

BIOGRAPHICAL SKETCH

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NAME Viktor Jirsa	POSITION TITLE		
eRA COMMONS USER NAME (credential, e.g., agency login)	Director of Research, CNRS		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of Manchester, United Kingdom	Master of Science	1990-1991	Elem. Particle Physics
University of Stuttgart, Germany	Diploma	1992-1993	Theoretical Physics
University of Stuttgart, Germany	Dr. rer. nat.	1994-1996	Theoretical Physics

A. Personal Statement

In 1999, I founded the Theoretical Neuroscience Group in Boca Raton Florida USA, with the goal to study the generic computational mechanisms underlying the emergence of brain function from brain network dynamics. In 2005, I transferred my group to the CNRS, Marseille France. The projects of my group rely heavily on nonlinear dynamic system theory and computation and are linked by the common goal of building large scale brain networks capable of biological function. Our research spans from the development of single neuron models through simulations of biologically realistic brain networks to the phenomenological modelling of human movement. Two of our key expertises are spatiotemporal pattern formation and stochastic time delay systems. I have developed the theoretical basis for the understanding of networks with heterogeneous connectivity as known from large-scale brain systems and neural field theory. In addition, I have contributed to the development of theories of cognitive architectures in the field of perception and action. Much of this work is based on computational techniques, which are well-established in our group. In 2009, three tenured faculty members joined my group and significantly strengthened our neuroinformatics expertise and competence. I have managed and taken leadership in various international projects. Relevant to this proposal is the European project BrainScales (2011-2014) with the objective of developing novel forms of biologically inspired generic computational algorithms, multiscale neural dynamics and hardware development of neuromorphic structures. BrainScales is the successor of the project Facets (<http://facets.kip.uni-heidelberg.de/>). The current composition of my group is 5 tenured faculty members, 4 postdocs and 6 doctoral students. My group has a lot of experience with and local access to various high performance cluster platforms including our own cluster, a supercomputer and grid computing.

B. Positions and Honors**Positions and employment**

Since 2010	Co-Director and founding member of the new Brain Dynamics Institute (CNRS-Inserm-Université) at La Timone, Marseille, France
Since 2006	Director of Research , CNRS Marseille, France Head of the Theoretical Neuroscience Laboratory at the Movement Science Institute, CNRS Director of International Program in Theoretical Neurosciences , Florida Atlantic University & CNRS
Since 2005	Associate Professor in Complex Systems and Brain Sciences and Associate Professor of Physics, Florida Atlantic University, USA

1999-2004 **Assistant Professor** in Complex Systems and Brain Sciences and **Assistant Professor** of Physics, Florida Atlantic University, USA
1997-1999 **Human Frontiers Science Fellow**. Research Associate at the Center for Complex Systems and Brain Sciences, Florida Atlantic University, USA
1996-1997 **Research Fellow** of the Deutsche Forschungsgemeinschaft at the Center for Complex Systems and Brain Sciences, Florida Atlantic University, USA

Other Experience and professional membership

Associate Editor of the journal NEUROCOMPUTING (published by Elsevier) since 2004
Associate Editor of the journal COGNITIVE NEURODYNAMICS (published by Springer) since 2006
Associate Editor of the journal JOURNAL OF MATHEMATICAL NEUROSCIENCE (published by Springer) since 2010
Guest Editor of the special issue "Computational Models of the Brain" in Neuroimage in 2009
Advisory Editor of the journal COGNITIVE PROCESSING (published by Springer) 2007-2008
Consulting Editor of the journal Journal of Motor Behavior (published by Heldref) 2004-2008

Founding member of the Computational Neuroscience Network in Marseille (RNCM) since 2010
Member of Commission de specialists 74ème section, Aix-Marseille [Enseignement supérieur] since 2007
Director of the International Program in Theoretical Neurosciences (ISM and FAU) since 2006
Member of the Advisory Board of the Workshop Series "Brain Connectivity" since 2005
Group Coordinator of the AMEBA network on Biomathematics between France and United Kingdom since 2008
Member of the Advisory Board of the Center for Complex System Studies, College of Kalamazoo, Michigan, 2002-2008

Honors

April 2005 **Researcher of the Year 2004-2005** (FAU)
June 2004 **Early Career Distinguished Scholar Award** by the North American Society for the Psychology of Sport and Physical Activity. This award was given to recognize outstanding scientific contributions to Human Movement Sciences.
June 2001 **Francois Erbsmann Prize** for best research paper: *Neural field dynamics on the folded three-dimensional cortical sheet and its forward EEG and MEG*. This award was given to recognize outstanding contributions to the fields of Neural Network Modeling, Brain Imaging and Neurophysics.
June 2001 **Honorable Mention Research Award** (Presidential Research Development, FAU)

C. Selected Peer-reviewed Publications (from a total of 55 peer-reviewed publications)

Most relevant to the current application

1. Deco G, Jirsa VK, McIntosh AR. Emerging concepts for the dynamical organization of resting state activity in the brain. Nature Reviews Neuroscience (accepted for publication)
2. Qubbaj, M., Jirsa, V.K. Neural field dynamics under variation of local and global connectivity and finite transmission speed. Physica D 238, 2331-2346 (2009)
3. Deco, G., Jirsa, V.K, Sporns, O., McIntosh, A.R., Kötter, R. The Key Role of Coupling, Delay and Noise in Resting Brain Fluctuations. PNAS 106:10302-10307 (2009)

4. Ghosh A, Rho Y, McIntosh AR, Kötter R, Jirsa VK (2008) Noise during rest enables the exploration of the brain's dynamic repertoire. PLoS Comput Biol 4: e1000196.
5. Jirsa, V.K. Neural field dynamics with local and global connectivity and time delay. Phil. Trans. Royal Society A 367, 1131-1143 (2009)

Additional recent publications relevant to the application (in chronological order)

1. Ghosh, A., Roy, D., Jirsa, V.K. Simple model for bursting dynamics of neurons. PRE 80, 041930 (2009)
2. Knock, S.A., McIntosh, A.R., Sporns, O., Kötter, R., Hagmann, P., Jirsa, V.K. The effects of physiologically plausible connectivity structure on local and global dynamics in large scale brain models. J. Neurosci. Methods 183, 86-94 (2009)
3. Stefanescu, R., Jirsa, V.K. A low dimensional description of globally coupled heterogeneous neural networks of excitatory and inhibitory neurons. PLoS Computational Biology 4(11): e1000219. doi:10.1371/journal.pcbi.1000219 (2008)
4. Deco, G., Jirsa, V.K., Robinson, P.A., Breakspear, M., Friston, K. The dynamic brain: from spiking neurons to neural masses and cortical fields. PLoS Computational Biology 4(8): e1000092. doi:10.1371/journal.pcbi.1000092 (2008)
5. Ghosh, A., Rho, Y., McIntosh, A.R., Kötter, R., Jirsa, V.K. Cortical network dynamics with time delays reveals functional connectivity in the resting brain. Cognitive Neurodynamics 2 (2) , 115-120 (2008)
6. V.K. Jirsa. Dispersion and time-delay effects in synchronized spike-burst networks. Cognitive Neurodynamics Vol.2, No. 1, 29-38 (2007)
7. Qubbaj, M.R., & Jirsa, V.K., Neural field dynamics with heterogeneous connection topology. PRL93, 23802 (2007)
8. C.G. Assisi, V.K. Jirsa, J.A.S. Kelso: Synchrony and clustering in heterogeneous networks with global coupling and parameter dispersion. PRL94, 018106 (2005)
9. V.K. Jirsa, J.A.S. Kelso: Spatiotemporal pattern formation in continuous systems with heterogeneous connection topologies, Phys. Rev. E 62, 6, 8462-8465 (2000)
10. V.K. Jirsa, K.J. Jantzen, A. Fuchs, J.A.S. Kelso: Spatiotemporal forward solution of the EEG and MEG using network modeling, IEEE Transactions on Medical Imaging, 21, 5, 493-504 (2002)

D. Research Support

Ongoing Research Support

Oct 2010 - Sep 2014 **Co-Principal Investigator** on the European Project (IP) *BrainScales*. Funding Agency: IP, FET Call 6 (PI: Maier)

Sep 2010 - Aug 2013 **Principal Investigator** on the research project entitled *Process-based Control 2*. Funding agency: Codebox Research

Jan 2009 - Dec 2010 **Co-Principal Investigator** on the research project entitled *Brain Network Recovery*. Funding agency: James McDonnell Foundation (PI: McIntosh)

Jan 2009 - Dec 2010 **Principal Investigator** on the research project entitled *Phase Flow Control*. Funding agency: ATIP Plus CNRS

Completed Research Support

Jun 2008 - May 2010 **Principal Investigator** on the research project entitled *Brain Noise*. Funding agency: CNRS program Neuroinformatique

Sep 2007 - Aug 2010 **Principal Investigator** on the research project entitled *Process-based Control*. Funding agency: Codebox Research

Jan 2006 - Dec 2008 **Principal Investigator** on the research project entitled *Theoretical Foundations of Coordination Dynamics*. Funding agency: ATIP CNRS

Program Director/Principal Investigator (Last, First, Middle): McIntosh, Anthony Randal

Aug 2005 - Jul 2008 **Co-Principal Investigator** on the research project entitled *Brain Network Recovery*. Funding agency: James McDonnell Foundation. (PI: McIntosh)

Oct 2004 - Dec 2007 **Principal Investigator** on the research project entitled *Measures of Team Performance* Funding agency: ONR.

Jan 2002 - Jul 2003 **Principal Investigator** on the research project entitled *Augmented Cognition* in collaboration with Daimler Chrysler Company. Funding agency: DARPA.

May 2001 - May 2005 **Key Research Personnel** on the research project entitled *Dynamic Patterns in Complex Biological System*. Funding Agency: NIH/NIMH (PI: Kelso)