Personal data

Born in 1971

Bio and Education

Aldo Genovesio graduated in Psychology from the University of Turin in 1996 (110/110 cum laude). He continued his academic training by obtaining a PhD in Neurophysiology of Behavior in 2002 from La Sapienza University of Rome, studying in particular the role of the parietal cortex in reaching movements in macaques. After graduation, he undertook a research period abroad at the National Institutes of Health (NIH) from 2003 to 2007, focusing on the role of the prefrontal cortex in attention, time and space perception, learning, and memory.

In 2009, he returned to Italy, first as a researcher and then as an associate professor with a direct call at La Sapienza University until 2024. He initially won a FIRB funding for young researchers and later an ERC Consolidator grant with a project on the study of the Frontal Pole. He currently participates in the European ITN (Innovative Training Network) Marie Curie project "In2PrimateBrains," which focuses on studying intra- and inter-areal communication in non-human primates. Since 2024, he has been a Full Professor at the University of Eastern Piedmont and is affiliated with the CNR at the Institute of Biochemistry and Cell Biology (IBBC) in Monterotondo, where he collaborates on neurophysiology research on memory in rodents. His current interests focus on the study of the computational properties of in vitro networks in collaboration with the NICO Center in Orbassano.

University Career

2024-	Full Professor, Dipartimento di Scienze del Farmaco, Università del Piemonte Orientale, Novara.
2016-2024	Associate professor, Dipartimento di Fisiologia e Farmacologia, Università La Sapienza.
2009-2016	Assistant professor, Dipartimento di Fisiologia e Farmacologia, Università La Sapienza.

Main fields of interest

1. Frontal Cortes
2. Zona incerta
3. Learning and memory
4. Timing perception
5. Social interaction
6. Functional connectivity

Current funded projects

Programme	Funded Projects
ITN (Innovative Training Network) Marie Curie "In2PrimateBrains".	Role of the frontal cortex in high level cognitive and social functions for mentalizing.

Current issues of research

1) Frontal Pole Cortex: It is believed that this area plays a role in supporting the unique cognitive abilities of both non-human and human primates. There is a homology of the human Frontal Pole cortex only with non-human primates. Our current work focuses on studying this area in relation to social cognition and rapid learning from single events. The latest published paper is in PLoS Biology.

2) Social Cognition: We are particularly interested in understanding the neural mechanisms underlying social interaction. One of our goals is to clarify the mechanisms that enable the distinction between self and others, as well as the prediction and monitoring of others' actions and goals. We have identified neural correlates of predicting others' behavior in various frontal areas, with the anterior medial prefrontal cortex showing the greatest separation in neural representations between self and others.

3) Interval Timing: We study the involvement of the prefrontal cortex in encoding stimulus duration and comparing event durations. We also investigate the relationship between time and space and the overlap in neural codes between these two dimensions.

4) Decision Making and Learning: My research examines decision-making processes, from the decision to the conversion of that decision into a motor plan across various discrimination and learning tasks. We also study the influence of past experience in determining biases in future decisions, such as the “contraction bias.”

5) Timescales: Our work has characterized the timescales of intrinsic fluctuations in the spiking activity of neurons in different cortical and subcortical areas, exploring how these timescales are predictive of neuronal involvement in the maintenance of information in memory.

6) Large-Scale Brain Connectivity Analysis: Recently, we have initiated a new line of research using a computational approach to connectivity in mice. We have begun studying functional connectivity in mice by searching for motifs of connectivity among neurons in different areas of the Zona Incerta. We are now shifting to the study of large-scale brain connectivity at both cortical and subcortical levels. In the long term, we plan to apply pharmacological and optogenetic manipulations in mice to study variations in functional connectivity in large-scale recordings of hundreds or thousands of simultaneously recorded neurons.

7) In vitro studies: investigation of the properties and computational potential of in vitro neuronal circuits trained to perform tasks through an input–output system, implemented via large-scale stimulation and recording using the 3Brain Duplex system with 4096 channels. These studies may have implications for the development of low-energy biological computers and for drug screening.

Top five papers

Genovesio A*, Tsujimoto S, Wise SP (2009) Feature- and Order-Based Timing Representations in the Frontal Cortex. Neuron 63:254–266.

Messinger A, Cirillo R, Wise SP, Genovesio A* (2021) Separable neuronal contributions to covertly attended locations and movement goals in macaque frontal cortex. Sci. Adv. 7: 1-15.

Ceccarelli F, Ferrucci L, Londei F, Ramawat S, Brunamonti E, Genovesio A* (2023) Static and dynamic coding in distinct cell types during associative learning in the prefrontal cortex. Nat Commun. 14:8325.

Fascianelli V, Battista A, Stefanini F, Tsujimoto S, Genovesio A*, Fusi S. (2024). Neural representational geometries reflect behavioral differences in monkeys and recurrent neural networks. Nat Commun. 15:6479.

Nougaret S, Ferrucci L, Ceccarelli F, Sacchetti S, Fascianelli V, Benozzo D, Genovesio A*(2024). Neurons in the monkey frontopolar cortex encode learning stage and goal during a fast learning task. PLoS Biol. 22:e3002500.

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