All the presenters illustrated their remarkable work and key findings in a very clear, captivating way. The biological questions they asked and the novel approaches they were using to answer those questions were extremely inspiring for my own work." Dr. Frank Bruggeman from the Netherlands Institute for Systems Biology in Amsterdam spoke about the origins of cell-to-cell heterogeneity and stochastic transcription dynamics, while Prof. Bas Teusink from the same institute addressed the topic of reverse engineering and how biological systems are constructed in the light of evolution. Prof. Matthias Heinemann (Univ. Groningen/IMSB, ETH Zurich) spoke about the adaptation of bacteria to nutrients and growth on substrates despite the lack of sensors for these substances. Using a simplified mechanistic model of central metabolism, he showed that adaption to nutrients emerges from dynamic interactions in metabolism.

Industry Perspectives

Dr. Joseph Lehar from Novartis NIBR in Boston raised the question whether synergetic effects can elucidate biology and explained how combinatorial drug therapy may overcome resistance to monotherapy. Dr. Birgit Schöberl from Merrimack Pharmaceuticals, Cambridge, MA discussed the application of engineering principles to the development of novel cancer therapies using antibodies and gave insight into the research perspective of industry, and the availability of job opportunities for modelers.

SystemsX.ch **PhD Retreat 2010**

By Andreas Kühbacher

SystemsX.ch's second student retreat took place from 30th September to 1st October 2010 in Murten. The relaxed atmosphere before and during the welcome speech, delivered by the organizer, Dr. Franziska Biellmann, made it easy for the participants to enter into a receptive mood.

The program started with an interesting presentation from Prof. Nouria Hernandez (University of Lausanne). She was followed by guest speaker Prof. Wolfram Weckwerth from the University of Vienna, who gave an insight into his work. Two poster sessions gave participants the chance to gain an overview of the various projects being carried out under the SystemsX.ch initiative. This introductory part of the program was rounded off with a series of short presentations, which were presented by Prof. Jörg Stelling (ETH Zurich).

On a guided tour students and guest speakers learned how the medieval town of Murten had been founded under the Zähringer family, and thereafter developed under the influence of both German and French-speaking peoples over hundreds of years. In addition to the tour of the city, which is still is bilingual today, a welcome meal break afforded good opportunities for students to talk in a relaxed atmosphere among themselves and with guest speakers. The students benefited from the experience of the invited scientists, who in turn, showed great interest in the PhD student's own work and projects.

The retreat made an exciting exchange possible between international students from a range of scientific backgrounds. The retreat also revealed how very diverse biological problems can be solved with systems biological approaches.

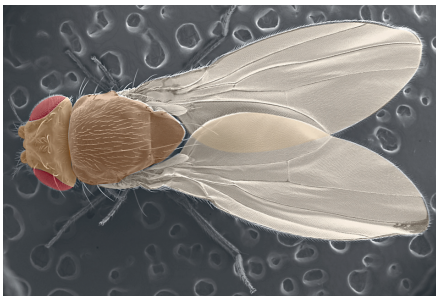
Register now ...

... for the 2011 **SystemsX.ch PhD Retreat, August 19th–22nd** in Kandersteg. **Deadline is April 30th.** Students should present an overview of their project from the logistical/technical/practical side, focusing on productive aspects or obstacles being faced. Prof. **Susan Gasser**, Director, FMI Basel will give a welcome address.

http://www.systemsx.ch/events

How does an **embryo make organs with a precise size?**

Nature has ensured that the proportions of our limbs are respected, whether we are meant to be tall or short. One of the puzzling questions in developmental biology is how growth and patterning of tissues is controlled. Addressing this issue also helps to understand how the lack of coordination between growth of the tissue and specialization of its constituent cells leads to malformations. A team led by Marcos Gonzalez-Gaitan, Professor at the University of Geneva, has discovered a growth control mechanism that regulates the size of the tissue. The scientists unveil how molecular actors named morphogens determine the dynamics of proliferation in developing organs. The authors of this study, published in the March 4th edition of Science, are currently investigating whether such a "growth rule" could explain some conditions leading to tumor development.



The fruit fly was used as an experimental organism. Photo: UniGe