SystemsX.ch
Project Overview
2nd Generation Projects
from 2012 onwards

SystemsX.ch
The Swiss Initiative in Systems Biology

Research, Technology and Development (RTD) Projects

AgingX
Systems Genetics
Approach to
the Biology of Aging

Principal investigator
Prof. Bart Deplancke
Laboratory of Systems Biology
and Genetics
EPF Lausanne
bart.deplancke@epfl.ch

Partners
EPFL, UniL

Scientific fields
- Biology of aging
- Genetic and phenotypic variation
- Systems genetics
- Regulatory genomics
- Metabolism

Technologies
High-throughput sequencing,
metabolomics, statistical genetics,
network modeling

Approved 2013

HostPathX
Modeling and Manipulating
the Phagocyte-Mycobacteria
Interface

Principal investigator
Prof. Thierry Soldati
Department of Biochemistry
University of Geneva
thierry.soldati@unige.ch

Partners
UniGE, UZH, TU Darmstadt, SIB

Scientific fields
- Host-pathogen interactions
- Metabolism
- Bacterial virulence
- Innate immunity
- Engineering
- Anti-infection drugs

Technologies
Infection monitoring, live cell
microscopy, molecular genetics,
high-throughput dual RNA-sequen-
cing, bioinformatics, mathematics
and modeling, small compound
screening, model systems

Approved 2013

MalarX
Systems Medicine
of Malaria

Principal investigator
Prof. Vassily Hatzimanikatis
Laboratory of
Computational Systems
EPF Lausanne
vassily.hatzimanikatis@epfl.ch

Partners
EPFL, UniGE, UniBE

Scientific fields
- Engineering
- Medical microbiology
- Malaria
- Metabolomics
- Molecular parasitology
- Cell biology

Technologies
Mathematics and modeling, live
and intravital microscopy, 3D cell
culture, LC-MS/MS

Approved 2013

MERIC
Mechanisms of
Evasive Resistance
in Cancer

Principal investigator
Prof. Niko Beerenwinkel
Department of Biosystems
Science and Engineering
ETH Zurich
niko.beerenwinkel@bsse.ethz.ch

Partners
ETHZ, UniBas

Scientific fields
- Hepatocellular carcinoma
- Signaling pathways
- Liver cancer
- Genetic tumor progression
- Genomics
- Phosphoproteomics

Technologies
Mathematics and modeling

Approved 2013

MicroScapesX
Design and Systems Biology
of Functional Microbial
Landscapes

Principal investigator
Prof. Jan Roelof van der Meer
Department of Fundamental
Microbiology
University of Lausanne
janroelof.vandermeer@unil.ch

Partners
UniL, EPFL, ETHZ, CHUV

Scientific fields
- Experimental microbiology
- Environmental sciences
- Medical microbiology
- Synthetic ecology
- Bioremediation
- Metabolomics

Technologies
Experimental biology, mathema-
tics and modeling, genomics

Approved 2013

MorphogenetiX
Modeling the
3-Dimensional Shaping
of Tissue Systems

Principal investigator
Prof. Damian Brunner
Institute of Molecular Life
Sciences
University of Zurich
damian.brunner@imls.uzh.ch

Partners
UZH, UniBas, MPI Cologne

Scientific fields
- Embryology
- Cell-to-cell variability
- Intestinal organoids
- Wing imaginal discs
- Embryonic dorsal closure
- Cell biology

Technologies
Mathematics and modeling, 3D
tissue morphogenesis, cell-to-cell
variability, 3D live fluorescence
imaging

Approved 2013

SignalX
Model-Driven
Experimental Design
of TOR Signaling

Principal investigator
Prof. Uwe Sauer
Institute of Molecular Systems
Biology
ETH Zurich
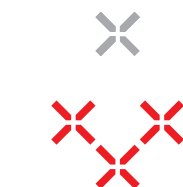sauer@imsb.biol.ethz.ch

Partners
ETHZ, UniGE

Scientific fields
- Engineering
- Cell signaling
- Proteomics
- Metabolomics

Technologies
Mathematics and modeling,
computational biochemistry

Approved 2013

TargetInfectX
Multi-Pronged Perturbation
of Pathogen Infection
in Human Cells

Principal investigator
Prof. Christoph Dehio
Biozentrum
University of Basel
christoph.dehio@unibas.ch

Partners
UniBas, ETHZ, UZH

Scientific fields
- RNA interference
- miRNA
- Bacterial infection
- Signaling pathway reconstruction
- Anti-infectives
- Cell Biology

Technologies
Computational biology, genomics,
mathematics and modeling

Approved 2013

TbX
Systems Biology of
Drug-resistant Tuberculosis
in the Field

Principal investigator
Prof. Sébastien Gagneux
Medical Parasitology and Infection
Biology, Swiss Tropical and Public
Health Institute (Swiss TPH)
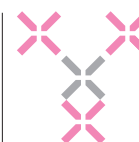University of Basel
sebastien.gagneux@unibas.ch

Partners
UniBas, ETHZ, BioVersys AG

Scientific fields
- Genomic epidemiology
- Experimental microbiology
- Population genomics
- Functional genomics
- Computer sciences
- Mathematics and modeling

Technologies
Transcriptomics, proteomics,
lipidomics, metabolomics

Approved 2013

AntibodyX
Systems Biology of
Humoral Immunity

Principal investigator
Prof. Sai Reddy
Department of Biosystems
Science and Engineering
ETH Zurich
sai.reddy@bsse.ethz.ch

Partners
ETHZ, UZH

Scientific fields
- Clinical immunology
- Clinical immunopathology
- Engineering
- Molecular biology

Technologies
Genomics, mathematics and
modeling, computational
biochemistry

Approved 2012

EpiPhysX
The Physics of
Epithelia

Principal investigator
Prof. Michel Milinkovitch
Department of
Genetics & Evolution
University of Geneva
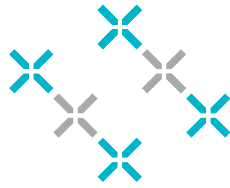michel.milinkovitch@unige.ch

Partners
UniGE, UZH, SIB

Scientific fields
- Engineering
- Developmental biology
- Embryology
- Zoology
- Biophysics
- Cellular biology

Technologies
Computer sciences, mathematics
and modeling

Approved 2012

LipidX
Systems Biology of
Biomembranes

Principal investigator
Prof. Gisou van der Goot
Global Health Insititue
EPF Lausanne
gisou.vandergoot@epfl.ch

Partners
EPFL, UZH, UniGE

Scientific fields
- Lipidomics
- Proteomics
- Cell signaling
- Metabolomics
- Cell biology
- Mathematical modeling

Technologies
Computational biochemistry,
mathematics and modeling

Approved 2012

MecanX
Understanding Physics of
Plant Growth

Principal investigator
Prof. Ueli Grossniklaus
Institute of Plant Biology
University of Zurich
grossnik@botinst.uzh.ch

Partners
UZH, ETHZ, IBM,
FemtoTools AG

Scientific fields
- Engineering
- Plant growth
- Microelectronics
- Biophysics
- Cell biology
- Computational biochemistry

Technologies
Cellular force microscopy, micro-
electronic mechanical systems
(MEMS), multifrequency AFM,
microrobotics

Approved 2012

NeuroStemX
Systems Biology of
Forebrain Development

Principal investigator
Prof. Verdon Taylor
Department of Biomedicine
University of Basel
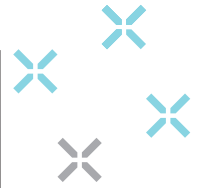verdon.taylor@unibas.ch

Partners
UniBas, ETHZ

Scientific fields
- Engineering
- Developmental biology
- Brain patterning
- Signaling

Technologies
Single cell RNA-Seq, genomics,
transgenics, mathematics and
modeling, microfluidics

Approved 2012

PhosphoNet PPM
Personalized-Precision
Medicine

Principal investigator
Prof. Ruedi Aebersold
Institute of Molecular Systems
Biology
ETH Zurich
aebersold@imsb.biol.ethz.ch

Partners
ETHZ, UZH, KSSG, University of
Cologne

Scientific fields
- Experimental cancer research
- Personalized medicine
- Biomarker
- Proteomics

Technologies
Computer sciences, mathematics
and modeling, imaging

Approved 2012

PlantGrowth2
in a Changing
Environment

Principal investigator
Prof. Cris Kuhlemeier
Institute of Plant Sciences
University of Bern
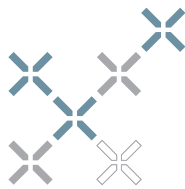cris.kuhlemeier@ips.unibe.ch

Partners
UniBE, UniL, UniFR, ETHZ

Scientific fields
- Botany
- Biophysics
- Agricultural and forestry
  sciences
- Genomics

Technologies
Computer sciences, mathematics
and modeling, imaging

Approved 2012

StoNets
Controlling and Exploiting
Stochasticity in Gene
Regulatory Networks

Principal investigator
Prof. Mihaela Zavolan
Biozentrum
University of Basel
mihaela.zavolan@unibas.ch

Partners
UniBas, EPFL, UniL

Scientific fields
- Gene expression
- Regulatory networks
- Circadian rhythms
- Cellular reprogramming
- miRNAs
- Single cell imaging

Technologies
Single cell analysis, computer
sciences, mathematics and
modeling

Approved 2012

SynaptiX
Systems Biology of
Forgetting

Principal investigator
Prof. Simon Sprecher
Department of Biology
University of Fribourg
simon.sprecher@unifr.ch

Partners
UniFR, UniBE, University of Nevada

Scientific fields
- Engineering
- Cytology
- Synaptic plasticity
- Transcriptomics
- Neurogenetics
- Genomics
- Cell biology

Technologies
Super resolution microscopy,
mathematics and modeling

Approved 2012

SysGenetiX
Cellular Systems Genetics
in Humans

Principal investigator
Prof. Emmanouil Dermitzakis
Department of Genetic Medicine
and Development
University of Geneva Medical School
emmanouil.dermitzakis@unige.ch

Partners
UniGE, EPFL, UniL, MIT

Scientific fields
- Cytology
- Genome variation
- Systems genetics
- Local regulatory networks
- Medicine
- Genomics
- Cell biology

Technologies
Computer sciences, mathematics
and modeling

Approved 2012

TubeX
Multiscale Biophysics of
Microtubule Dynamics

Principal investigator
Prof. Yves Barral
Institute of Biochemistry
ETH Zurich
yves.barral@bc.biol.ethz.ch

Partners
ETHZ, PSI

Scientific fields
- Microtubule cytoskeleton
- Saccharomyces cerevisiae
- Cytoskeleton
- Proteomics
- Cell biology

Technologies
Molecular genetics, X-ray
crystallography, mathematics and
modeling, imaging

Approved 2012

Medical Research and Development (MRD) Projects

AneuX
Shape as Biomarker
for Aneurysm Disease

Principal investigator
CC Dr. med. Philippe Bijlenga
Department of Clinical
Neurosciences
Geneva University Hospitals
philippe.bijlenga@hcuge.ch

Partners
UniGE/HUG, ZHAW, UZH, ETHZ,
UniGE, UZH/USZ

Scientific fields
- Intracranial aneurysm
- Image biomarker
- Mechano-biological transduction
- Shape analysis

Technologies
Disease modeling, vessel wall
remodeling, database validation,
pathway modeling, statistical mo-
deling, fluid-structure modeling

Approved 2014

GutX
Systems Biology of
Inflammatory
Bowel Disease

Principal investigator
**Prof. Dr. med.
Andrew Macpherson**
Gastroenterology & Mucosal
Immunology, Inselspital
University of Bern
andrew.macpherson@insel.ch

Partners
UniBE/Inselspital, ETHZ, SIB

Scientific fields
- Commensal microbiota
- Metabolomics
- Inflammatory bowel disease
- Intestinal microbiology
- Metabolic pathways
- Nutrition

Technologies
Stable isotope tracing, metabolic
modeling, gnotobiotics, axenics,
metagenomics, metatranscript-
omics

Approved 2014

HDL-X
Systems Biology of
High Density Lipoproteins

Principal investigator
**Prof. Dr. med.
Arnold von Eckardstein**
Institute of Clinical Chemistry
University Hospital Zurich
arnold.voneckardstein@usz.ch

Partners
UZH/USZ, ETHZ

Scientific fields
- Atherosclerosis
- Diabetes
- Lipoproteins
- Transcriptomics
- Proteomics
- Lipidomics
- Signal transduction

Technologies
RNA sequencing, mass spectro-
metry, bioassays of cellular
functions, bioinformatics

Approved 2014

HIV-X
Deciphering Host-Virus
Interactions to
Cure HIV

Principal investigator
**Prof. Dr. med.
Huldrych Günthard**
Division of Infectious Diseases
and Hospital Epidemiology
University Hospital Zurich
huldrych.guenthard@usz.ch

Partners
UZH/USZ, ETHZ, EPFL, UZH,
UniBas, SIB, IBM

Scientific fields
- HIV type 1
- Viral reservoir
- Viral latency
- HIV-1 genetics
- Personalized treatment
- Host-virus interactions

Technologies
Machine learning models, genome-
wide association study, next-gene-
ration sequencing, exome sequen-
cing, statistical and causal relations,
large-scale regression model

Approved 2014

MelanomX
Tumour Microenvironment
Crosstalk in Melanoma
Adaptive Resistance

Principal investigator
Prof. Dr. med. Olivier Michielin
University of Lausanne and SIB
Swiss Institute of Bioinformatics
olivier.michielin@isb-sib.ch

Partners
UniL/CHUV, SIB, UniL, EPFL

Scientific fields
- Adaptive resistance of cancer
- Tumor microenvironment
- Bioinformatics
- Systems biology
- Systems medicine
- Translational melanoma research

Technologies
High-throughput sequencing,
single cell technology, protein
targets, clinical trials

Approved 2014

MetastasiX
Systems Biology of
Breast Cancer

Principal investigator
PD Dr. med. Walter Paul Weber
Breast Center
University Hospital Basel
walter.weber@usb.ch

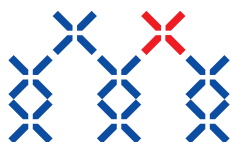**Partners**
UniBas/USB, UniBas, UZH, FMI,
SIB, IBM

Scientific fields
- Breast tumor heterogeneity
- Systems biology
- Metastasis

Technologies
Mathematical modeling, RNA
sequencing, mass cytometry

Approved 2014

PrionX
Systems Biology
of Prion Diseases

Principal investigator
Prof. Dr. med. Adriano Aguzzi
Institute of Neuropathology
University Hospital Zurich
adriano.aguzzi@usz.ch

Partners
UZH/USZ, UZH, UniL, SIB,
University of Cambridge

Scientific fields
- Systems medicine
- Prion diseases
- Transcriptomics
- Microfluidics

Technologies
CRISPR-CAS9, drug screening,
data integration, in silico analysis

Approved 2014

StemSysMed
Systems Approach to
Hematopoietic
Stem Cell Diseases

Principal investigator
Prof. Dr. med. Radek Skoda
Department of Biomedicine
University Hospital Basel and
University of Basel
radek.skoda@unibas.ch

Partners
UniBas, UZH/USZ, ETHZ,
UniBas/USB

Scientific fields
- Hematopoiesis
- Stem cells
- Cancer
- Aging
- Modeling of stem cell dynamics

Technologies
Next-generation sequencing,
single cell analyses, mouse
models of disease, xenograft
models, artificial stem cell niche

Approved 2014

VirX
A Host-Directed
Approach Against
Viral Disease

Principal investigator
Prof. Patrick Matthias
Friedrich Miescher Institute for
Biomedical Research
patrick.matthias@fmi.ch

Partners
FMI, UZH, UniGE/HUG, ETHZ,
UniL/CHUV

Scientific fields
- Influenza
- Host-virus interaction
- HDAC6
- Ubiquitin
- Aggresome
- Proteasome

Technologies
Protein analysis, advanced
microscopy, cellular and
biochemical assays and screens,
transgenic mice generation and
analysis, clinical samples analysis,
mathematical modeling

Approved 2014

Transfer Projects (TF)

Harnessing the immunome's potential to fight cancer: evaluating synergistic antibody drug conjugate – immunotherapy treatments for cancer by comprehensive systems biology analysis

Collaboration between
Prof. Alfred Zippelius
University Hospital Basel/ University of Basel
and
NBE-Therapeutics

Scientific fields, keywords
- antibody drug conjugates
- immunotherapy
- cancer
- immune response
- tumor microenvironment

Approved 2014

MoDeLoMX: MacrOphage DiffErenciation LOgical Modeling

Collaboration between
Prof. Ioannis Xenarios
SIB Swiss Institute of Bioinformatics
and
F. Hoffmann – La Roche Ltd.

Scientific fields, keywords
- Modeling regulatory network
- Experimental design

Approved 2014

Foes or friends? Reprogramming tumor-associated macrophages to fight cancer by targeted signaling network modulation

Collaboration between
Prof. Bernd Bodenmiller
University of Zurich
and
F. Hoffmann – La Roche Ltd.

Scientific fields, keywords
- Medicine
- Tumor associated Macrophages
- Single cell analysis
- Reprogramming
- Drug screening
- Signaling network analysis

Approved 2013

Mechanisms of cancer drug resistance

Collaboration between
Dr. Matthias Gstaiger
ETH Zurich
and
Novartis Pharma AG

Scientific fields, keywords
- Drug resistance
- Biomarkers
- Personalized medicine
- Mass spectrometry
- Proteomics
- Cancer therapy
- PI3K signaling

Approved 2013

EvolutionX – analyzing evolution of adaptation to a novel siderophore antibiotic in Gram-negative bacteria by next-generation sequencing

Collaboration between
Dr. Marc Creus
University of Basel
and
Basilea Pharmaceutica International Ltd.

Scientific fields, keywords
- Genomics
- Transcriptomics
- Laboratory evolution
- Next-generation sequencing
- Antibiotics
- Antibiotic resistance

Approved 2012

In vivo endoscopic fluorescence imaging in the dopamine system of the healthy and diseased brain

Collaboration between
Prof. Fritjof Helmchen
University of Zurich
and
F. Hoffmann – La Roche Ltd.

Scientific fields, keywords
- Fluorescence imaging
- 2-photon microscopy
- Calcium indicator
- Neocortex
- Striatum
- Dopamine

Approved 2012

Multi-modal assessment of mutated predictors BRAF and DDR2 at lung carcinoma invasion fronts by topographic DNA extraction and micro-immunohistochemistry using the microfluidic probe

Collaboration between
Prof. Alex Soltermann
University Hospital Zurich
and
IBM Research – Zurich

Scientific fields, keywords
- Lung cancer
- Immunohistochemistry
- Microfluidic probe
- Oncogenic mutation
- Predictive biomarker

Approved 2012

Statistical reverse engineering of the signaling network involved in cachexia

Collaboration between
Prof. Heinz Wolfgang Koeppl
Technical University of Darmstadt
Prof. Ruedi Aebersold
ETH Zurich
and
Novartis Pharma AG

Scientific fields, keywords
- Mathematics
- Reverse engineering
- Molecular biology

Approved 2012

International Projects within ERASysAPP

ROBUSTYEAST: Optimizing metabolic regulation in yeast production strains for dynamic conditions

Project consortium coordinator
Prof. Steffen Waldherr
Otto-von-Guericke-Universität Magdeburg, Germany

Swiss consortium partner
Prof. Vassily Hatzimanikatis
EPF Lausanne

Approved 2015

RootBook: Systems analysis of peptide-mediated cell-cell communication in the plant root by in situ sequencing

Project consortium coordinator
Prof. Manfred Claassen
ETH Zurich

Swiss consortium partner
Prof. Manfred Claassen
ETH Zurich

Approved 2015

FAIRDOM: Next generation of data and model management services in Europe

Project consortium coordinator
Prof. Carole Goble
University of Manchester, GB
Swiss consortium partners
Dr. Lars Malmström
University of Zurich
Dr. Peter Kunszt
University of Zurich and SIB Swiss Institute of Bioinformatics
Dr. Bernd Rinn
ETH Zurich and SIB Swiss Institute of Bioinformatics

Approved 2014

MetApp: Systems biology of bacterial methylotrophy for biotechnological products from methanol

Project consortium coordinator
Prof. Trygve Brautaset
SINTEF Materials and Chemistry, Norway

Swiss consortium partner
Prof. Julia Vorholt
ETH Zurich

Approved 2014

SysMetEx: Systems biology of acidophile biofilms for efficient metal extraction

Project consortium coordinator
Prof. Mark Dopson
Linnaeus University, Sweden

Swiss consortium partner
Prof. Igor Pivkin
Università della Svizzera italiana

Approved 2014

SysMilk: Designer microbial communities for fermented milk products: a systems biology approach

Project consortium coordinator
Dr. Kiran Patil
European Molecular Biology Laboratory, Germany

Swiss consortium partner
Prof. Uwe Sauer
ETH Zurich

Approved 2014

SysVirDrug: Translating systems virology data into broad-spectrum antiviral drugs

Project consortium coordinator
Prof. Lars Kaderali
Technische Universität Dresden, Germany

Swiss consortium partner
Prof. Niko Beerenwinkel
ETH Zurich

Approved 2014

Transition Postdoc Fellowships (TPdF)

A systems biology approach to the regulation of compartmentalization through liquid phase transitions	**Exploring the silent fitness landscape**	**Modeling mechano-biology of the artery to drive the design of novel bioresorbable stents**	**Molecular signalling fingerprinting of human hematopoietic stem cell fate**	**Reconstituting ESCRT-III-mediated membrane fission in vitro**
Principal investigator Dr. Reinoud de Groot University of Zurich	**Principal investigator** Dr. Victor Garcia ZHAW	**Principal investigator** Dr. Gautham Sivachander Yepuri Ramesh ZHAW	**Principal investigator** Dr. Weijia Wang ETH Zurich	**Principal investigator** Dr. Joachim Moser von Filseck University of Geneva
Host research group Prof. Lucas Pelkmans University of Zurich	**Host research group** Dr. Maria Anisimova ZHAW	**Host research group** Dr. Sven Hirsch ZHAW	**Host research group** Prof. Timm Schroeder ETH Zurich	**Host research group** Prof. Aurélien Roux University of Geneva
Approved 2015	**Approved** 2015	**Approved** 2015	**Approved** 2015	**Approved** 2015
Single cell analysis of the onset of circadian oscillations in differentiating ES cells	**Targeted intron retention as a novel mechanism for neuronal plasticity**	**Targeting bottlenecks in the evolution of metastatic potential – modeling metastatic signaling networks with imaging mass cytometry**	**Adaptive noise cancellation in synthetic biomolecular circuits**	**Exploiting signaling dynamics to overcome robustness of oncogenic networks**
Principal investigator Dr. Eric Paquet EPF Lausanne	**Principal investigator** Dr. Oriane Mauger University of Basel	**Principal investigator** Dr. Hartland Jackson University of Zurich	**Principal investigator** Dr. Christoph Zechner ETH Zurich	**Principal investigator** Dr. Rohitha SriRamaratnam University of Basel
Host research group Prof. Felix Naef EPF Lausanne	**Host research group** Prof. Peter Scheiffele University of Basel	**Host research group** Prof. Bernd Bodenmiller University of Zurich	**Host research group** Prof. Mustafa Khammash ETH Zurich	**Host research group** Prof. Matthias Wymann University of Basel
Approved 2015	**Approved** 2015	**Approved** 2015	**Approved** 2014	**Approved** 2014
High-throughput super-resolution imaging reveals contextual effects in gene expression	**Mediation of specificity in mRNA translation by heterogeneous ribosomes**	**Membrane-based memory formation in bacteria: scaling up from single-cell behavior to the dynamics of populations**	**Systems biology of scaling: biophysics of gradient expansion**	**The thermodynamic underpinnings of enzyme-enzyme interactions and substrate channeling**
Principal investigator Dr. Kyle Douglass EPF Lausanne	**Principal investigator** Dr. Joao Guimaraes University of Basel	**Principal investigator** Dr. Susan Schlegel ETH Zurich	**Principal investigator** Dr. Maria Luisa Merino University of Geneva	**Principal investigator** Dr. Elad Noor ETH Zurich
Host research group Prof. Suliana Manley EPF Lausanne	**Host research group** Prof. Mihaela Zavolan University of Basel	**Host research group** Prof. Martin Ackermann ETH Zurich	**Host research group** Prof. Marcos Gonzalez-Gaitan University of Geneva	**Host research group** Prof. Uwe Sauer ETH Zurich
Approved 2014	**Approved** 2014	**Approved** 2014	**Approved** 2014	**Approved** 2014
3D mass cytometry – a new technology for multi-parameter tissue imaging	**4-dimensional analysis of neural stem cell commitment in the developing telencephalon**	**Applications of network reconstruction, graph theoretic analysis and qualitative modelling to virus-host interaction networks**	**Assessing the impact of cancer-associated mutations on the kinase interaction networks**	**Computational fate prediction of embryonic stem cell subpopulations**
Principal investigator Dr. Serena Di Palma University of Zurich	**Principal investigator** Dr. Marion Betizeau ETH Zurich	**Principal investigator** Dr. Maria Pamela Dobay SIB Swiss Institute of Bioinformatics	**Principal investigator** Dr. Marija Buljan ETH Zurich	**Principal investigator** Dr. Stavroula Skylaki ETH Zurich
Host research group Prof. Bernd Bodenmiller University of Zurich	**Host research group** Prof. Dagmar Iber ETH Zurich	**Host research group** Dr. Mauro Delorenzi SIB Swiss Institute of Bioinformatics	**Host research group** Prof. Ruedi Aebersold ETH Zurich	**Host research group** Prof. Timm Schroeder ETH Zurich
Approved 2013	**Approved** 2013	**Approved** 2013	**Approved** 2013	**Approved** 2013
Expounding epigenetiX	**Interplay between lipid composition and ER structure and function: a systems approach**	**Mathematical modeling of population epigenetics**	**Morphogenesis of monolayer epithelia: models and experiments**	**Systems modeling of the metabolic network of a gut microbial community**
Principal investigator Dr. Dimitrios Spiliotopoulos University of Zurich	**Principal investigator** Dr. Maria Eugenia Zaballa EPF Lausanne	**Principal investigator** Dr. Önder Kartal University of Zurich	**Principal investigator** Dr. Séverine Urdy University of Zurich	**Principal investigator** Dr. Julien Limenitakis University of Bern
Host research group Prof. Amedeo Caflisch University of Zurich	**Host research group** Prof. Gisou van der Goot EPF Lausanne	**Host research group** Prof. Ueli Grossniklaus University of Zurich	**Host research group** Prof. Christof Aegerter University of Zurich	**Host research group** Prof. Andrew Macpherson University of Bern
Approved 2013	**Approved** 2013	**Approved** 2013	**Approved** 2013	**Approved** 2013

Interdiscipliplinary PhD Projects (IPhD)

Systems-level study on the origin and variation of lag times in E. coli

Principal investigator
Dr. Markus Basan
ETH Zurich

Host research group
Prof. Uwe Sauer
ETH Zurich

Approved 2013

The influence of pH signaling on the regulation of brain energy metabolism

Principal investigator
Dr. Guillaume Azarias
University of Zurich

Host research group
Prof. Bruno Weber
University of Zurich

Approved 2013

A systems biology approach to understanding the mode of action of new antibiotics against Gram-negative bacteria

PhD student
Alessandra Vitale
University of Zurich

Supervisors
Prof. John A. Robinson
Prof. Leo Erbel
University of Zurich

Approved 2015

A systems immunology guided strategy for immunogen engineering

PhD student
Fabian Sesterhenn
EPF Lausanne

Supervisors
Prof. Bruno Emanuel Ferreira De Sousa Correia
EPF Lausanne
Prof. Sai Reddy
ETH Zurich

Approved 2015

Baysian learning of quantal parameters at single synapse resolution

PhD student
tba

Supervisors
Prof. Martin Müller
University of Zurich
Prof. Jean-Pascal Pfister
University of Zurich and ETH Zurich

Approved 2015

Understanding the genotype to phenotype transformation for cholesterol regulation using a network based approach

Principal investigator
Dr. Peter Blattmann
ETH Zurich

Host research group
Prof. Ruedi Aebersold
ETH Zurich

Approved 2013

Cortical tension and stiffness during asymmetric cell division

Principal investigator
Dr. Tri Thanh Pham
University of Basel

Host research group
Prof. Clemens Cabernard
University of Basel

Approved 2012

Deciphering a prototypical MAP kinase signaling network at the single cell level using a genetically-encodable optogenetic circuit

PhD student
tba

Supervisors
Prof. Olivier Pertz
University of Basel
Prof. Mustafa Khammash
ETH Zurich

Approved 2015

Decision-making: a multi-stage approach

PhD student
Leila Drissi Dahoudi
EPF Lausanne

Supervisors
Prof. Michael Herzog
Prof. Wulfram Gerstner
EPF Lausanne

Approved 2015

Evolutionary systems biology: robustness, cryptic genetic variation and innovation in transcription factor binding

PhD student
Illaria Sala
University of Zurich

Supervisors
Prof. Andreas Wagner
Dr. Yolanda Schärli Renggli
Dr. Joshua Payne
University of Zurich

Approved 2015

Metabolic regulations of human T cell activation and differentiation

Principal investigator
Dr. Roger Geiger
Università della Svizzera italiana

Host research group
Prof. Antonio Lanzavecchia
ETH Zurich

Approved 2012

Robustness of C. elegans development at thermal limits

Principal investigator
Dr. Aitana Neves da Silva
EPF Lausanne

Host research group
Prof. Pierre Gönczy
EPF Lausanne

Approved 2012

Modeling the neural circuit for sensorimotor transformations in Drosophila

PhD student
tba

Supervisors
Prof. Simon Sprecher
University of Fribourg
Prof. Walter Senn
University of Bern
Prof. Christian Mazza
University of Fribourg

Approved 2015

Molecular mechanisms of stochastic chromatin effector interaction dynamics

PhD student
tba

Supervisors
Prof. Beat Fierz
Prof. Vassily Hatzimanikatis
EPF Lausanne

Approved 2015

Nuclear organization of expanded trinucleotide repeats

PhD student
Gustavo Ruiz Buendia
University of Lausanne

Supervisors
Prof. Vincent Dion
University of Lausanne
Prof. Ioannis Xenarios
SIB Swiss Institute of Bioinformatics and University of Lausanne

Approved 2015

Systems analysis of the bistable transfer competence pathway of a prokaryotic integrative and conjugative element

PhD student
Xavier Richard
University of Lausanne

Supervisors
Prof. Jan Roelof van der Meer
University of Lausanne
Prof. Christian Mazza
University of Fribourg

Approved 2015

A computational framework for systems pathology of prostate cancer

PhD student
Malamati Koletou
University of Zurich

Supervisors
Prof. Peter Wild
University Hospital Zurich
Dr. Maria Rodriguez Martinez
IBM Research – Zurich

Approved 2014

Comprehensive analysis of transcription factor – promoter interaction in vitro and in vivo

PhD student
tba

Supervisors
Prof. Sebastian Maerkl
EPF Lausanne
Prof. David Shore
University of Geneva

Approved 2014

Computational modeling of pluripotent stem cell transcription factor networks

PhD student
Oliver Hilsenbeck
ETH Zurich

Supervisors
Prof. Timm Schroeder
Prof. Jörg Stelling
ETH Zurich

Approved 2014

Establishment of in vivo verified molecular networks that control T cell function in chronic infection

PhD student
Patrick Roelli
University of Lausanne

Supervisors
Prof. Dietmar Zehn
University Hospital Lausanne
Dr. Mauro Delorenzi
SIB Swiss Institute of Bioinformatics

Approved 2014

Functional organization of the plant nucleus

PhD student
Mariamawit Ashenafi
University of Zurich

Supervisors
Dr. Célia Baroux
Prof. Ueli Grossniklaus
University of Zurich
Dr. Peter Majer
Bitplane AG

Approved 2014

Input-output relationships underlying transcriptional bursting at the genome-wide level

PhD student
Onur Tidin
EPF Lausanne

Supervisors
Prof. David Suter
Prof. Felix Naef
EPF Lausanne

Approved 2014

Integrating genomic and physiological data to unravel the functioning of key hub nodes in mammalian regulatory networks: the case of the peroxisome proliferator-activated receptor γ co-activator 1α (PGC-1α)

PhD student
Anne Krämer
University of Basel

Supervisors
Prof. Christoph Handschin
Prof. Erik van Nimwegen
University of Basel

Approved 2014

Metabolic network governing Toxoplasma gondii persistence and transmission

PhD student
Aarti Krishnan
University of Geneva

Supervisors
Prof. Dominique Soldati-Favre
University of Geneva
Prof. Vassily Hatzimanikatis
EPF Lausanne
Prof. Adrian Hehl
University of Zurich

Approved 2014

Micro2X: micropatterning of microbial communities – tailoring cooperation versus competition

PhD student
Maximilian Mittelviefhaus
ETH Zurich

Supervisors
Prof. Julia Vorholt
Dr. Tomaso Zambelli
ETH Zurich

Approved 2014

Model based inference of age related changes in circadian oscillators

PhD student
Sara Fonseca
University of Fribourg

Supervisors
Prof. Daniel Wegmann
Dr. Jürgen Ripperger
University of Fribourg

Approved 2014

Prediction error processing in neural networks of the mammalian brain

PhD student
Maria Chernysheva
University of Zurich

Supervisors
Prof. Fritjof Helmchen
University of Zurich
Prof. Klaas Enno Stephan
ETH Zurich and University of Zurich

Approved 2014

Quantification of growth-controlled gene transcription dynamics by live, single-cell imaging

PhD student
Victoria Wosika
University of Lausanne

Supervisors
Prof. Serge Pelet
University of Lausanne
Prof. David Shore
University of Geneva

Approved 2014

Spectral deconvolution of SWATH data for peptide identification and deciphering HIV-1 antiviral response mechanisms

PhD student
Aivett Bilbao
University of Geneva

Supervisors
Dr. Frédérique Lisacek
SIB Swiss Institute of Bioinformatics
Prof. Gérard Hopfgartner
University of Geneva

Approved 2014

Systematic characterization of the cell biological and mechanical properties of asymmetrically dividing Drosophila neuroblasts

PhD student
Arnaud Monnard
University of Basel
Supervisors
Prof. Clemens Cabernard
University of Basel
Prof. Daniel Jobst Müller
ETH Zurich

Approved 2014

Systems analysis of the impact of IFN-lambda signaling on vaccine response

PhD student
Jana Esther Linnik
ETH Zurich
Supervisors
Prof. Jörg Stelling
ETH Zurich
Dr. Adrian Egli
University of Basel

Approved 2014

Systems biology of vision: online identification of visual coding properties of retinal ganglion cells

PhD student
Roland Diggelmann
ETH Zurich
Supervisors
Prof. Andreas Hierlemann
ETH Zurich
Dr. Botond Roska
Friedrich Miescher Institute for Biomedical Research

Approved 2014

Towards in silico organogenesis: inferring and simulating regulatory network dynamics on growing embryonic 3D limb bud domains

PhD student
Diana Barac
ETH Zurich

Supervisors
Prof. Dagmar Iber
ETH Zurich
Prof. Rolf Zeller
University of Basel

Approved 2014

A massively parallel space-time connected approach based on implicit active contour methods to track leukocytes observed by multiphoton intra vital and confocal microscopy

PhD student
Diego Ulisse Pizzagalli
Università della Svizzera italiana
Supervisors
Dr. Santiago Fernandez Gonzalez
Prof. Rolf Krause
Prof. Marcus Thelen
Prof. Michael Bronstein
Università della Svizzera italiana
Approved 2013

Cause and necessity of metabolic adaptation in human epidermis

PhD student
Andreas Kühne
ETH Zurich

Supervisors
Dr. Nicola Zamboni
Prof. Manfred Claassen
ETH Zurich

Approved 2013

Dynamic single-cell analysis through microfluidics-enabled impedance spectroscopy and fluorescence microscopy

PhD student
Ketki Chawla
ETH Zurich

Supervisors
Prof. Andreas Hierlemann
Prof. Jörg Stelling
ETH Zurich

Approved 2013

Exploring response surfaces and synergistic interactions of antibiotic combination treatment for Neisseria gonorrhoeae

PhD student
Sunniva Förster
University of Bern

Supervisors
Dr. Christian Althaus
Dr. Lucy Hathaway
Prof. Nicola Low
University of Bern

Approved 2013

High-throughput microfluidic single cell analysis platform for deciphering heterogeneity in stress-responsive signalling

PhD student
Ranjan Mishra
ETH Zurich

Supervisors
Prof. Matthias Peter
Prof. Andrew deMello
ETH Zurich

Approved 2013

Integrating transcriptional and allosteric regulation in central metabolism of E. coli

PhD student
Dimitris Christodoulou
ETH Zurich

Supervisors
Prof. Uwe Sauer
Prof. Jörg Stelling
ETH Zurich

Approved 2013

Numerical models of reaction-diffusion/chemotaxis determining complex patterns of skin appendages and skin coloration: incorporating 3D, growth, and realistic networks of activators/inhibitors

PhD student
Antonio Martins
University of Geneva

Supervisors
Prof. Michel Milinkovitch
Prof. Bastien Chopard
University of Geneva

Approved 2013

QuantX – quantification of amino acid transporter interaction through system identification

PhD student
Mehdi Taslimifar
University of Zurich

Supervisors
Prof. Vartan Kurtcuoglu
Prof. François Verrey
University of Zurich

Approved 2013

Systems analysis of a morphogen response

PhD student
Alexandra Franz
University of Zurich

Supervisors
Prof. Konrad Basler
Prof. Christian von Mering
University of Zurich

Approved 2013

A microfluidics-based pipeline for the quantitative analysis of yeast aging

PhD student
Marek Konrad Krzyzanowski
ETH Zurich

Supervisors
Prof. Yves Barral
Prof. Andrew deMello
ETH Zurich

Approved 2012

An extended computational morphodynamics approach to understand self-organization in plant growth control

PhD student
Alice Sarah Breda
University of Lausanne

Supervisors
Prof. Christian Hardtke
University of Lausanne
Prof. Richard Smith
MPI Cologne

Approved 2012

Collective dynamics and crosstalk in MAPK signaling

PhD student
Sunil Kumar
ETH Zurich

Supervisors
Prof. Heinz Koeppl
Technical University of Darmstadt
Prof. Matthias Peter
ETH Zurich

Approved 2012

Dynamics of Sertoli cell transcriptomes during the progression of spermatogenesis using ultrahigh-throughput sequencing technologies

PhD student
Isabelle Stévant
University of Geneva

Supervisors
Prof. Serge Nef
Prof. Emmanouil Dermitzakis
University of Geneva

Approved 2012

Special Opportunities Projects

Generation of biomarkers for the detection of ADP-ribosy-lated proteins during cellular stress

PhD student
Vera Bilan
University of Zurich

Supervisors
Prof. Michael Hottiger
University of Zurich
Prof. Gérard Hopfgartner
University of Geneva

Approved 2012

Modeling dynamics of protein synthesis and degradation in Arabidopsis thaliana

PhD student
Phillip Ihmor
ETH Zurich

Supervisors
Dr. Katja Bärenfaller
ETH Zurich
Prof. Mark Robinson
University of Zurich

Approved 2012

Quantitative approaches for the reconstruction of palmit-oylation networks in ER

PhD student
Tiziano Dallavilla
EPF Lausanne

Supervisors
Prof. Vassily Hatzimanikatis
Prof. Gisou van der Goot
EPF Lausanne

Approved 2012

Towards systems biology of adenovirus transmission

PhD student
Artur Yakimovich
University of Zurich

Supervisors
Prof. Urs Greber
University of Zurich
Prof. Ivo F. Sbalzarini
Max Planck Institute of Molecular Cell Biology and Genetics, Dresden

Approved 2012

Genomic and transcriptomic characterization of hetero-geneous tumor cell populations

PhD student
Ariane Hofmann
ETH Zurich

Supervisors
Prof. Niko Beerenwinkel
Dr. Christian Beisel
ETH Zurich
Prof. Holger Moch
University Hospital Zurich

Approved 2012

Modeling the cellular phospho-rylation response to double strand breaks using quanti-tative mass spectrometry

PhD student
Ariel Bensimon
ETH Zurich

Supervisors
Prof. Ruedi Aebersold
Prof. Niko Beerenwinkel
ETH Zurich

Approved 2012

Systems analysis of neutral-izing antibody repertoires for nanoparticulate-based anti-viral vaccine design

PhD student
Marcela Rincon-Restrepo
EPF Lausanne

Supervisors
Prof. Melody Swartz
EPF Lausanne
Prof. Sai T. Reddy
ETH Zurich

Approved 2012

A new technology for affinity proteomics in systems biology

Principal investigator
Prof. Andreas Plückthun
University of Zurich

Approved 2015

Bidirectional, tunable and spatio-temporally controlled multigene regulation using CRISPR-sgRNA-arrays

Principal investigator
Prof. Konrad Basler
University of Zurich

Approved 2015

In vivo group II intron folding and self-splicing on the single molecule level

Principal investigator
Prof. Roland Sigel
University of Zurich

Approved 2015

Lunaphore: Development of a microfluidic tissue processor for high-throughput and multi-plexed molecular profiling of tumors

Principal investigator
Dr. Ata Tuna Ciftlik
EPF Lausanne

Approved 2013

SIB fellowship program: SIB PhD-fellowships

Principal investigator
Prof. Ron Appel
SIB Swiss Institute of Bioinformatics

Approved 2012

An integrative microfluidic platform for rapid and parallel gene expression and chroma-tin landscape profiling in few (<100) to single cells

Principal investigator
Prof. Bart Deplancke
EPF Lausanne

Approved 2015

Development of a high-throughput platform for systems immunology and protein engineering

Principal investigator
Prof. Sebastian Maerkl
EPF Lausanne

Approved 2015

Protein-LEGO: a high-through-put approach to dissecting protein-genome interactions by quantifying the contribution of individual protein domains

Principal investigator
Prof. Tuncay Baubec
University of Zurich and Friedrich Miescher Institute for Biomedical Research

Approved 2015

Entrepreneur in residence (EIR): Innovation scouting service

Principal investigator
Michael Dillhyon
Dillhyon Ventures

Approved 2012

SwissLipids: Dedicated know-ledge base for comprehensive curated information on lipids

Principal investigator
Dr. Alan Bridge
SIB Swiss Institute of Bioinformatics

Approved 2012 / 2014

Associating HDL synapse nano-organisation with clinical HDL particle signaling capacity

Principal investigators
Prof. Bernd Wollscheid
Prof. Manfred Claassen
ETH Zurich

Approved 2015

High-throughput single yeast cell secretion analysis in nL droplets

Principal investigators
Prof. Petra S. Dittrich
ETH Zurich
Prof. Lars Blank
RWTH Aachen

Approved 2015

SynucleiX: a platform for systems biology of Parkinson's disease

Principal investigators
Prof. Dr. med. Adriano Aguzzi
Dr. Simone Hornemann
University Hospital Zurich
University of Zurich

Approved 2015

Micronaut: Recording high resolution stereo-SEM images

Principal investigator
Prof. Henning Stahlberg
University of Basel

Approved 2012

Visible networks – research politics and life sciences in the 21st century: PhD project in history of technology

Principal investigator
Prof. David Gugerli
ETH Zurich

Approved 2011

Partner institutions of SystemsX.ch

EPFL — ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

ETH — Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

FMI — Friedrich Miescher Institute for Biomedical Research

IBM

PAUL SCHERRER INSTITUT PSI

SIB — Swiss Institute of Bioinformatics

University of Basel

u^b — UNIVERSITÄT BERN

UNI FR — UNIVERSITÉ DE FRIBOURG / UNIVERSITÄT FREIBURG

UNIVERSITÉ DE GENÈVE

Unil | Université de Lausanne

unine — UNIVERSITÉ DE NEUCHÂTEL

Università della Svizzera italiana

University of Zurich [UZH]

Zürcher Hochschule für Angewandte Wissenschaften
zh aw

Contact information

Dr. Daniel Vonder Mühll
Managing Director
SystemsX.ch
Clausiusstrasse 45
CH-8092 Zurich
Phone: +41 (0)44 632 78 88
daniel.vondermuehll@systemsx.ch

Visit our website:
www.systemsx.ch

Subscibe to our newsletter:
communications@systemsx.ch

Issued: November 2015

Layout: Ruedi Widmer Grafik, Winterthur
Photo: Martin Stollenwerk, Zurich