

Part A. PERSONAL INFORMATION

CV date	20/07/2018
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First and Family name	Santiago Canals Gamoneda		
ID number	50853305Y	Age	43
Researcher numbers	Researcher ID	N-5838-2014	
	Orcid code	0000-0003-2175-8139	

A.1. Current position

Institution	Consejo Superior de Investigaciones Científicas		
Center	Instituto de Neurociencias		
Address and Country	Av. Ramón y Cajal s/n		
Phone number	965919202/03	E-mail	scanals@umh.es
Current position	Científico Titular CSIC	From	01/09/2009
Espec. cód. UNESCO	24		
Keywords	Systems neuroscience, neuroimaging, complex networks learning and memory, plasticity, neurophysiology, addiction, alcoholism		

A.2. Education

PhD	University	Year
Licenciado en Biología	Universidad Complutense de Madrid	1997
Grado en Neurobiología	Universidad Complutense de Madrid	1998
Doctor en Biología	Hospital Ramón y Cajal de Madrid	2003

Part B. CV SUMMARY (*max. 3500 characters, including spaces*)

The main goal of my research is to understand the mechanisms governing information channelling in brain networks. Two major strengths of the lab are its ground-breaking technological implementations and a truly multidisciplinary focus. This is the results of previous an intensive work I have conducted in a broad spectrum of neurobiology fields, from molecular and cellular levels, to systems neuroscience and behavioural studies. Current research in my lab has been largely influenced by my postdoc at the lab of Nikos Logothetis (MPI, Tübingen) were I learned neuroimaging techniques and contributed to the development of key MRI tools. This research started with the simultaneous combination in rats of fMRI, electrophysiology and intracranial microstimulation (Magn. Reson. Imaging 2008, Neuroimage 2008), and continued with a landmark finding, namely that activity in global brain networks can be routed by local and transient changes in synaptic strength (Curr Biol. 2009). This finding attracted the attention of the scientific community since it was the first demonstration of enhanced hippocampal-neocortical interactions controlled by a synaptic mechanism known to be critical for memory formation. Overall, this result and others that followed (i.e. Philos. Trans. R. Soc. Lond. B 2013, Cereb. Cortex 2016, Nat Commun 2018) were suggesting a mechanism to modulate information channels in the brain and therefore, of potential utility for intended reorganization of functional circuits. In addition, our strong background on brain imaging and the new tools for big-data analysis, has guided our research efforts towards the development new analytical strategies. Combining both expertise, basic neurobiology and applied imaging, we aim at contributing a new generation of imaging biomarkers with clinical application.

Part C. RELEVANT MERITS

C.1. Publications (**10 selected**) (*corresponding author)

1. Del Ferraro G, Moreno A, Min B, Morone F, Pérez-Ramírez Ú, Pérez-Cervera L, Parra LC, Holodny A, Canals S*, Makse HA*. Finding influential nodes for integration in brain networks using optimal percolation theory. **Nat Commun**. 2018 Jun 11;9(1):2274.
2. De Santis S, Moratal D, Canals S*. Radiomicrobiomics: advancing along the gut-brain axis through big data analysis. **Neuroscience**. 2017 S0306-4522(17)30876.
3. Cosa A, Moreno A, Pacheco-Torres J, Ciccocioppo R, Hyytiä P, Sommer WH, Moratal D, Canals S*. Multi-modal MRI classifiers identify excessive alcohol consumption and treatment effects in the brain. **Addict Biol**. 2016 Jun 8. 22(5):1459-1472.

- Moreno A, Morris RG, Canals S* Frequency-dependent gating of hippocampal-neocortical interactions. **Cereb. Cortex.** 2016 26(5):2105-2114
- Rancz EA, Moya J, Drawitsch F, Brichta AM, Canals S*, Margrie TW*. (2015) Widespread Vestibular Activation of the Rodent Cortex. **J. Neurosci** 35:5926-34.
- Reis S, Hu Y, Babino A, Andrade JA, Canals S, Sigman M, Makse H. (2014) Avoiding catastrophic failure in correlated networks of networks. **Nature Physics.** 10, 762.
- Jego, P., Pacheco-Torres, J., Araque, A., Canals, S*. (2014) Functional MRI in mice lacking IP3-dependent calcium signalling in astrocytes. **J. Cereb. Blood Flow Metab.** 34(10):1599-603
- Martínez-Martínez, MA, Pacheco, J, Borrell, V, Canals, S*. (2014) Phenotyping the central nervous system of the embryonic mouse by Magnetic Resonance Microscopy. **Neuroimage** 97:95-106.
- Álvarez-Salvado, E., Pallarés, V., Moreno, A., Canals, S*. (2013) Functional MRI of long-term potentiation: imaging network plasticity. **Philos. Trans. R. Soc. Lond. B.** 369:152-68.
- Canals, S.*, Beyerlein, M., Merkle, H. and Logothetis, N.K. (2009) Functional MRI evidence for LTP-induced neural network reorganization. **Curr. Biol.** 19(5):398-403.

C.2. Projects (last 5 years)

1. *Severo ochoa excellence grant*

Ministerio de Economía y Competitividad.
Santiago Canals as guarantor (1 out of 10 guarantors).
From 01-07-2018 To 31-06-2022
Funding: 4.000.000,00 euros

2. *Treating disease by retuning brain network dynamics*

Ministerio de Economía y Competitividad. Plan Estatal de Investigación Científica y Técnica y de Innovación. RETOS de la Sociedad.
Santiago Canals as PI and coordinator (subproject PI: David Moratal, UPV)
From 01-01-2016 To 31-12-2018
Funding: 240.000 EUR

3. *Systems biology of alcohol addiction: modelling and validating disease state networks in human and animal brains.*

European Commission H2020-PHC-2015
Santiago Canals as PI of the Spanish node, Wolfgang Sommer (coordinador)
From 2016 To 2019
Funding: 455.000 EUR (Santiago Canals budget)

4. *Strength of weak-links in functional brain networks*

National Science Foundation (NSF), Collaborative Research in Computational Neuroscience
Santiago Canals as PI of the Spanish group, Hernan Makse (coordinador)
From 01-10-2015 To 30-09-2019
Funding: 100.000,00 \$ (Santiago Canals budget)

5. *Severo ochoa excellence grant*

Ministerio de Economía y Competitividad.
Santiago Canals as guarantor (1 out of 10 guarantors).
From 01-09-2014 To 31-08-2018
Funding: 4.000.000,00 euros

6. *Memory mechanisms: from synaptic plasticity to network dynamics*

Ministerio de Economía y Competitividad. Subprograma de Proyectos de Investigación Fundamental No orientada, Biología Fundamental y de Sistemas. Ref: BFU2012-39958
Santiago Canals as PI
From 01-01-2013 To 31-12-2015
Funding: 117.000,00 euros

7. *Dysfunctional neuronal networks in alcoholism: utilizing translational neuroimaging to identify altered brain connectivity and treatment efficacy predictors*

ERA-NET NEURON - Transnational research projects 2010 - "European Research Projects on Mental Disorders" – PIM2010ERN-00679
Santiago Canals as PI of the Spanish node, Wolfgang Sommer (coordinador)
From 01-03-2011 To 01-03-2014
Funding: 1.089.283,00 euros (complete grant) – 180.000,00 euros (SC)

C.3. Contracts

Consulting and Technical Assistance Agreement between the Universidad Miguel Hernández de Elche and Open Ephys Incorporated.

Santiago Canals as PI From 01-06-2014 To 25-04-2019 (renewed 3 consecutive periods)

Funding: 130.037 €

C.4. Patents

- Moratal Pérez D, Quiñones Colomer DR, García Manrique JA, Pérez Feito R, Canals S. Sistema automático de posicionamiento para corte de tejido tridimensional en muestras vivas o fijadas. N.º de solicitud: R17048-2014 N/Ref 2014_34. Fecha de registro: junio 2014. Entidades titulares: Universitat Politècnica de València and CSIC.

- Moratal D, Cuevas A, Quiñones DR, Canals S. RFID tiles to track identified animals in large enclosures. P201730978.

C.5. Organization of scientific meetings (last 5 years)

2018 International summer school: “Memory School” (Co-organized with Dr. A. Gomez-Marin). Toledo (Spain). Speakers: Ray Dolan, Randy Gallistel, Richard Morris, Giulio Tononi, Rui Costa, Jose Carmena, Rodrigo Quian Quiroga.

2017 International Symposium: “Memory meeting” (Co-organized with Dr. A. Gomez-Marin). Instituto de Neurociencias de Alicante (Spain). Speakers: Richard Morris, Laura Nuño de la Rosa, Bjorn Brembs, Jordi Camí, Felipe Criado-Boalo, Emmanuel Fort, Justo García de Yébenes, Claudio Mirasso, Rodrigo Quian Quiroga, Mariano Sigman, Raúl Vicente.

2016 International Symposium: “Modelling disease state networks in human and animal brains” (Co-organized with Dr. Wolfgang Sommer). 18th International Neuroscience Winter Conference, Sölden, (Austria). Speakers: Wolf Singer, Maria Ercsey-Ravasz, Angelo Bifone, Martin Walter, Hamid Noori, Rainer Spanagel.

2015 International Symposium: “Functional Connectomics: non-invasive windows into brain complexity” (Co-organized with Dr. David Moratal). SENC Meeting, Granada, (Spain). Speakers: A. Van der Linden, J. Goense, A. Gozzi, D. Moratal

C.6. Most relevant invited conferences (selected last 5 years)

1. Transylvanian Experimental Neuroscience, Romania (Jun 2018).
2. Bernstein Conference, Göttingen (Sept 2018).
3. University of Sussex, Brighton (Feb 2017).
4. University of Hamburg-Eppendorf, SFB 936 meeting (2016).
5. The Royal Society, London (December 2014).
6. European College of Neuropsychopharmacology meeting, Barcelona (2013).
7. Centre for Cognitive and Neural Systems, Edinburgh University (September 2013).
8. Medical Research Council, London (Feb 2013).

C.7. Current positions and institutional responsibilities

2015 – present **Director** of the Cellular and Systems Neuroscience Department
Institute of Neuroscience. Spanish National Research Council (CSIC)
URL: <http://in.umh.es/organigrama.aspx>

2014 – present Member of the **Executive Committee** of the Severo Ochoa Excellence Grant

2013 – present **Associate member** of the Centre for Cognitive and Neural Systems (cCNS)
The University of Edinburgh, Edinburgh (UK)
URL: <http://www.ccns.ed.ac.uk/People/Associates/canals.html>

2010 – present **Director** of the Functional Magnetic Resonance Unit
Institute of Neuroscience. Spanish National Research Council (CSIC)
URL: <http://in.umh.es/organigrama.aspx>

C.8. Awards and fellowships

- 2009 – present ENI Young Investigator
Network of European Neuroscience Institutes (ENINET)
URL: <http://www.eni-net.org/members/dr-santiago-canals>
- 2005 – 2008 Human Frontiers Science Program (HFSP) Long-term Fellowship
Max Planck Institute for Biological Cybernetics, Physiology of Cognitive processes,
Tübingen (Germany)
- 2003 American Parkinson Disease Foundation recognition to the PhD work

C.9. Teaching activities

- 2015 – present Course Director – Magnetic Resonance Imaging for small animals.
IN, Alicante, Spain.
- 2013 National Course of Neuroscience. CSIC and Universidad Pablo de Olavide, Carmona
- 2012 – present Teacher at the Master in Neuroscience. IN, Alicante, Spain.
- 2009 International Graduate School of Neuroscience. Rhur-University, Bochum (Germany)

C.10. Commissions of trust

- 2016 – present Section Editor of the journal Neuroscience.
- 2014 – 2015 Associate Editor of the journal Nature Scientific Reports
- 2011 – present Grant Reviewer, French National Research Agency (ANR), France
- 2008 – present Grant Reviewer, Ministry of Economy and Competitiveness (MINECO, formerly
Ministry of Science and Innovation), Spain
- 2008 – present Scientific Reviewer of the following Journals: Neuron, PNAS, PLoS Biology,
Cerebral Cortex, Journal of Neuroscience, Neuroimage, Scientific Reports.

C.11. Major collaborations:

Prof Richard G. Morris (University of Edinburgh, UK), Prof Hernán Makse (CUNY, New York, US), Prof. Wolfgang Sommer (ZI-Mannheim, Germany), Prof. Claudio Mirasso (Universitat de les Illes Balears, Spain), Dr David Moratal (Universidad Politécnica de Valencia, Spain), Prof Troy Magrie (MRC London, UK) and Dr Bryan Strange (Universidad Politécnica de Madrid, Spain).

C.12. Other merits:

Our work has been highlighted in a number of scientific and divulgation media:

Selected by the Scientific American magazine in 2015 as one of the **Innovators in Memory**. Interview in **Scientific American Mind**; por Maggie Koerth. Sci. Am. Mind (2009). Research highlights in **Nature Reviews Neuroscience**: Neural networks: Reorganizing the brain; M. Aulakh (2009). Dispatch in **Current Biology**: Memory Networks: Answering the Call of the Hippocampus; Matthew Shapiro (2009). **Faculty of 1000**: Karl-Peter Giese “must read” (2009). **News and Views** in Nature Physics (2014) by F. Bianconi. TV Documental 3.14 **Genius** La 2 de TVE (2012 News about our research in national and international media: **El País** 2014, **ABC**, **La Vanguardia**, **Información**, **La Verdad**, **Daily-news**, **La SER** radio, **El País** 2016, **El Mundo** 2018, **La Razón** 2018, **Información** 2018.