

▶ Industrial Platform

UNICELLSYS will establish a **Systems Biology Industrial Advisory Platform**. The Industrial Platform will ensure that there is an exchange of knowledge, tools, methods and standard operating procedures for systems biology between academia and industry. There will also be possibilities for staff from participating companies to undergo training in UNICELLSYS laboratories.

▶ Congresses & Public Outreach

In addition to the UNICELLSYS website, **scientific publication** activities, **dissemination** of major UNICELLSYS results will involve regular national and international scientific **congresses** and meetings. Importantly, the **broad public** and **media** will also be engaged to communicate the future **potential** of systems biology in **medical and biotechnological** or **industrial applications**.

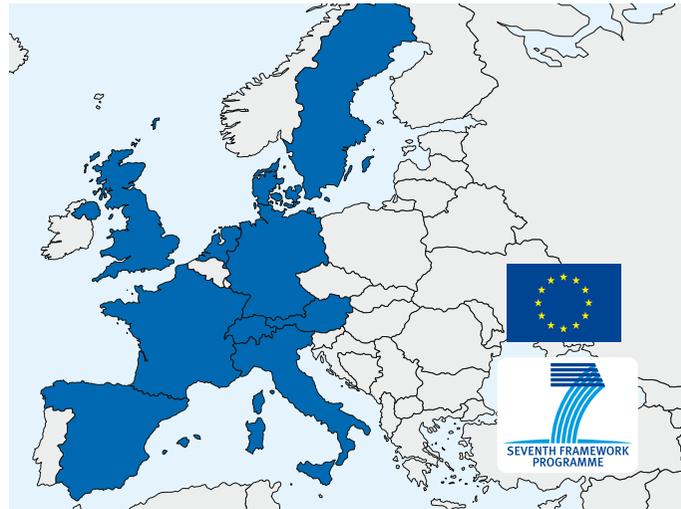
▶ Student Training & Education

UNICELLSYS will provide high-level training of young scientists through a mobility and inter-laboratory exchange programme.

Student training will also involve participation in conferences, in theoretical and/or practical hands-on lecture courses, in combined practical/lecture courses, as well as “on-demand”, tailor-made individual **short term scientific missions (STSM)** for exchanging students between UNICELLSYS laboratories for experimental and computational work.

▶ European Systems Biology Area

The coordinated research and training efforts of UNICELLSYS will support a sustained development of the *European Research Area* in an important and expanding field of interdisciplinary biomedical research. Hence, UNICELLSYS will lay the foundation for future programmes in Systems Biology at the European level and ensure the competitiveness in this rapidly expanding scientific area that unites theoretical and experimental scientists



▶ UNICELLSYS Contact Information

Stefan Hohmann
Project Coordinator

Martin Markström
Project Manager

University of Gothenburg
Department of Cell and Molecular Biology
University of Gothenburg
Box 462 - SE-405 30 Göteborg, Sweden
Phone: +46-31-786-3294
Fax: +46-31-786-2525
e-mail: martin.markstrom@gu.se
Website: <http://www.unicellsys.eu>



Eukaryotic Unicellular Organism Biology



Systems Biology of the Control of Yeast Cell Growth & Proliferation

Scientists & Partner Institutions

Stefan Hohmann (Coordinator), **Anders Blomberg**,
Per Sunnerhagen, **Thomas Nyström**, **Mattias Goksör**
University of Gothenburg - SE

Lilia Alberghina, **Marco Vanoni**, **Enzo Martegani**
University of Milano-Bicocca - IT

Jean Beggs, **David Tollervey**, **Mike Tyers**
University of Edinburgh - UK

Mats Jirstrand
Fraunhofer-Chalmers Research Centre for Industrial Mathematics - SE

Douglas Kell, **Pedro Mendes**
University of Manchester - UK

Ross King
Aberystwyth University - UK

Edda Klipp
Humboldt University of Berlin - DE

Sylvia Krobitsch
Max Planck Institute for Molecular Genetics - DE

Karl Kuchler, **Gustav Ammerer**
Medical University Vienna – University of Vienna - AT

Jens Nielsen
Chalmers University of Technology – SE

Bela Novák
University of Oxford - UK

Steve Oliver
University of Cambridge – UK

Francesc Posas, **Eulalia de Nadal**
Universitat Pompeu Fabra – ES

Uwe Sauer, **Ruedi Aebersold**, **Matthias Peter**, **Jörg Stelling**
ETH Zürich - CH

Luis Serrano
Fundació Privada Centre de Regulació Genòmica – ES

Hans Westerhoff, **Barbara Bakker**, **Jacky Snoep**
Vrije Universiteit Amsterdam – NL

Chris Workman
Danmarks Tekniske Universitet – DK

► Mission & Goals of UNICELLSYS

The main objectives of UNICELLSYS are a **quantitative understanding** of fundamental characteristics of eukaryotic unicellular organism biology, namely how **cell growth and proliferation** are **controlled** and coordinated by **extracellular and intrinsic stimuli**.

The understanding of fundamental principles by which biomolecular systems operate requires integrating quantitative experimentation with simulations through dynamic mathematical models.

UNICELLSYS brings together a consortium of leading European **experimental** and **theoretical** scientists to **study cell growth** and proliferation at the levels of yeast cell populations, single cells, cellular networks, large-scale dynamic systems and functional modules.

Building **computational reconstructions** and dynamic models will involve **quantitative data**, paired with complementary approaches such as **mathematical modeling**. A major challenge will be the generation of comprehensive dynamic models of control machineries driving cell growth and proliferation. **Iterative cycles** of **simulations** followed by with **experimentation** and hypothesis generation shall discover new and **emerging fundamental principles** of cellular organisation and underlying control mechanisms.

UNICELLSYS will drive systems biology research in single eukaryotic cells, ensuring a competitive advantage of Europe in the dynamic quantitative modelling of biomolecular processes.

Stefan Hohmann
UNICELLSYS Coordinator

► Scientific Work Packages

The workload in UNICELLSYS is divided into several distinct Work Packages, which are coordinated by scientists from partner institutions.

Work Package 1 – Jens Nielsen (SE)
Reconstruction of regulatory networks

Work Package 2 – Steve Oliver (UK)
Topological data sets for system definition

Work Package 3 – Uwe Sauer (CH)
Data through high-throughput technologies

Work Package 4 – Francesc Posas (ES)
Data through dedicated experimentation

Work Package 5 – Mattias Goksör (SE)
Single cell methods

Work Package 6 – Edda Klipp (GE)
High-resolution predictive dynamic models

Work Package 7 – Jörg Stelling (CH)
Dynamic models of yeast growth & proliferation

Work Package 8 – Pedro Mendes (UK)
Integration of levels of biological organization

Work Package 9 – Hans Westerhoff (NL)
New and emerging system properties

Work Package 10 – Chris Workman (DK)
Data availability for dynamic modeling

Work Package 11 – Mats Jirstrand (DK)
Computational tools for systems biology

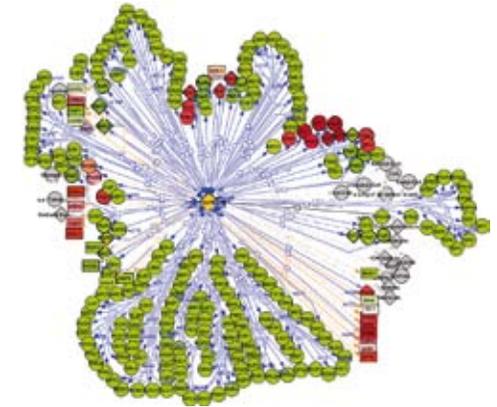
Work Package 12 – Karl Kuchler (AT)
Student training, mobility & public outreach

Work Packages 13 & 14 – Stefan Hohmann (SE)
Quality control & project management

► Major Objectives

UNICELLSYS aims at advancing the field of systems biology by:

- **Developing and disseminating new tools for dynamic modeling in computational systems biology**
- **Developing and disseminating new and optimising existing tools of generic suitability for quantitative measurements as required for dynamic modelling**
- **Generating and disseminating new knowledge on the quantitative and system properties of the central regulatory mechanisms of eukaryotic cells**
- **Advancing interdisciplinary collaborations between experimentalists and theoreticians in systems biology**



► Scientific Advisory Board

The UNICELLSYS Scientific Advisory Board comprises **Hiroaki Kitano** (Systems Biology Institute, Tokyo), **Roger Brent** (Molecular Science Institute, Berkeley), **Bernard Palsson** (University of California, San Diego), **Charlie Boone** (University of Toronto) and **Marc Vidal** (Harvard University).

These leading experts shall advise the UNICELLSYS consortium in all matters ranging from system analysis, quantitative yeast biology, as well as organization and management of large-scale efforts. Further, these external advisors represent important global links to relevant systems biology initiatives in North America and Asia.