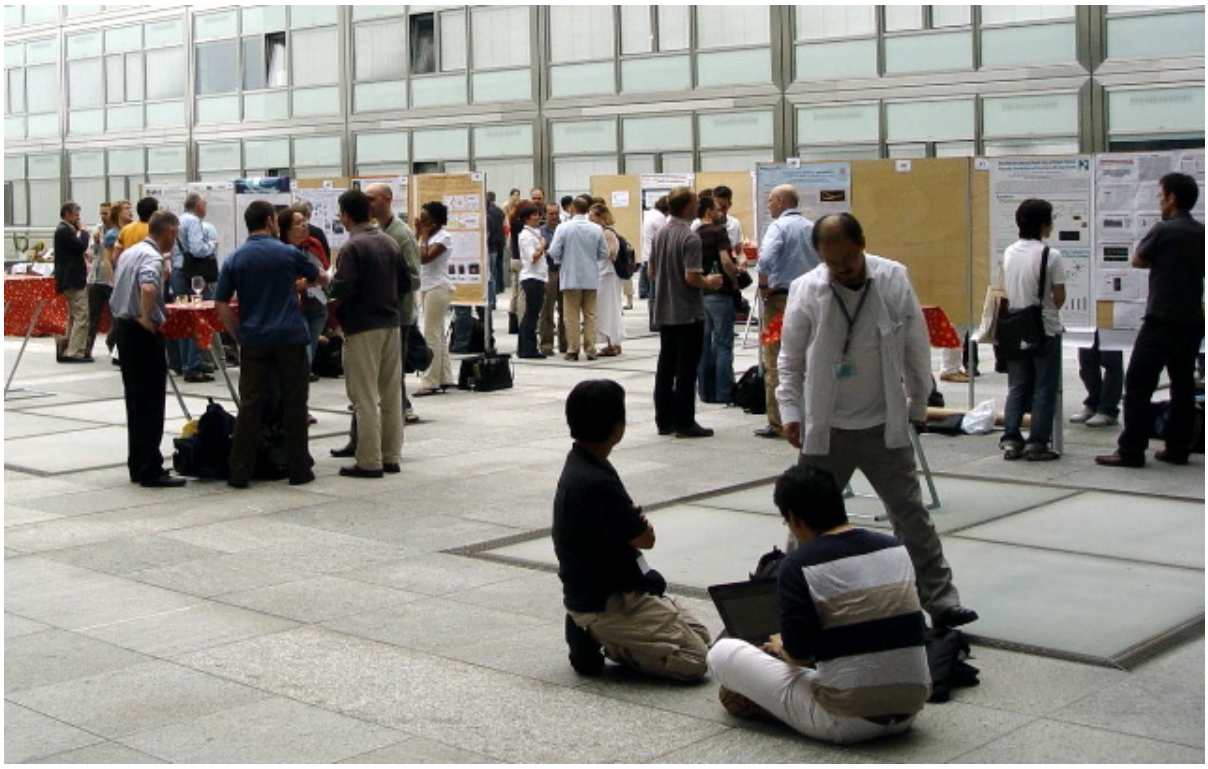
SystemsX.ch
The Swiss Initiative in Systems Biology

Newsletter #12
July 9th 2007

# Laying the Cornerstones of Synthetic Biology

The Synthetic Biology Conference 3.0 at ETH Hönggerberg was a success. It had to offer something to the enthusiastic, the curious, and the concerned and as a rather unconventional aspect, it also incorporated socio-political issues.



**Open air poster session in Science City at ETH Hönggerberg.**

**Zurich.** «Can simple biological systems be built from standard, interchangeable parts and operated in living cells?» According to Randy Rettberg this is the central question of the new emerging discipline of Synthetic Biology. Rettberg knows what he is talking about. He is Director of iGEM, the international student competition in the field of Synthetic Biology. And the third big international conference devoted to Synthetic Biology at ETH Zurich, delivered a cautious «Yes» to his question. The conference from June 24 to 26 on the ETH Hönggerberg attracted 350 participants from all over the world.

*From Robin Künzler*(Text and Photos)*

Synthetic Biology is a new field at the interface of biology and engineering that brings a new dimension by trying to engineer biological parts and build new living systems from scratch. There are many exciting potential applications heralded, for example in the health, materials and energy sectors. An important characteristic of the new discipline is its interdisciplinary nature. Researchers from diverse fields as natural sciences, engineering, mathematics and social sciences are working together to get Synthetic Biology going.

And there are still many hurdles to take. For the time being, people are trying to find out to what extent biological systems can be made amenable to engineering. For example, a current challenge is to build the minimal bacterial genome that is still needed for a bacterial cell to live. This highlights two major challenges that are imposed by the ideas of Synthetic Biology.

**Rachel Wellhausen (MIT) gives input from the social sciences.**

First, a new way of thinking is required in order to engineer biology. A modern engineering technology builds on standardization (i.e. of interfaces, design rules, and fabrication techniques), abstraction and computer aided design. Many of these tools are not yet available for building new living systems and have to be developed. If successful, this leads directly to the second challenge. Some of the applications searched and hoped for and the technologies envisioned are likely to have a huge impact on social life, so the Synthetic Biology community has started a debate on the social and ethical aspects of Synthetic Biology. Furthermore there are concerns about security and safety of Synthetic Biology. And after all, is it OK to build living systems from scratch and how far can we go?

**Open Air Poster Session**

The open air poster session on Sunday evening turns out to be an excellent opportunity to discuss such questions. Enjoying the mild and warm weather on this nice evening, people are relaxed, enjoy the good atmosphere and their well-deserved dinner.

There is for example, Rachel Wellhausen, a PhD student of political sciences at the Massachusetts Institute of Technology (MIT). She is part of the Program on Emerging Technologies and her focus is intellectual property right. In this area, her group identifies, amongst others, the following problems facing Synthetic Biology's development: The culture of patenting in biology and the difficulty of finding out about who has patented what (patent thickets).

Her motivation to come to SB 3.0 is her belief that emerging technologies in general and Synthetic Biology in particular need input from social sciences. «I would like to learn about the experiences of international scientists with intellectual property and find out if our recommendations and findings make sense for them», she says.

**All the Way from Bangalore**

Aashiq Kachroo is more on the acting than on the reflecting side. He is a PhD student in Synthetic Biology from the Indian Institute of Science in Bangalore. «Synthetic Biology connects the fundamental sciences with applications, and I expect the field to grow rapidly in the near future», he says. As Rachel Wellhausen, he is very happy to have been invited by SystemsX to come here and for him, the greatest thing is the possibility to talk to the founders of his discipline in person and to listen to their talks. He likes the community and especially the openness of the researchers for new ideas and new people.

**Aashiq Kachroo from Bangalore asks a question.**

One of Aashiq's personal highlights was the speech of Pam Silver from Harvard Medical School on Sunday afternoon. Her presentation on «Designing Biological Memory and Logic» showed very nicely how the concepts of parts and devices can be used to design new biological systems. For the construction of a memory device in yeast cells that can remember past events she used so-called BioBriks from the Registry of Standard Biological Parts (http://parts.mit.edu). The idea of this concept is to allow the design of biological systems using standard, interchangeable components. These components can be compared to components in electrical engineering.

The open spirit of the opening evening is taken along for Monday and Tuesday. On Tuesday evening, Tom Knight from MIT gives the final keynote about «Computer Aided Design and Construction of

**Tom Knight from MIT on the importance of abstraction.**

Living Systems» where he identifies some of the requirements for the success of the emerging discipline of Synthetic Biology and shows how and where the current tools are insufficient. In contrast to other mostly very focused talks, he develops general ideas and points out the importance of abstraction, standardization, and computer aided design.

For example, he explains that existing bioinformatics software is often special-purpose and therefore can be used only by specialists. The tools required in Synthetic Biology must offer design freedom and need to be easy to use. By illustrating the concepts of abstraction and standardization using electrical engineering as an example, he makes suggestions on how these concepts could be realized in Synthetic Biology.

«The conference had to offer a lot, for the enthusiastic, the curious and the concerned», Sven Panke of the organization committee, states at the gala dinner. This sums it up!

*Robin Künzler is Bachelor Student in Computer Science at ETH Zurich

# SystemsX.ch Executive Board Completed

**Zurich.** AK. Five further members of the Scientific Executive Board have been elected by Board of Directors of SystemsX.ch. At their meeting of July 6, the board chose scientists from the fields Computer Science & Modelling, Genetics & Genomics, Physics & Imaging and Non-Medical Biology. The first task of the SEB will be to finalize and approve the call for proposals for SystemsX.ch projects. See www.systemsx.ch for the complete SEB.

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## One woman and four men elected

### Susan Gasser

Professor for Molecular Biology at
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Director of FMI

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Susan Gasser's research focus is on epigenetics and functional implications of nuclear organization. She and her team are interested in how nuclear and chromosomal context establishes and maintains the patterns of gene expression and replication origin usage. Gasser's team aims to understand how these contribute to the stable inheritance of differentiated cellular states.

### Denis Duboule

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Professor for Biology
University of Geneva

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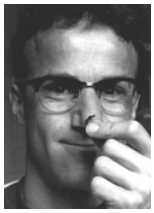
Duboule is a specialist in developmental genetics. He revealed the role of the Hox genes in limb formation and the basic mechanisms of how they work. His findings on this topic launched a line of research that has since become extraordinarily active, with important implications for understanding the evolution of species. He is also known for authoring popular science articles.

## Laurent Keller



Professor of Evolutionary Ecology &
Head of Department of Ecology and Evolution
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Laurent Keller is an expert on the evolution of social insects and is interested in phenomena like kin recognition and altruism. He has explored the use of robots for biological research in collaboration with the Laboratory of Intelligent systems at EPFL. His goal is to understand the principles governing the evolution of animal societies and the ecological and evolutionary consequences of social life.

## Demetri Psaltis

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Demetri Psaltis is an expert in the area of optical information processing, holography, optical networks, imaging, optical memories and optical devices, and is known for his pioneering work in holographic memory and optical neural networks. Psaltis has obtained 39 patents and co-founded two start-up companies. He also has a bachelor degree in economics from Carnegie Mellon University.

## Peter Widmayer

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Peter Widmayer's team is specialised in data structures and algorithms for combinatorial and geometric problems from a variety of areas. The focus is on problems involving large data sets and hard optimization questions. The topics include spatial data structures and algorithms, optimization of railway networks and data structures and algorithms for computational biology problems.

# Looking into the Mirror of Health

To diagnose diseases a long time before they erupt, is one of the aims of Ruedi Aebersold, the head of the Institute of Molecular Systems Biology of ETH Zurich. The institute tries to cover as many aspects of Systems Biology as possible.

«Blood is a juice of very special kind», says Goethe's Mephisto to Faust. Today this sentence holds true more than ever. As it turns out, blood is not a mere juice, but a liquid organ reaching every tissue and almost every cell of the human body. Today the analysis of certain proteins in the blood allows doctors to diagnose acute diseases. «In the future, it might be possible to diagnose a disease months or even years before it is detectable with current methods», says Ruedi Aebersold, Professor of Systems Biology and director of the Institute of Molecular Systems Biology of ETH Zurich.

*From Thomas Müller*

**Ruedi Aebersold hopes for a smooth transition to SystemsX.ch.** *Photo Christian Flierl*

This prediction involves more than just an extrapolation of existing diagnostic routines. It is based on the principle that, however minute the concentrations, most of the proteins present in the different organs of an individual are represented in the blood. As we are healthy for most of our life, it may be possible to define the «state of health» as a distinct pattern of a (large) number of proteins – blood as a mirror of health. Periodic checks allow to determine if the «health pattern» persists. If not, a more detailed analysis can be applied to figure what disease is beginning to develop, allowing a more economic and comfortable, early intervention out. So simple the concept is, so difficult its realisation will be. «I will give no time frames until the task is accomplished, because such estimates are always wrong», says Aebersold, who pours considerable effort into the biomarker project. One of the major problems to solve is dealing with the

huge range of concentrations, over ten orders of magnitude, in which the proteins are appearing in the blood. Another problem is that every individual and its blood is different, and that the protein composition of the blood changes by the minute.

**Wide range of technologies**

This complexity is why Aebersold and his group intend to concentrate on a set of well known proteins called biomarkers which herald the emergence of a disease like prostate cancer or diabetes type 2.

The biomarker project is symptomatic of the philosophy of the institute in attempting to cover as many aspects of Systems Biology as possible by creating an interactive atmosphere in the institute. Describing his approach Aebersold says, «we try here to both develop technology relevant for different biological systems and at the same time to use this new technology directly to answer biological questions».

The range of technologies used and developed at IMSB is wide. Aebersold's group is developing cutting edge proteomics tools for the high-throughput analysis of proteins. The group of Lukas Pelkmans is using a viral «shuttle service» to investigate the traffic to and from the plasma membrane of cells. Markus Stoffel's group focuses on the molecular and genetic mechanisms in diabetes type 2 by applying and developing microRNA assays. Uwe Sauer's group concentrates on metabolites and tries to model them in mathematical terms. And Bernd Wollscheid's research group is focusing on the detection and functional characterization of cell surface proteins upon perturbation of the nervous system.

**Ernst Hafen's return**

Ernst Hafen's group had moved from University of Zurich into IMSB in August 2006, a few months before Ernst Hafen stepped down as president of ETH Zurich in November 2006. «Being at IMSB is ideal for us», says Hafen, who did not give up research completely even during his presidency. «Here we can complement our genetic dissection of growth in Drosophila with proteomics in order to decipher the entire growth regulatory network.», explains Hafen, who cooperates in this endeavour with Ruedi Aebersold and the group of Matthias Gstaiger, a young group leader also at IMSB.

During his presidency, Hafen had engaged himself a lot to bring SystemsX forward, an effort that yields fruit now. Ruedi Aebersold, who also acts as the chairman of the SystemsX.ch executive committee sees Switzerland in an extraordinary position to stay at the forefront of global Systems Biology, if, but only if, the federal parliament in autumn grants the allocated 200 Million Francs for SystemsX.ch and the D-BSSE in Basel. Almost every country has its Systems Biology project by now, but most of them are arranged around a specific topic like liver or neuronal cells.

continued on page 7…

| **The Institute of Molecular Systems Biology at a glance** | |
|---|---|
| Type of SystemsX Project: | Scientific Node |
| Head: | Ruedi Aebersold |
| Collaborating Institutions: | Center for Model Organism Proteomics (C-MOP) at the University of Disease (CC-SPMD) at the ETH Zurich, Center of Biosystems & Engineering (C-BSSE) of the ETH Zurich at Basel, Institute for Systems Biology (ISB) in Seattle, WA, Yeast Systems Biology Network, Advanced Systems Biology Courses. |
| Number of Research Groups: | 6 |
| Number of People at IMSB: | 120 |
| Budget 2007 (federal funding): | 5'168'500 CHF |
| Third Party Funds raised 2006: | 4'228'072 CHF |

# Computational Brainpower for D-BSSE

**Basel.** thm. Dagmar Iber (29) and Niko Beerenwinkel (34) are the new tenure track assistant professors in computational biology at the Department of Biosystems Science and Engineering (D-BSSE) of ETH Zurich in Basel. They were elected by the ETH Council at its meeting of last week. Iber and Beerenwinkel join the bioengineer Luke Lee and the molecular biologist and founding director Renato Paro, who wants to give equal weight to experimentation, theory and technology development at D-BSSE. «Dagmar Iber and Niko Beerenwinkel fit perfectly into the mission of D-BSSE, and I am convinced that their expertise in mathematics will build many collaborative bridges between D-BSSE and other departments of ETH Zurich, the University of Basel and the pharmaceutical industry here in Basel», says Renato Paro.

### Dagmar Iber

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Dagmar Iber is lecturer at the department of Mathematics of the Imperial College in London. She holds two PhD degrees, one from University of Cambridge in experimental biology, and one from University of Oxford in theoretical biology. Her main interest is in the precise mathematical description of the molecular processes leading to cell differentiation. Other research topics focus on the modelling of cell adhesion and algorithms for the description of evolutionary mechanisms of sexual reproduction. At D-BSSE Dagmar Iber wants to develop computational models of complex eukaryotic developmental and evolutionary systems. She will take office in August 2008.

### Niko Beerenwinkel

Assistant Professor for Computational Biology at Department of Biosystems, ETH Zurich

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Niko Beerenwinkel is member of the «Program for Evolutionary Dynamics» at Harvard University. He is mathematician and has a PhD in informatics from the University of Saarland (Germany). He has received the Otto Hahn Medal of the Max Planck Society. His strength is the development and use of tools for describing in mathematical terms complex biological and clinical problems. For example, he has developed algorithms to predict resistances against HIV-drugs, which are now widely used by doctors. At D-BSSE he plans to model the organisation and development of cellular networks. Niko Beerenwinkel will take office in September 2007.

…continued from page 6

«We understand SystemsX as an initiative that is enabling a large diversity of projects», explains Aebersold who is convinced that this approach will render more interesting results than the concentration on one type of cell or biological system.

On a general science policy level, however, he sees disadvantages for Switzerland. «It took us four years to raise the considerable funds required for Systems Biology in Switzerland. That's much too slow». In the US, he says, it is possible to kick off a large scientific program in the course of one year, if necessary. Aebersold is therefore calling for a body in Switzerland, which can respond quickly to new developments and decide on purely scientific (and not political) grounds where the money goes.

Aebersold also hopes for a smooth transition of SystemsX to SystemsX.ch in 2008. He expects that the new organisational structure (see Newsletter 11), the impulses of the larger number of partners and the upgraded Scientific Executive Board and the Swiss National Science Foundation as reviewing authority (see article on page 3) will make the new Swiss-wide initiative exciting and sustainable.

# DMS-Prize for IMSB-Bodenmiller


**Bernd Bodenmiller**

**Zurich.** thm. Bernd Bodenmiller, PhD student in Ruedi Aebersold's lab at the Institute of Molecular Systems Biology, has won the first prize of the DSM Science & Technology awards (EUR 7500) for his PhD thesis «Quantitative Analysis of Protein Phoshorylation on a Proteome wide scale: Technology, Development, Validation and Applications». Bernd Bodenmiller has succeded in developing and validating a novel technology in proteomics to enrich, identify and quantifiy phosphopeptides on a system-wide scale, says the press release by DSM. Bodenmiller will obtain his doctorate in November 2007. Also the winner of the second prize for outstanding PhD research, Eveline Trachsel, comes from ETH Zurich. The third winner from ETH Zurich is Matthias Bechtold. In total 12 prizes were given.

Press release DSM

# All-SystemsX.ch-Day with a planned Cern visit

**Zurich.** AK. The All-SystemsX.ch-Day will take place on September 17, 2007 at EPF Lausanne. Current research within SystemsX will be presented in the morning. A poster session shall demonstrate ongoing projects and also allow getting in touch with working groups. In the afternoon, workshops shall take place to coordinate the setting up of research proposals. On the subsequent day a visit to Cern* is planned. Please register before August 31, 2007 here.

* Due to security reasons, the number of visitors may be limited or the visit can be cancelled.

**Program of the All-SystemsX.ch-Day**

**Monday, September 17th 2007**

| | |
|---|---|
| 08.15 - 08.30 | Opening of All-SystemsX.ch-Day |
| 08.30 - 12.00 | Presentations of existing SystemsX projects |
| 12.00 - 12.45 | Lunch Break |
| 13.00 -14.00 | Poster Session (Presentation of IPP, IPFP, ongoing research) |
| 14.00 - 16.30 | Workshop: Preparing for topics and collaboration for submission of proposals |
| 16.30 - 17.30 | Conclusion |
| 17.30 - 18.00 | Closing of event |

**Tuesday, September 18th 2007**

Visit of Cern*

# Reducing animal testing with Systems Biology

**Washington.** thm. Recent advances in systems biology, testing in cells and tissues, and related scientific fields offer the potential to fundamentally change the way chemicals are tested for risks they may pose to humans, says a new report from the National Research Council. The report outlines a new approach that would rely less heavily on animal studies and instead focus on in vitro methods that evaluate chemicals' effects on biological processes using cells, cell lines, or cellular components, preferably of human origin. The new approach would generate more-relevant data to evaluate risks people face, expand the number of chemicals that could be scrutinized, and reduce the time, money, and animals involved in testing, said the committee that wrote the report.

The report recommends an approach that would take advantage of rapidly evolving scientific understanding of how genes, proteins, and small molecules interact to maintain normal cell function and how some of these interactions can be perturbed in ways that could lead to health problems. Over time, the need for traditional animal testing could be greatly reduced, and possibly even eliminated someday, says the report.

See press relesase by National Academies
Full report here

# Call for global push for Synthetic Biology

**Oxnard** (California)**.** thm. At the time of the Synthetic Biology Conference 3.0 in Zurich, seventeen leading scientists issued a statement announcing that, much as the discovery of DNA and the invention of the transistor revolutionized science, synthetic biology is a new scientific field on the brink of revolutionizing our approach to problems ranging from eco-safe energy to outbreaks of malaria. Among the scientists are Hiroaki Kitano, member of the SystemsX Scientific Advisory Board, Drew Endy from MIT, and Freeman Dyson from the Institute for Advanced Study.

The two-page «Ilulisaat Statement» entitled «Synthesizing the future» calls for an international effort to advance synthetic biology that would not only propel research, but do so while developing protective measures against accidents and abuses of synthetic biology.

The statement's recommendations include creation of a organization that will engage with the broader society to maximize the benefits, minimize the risks, and oversee the ethics of synthetic life.

More information:
Press release by Kavli Foundation
Complete text of statement

# $375 million for Systems Bioenergy Centers


**Washington.** thm. Te U. S. Department of Energy (DOE) announced end of June that DOE will invest up to $375 million in three new Bioenergy Research Centers that will be located in Oak Ridge, Tennessee; Madison, Wisconsin; and near Berkeley, California. The Centers are intended to accelerate basic research in the development of cellulosic ethanol and other biofuels. The Department plans to fund the Centers for the first five years of operation (Fiscal Years 2008-2013).

A major focus will be on understanding how to reengineer biological processes to develop new, more efficient methods for converting the cellulose in plant material into ethanol or other biofuels that serve as a substitute for gasoline.

The Centers are expected to begin work in 2008, and shall be fully operational by 2009. The establishment of the bioenergy research centers culminates a six-year effort by DOE's Office of Science to lay the foundation for breakthroughs in Systems Biology for the cost-effective production of renewable energy. In July 2006, DOE's Office of Science issued a joint biofuels research agenda with the Department's Office of Energy Efficiency and Renewable Energy titled "Breaking the Biological Barriers to Cellulosic Ethanol."

DOE's Office of Science is the single largest supporter of basic research in the physical sciences in the United States.

Press release by DOE

# Recent Publications from SystemsX Scientists

Publications from Glue Projects and Scientific Nodes, which have been released since the beginning of the year. The compilation is based on self-declaration.

**CENTER FOR CELL PLASTICITY IN HEALTH AND DISEASE**

The nuclear envelope and transcriptional control.
Akhtar A, Gasser SM.
Nat Rev Genet. 2007 Jul;8(7):507-17. Epub 2007 Jun 5.

Nuclear pore association confers optimal expression levels for an inducible yeast gene
Taddei A, Gasser SM et al.
Nature 2006 441 (7094): 774-778

The origin recognition complex functions in sister-chromatid cohesion in Saccharomyces cerevisiae.
Shimada K, Gasser SM.
Cell. 2007 Jan 12;128(1):85-99.

Increased tumor cell dissemination and cellular senescence in the absence of beta(1)-integrin function.
Kren A, Christofori G. et al.
EMBO J. 2007 May 31; [Epub ahead of print]

Cancer: division of labour.
Christofori G.
Nature. 2007 Apr 12;446(7137):735-6. No abstract available.

Distinct roles of vascular endothelial growth factor-D in lymphangiogenesis and metastasis.
Kopfstein L, Christofori G. et al.
Am J Pathol. 2007 Apr;170(4):1348-61.

The potential role of podoplanin in tumour invasion.
Wicki A, Christofori G.
Br J Cancer. 2007 Jan 15;96(1):1-5. Epub 2006 Dec 19. Review.

Tumor progression induced by the loss of E-cadherin independent of beta-catenin/Tcf-mediated Wnt signaling.
Herzig M, Christofori G. et al.
Oncogene. 2007 Apr 5;26(16):2290-8. Epub 2006 Oct 9.

Claudins provide a breath of fresh Aire.
Hollander GA.
Nat Immunol. 2007 Mar;8(3):234-6. No abstract available.

Donor T-cell alloreactivity against host thymic epithelium limits T-cell development after bone marrow transplantation.
Hauri-Hohl MM, Krenger W. et al.
Blood. 2007 May 1;109(9):4080-8. Epub 2007 Jan 9.

Keratinocyte growth factor (KGF) enhances postnatal T-cell development via enhancements in proliferation and function of thymic epithelial cells.
Rossi SW, Hollander GA. et al.
Blood. 2007 May 1;109(9):3803-11. Epub 2007 Jan 9.

Sustained thymopoiesis and improvement in functional immunity induced by exogenous KGF administration in murine models of aging.
Min D, Weinberg KI. et al.
Blood. 2007 Mar 15;109(6):2529-37. Epub 2006 Nov 30.

Target-induced transcriptional control of dendritic patterning and connectivity in motor neurons by the ETS gene Pea3.
Vrieseling E, Arber S.
Cell. 2006 Dec 29;127(7):1439-52.

Generation of a defined and uniform population of CNS progenitors and neurons from mouse embryonic stem cells.
Bibel M, Barde YA. et al.
Nat Protoc. 2007;2(5):1034-43.

Identification of a lectin causing the degeneration of neuronal processes using engineered embryonic stem cells.
Plachta N, Barde YA. et al.
Nat Neurosci. 2007 Jun;10(6):712-9. Epub 2007 May 7.

Chromosome-wide nucleosome replacement and H3.3 incorporation during mammalian meiotic sex chromosome inactivation.
Van der Heijden GW, de Boer P. et al.
Nat Genet. 2007 Feb;39(2):251-8. Epub 2007 Jan 21.

Rules for the rearrangement events at the L chain gene loci of the mouse.
Melchers F, Andersson J.et al.
Adv Exp Med Biol. 2007;596:63-70. Review. No abstract available.

Selection of Foxp3+ regulatory T cells specific for self antigen expressed and presented by Aire+ medullary thymic epithelial cells.
Aschenbrenner K, Klein L. et al.
Nat Immunol. 2007 Apr;8(4):351-8. Epub 2007 Feb 25.

The B lineage potential of thymus settling progenitors is critically dependent on mouse age.
Ceredig R, Bosco N, Rolink AG.
Eur J Immunol. 2007 Mar;37(3):830-7.

Genomic patterns of DNA methylation: targets and function of an epigenetic mark.
Weber M, Schubeler D.
Curr Opin Cell Biol. 2007 Jun;19(3):273-80. Epub 2007 Apr 26.

Distribution, silencing potential and evolutionary impact of promoter DNA methylation in the human genome.
Weber M, Schubeler D. et al.
Nat Genet. 2007 Apr;39(4):457-66. Epub 2007 Mar 4.

Enhancing genome annotation with chromatin.
Schubeler D.
Nat Genet. 2007 Mar;39(3):284-5. No abstract available.

Inference of miRNA targets using evolutionary conservation and pathway analysis.
Gaidatzis D, Zavolan M. et al.
BMC Bioinformatics. 2007 Mar 1;8:69.

Marek's Disease Virus Type 2 (MDV-2)-Encoded MicroRNAs Show No Sequence Conservation with Those Encoded by MDV-1.
Yao Y, Nair V. et al.
J Virol. 2007 Jul;81(13):7164-70. Epub 2007 Apr 25.

Quantitative technologies establish a novel microRNA profile of chronic lymphocytic leukemia.
Fulci V, Macino G. et al.
Blood. 2007 Jun 1;109(11):4944-51. Epub 2007 Feb 27.

Amphiregulin is an essential mediator of estrogen receptor alpha function in mammary gland development.
Ciarloni L, Mallepell S, Brisken C.
Proc Natl Acad Sci U S A. 2007 Mar 27;104(13):5455-60. Epub 2007 Mar 16.

Novel c-MYC target genes mediate differential effects on cell proliferation and migration.
Cappellen D, Hynes NE. et al.
EMBO Rep. 2007 Jan;8(1):70-6. Epub 2006 Dec 8.

Position dependencies in transcription factor binding sites.
Tomovic A, Oakeley EJ.
Bioinformatics. 2007 Apr 15;23(8):933-41. Epub 2007 Feb 18.

A cassette system to study embryonic stem cell differentiation by inducible RNA interference.
Wegmuller D, Moroni C. et al.
Stem Cells. 2007 May;25(5):1178-85. Epub 2007 Jan 11.

Local retinal circuits of melanopsin-containing ganglion cells identified by transsynaptic viral tracing.
Viney TJ, Roska B. et al.
Curr Biol. 2007 Jun 5;17(11):981-8. Epub 2007 May 24.

The movies in our eyes.
Werblin F, Roska B.
Sci Am. 2007 Apr;296(4):72-9. No abstract available.

Molecular heterogeneity of developing retinal ganglion and amacrine cells revealed through single cell gene expression profiling.
Trimarchi JM, Cepko CL. et al.
J Comp Neurol. 2007 Jun 20;502(6):1047-65.

Bcl10 controls TCR- and FcgammaR-induced actin polymerization.
Rueda D, Thome M. et al.
J Immunol. 2007 Apr 1;178(7):4373-84.

Paracrine promotion of tumor development by the TNF ligand APRIL in Hodgkin's Disease.
Schwaller J, Huard B. et al.
Leukemia. 2007 Jun;21(6):1324-7. Epub 2007 Feb 22. No abstract available.

Neutrophil-derived APRIL concentrated in tumor lesions by proteoglycans correlates with human B-cell lymphoma aggressiveness.
Schwaller J, Huard B. et al.
Blood. 2007 Jan 1;109(1):331-8.

Reduction of BMP4 activity by gremlin 1 enables ureteric bud outgrowth and GDNF/WNT11 feedback signalling during kidney branching morphogenesis.
Michos O, Zeller R. et al.
Development. 2007 Jul;134(13):2397-405. Epub 2007 May 23.

Protease nexin 1 and its receptor LRP modulate SHH signalling during cerebellar development.
Vaillant C, Monard D. et al.
Development. 2007 May;134(9):1745-54. Epub 2007 Apr 4.

**INSTITUTE FOR MOLECULAR SYSTEMS BIOLOGY**

The Implications of Proteolytic Background for Shotgun Proteomics.
Picotti P, Aebersold R, Domon B.
Mol Cell Proteomics. 2007 May 28

Quantitative proteomic analysis reveals that proteins differentially expressed in chronic pancreatitis are also frequently involved in pancreatic cancer.
Chen R, Brentnall TA, Pan S, Cooke K, White Moyes K, Crispin DA, Goodlett DR, Aebersold R, Bronner MP.
Mol Cell Proteomics. 2007 May 12

# Upcoming events

| Date | Location | Topic |
|---|---|---|
| September 6 2007 | Kuala Lumpur, Malaysia | International Conference on Mathematical Biology 2007 (ICMB07) |
| September 10-12 2007 | The New Forest, UK | Seventh International Conference on Modelling in Medicine and Biology |
| September 13-14 2007 | Buxton, Derbyshire, UK | 17th New Phytologist Symposium Systems Biology and the Biology of Systems: how, if at all, are they related? |
| September 9-12 2007 | Stuttgart, Germany | 2nd Conference Foundations of Systems Biology in Engineering (FOSBE 2007) |
| September 17-18 2007 | EPF Lausanne | All-SystemsX.ch-Day |
| September 19 2007 | ETH Hönggerberg | Conference of the Swiss Biochemical Society 2007 |
| October 1-6, 2007 | Long Beach, California | International Conference on Systems Biology (ICSB-2007) |
| October 11-13 2007 | Jeju-do, Korea | Frontiers in the Convergence of Bioscience and Information Technologies (FBIT 2007) |
| November 14-16 2007 | Montreux, Switzerland | Trends and Visions in MicroNano Technologies for Biosciences |
| November 24-29 2007 | Sant Feliu de Guixols, Spain | European Conference on Synthetic Biology (ECSB) |
| November 26-28 2007 | Zurich/Basel | Scientific Advisory Board Meeting |
| January 4-8 2008 | Big Island, Hawaii | From Molecules to Cells to Organisms<br>Pacific Symposium on Biocomputing conference |
| February 6-7, 2008 | EPF Lausanne | Biology meets Engineering - Union of the Swiss Societies for Experimental Biology (USGEB 2008) |

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