Biosystems Engineering Group

- Bogazici University
- Faculty of Engineering
- Chemical Engineering Department
Members

- **Betül Kırdar**: Professor of Molecular Biology and Genetics

- **Z. İlsen Önsan**: Professor of Chemical Reaction Engineering

- **Kutlu O.Ülgen**: Professor of Chemical/Biochemical Reaction Engineering

- **Amable Hortaçsu**: Professor of Chemical Engineering

- **Elif Özkırimli Ölmez**: Assistant Professor (PhD in biochemistry and molecular biology)

- **15-20 graduate students**
Previous Experience
Relevant
to
Industrial Biotechnology
construction of the genetically modified strains

production of industrially important bio-products in recombinant *E. coli* and *S. cerevisiae*

fermentation technology using well controlled fermentors under different operating conditions and feeding strategies
downstream separation operations

bioprocess design

development of stochiometric and dynamic models
Current Research Activities

Systems Biology
Genome Scale Models
Metabolic Engineering
Networks working for life

Knowledge-based Bio-Economy (KBBE)
development of novel tools to analyze and integrate different omics

genome scale modelling

rational design of industrially important microorganisms (cell factories)

for the development of new products and/or improved processes

using systems biology approaches and genetic engineering techniques

in *Saccharomyces cerevisiae* and *E.coli*. 
Multifactorial diseases

- Molecular basis
- Drug targets
Projects Funded by TÜBİTAK


104M362- Determination of Drug Targets in Sphingolipid Metabolism to be used Drug Design through System-based Engineering Approaches
EU Funded Projects

- **Yeast Systems Biology Network**
  - YSBN LSH-2004-1.1.0-2
  - 2005 - 2008

- **Systems Biology as a Driver for Industrial Biotechnology**
  - SYSINBIO
  - 2008 April - 2011
Overall Goal of SYSINBIO

to coordinate research activities in the field of **model driven metabolic engineering** in Europe

- systems biology to improve the performance of metabolic models
- mathematical models for improved design of cell factories used in industrial biotechnology
In Industrial Biotechnology

- the development of efficient cell factories
- to speed up the improvement of existing bioprocesses and
- to ensure that new products are brought to the market faster
Selected Publications
Toksoy E., Önsan Z.İ., Kırdar B. (2002) High level production of Taq restriction endonuclease by three different expression system in Escherichia coli cells using T7 phage promoter Applied Microbiology and Biotechnology 59, 239-245


Thank you
Stephen G. Oliver
University of Cambridge
Faculty of Life Sciences

Jens Nielsen
Denmark Technical University
Center for Microbial Biotechnology