BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Gustavo Deco	Research Professor at the Institucio Catalana de Recerca i Estudis Avançats and Full Professor (Catedrático) at the University Pompeu Fabra
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
. National University of Rosario	Diploma	03/83	Theoretical Physics
National University of Rosario.	Ph.D	06/87	Theoretical Physics.
Technical University of Munich	Habilitation and PhD	12/96	Theoretical Computer Science
Ludwig-Maximilian-University of Munich	Ph.D	07/01	Psychology

A. Personal Statement

The Computational and Theoretical Neuroscience Group of the Department of Technology at the University Pompeu Fabra, directed by Prof. Gustavo Deco, investigates mechanisms underlying brain functions. In particular, they are a key player not only in the modeling literature of perception and cognition, but also in the global modeling of whole brain activity under rest and stimulus/task conditions. Prof. Deco was involved in a European Project (BRAINSYNC) from 2008-2010 relevant for the present project which was mainly aiming to formulate whole brain models for resting state and for tasks conditions using monkey fMRI and electrophysiological data, as well as fMRI, MEG, intra-cortical EEG data in healthy humans and patients. He was also collaborating with many of the members of the actual consortium since many years(McIntosh, Jirsa, Sporns, Breakspears). For example, they already published papers on whole brain activity under resting state condition (e.g. Deco et al. PNAS 2009) and recently a Nature Review Neuroscience paper reviewing for the first time the modelling literature relevant fo this project was accepted (Deco, Jirsa, and McIntosh, 2010).

Prof. Dr. phil. Dr. rer. nat. habil. Gustavo Deco is Research Professor at the Institucio Catalana de Recerca i Estudis Avançats and Full professor (Catedratico) at the Pompeu Fabra University (Barcelona) where he is head of the Computational Neuroscience group at the Department of Technology and also the Director of the doctoral program in Computer Science and Digital Communication. He studied Physics at the National University of Rosario (Argentina) where he received his diploma degree in Theoretical Atomic Physics. In 1987, he received his Ph.D. degree in Physics for his thesis on Relativistic Atomic Collisions. In 1987, he was a post doctoral fellow at the University of Bordeaux in France. In the period from 1988 to 1990, he obtained a post doctoral position of the Alexander von Humboldt Foundation at the University of Giessen in Germany. From 1990 to 2003, he has been with the Neural Computing Section at the Siemens Corporate Research Center in Munich, Germany, where he led the Computational Neuroscience Group. In 1997, he obtained his habilitation (maximal academical degree in Germany) in Computer Science (Dr. rer. nat. habil.) at the Technical University of Munich for his thesis on Neural Learning. In 2001, he received his PhD in Psychology (Dr. phil.) for his thesis on Visual Attention at the Ludwig-Maximilian-University of Munich. He was lecturer at the universities of Rosario, Frankfurt and Munich. Since 1998 he is Associate Professor at the Technical University of Munich and Honorary Professor at the University of Rosario, and since 2001 Invited Lecturer at the Ludwig-Maximilian-University of Munich. Since 2001 he is also McDonnell-Pew Visiting Fellow of the Centre for Cognitive Neuroscience at the University of Oxford.In 2001 he was awarded the international price of Siemens "Inventor of the Year" for his contribution in statistical learning, models of visual perception, and fMRI based diagnosis of neuropsychiatric diseases. His research interests include computational neuroscience, neuropsychology, psycholinguistics, biological networks, statistical formulation of neural networks, and chaos theory.

He has published 4 books, more than 140 papers in International Journals, 240 papers in International Conferences and 30 book chapters. He has also 52 patents in Europe, USA, Canada and Japan.

B. Positions and Honors

Academic Positions

since 2008	Full Professor (Catedrático) at the University Pompeu Fabra (Barcelona).Lectures: - Artificial Intelligence II (Undergraduates Courses), Computational Neuroscience (PhD ans Master Courses)
2007	Invited Professor: Computational Neuroscience (PhD Course). Universidad La Laguna, Almería (Spain), Karolinska Institute, Stockholm (Sweden)
2006	Invited Professor: Computational Neuroscience (PhD Course), Universidad La Laguna, Almería (Spain)
2005	Invited Professor: Computational Neuroscience (PhD Course), Karolinska Institute, Stockholm (Sweden), Universidad La Laguna, Almería (Spain)
2004-2006	Director of the Doctoral Program in Computer Science and Digital Communication at University Pompeu Fabra (UPF, Barcelona).
2003-2008	Professor at the University Pompeu Fabra (Barcelona). Lectures: Artificial Intelligence II (Undergraduates Courses), Computational Neuroscience (PhD and Master Courses), Biomathematics (Master in Bioinformatics, Biology-UPF)
since 10/01	Invited Lecturer at the Ludwig-Maximilians-University Munich. Computational Neuroscience
10/02	Invited Professor at the University Pompeu Fabra (Barcelona). Introduction to Computational Neuroscience
05/97	Invited Professor at the National University of Rosario. Theoretical Computer Science
since 1994	Privat-Dozent at the Technical University of Munich. Information Theory and Neural Network. Informationdynamics. Computational Neuroscience.
1994-1995	Teaching Assistent at the University of Frankfurt. Introduction to the Theory of Neural Networks, Informationdynamics
04.1994	Invited Professor at the National University of Rosario. Introduction to the Theory of Neural Networks.
03/83-03/88	Teaching Assistent at the National University of Rosario. Theoretical Mechanic (1983-1984), Theoretical Electrodynamic (1985-1986), Quantum mechanic (1987-1988)

Research positions

since 03/08	Full Professor (Catedrático) at the University Pompeu Fabra
since 03/03	Research Professor by Institució Catalana de Recerca i Estudis Avançats (ICREA) at the University Pompeu Fabra.
since 02/01	McDonnell-Pew Visiting Fellow of the Centre for Cognitive Neuroscience of the University of Oxford
since 09/99	Privat-Dozent at the Technical University of Munich
since 09/99	Honorary Professorship at the National University of Rosario
07/92 – 03/03	Siemens AG, Research Corporate, Senior Principal Research Scientist. Neural Networks and Computational Neuroscience
01/90 – 06/92	Siemens AG, Unterschleißheim. Real Time Expert Systems and Neural Networks (Spin Glass)
05/88 – 12/89	Post-Doctoral Fellowship of the Alexander von Humboldt-Foundation, University of Gießen (Germany)
06/87 – 08/87	Post-Doctoral Fellowship at the University of Bordeaux (France)
04/84 – 03/88	Fellowship from the National Research Council at University of Rosario.

Afiliations:

Member of the Editorial Board of Journal of Physiology Paris; Member of the Editorial Board of Cognitive Neurodynamics; Action Editor of Neural Networks; Referee of: Physical Review, Physical Review Letters, Neural Computation, Network, Neural Networks, IEEE Transactions, Vision Research, J. Cog. Neurosc., PLoS Comp. Biology, ...; Member of the European Neural Network Society; Member of the German Society of Neuroscience; Member of the Society for Neuroscience (USA); Member of the Society for Cognitive Neuroscience (USA)

C. Selected Peer-reviewed Publications (Selected from 142 publications)

His books include:

1) *An Information-Theoretic Approach to Neural Computation*.
G. Deco and D. Obradovic, Springer Verlag,, New York 1996.
2) *Information Dynamics: Foundations and Applications*.
G. Deco and B. Schürmann, Springer Verlag, New York, 2000.
3) *Computational Neuroscience of Vision*.
E. Rolls and G. Deco, Oxford University Press, Oxford, 2001.
4) *The Noisy Brain*.
E. Rolls and G. Deco, Oxford University Press, Oxford, 2010.

Selected publications on these topics and in particular on the developed theoretical framework relevant for this project include:

"Synaptic dynamics and decision making", Deco G, Rolls R T and Romo R, PNAS 107 (16):7545-7549, 2010

"Key Role of Coupling, Delay, and Noise in Resting Brain Fluctuations", G. Deco, V. Jirsa, A. McIntosh, O. Sporns and R. Kötter, Proceedings of the National Academy of Science USA, 106 (25) 10302-10307, 2009.

"Lexical Plasticity in Early Bilinguals Does Not Alter Phoneme Categories: II. Experimental Evidence", N. Sebastian, F. Vera-Constan, J. Larsson, A. Costa, and G. Deco, Journal of Cognitive Neuroscience, 21(12), 2343-2357, 2009.

"Stochastic Dynamics as a Principle of Brain Function", G. Deco, E. Rolls and R. Romo, Progress in Neurobiology, 88, 1-16, 2009.

"The Encoding of Alternatives in Multiple-choice Decision Making", L. Albantakis and G. Deco, Proceedings of the National Academy of Science USA, 106 (25) pp 10308-10313,2009.

"Computational models of schizophrenia and dopamine modulation in the prefrontal cortex", E. Rolls, M. Loh, G. Deco, and G. Winterer, Nature Review Neuroscience, 9, 696-708, 2008.

"Lexical Plasticity in Early Bilinguals Does Not Alter Phoneme Categories: I. Neurodynamical Modeling", J. Larsson, F. Vera Constán, N. Sebastián Galles and G. Deco, Journal of Cognitive Neuroscience, 20:1, 76-94, 2008.

"Neurodynamics of the Prefrontal Cortex During Conditional Visuomotor Associations", M. Loh, A. Pasupathy, E. Miller and G. Deco, Journal of Cognitive Neuroscience, 20:3, 421-431, 2008.

"The Dynamic Brain: From Spiking Neurons to Neural Masses and Cortical Fields", G. Deco, V. Jirsa, P. Robinson, M. Breakspear, and K. Friston, PLoS Computational Biology, 4(8): e1000092. doi:10.1371/journal.pcbi.1000092, 2008.

"The Neuronal Basis of Attention: Rate versus Synchronization Modulation", A. Bühlmann and G. Deco, Journal of Neuroscience, 28 (3): 7679-7686, 2008.

"The Role of Fluctuations in Perception", G. Deco and R. Romo, Trends in Neurosciences, 31, 11, 591-598, 2008.

"A Dynamical System Hypothesis of Schizophrenia", M. Loh, E. Rolls, and G. Deco, PLoS Computational Biology, 3 (11), e228, 2007.

"Perceptual Detection as a Dynamical Bistability Phenomenon: A Neurocomputational Correlate of Sensation", G. Deco, M. Pérez-Sanagustín, V. de Lafuente, and R. Romo, Proceedings of the National Academy of Sciences of the USA (PNAS), 104 (50), 20073-20077, 2007.

"Weber's Law in Decision Making: Integrating Behavioral Data in Humans with a Neurophysiological Model", G. Deco, L. Scarano, and S. Soto-Faraco, The Journal of Neuroscience, 27 (42), 11192-11200, 2007.

D. Research Support

- European Project „EmCap“: „Emergent Cognition Through Active Perception“. FP6-2002-IST, 013123-2 (2005-2008).

Our goal is to investigate how complex cognitive behaviour in artificial systems can emerge through interacting with an environment, and how, by becoming sensitive to the properties of the environment, such systems can autonomously develop effective representations.

- European Project „Neural Decision in Motion“ FP6-IST-4 (2006-2009)

The research goals of the project "DECISIONS-IN-MOTION" is to describe the neural mechanisms used to guide behaviour in complex visual scenes, in which the living (or animated) agent is in motion and navigates to avoid stationary and/or moving objects

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- Volkswagen-Foundation„Audiovisual Processing of Speech and Non-Speech Oral Gestures“ (2006-2009)

In this project the perception of speech and non-speech facial movements is considered as a paradigm to compare multisensory integration (MSI) mechanisms in a highly overlearned and a "novel" domain and will be used to study the learning-induced plasticity of these mechanisms. The project combines three approaches: (1) a behavioural approach based on data from normal subjects and from patients with focal brain lesions, (2) an imaging approach based on fMRI activation studies and (3) a computational modelling approach based on a model incorporating dynamics at the neuronal and synaptic level.

- BMBF (German Ministery for Science) „Brain Plasticity and Perceptual Learning: Experimental Analysis and Computational Modeling“ (Ref.: 01GW0761) (2008-2010)

This collaborative research effort aims to explore the neural mechanisms underlying cortical plasticity in healthy subjects and in patients who learn or re-learn a perceptual task. Our approach is novel since it is strongly guided by methods from computational and cognitive neurosciences and directly applies them to problems arising in clinical neurology and neurorehabilitation

- Plan Nacional de Investigación Científica (Ministerio de Educación y Ciencia, Spain), Project: „From Detection to Decision: Neurodynamical Model of Higher Order Cortical Processing “ (BFU2007-61710/BFI)

- Bilingualism and Cognitive Neuroscience Consolider Ingenio 2010 (Elite-Project of the Ministerio de Educación y Ciencia, Spain) (2008-2012)

By integrating the work of six research groups formed by professionals from various scientific fields and with the common aim of addressing the phenomenon of bilingualism, the overall objective is to understand the neural and cognitive mechanisms which enable the acquisition and use of various languages, this being considered within the wider context of other human cognitive skills.

- European Project (HEALTH FP7) „BrainSync“ „Large Scale Interaction in Brain Networks and their Breakdown in DiseasesBrain“ (2008-2010)

The long-term goal of this project is to understand how neuronal assemblies exchange information (functional or neuronal communication), and how variability in neuronal communication explains variability in behavioural performance, both in the intact and injured brain. Communication involves temporal interactions between neuronal assemblies either locally within an area or large-scale between areas. We concentrate on large-scale interaction that occur at two different temporal scales: 'slow' (<0.1 Hz) fluctuations of the blood oxygen level dependent (BOLD) signal easily measured with functional magnetic resonance imaging (fMRI), and 'fast' (1-150 Hz) neuronal oscillations measured at high (multi-unit activity (MUA), local field potential (LFP)) or low (electroencephalography, EEG; magnetoencephalography, MEG) spatial resolution. We wish to demonstrate that these two phenomena are mechanistically linked and are behaviorally significant. A potentially important clinical application is the development of easy-to-use diagnostic measures of neuronal communication for many brain diseases such as stroke, traumatic head injury, multiple sclerosis, and Alzheimer's disease