Biological systems, from the simplest microorganisms to self-conscious animals, present many properties unique to evolving living matter. Physical sciences, although traditionally dealing only with non-living matter, did contribute significantly to the emergence and growth of molecular biology, both through the development of experimental techniques and quantitative descriptions of molecular processes. New experimental and computational tools continue to play an important role in studies of biological systems beyond mere description of their molecular components, and they are now successfully applied at the cellular, organismal, and population levels.

This relative success of physics, mathematics, and computer science in biology should not hide the fact that we are still far from having developed a coherent, quantitative and predictive theoretical framework to describe the behavior of even the simplest living systems evolving in contact with their environment. Such a theoretical framework obviously should be developed in close contact with experiments and observations. However, in our view, it should also involve a continual search for underlying general principles, an introduction of necessary simplifications and abstractions, and a necessary development of new theoretical concepts, better suited for the description of the complex, evolved matter. It is our hope that the research activity of our Center will contribute, even if only in a modest way, to the development of such a theoretical framework.

Stanislas Leibler *is a physicist interested in collective, dynamic phenomena unique to living matter. Those include self-assembly of multifarious mixtures of proteins, functioning and robustness of genetic and biochemical networks, adaptation of information processing organisms to their varying environments, and contingency and determinism in the dynamics of ecological systems.*

Misha Tsodyks *is a theoretical neuroscientist; his main research interests lie in developing mathematical models of brain functions. Among his past achievements is a theory of short-term synaptic plasticity and its role in information processing in the brain, synaptic theory of working memory and new fundamental relationships between memory acquisition and recall.*