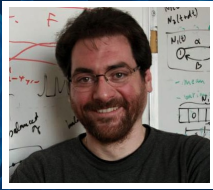


Decoding Brain Circuits



Roberto Fernandez Galan
Assistant Professor, Neurosciences

CURRENT RESEARCH

Using high density multielectrode arrays to investigate brain circuits at the mezosopic level

For the last two decades neuroscience research has mainly focused on two extreme levels of complexity: the microscopic level, pertaining to molecules, genes, etc., and the macroscopic level, referring to large-scale brain areas and their interactions. In contrast, the intermediate or "mezosopic" level of complexity, encompassing brain circuits with hundreds and thousands of neurons, have been much less explored. Dr. Roberto F. Galan of Case Western Reserve University, studies these mezosopic levels, using cutting-edge technology called high density multielectrode arrays, to investigate brain circuits.

Therefore, Dr. Galan's research unmasks an array of undiscovered opportunities within neuroscience as it allows him to report on thousands of neurons at time. While Dr. Galan's primary interest is fundamental research, his studies have multiple ramifications into translational and clinical applications including important implications for epilepsy and autism. Dr. Galan's multidisciplinary approach combines tools from mathematics and physics with experimental techniques in biology and physiology as well as with computational simulations of neuronal activity to understand how information flows in brain circuits.

Current projects include:

- Measuring the propagation of spontaneous and evoked activity in normal circuits, which is a key feature underlying the processing of sensory and motor information in the brain, as well as in higher cognitive functions. This method also allows Dr. Galan and his team to investigate how different drugs, and endogenous neuromodulators, such as serotonin, affect brain activity.
- Investigating how epileptic activity develops and...

AFFILIATION

 Case Western Reserve University

EDUCATION

- Ph.D. in Theoretical Biology 2003, Humboldt Universitat zu Berlin, Germany
- M.S. in Fundamental Physics 1999, Universidad Autonoma de Madrid
- B.S. in Physics 1996, Universidad Autonoma de Madrid, Spain

AWARDS

- Biomedical Researcher Award of the Hartwell Foundation, 2013

RESEARCH AREAS

Life Science, Neurological / Cognitive, Neurological / Cognitive, Pediatric

FUNDING REQUEST

Your contributions will support research which aims to understand how neurons interact with each other to process information in brain circuits which ultimately steers behavior. Your donations will cover the necessary \$150,000 required for running the lab including supplies, personnel, publication, travel, and membership fees. With sufficient funding, the current projects should be completed within the next 4-5 years and will continue to cover the knowledge gap that currently exists between the microscopic and macroscopic levels of complexity in the brain.

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