

## Fraunhofer opens Center for Systems Biotechnology in Chile

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<http://www.fraunhofer.de/en/press/research-news/2010-2011/21/fraunhofer-chile.jsp>

On September 1, 2011 the Chilean Minister of the Economy, Mr Pablo Longueira and Professor Bullinger officially opened Fraunhofer's first research center in South America. The new 'Fraunhofer Center for Systems Biotechnology' has been established in Santiago de Chile to develop and optimize new technologies in key areas of importance for the Chilean economy. The research projects are collaborations between Chilean and German scientists and focus at present on aquaculture, renewable energy, agriculture, and bio-computing.

The Fraunhofer Center for Systems Biotechnology is the first research center to be launched by the Fraunhofer Chile Research Foundation which was established on October 4, 2010. The research carried out at the new Center will benefit from and make a long-lasting contribution to Chile's pioneering spirit and economic strength, eg the strong emphasis on the traditional economy based upon raw materials, agriculture, aquaculture and the sustainable use of natural resources. Systems biotechnology is an emerging field in life sciences that aims to develop an understanding of the complex and dynamic processes in cells, organisms and ecosystems analyzed at the systems level. This is achieved by creating computer models and mathematical simulations, which can then be applied to real life problems encountered in the relevant industries.

The Chilean aquaculture industry suffered dramatic losses during the ISA crisis. The research projects are aimed at avoiding a similar situation in the future. Scientists at Fraunhofer IME, Fraunhofer Chile researchers and partners at Fundación Chile will generate new and more rapid methods for early detection of fish diseases. New vaccines can then be generated against these diseases and major disease outbreaks avoided. Computational biology is being used to drive the innovation process and integrate the various data sets being developed with genomic scale technologies.

The Fraunhofer Division of Nanotechnology at Talca University uses advanced computer modeling to identify 'intelligent polymers' to remove unwanted small molecules from wines, fruit juices or water. Computer simulations have so far identified key structural features in these polymers which interact with major contaminants in the local water supply. In addition, FCR scientists have developed novel computer based methods to analyze the molecular interactions seen in these computer simulations. A newly installed Mass Spectroscopy facility, the only one of its kind in Chile, will greatly facilitate in house analysis but will also provide analytical services to outside clients. The applications for water purification are being targeted for application research.

The group working on renewable energy and resources at the Pontificia Universidad Católica de Valparaíso is focusing on strategies for carbon sequestration. New strains of microalgae can be adapted or manipulated to provide maximal carbon capture capacity in an industrial setting and simultaneously these organisms are being used to produce high value products which can be used in the food industry as additives or as nutraceuticals. FCR scientists have begun work with a local renewable energy company to transfer their know-how into a pilot plant setting. At the same time, local strains of *Jatropha* will be improved for biodiesel production. An additional project deals with the production of Russian Dandelion which is used for natural rubber and inulin production. These projects focus on the development of renewable biological platforms. This work is complemented by engineering projects which help to establish optimal extraction conditions for these biomaterials.

Other scientists at Pontificia Universidad Católica de Valparaíso are working on the production of therapeutic peptides. This research is based on extensive bioinformatics and modeling work to identify suitable regions in proteins which can be developed as therapeutic peptides. Strategies are being developed to control diseases in farmed animals as well as humans. In the first instance, viral and bacterial disease will be tackled, but strategies are also in place to focus on fungal diseases.

The Biocomputing Division is building significant infrastructure for data handling and modeling activities which is key for Systems Biotechnology applications. One of the activities is the design of automated data analysis of large scale data sets generated in various research and applied projects. These techniques are being tested with a number of academic collaborators and industrial customers. Visualization of the critical data from these large data sets is an important component of the work.

The German partner in all these projects is the Fraunhofer Institute for Molecular Biology and Applied Ecology IME, headed by Professor Rainer Fischer.

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