentially generic framework for understanding the properties of any kind of complex adaptive system, including socio-economic systems.

Sincerely,

Jennifer Dunne, Chair of the Faculty, Santa Fe Institute