Stanislas Leibler, Ph.D.

GLADYS T. PERKIN PROFESSOR, LABORATORY OF LIVING MATTER

Even the simplest of organisms, such as bacteria, interact extensively and are capable of processing information in a highly sophisticated manner, adapting to varying environments and evolving new functions. Leibler is interested in the quantitative description of such systems, both on cellular, population and ecological levels.

In recent years, the field of molecular biology has moved away from the study of individual components and toward the study of how these components interact—a systemic approach that seeks an appropriate and quantitative description of cells and organisms. Leibler's laboratory is developing both theoretical and experimental methods to conduct studies on the collective behavior of biomolecules, cells, and organisms. In selecting some basic questions about how simple genetic, biochemical, cellular, and organismal networks evolve and function, his lab studies how individual components can give rise to complex collective phenomena.

Recent research topics in the laboratory include quantitative studies of interacting microorganisms. In particular, Leibler and his collaborators are developing new theoretical and experimental techniques that can allow the quantitative analysis of long-time population dynamics and collective behavior in microbial populations. They are also using mathematical methods to analyze long-term dynamics of various ecosystems, ranging from artificial microbial microcosms to those encountered in natural terrestrial ecology.

EDUCATION

Ph.D. in theoretical physics, 1981
Ph.D. in physics, 1984
University of Paris

POSTDOC

Cornell University, 1985–1987

POSITIONS

Research Fellow with Tenure, 1984–1992
Centre d'Études de Saclay

Professor, 1992–2001
Princeton University

Professor, 2001–
The Rockefeller University

Tri-Institutional Professor, 2003–2010
Weill Cornell Medical College and the Sloan-Kettering Institute

Professor, 2009–
Institute for Advanced Study

Investigator, 2000–2001
Howard Hughes Medical Institute

HONORARY SOCIETIES

National Academy of Sciences

American Physical Society, Fellow

SELECTED PUBLICATIONS

Pleška, M. et al. Nongenetic individuality, changeability, and inheritance in bacterial behavior. *Proc. Nat. Acad. Sci. U.S.A.* 118, e2023322118, (2021).

Chuang, J.S. et al. Homeorhesis and ecological succession quantified in synthetic microbial ecosystems. *Proc. Nat. Acad. Sci. U.S.A.* 116, 14852-14861 (2019).

Balaban, N.Q. et al. Bacterial persistence as a phenotypic switch. *Science* 305, 1622-1625 (2004).

Elowitz, M. and Leibler, S. A synthetic oscillatory network of transcriptional regulators. *Nature* 403, 335-338 (2000).

Alon, U. et al. Robustness in bacterial chemotaxis. *Nature* 397, 168-171 (1999).