

Excerpt from http://genome.gsc.riken.jp/osc/english/members/Piero_Carninci.html

Piero Carninci

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Link to OSC Main Activities: [Mouse Genome Encyclopedia](#) [FANTOM](#) [Genome Network](#) [Functional RNA](#) [LSA](#)

**Research
Interest:**

Breakthroughs in science depend on the development of novel technologies to solve outstanding biological problems. We have previously developed key technologies including the cap-trapper to comprehensively clone full-length cDNAs and the cap-analysis gene expression (CAGE). The mission of the Functional Genomics Technology Team is to develop novel original approaches to comprehensively study genes, their products and their interactions. The approaches should address biological questions that cannot be addressed with technologies that are the state of the art today. In contrast with classic approaches considering one gene at the time, our mission is to develop approaches that aim at targeting biological problem as systems. This requires to comprehensively analyzing various biological aspects.

The members of the laboratory are engaged in the development of original approaches and to design, propose and realize original genomics technologies and apply these to challenging biological problems. These include the discovery, validation and analysis of novel classes of non-coding RNAs; establishing single-cell CAGE methods and its application to reduced biological samples; and data mining, with particular interest at identifying biological patterns and rules, including genome-wise analysis of novel classes of RNAs and their network. To address these genomics approaches for samples derived from living cells in their biological context, particular emphasis consists in the miniaturization of these technologies, to analyze systematically the biology of few or single isolated cells, such as the characterization of the molecular networks of individual neurons, included in a larger cellular networks. Going beyond simple expression profiling, the ultimate mission is to understand the complex relationships between gene expression regulation, the non-coding RNA world, the epigenome and the biological output.

These developments will be done in collaboration with other teams and units and external collaborator, with particular hope to contribute to the development of the Omics Science Center as an internationally recognized institute and serve the community by ultimately implementing biomedical sciences and increasing our knowledge.

Curriculum Vitae:

Education

- July 1984, Graduation at the Scientific Lyceum G. Oberdan, Trieste
- March 1989: Doctor in Biological Science at University of Trieste, mark 106/110, with the experimental thesis "Characterization of a gene specifically expressed during the resting phase (Go) of cell cycle". Thesis prepared at the International Center for Genetic Engineering and Biotechnology (ICGEB, UNIDO), Trieste, Italy, with Prof. C. Schneider.
- May 1990: National (Italian) Examination for the profession of Biologist, University of Ferrara, Italy.

Positions and summary of achievements

- April 1989- September 1989: researcher, laboratory of Prof. C. Schneider at ICGEB, Trieste, Italy, where he developed a discontinuous buffer system to increase speed and resolution in sequencing electrophoresis and methods for the rapid purification of Genomic DNA from whole blood and yeast.
- October 1989- September 1990: compulsory Italian army duty as a "health assistant". Concurrently, part-time consultant of the biotechnology company, TALENT srl, Trieste, Italy.
- October 1990- March 1995: researcher at TALENT srl (<http://www.spin.it/talent/>). He has developed DNA extraction and DNA sequencing methods and 7 DNA extraction kits for quick and simplified extraction of high-quality DNA from several substrates. He has developed the chemical reactions for an automated DNA extraction instrument. In collaboration with Prof. C. Schneider at the National Laboratory of Italian Consortium for Biotechnology he has also developed a method for capillary slab gel DNA sequencing.
- April 1995- September 1995: researcher at the Genome Science Laboratory, RIKEN Tsukuba Institute, Japan
- October 1995- March 1997: STA Fellow at the Genome Science Laboratory, RIKEN Tsukuba Institute.
- April 1997- September 2001: tenured Scientist at the Genome Science Laboratory, RIKEN Tsukuba Institute.
- October 2001- March 2003: tenured Scientist at the Genome Science Laboratory, RIKEN-Wako Main Campus
- April 2003- March 2008: tenured Senior Scientists" at the Genome Science Laboratory, RIKEN, Wako Main Campus; adjunct appointment as Senior Scientist at RIKEN Genomic Sciences Center, RIKEN Yokohama Institute.

During the activity at RIKEN he has established a comprehensive set of full-length cDNA cloning technologies and widely applied them to construct the mouse full-length cDNA encyclopedia project and other full-length cDNA collections. He has actively lead the Fantom (Functional Annotation of the Mouse) activity, involving functional annotation of cDNA and the discovery of

the widespread existence of non-coding RNAs in mammals. He has also established the CAGE technology and other tagging methods to analyze the transcriptome and transcriptional networks, and produced a comprehensive map of mammalian promoters. Altogether, these technologies have originated more than 4 millions of entries in GenBank and more than 235,000 protein sequences.

- April 2006-: Adjunct Professor at Department of Molecular Biochemistry, Gunma University Graduate School of Medicine.
- April 2008-: Leader of the Functional Genomics Technology Team, Leader of the Omics Resource Development Unit and Deputy Project Director of the LSA Technology Development Group and the Omics Science Center, RIKEN Yokohama Institute.

Awards

- First prize Biotech Award 2001, for Italian scientists under 40 year old involved in biotechnology, for the “Construction of the full-length cDNA encyclopedia”. Award ceremony on October 29, 2001 in Milan, Italy.
- Yamazaki-Teiichi award 2007 (<http://www.mst.or.jp/prize/2007/jushou.html>) for the development of the cap-trapper technology and its use for the annotation of the transcriptional output of the genome

Memberships and Chairs

- Member of the International Mouse Nomenclature Committee (2003-)
- Associate Editor of the journal “Genomics” (September 2006-)
- Scientific Advisory Board of DNAform (January 2009-)
- Editorial Board of Nature Communications (2010-)
- Editorial Board of BioEssays (2010-)
- Member of the IMGC Secretariat (2010-)

Meetings organized

- Co-organizer (together with Bento Soares) of the “Full-length cDNA Cloning: A Workshop on Problems and Solutions”, The Banbury Center, Cold Spring Harbor Laboratory, NY, USA, March 23-25, 1998.
- Organizing committee of the International mouse genome conference (IMGC) in 2000 in Narita, Japan.

- Organizing committee of the “Systems Neurobiology” meeting at the International School for Advanced Studies (SISSA), Trieste, Italy, December 18-19, 2006.
- Scientific coordinator of the collaborative Fantom 3 “Functional Annotation of the mouse” project and key contribution for other Fantom meetings: annotation organizer (Fantom 1), team organizer (Fantom 2) and chore author (Fantom 4)

Summary of presentations and publications

- Author of more than 180 papers and book chapters (more than 12,000 citations)
- Inventor in more than 25 patents and applications
- Author of 250 posters and presentations (more than 30 as invited speaker)