

**BIOZENTRUM**

Universität Basel  
The Center for  
Molecular Life Sciences

# Biozentrum Lectures

Integrative Structural Biology

Andrej Sali

Professor of Computational Biology  
at the University of California

15 January 2013, 4 pm

Hörsaal 1, Pharmazentrum  
Klingelbergstrasse 50/70, Basel

Molecular  
Life Sciences.



# Integrative Structural Biology

The structures of macromolecular assemblies provide insights into their function and thus help us to understand the workings of living cells. Detailed structural characterization of large and often dynamic assemblies is generally impossible by any single existing experimental or computational method. This challenge can be overcome by hybrid approaches that integrate data from diverse biochemical and biophysical experiments (*eg*, X-ray crystallography, NMR spectroscopy, electron microscopy, chemical cross-linking, and small angle X-ray scattering).

Professor Sali formulated the integrative approach to structure determination as an optimization problem, the solution of which requires three main components: the representation of the assembly, the scoring function, and the optimization method. In his lecture, Sali will outline latest advances in computational methods for integrative structure modeling as well as illustrate these methods by their application to the 26S proteasome.



**Andrej Sali** is Professor of Computational Biology at the University of California (San Francisco, USA). He is interested in developing and applying computational methods for determining structures and functions of proteins and their assemblies. In particular, he is focusing on developing computational methods for integrative structure determination of macromolecular assemblies, based on diverse biochemical and biophysical experiments. Prof. Sali's group has also applied these methods to a number of challenging macromolecular complexes, including the 26S proteasome and the Nuclear Pore Complex (NPC), the major gateway for molecular traffic in and out of a cell's nucleus.

Prof. Sali received his PhD in Molecular Biophysics in 1991 from the University of London under the supervision of Prof. Tom L. Blundell, where he developed the program MODELLER for comparative modeling of protein structures. Following postdoctoral research at Harvard University with Prof. Martin Karplus, he became first Assistant Professor and then Associate Professor at The Rockefeller University. In 2003, he moved to University of California, where he is currently Vice Chair of the Department of Bioengineering and Therapeutic Sciences.

The Biozentrum Lectures are organized by the Biozentrum, University of Basel, and were initiated in 2009. The lectures present speakers who have made outstanding contributions in the field of Life Sciences. The goal of the series is to highlight the work of these individuals in an event that brings together researchers from the entire community in Basel and its surroundings.

Past speakers in the Biozentrum Lectures series:

**James E. Rothman**

Chairman, Department of Cell Biology  
Professor, Department of Chemistry Yale University

**Thomas Walz**

Investigator, Howard Hughes Medical Institute  
Professor, Department of Cell Biology, Harvard Medical School

**Austin Smith**

Director, Wellcome Trust Centre for Stem Cell Research,  
University of Cambridge

**Tim Hunt**

Cancer Research UK,  
Clare Hall Laboratories, South Mimms, Hertfordshire

**Laurent Keller**

Department of Ecology and Evolution,  
University of Lausanne

**Peter Carmeliet**

Director of the VIB – Vesalius Research Center,  
University of Leuven, Belgium