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Conquering Disease Using Computer Models:
Over 1,000 participants at the International Conference on Systems Biology (ICSB) in Heidelberg and Mannheim

Computer simulations are becoming a cornerstone of life science research. They contribute to gaining a better understanding of diseases and help to develop new drugs more rapidly.

New analysis methods such as detailed capturing of processes within cells using fluorescent proteins or parallel sequencing of genomes from tumor cells produce an overwhelming flood of highly complex data. Interpreting such data and deducing consequences such as for enhancing treatment of diseases are usually beyond human intuition. To facilitate a better understanding of these processes, the discipline of systems biology, which has evolved since the beginning of this century, uses theoretical models and computer simulations that provide explanations for observed behaviors based on experimentally measured results.

Since Sunday, 28th August 2011, over 1,000 representatives of this young and rapidly developing discipline have been convening at Rosengarten in Mannheim at the twelfth International Conference on Systems Biology, ICSB. Conference president Professor Dr. Roland Eils is head of the Division of Theoretical Bioinformatics at the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) in Heidelberg and founding director of the BioQuant Center of Heidelberg University. The fact that systems biology is a key discipline for national research was emphasized in the opening speeches of Dr. Schwanitz, Department Head in the Ministry of Science, Research and the Arts of Baden-Württemberg, and Professor Dr. Otmar D. Wiestler, Vice President of Helmholtz Association and Chairman of the Management Board of DKFZ. The conference is patronaged by the Federal Minister of Education and Research, Professor Dr. Annette Schavan. The Ministry of Education and Research (BMBF) has provided funds of more than 300 million euros since 2004.

The relevance of systems biology today reaches far beyond basic bioscience research. This also manifests itself in prominent visitors at the conference. On Monday, Professor Dr. Ralph Eichler, President of ETH Zürich, Martin Jetter, Head of Strategy at IBM, Professor Dr. Dr. Klaus Strein, Head of Small Molecule Research at Roche and Professor Dr. James H. Simons, former mathematics professor, founder of Renaissance Technologies, a billion-dollar hedge fund management firm, and starter of the Simons Foundation, will attend the conference. Professor Simons will hold a lecture on "The Unreasonable Effectiveness of Mathematics" on Monday. Nobel Prize Laureate Professor Roger Y. Tsien was an honorary guest yesterday and held a thrilling lecture about his research on fluorescent proteins.

At the conference that will last until Thursday, the latest results in systems biology will be presented in more than 100 oral presentations and on more than 600 posters. Topics covered include, for example, how the genetic make-up of human cells determines their susceptibility to viral infections, how computer models can help to find new targets in the fight against cancer and which molecular interactions influence metabolism.

“Although systems biology is a new research field that has evolved in the last couple of years, we have already achieved enormous progress,” says Professor Roland Eils. “Simulations at the computer are now among the standard procedures in the development of new drugs such as in cancer research. In the coming years we will collaborate even more closely with clinicians in order to use more of our research results in the clinic. New

technologies such as genome-wide identification of all mutations in tumor cells require interdisciplinary collaboration as it is practiced in systems biology."

Heidelberg, with its systems biology center BioQuant of Heidelberg University, and the German Cancer Research Center, is among the leading locations of systems biology research worldwide. This is also reflected by the fact that the researchers headed by Roland Eils have been entrusted for the second time with hosting the ICSB as the most important conference of the systems biology community.

A picture of Roland Eils is available on the Internet at:
http://www.dkfz.de/de/presse/pressemitteilungen/2009/images/Eils.jpg

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