

## **CURRICULUM VITAE: Gustavo Deco**

*Prof. Dr. phil. Dr. rer. nat. habil. Gustavo Deco* is a Research Professor at the Institució Catalana de Recerca i Estudis Avançats and Full Professor (Catedrático) the Pompeu Fabra University (Barcelona) where he is head of the Computational Neuroscience Group.

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 (maximum German academic degree) 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 a lecturer at the universities of Rosario, Frankfurt and Munich. From 1998 to 2001 he was Associate Professor at the Technical University of Munich. Since 1999 he has been an Honorary Professor at the University of Rosario, since 2001 Invited Lecturer at the Ludwig-Maximilian-University of Munich, since 2016 Associate Researcher at the Max Planck Institute for Human Cognitive and Brain Science, 2017 Adjunct Professor of the Faculty of Medicine of Monash University and 2019-2023 Adjunct Professor, Faculty of Medicine, School of Psychological Sciences and Turner Institute for Brain and Mental Health, Monash University. 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 prize 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 was awarded the Clarivate Highly Cited Researcher 2023.

He has published 4 books, more than 460 papers in International Journals and 36 book chapters. He has 52 patents in Europe, USA, Canada and Japan. He was awarded an ERC Synergy grant in 2022, an ERC Advanced grant in 2012. He was a member of the Human Brain Project (EU Flagship).

## CURRICULUM VITAE: Gustavo Deco

Prof. Dr. Dr. phil. Dr. rer. nat. habil. Gustavo Deco

**Private :** Birth Date and Place: 07.11.1961 in Rosario (Argentina)  
Marital Status: Married and four sons  
Nationality: Italian

### Graduates Degrees :

03.79 - 03-83 Diploma in Theoretical Physics  
National University of Rosario

### Postgraduates Degrees :

04.84 - 06.87 Ph.D in Theoretical Physics.

Ph.D thesis: Atomic Collision at Relativistic High Energies.  
National University of Rosario. Note: Summa cum Laude

12.96 Habilitation and PhD in Theoretical Computer Science (Dr. rer.nat. habil.)  
(Habilitation is the maximal academical degree in Germany and qualifies for a professorship)  
Postdoctoral thesis: Unsupervised Learning and Information Theory:  
Parametric and Nonparametric Formulation  
Technical University of Munich

05.97 - 07.01 Ph.D in Psychology (Neuropsychology, Dr. phil.).

Ph.D thesis: "The Computational Neuroscience of Visual Attention"  
Ludwig-Maximilian-University of Munich. Note: Summa cum Laude.

### Research Activities :

04.84 – 03.88 Fellowship from the National Research Council at University of Rosario.

06.87 - 08.87 Post-Doctoral Fellowship at the University of Bordeaux (France)

05.88 - 12.89 Post-Doctoral Fellowship of the *Alexander von Humboldt-Foundation*  
University of Gießen (Germany)

01.90 - 06.92 Siemens AG, Unterschleißheim  
Real Time Expert Systems and Neural Networks (Spin Glass)

07.92 – 03.03 Siemens AG, Research Corporate  
Senior Principal Research Scientist  
Neural Networks and Computational Neuroscience

since 09.99 Honorary Professorship at the National University of Rosario

since 02.01 McDonnell-Pew Visiting Fellow of the Centre for Cognitive Neuroscience of the  
University of Oxford

since 03.03 Research Professor by Institució Catalana de Recerca i Estudis Avançats (ICREA)  
at the University Pompeu Fabra.

**Publications:** (see list)

**Papers:**

International Reviews: 460+  
Chapters in Books: 36

**Books:**

- 1) *"An Information-Theoretic Approach to Neural Computing"*  
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.

**Patents** (see list): 52

**Awards:** Inventor of the Year 2001 (Siemens world wide competition).  
Clarivate Highly Cited Researcher 2023.

**Academic Activities:**

- 03.83-03.88 Teaching Assistant at the National University of Rosario.  
- Theoretical Mechanics (1983-1984)  
- Theoretical Electrodynamics (1985-1986)  
- Quantum mechanics (1987-1988)
- 04.1994 Invited Professor at the National University of Rosario.  
- Introduction to the Theory of Neural Networks.
- 1994-1995 Teaching Assistant at the University of Frankfurt  
- Introduction to the Theory of Neural Networks.  
- Information dynamics
- since 1994 Privat-Dozent at the Technical University of Munich  
- Information Theory and Neural Network.  
- Information dynamics.  
- Computational Neuroscience.
- 05.1997 Invited Professor at the National University of Rosario.  
- Theoretical Computer Science
- 10.2002 Invited Professor at the University Pompeu Fabra (Barcelona).  
- Introduction to Computational Neuroscience
- since 10.2001 Invited Lecturer at the Ludwig-Maximilians-University Munich.

- Computational Neuroscience
- 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)
- 2004-2006 Director of the Doctoral Program in Computer Science and Digital Communication at the University Pompeu Fabra (UPF, Barcelona).
- 2005 Invited Professor: Computational Neuroscience (PhD Course)
- Karolinska Institute, Stockholm (Sweden)
  - Universidad La Laguna, Almería (Spain)
- 2006 Invited Professor: Computational Neuroscience (PhD Course)
- Universidad La Laguna, Almería (Spain)
- 2007 Invited Professor: Computational Neuroscience (PhD Course)
- Universidad La Laguna, Almería (Spain)
  - Karolinska Institute, Stockholm (Sweden)
- since 2008 Full Professor (Catedrático) at the University Pompeu Fabra (Barcelona).  
Lectures:
- Artificial Intelligence II (Undergraduates Courses)
  - Computational Neuroscience (PhD and Master Courses)
- since 2017 Associate Researcher at the Max Planck Institute for Human Cognitive and Brain Science
- 2017-2023 Adjunct Professor, Faculty of Medicine, Monash University, Australia
- 2019-2023 Adjunct Professor, Faculty of Medicine, School of Psychological Sciences and Turner Institute for Brain and Mental Health, Monash University.

**Languages :** Spanish, German, English, Catalan.

**Research Projects:**

- European Project “ GALATEA“ ESPRIT Project 5293 (1992-1994)
- European Project “ Computational Tools and Industrial Applications of Complexity“ ESPRIT Project 21042 (1997-1999)
- European Project “ ALAVLSI“ IST-2001-38099 (2002-2005)
- Siemens AG-Project “ Computational Neuroscience“ (2003-2006)
- Deutsche Forschungsgemeinschaft (DFG)  
Germany Ministry, “ Attention and Dynamics“ (2003-2005)
- Royal Society Project, British Council, Ref. Nr. 15619 (2003-2005)
- Plan Nacional de Investigación Científica (Ministerio de Educación y Ciencia, Spain) “ Mechanisms of Multisensory and Temporal Integration in Cognition and Intelligent Systems“ (TIN2004-04363-C03-01)

(2004-2006)

- European Project “ EmCap“ “ Emergent Cognition Through Active Perception“ FP6-2002-IST, 013123-2 (2005-2008)
- European Project “ Neural Decision in Motion“, FP6-IST-4 (2006-2009)
- Volkswagen-Foundation “ Audiovisual Processing of Speech and Non-Speech Oral Gestures“ (2006-2009)
- BMBF (German Ministry for Science) “ Brain Plasticity and Perceptual Learning: Experimental Analysis and Computational Modeling“ (Ref.: 01GW0761) (2008-2010)
- Plan Nacional de Investigación Científica (Ministerio de Educación y Ciencia, Spain) “ From Detection to Decision: Neurodynamical Model of Higher Order Cortical Processing“ (BFU2007-61710/BFI) (2007-2009)
- Bilingualism and Cognitive Neuroscience. Consolider Ingenio 2010 (Elite-Project of the Ministerio de Educación y Ciencia, Spain) (2008-2012)
- European Project (HEALTH FP7) “ BrainSync“ “ Large Scale Interaction in Brain Networks and their Breakdown in DiseasesBrain“ (2008-2010)
- European Marie Curie Training Network, CODDE “ Coordination of Optimal Decisions in Dynamical Enviroments“ (2008-2011)
- Fundació La Marató TV3. “ Estudi de la dinàmica remissió-recaiguda de la depressió major a través de l'anàlisi de xarxa als mapes de connectivitat de Fmri: implicacions per a la teràpia“ (2010-2012)
- Plan Nacional de Investigación Científica (Ministerio de Educación y Ciencia, Spain) “ Communication and Information Processing Between Cortical Circuits: Oscillations and Plasticity“ (2011-2013)
- European Project (FP7), CORONET “ Choreographing neural networks: coupling activity dynamics across biomimetic brain interfaces with neuromorphic VLSI” (2011-2014)
- European Project (FP7) BRAINSCALES “ Brain-inspired multiscale computation in neuromorphic hybrid systems“ (2011-2014)
- James McDonnell Foundation US. Collaborative Awards - Human Cognition “ Brain Network Recovery Group Phase II“ (2011-2016)
- Advanced ERC Grant European Research Council “DYSTRUCTURE“: The Dynamical and Structural Basis of Human Mind Complexity: Segregation and Integration of Information and Processing in the Brain“ (2012-2017)
- PCIN-2013-026 Plan Estatal de Fomento de la Investigación Científica y Técnica de Excelencia SEMAINE “ Simultaneous MEG or fMRI And INtracranial EEG”.ERA-NET-NEURON “SEMAINE“ (2013-2016).
- EU H2020 Marie Curie Fellowship, NEUCOD. Adrià Tauste “ Information-theoretic approach to infer encoding patterns in a decision making process“ (2013-2015)
- EU H2020 Marie Curie Fellowship, INTERACTIONS. Gorka Zamora “ Investigation of the interaction between external stimulation and ongoing brain activity in cortical networks: analysis, modeling and empirical corroboration“ (2013-2015)
- EU H2020 Marie Curie Training Network, INDIREA “ Individualised Diagnostics and Rehabilitation of Attention“ (2013-2017)

- EU H2020 Marie Curie Fellowship, eu-msca-629613 CEMNet. Alexandre Hyafyl “A unified framework for Perceptual Inference in Sensory cortices“ (2014-2016)
- National Institutes of Health (US-NIH), “Stroke, Brain Networks and Behavior“ (2015-2020)
- European Project (FP7, Flagship), HBP “ Human Brain Project“ (Ramp-up phase 2013-2016), “Human Brain Project SGA1“ (H2020) 2016-2018, “Human Brain Project SGA2“ (H2020) 2018-2020, and “Human Brain Project SGA3“ (H2020) 2020-2023
- Plan Estatal de I+D+I. Ministerio de Economía y Competitividad “ Integrating Connectomics with Brain Activity Mapping“ (2014-2016)
- AGAUR, Agencia Gestio Ajuts Universitaris i Recerca Research Group in Cognitive and Computational Neuroscience (2014-2016)
- PCIN-2015-079 NSF PIRE “PIRE-Program in Cognitive, Computational and Systems Neuroscience” Plan Estatal de I+D+I. Ministerio de Economía y Competitividad. Acciones de Programación Conjunta Internacional (2015-2017).
- PCIN-2015-127 CHAMPMouse “Charting Multi-areal Visual Perception in the Mouse” Plan Estatal de I+D+I. Ministerio de Economía y Competitividad. Acciones de Programación Conjunta Internacional (2015-2018)
- European Commission H2020 Marie Curie Fellowship, EU-MSCA-656547. NeuArc2Fun Mathew Gilson. “Biological neural networks: from structure to function”. European Commission, Horizon 2020 Marie Sklodowska-Curie Individual Fellowship: (2016-2018)
- European Marie Curie Fellowship, EU-MSCA-656262. QTMODEM Ignasi Cos “ Quantitative Motor Control for Decision Making“, European Commission Horizon 2020 Marie Sklodowska-Curie Individual Fellowship: I. Cos, (2016-2017)
- European Marie Curie Fellowship, EU-MSCA-661583- CONSCBRAIN “How consciousness is shaped by neuronal network dynamics”, European Commission, Horizon 2020 Marie Sklodowska-Curie Individual Fellowship: G. Hahn, (2015-2017)
- Swiss National Science Foundation (SNSF), SYNERGIA "Exploring brain communication pathways by combining diffusion based quantitative structural connectivity and EEG source imaging: application to physiological and epileptic networks" (2016-2020)
- Plan Estatal de I+D+I. Ministerio de Economía y Competitividad “COBRAS Searching for the underlying Complexity of Brain States“ (2016-2019)
- Fundació La Marató TV3. “Brain-Connect: Brain Connectivity During Stroke Recovery and Rehabilitation“ (2018-2020)
- Flag-ERA “Comparative Investigation of the Cortical Circuits in Mouse, NHP and Human“ (2018-2020).
- DFG German Research Foundation “Dynamic Connectome Underlying Language in the Brain“. (2018-2020).
- AGAUR, Catalan Agencia Gestio Ajuts Universitaris i Recerca “Research Group in Cognitive and Computational Neuroscience“ (2017-2020)

- EU ERDF Operational Program of Catalonia 2014-2020 “CECH The Emerging Brain Cluster“ (2019-2021)
- H2020 MSCA-ITN-2019 Innovative Training Networks “euSNN European School of Network Neuroscience“ (2019-2021)
- MCIU AEI Proyectos I+D+i 2019 “Awakening: Using Whole Brain Models Perturbational Approaches for Predicting External Stimulation to Force Transitions Between Different States“ (2019-2023)
- Australian Research Council “A Comprehensive Framework for Modelling the Human Connectome“ (2020-2022)
- The HBP Calls for Expression of Interest for SGA3 Validation and Inference “Netscovery Model-free and model-based inference and validation workflows for causal brain network discovery“ (2020-2023)
- The HBP Calls for Expression of Interest for SGA3 Data and models for understanding of consciousness “BRICON Brain Inspired Consciousness“ (2020-2023)
- Australian Research Council “Decoding neuronal populations for visually-guided decision and action“ (2021-2023)
- H2020-FET Proactive “Neurotwin Digital twins for model-driven non invasive electrical brain stimulation“ (2021-2024)
- FLAG-ERA JTC 2021 “Combining model free and model based biomarkers for the consciousness diagnosis“ (2021-2024)
- Australian NHMRC “Neuropharmacology of decision-making: causal brain network modelling across species“ (2022-2026)
- Horizon Europe EBRAIN-HEALTH „Actionable Multilevel Health Data (2022-2026)
- Horizon Europe Hyperstim “High-Dimensional Electrical Stimulation for Visual Prosthesis“ (2022-2026)
- AGAUR, Catalan Agència Gestió Ajuts Universitaris i Recerca “Research Group in Cognitive and Computational Neuroscience“ (2022-2024)
- CHDI Foundation “Whole-Brain Dynamic fMRI Biomarkers for Monitoring the Evolution of Huntington's Disease” (2023-2025)
- Ministry of Science and Innovation, the State Research Agency and the European Regional Development Fund.PID2022-136216NB-I00 MCIN /AEI /10.13039/501100011033 / FEDER, UE. Non-equilibrium DYNAMical analysis of brain functions in health and disease (2023-2026)
- ERC Synergy Grant Nemesis Neurological Mechanisms of Injury, and Sleep-like cellular dynamics (2023-2029)

### **Supervised Ph.D Thesis :**

- L. Parra, Ph.D in Physics  
at the Ludwig-Maximilian University of Munich
- C. Schittenkopf, Ph D in Computer Science  
at the Technical University of Munich
- S. Kriebel, Ph D in Computer Science  
at the Technical University of Munich
- M. Szabo, Ph.D in Computer Science  
at the Technical University of Munich

- N. Galm, PhD in Computer Science  
at the Technical University of Munich
- A. Stemme, PhD in Psychology  
at the Ludwig-Maximilian University of Munich
- D. Marti, PhD in Computer Science  
at the Universitat Pompeu Fabra
- M. Loh, PhD in Computer Science  
at the Universitat Pompeu Fabra
- A. Buehlmann, PhD in Computer Science  
at the Universitat Pompeu Fabra
- L. Albantakis, PhD in Computer Science  
at the Universitat Pompeu Fabra
- J. Cabral, PhD in Computer Science  
at the Universitat Pompeu Fabra
- J.P Larsson, PhD in Computer Science  
at the Universitat Pompeu Fabra
- A. Insabato in Computer Science  
at the Universitat Pompeu Fabra
- P. Theodoni, PhD in Computer Science  
at the Universitat Pompeu Fabra
- M. Martinez, PhD in Computer Science  
Universitat Pompeu Fabra
- T. Nakagawa, PhD in Computer Science  
Universitat Pompeu Fabra
- C. Tornador, PhD in Biology  
Universitat Pompeu Fabra
- M. Demirtas, PhD in Computer Science  
Universitat Pompeu Fabra.
- R.Ton, PhD in Computer Science  
Universitat Pompeu Fabra and University of Amsterdam
- R. Bettinardi, PhD in Computer Science  
Universitat Pompeu Fabra
- K. Glomb, PhD in Computer Science  
Universitat Pompeu Fabra
- V. Saenger, PhD in Computer Science  
Universitat Pompeu Fabra
- B. Jobst, PhD in Computer Science  
Universitat Pompeu Fabra
- V. Pallares, PhD in Computer Science  
Universitat Pompeu Fabra
- Josephine Cruzat, PhD in Biomedicine  
Universitat Pompeu Fabra
- Jessica de Santiago, PhD in Computer Science  
Universitat Pompeu Fabra
- Camilo Miguel Signorelli, PhD in Biomedicine  
Universitat Pompeu Fabra
- Manel Vila Vidal, PhD in Biomedicine  
Universitat Pompeu Fabra
- Ane Lopez, PhD in Biomedicine  
Universitat Pompeu Fabra



-Laura Ulysse, PhD in Computer Science  
Universitat Pompeu Fabra  
-Eleonora DeFilippi PhD in Computer Science  
Universitat Pompeu Fabra  
-Anira Escrichs, PhD in Computer Science  
Universitat Pompeu Fabra  
-Katerina Capouskova in Biomedicine  
Universitat Pompeu Fabra  
-David Blair in Computer Science  
Universitat Pompeu Fabra  
-Ludovica Mana Biomedicine  
Universitat Pompeu Fabra  
-Sebastian Idesis Biomedicine  
Universitat Pompeu Fabra

### **Affiliations:**

Member of the Editorial Board of Journal of Physiology Paris  
Member of the Editorial Board of Cognitive Neurodynamics  
Member of the Editorial Board of eNeuro  
Action Editor of Neural Networks  
Referee of: Science, Nature Neuroscience, Neuron, PNAS, Physical Review,  
Physical Review Letters, Neural Computation, PLoS CB, etc.  
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)  
Member of the International Scientific Advisory Board of the Max-Planck  
Institute for Biological Cybernetics (Tuebingen)  
Member of the International Scientific Advisory Board of the Bernstein  
Center Berlin  
Member of the International Scientific Advisory Board of the Bernstein  
Center Heidelberg  
Member Hamburg Academy of Science  
Member Academia Europaea

### **Conferences Organization:**

First ESF (European Science Foundation) Workshop on Computational  
Neuroscience: Understanding Brain Functions  
Barcelona, Spain  
June 2005  
(see <http://final.upf.es/cnscience/>)

Symposium „Computational Model on Vision“  
(Organizers: L. Wiskott and G. Deco)  
at the 31st Göttingen Neurobiology Conference  
Göttingen, Germany  
March 2007

Brain Connectivity Workshop 2007.

Barcelona, Spain

May 2007

(see <http://www.iaa.upf.es/recerca/ComputationalNeuroscience/bcw2007>)

„Decision-Making in the Brain“

(Organizers: E. Rolls and G. Deco)

at the Autumn School in Cognitive Neuroscience

Oxford, United Kingdom

September 2007

Symposium 11: „Computational Approaches to Cortical Functions: From Perception to Action“

(Organizers: A. Compte and G. Deco)

at the XII Congreso Sociedad Española de Neurociencia

Valencia, Spain

September 2007

Workshop on Mathematical Models of Cognitive Architectures CIRM

(Organizers: V. Jirsa and G. Deco)

Marseille, France

December 2011

ESF Exploratory Workshop: Noise in Decision-Making

(Organizers: G. Deco)

Barcelona, Spain

May 2013

INBIOMEDvision, Bio-Medical-, and Neuro-informatics supporting  
Neurosciences

(Organizers: G. Deco)

Barcelona, Spain

July 2012

CNS 2013 Workshop: Metastable Dynamics of Neural Ensembles

(Organizers: G. Deco)

Paris, France

July 2013

CNS 2013 Workshop: Full Brain Network Dynamics

(Organizers: G. Deco)

Paris, France

July 2013

Workshop on "Population models and mean-field approaches to in vivo  
brain activity states"

(Organizers: A. Destexhe, O. Faugeras, M. Kamps, V. Jirsa and G. Deco).

Paris, France

February 2016

## Invited Lectures:

- "Relativistische Kollisionen"  
Justus-Liebig-Universität Gießen, August 1987,  
Gießen, Germany.  
(Invited by Prof. Dr. W. Scheid)
  
- "Transformation und Neuronale Netze"  
Ludwig-Maximilian-Universität, August 1993,  
Munich, Germany.  
(Invited by Dr. R. Hennicker)
  
- "Unsupervised Boltzmann Machines"  
Siemens Corporate Research, July 1993,  
Princeton, USA.  
(Invited by Dr. S. Hanson)
  
- "Overfitting in Neural Networks"  
Tokai University, November 1993,  
Tokai, Japan.  
(Invited by Prof. Dr. Ryotaro Kamimura)
  
- "Information Theory and Neural Networks"  
Hitachi Laboratories, November 1993,  
Hitachi, Japan.  
(Invited by Hitachi Corporate Research)
  
- "Theory of Unsupervised Learning of Nonlinear Processes",  
J. W. v. Goethe Universität Frankfurt, December 1994,  
Frankfurt, Germany.  
(Invited by Prof. Dr. Martienssen)
  
- "Infomax and Redundancy Minimization Theory",  
Technische Universität München, January 1995,  
Munich, Germany.  
(Invited by Prof. Dr. Van Hemmen)
  
- "An Information Theoretic Approach to Unsupervised Learning",  
Technische Universität München, November 1995,  
Munich, Germany.  
(Invited by Prof. Dr. W. Brauer)
  
- "Time Series Analysis and Information Dynamics",  
Humboldt Universität Berlin, January 1996,  
Berlin, Germany.  
(Invited by Prof. Dr. W. Ebeling)
  
- "Learning Theory: Parametrical and Nonparametrical Formulation",  
Technische Universität München, July 1996,  
Munich, Germany.

(Invited by Prof. Dr. W. Brauer)

- "An Information Theoretic Approach to Learning",  
Ruhr-Universität Bochum, October 1996,  
Bochum, Germany.

(Invited by Prof. Dr. W. von Seelen)

- "Learning Theory: Parametrical and Nonparametrical Formulation"  
Technische Universität Berlin, November 1996,  
Berlin, Germany.

(Invited by Dr. S. Rueger)

- "Informationdynamics and Biomedical Signal Processing",  
Universität Würzburg, December 1996,  
Würzburg, Germany.

(Invited by Prof. Dr. W. Kinzel)

- "Data Selection in Temporal time Series"

Max-Planck-Institut für Psychologische Forschung, January 1997,  
Munich, Germany.

(Invited by Dr. L. Martignon)

- "Informationdynamics"

Max-Planck-Institut für extraterrestrische Physik, January 1998,  
Munich, Germany.

(Invited by Dr. H. Atmanspacher)

- "An Information Theoretic Approach to Learning"

Universität Freiburg, January 1998,  
Freiburg, Germany.

(Invited by Prof. Dr. B. Nebel)

- "A Neurodynamical Model for Selective Visual Attention"

University of Birmingham, Dept. of Psychology, September 1999,  
Birmingham, England.

(Invited by Prof. Dr. G. Humphreys)

- "A Neurodynamical Model for Selective Visual Attention"

Ludwig-Maximilians-University,  
Institut für Medizinische Psychologie, December 1999,  
Munich, Germany.

(Invited by Prof. Dr. I. Rentschler)

- "A Neurodynamical Model for the Resolution Hypothesis"

Carnegie Mellon University,  
Center for the Neural Basis of Cognition, February 2000,  
Pittsburgh, USA.

(Invited by Prof. Dr. T. Lee)

- "The Computational Neuroscience of Visual Attention"

Ruhr-Universität Bochum, May 2000,  
Bochum, Germany.  
(Invited by Prof. Dr. C. von der Malsburg)

- "Biased Competition Mechanisms for Visual Attention in a Multimodular  
Neurodynamical System"  
Universität Ulm, June 2000,  
Ulm, Germany.  
(Invited by Prof. Dr. G. Palm)

- "The Computational Neuroscience of Visual Attention"  
GMD FIRST, June 2000,  
Berlin, Germany.  
(Invited by Prof. Dr. K.R. Müller)

- "The Computational Neuroscience of Visual Attention"  
Universitätsklinikum "Benjamin Franklin"  
Freie Universität Berlin, June 2000,  
Berlin, Germany.  
(Invited by Dr. G. Curio)

- "Modelling of Active Perception: Neuropsychological Relevance"  
University of Birmingham, Dept. of Psychology, August 2000,  
Birmingham, England.  
(Invited by Prof. Dr. G. Humphreys)

- "The Computational Neuroscience of Visual Attention"  
University of Oxford, Dept. of Psychology, September 2000,  
Oxford, England.  
(Invited by Prof. E. Rolls)

- "Dynamische Systeme: Ein informationstheoretischer Zugang"  
Universität Innsbruck, Institut für Mathematik, October 2000,  
Innsbruck, Austria.  
(Invited by Prof. S. Hellebrand)

- "Neurokognitiven Mechanismen zur aktiven Bildverarbeitung"  
Technische Universität München, February 2001,  
Munich, Germany.  
(Invited by Prof. Dr. J. Eberspächer)

- "The Computational Neuroscience of Visual Attention"  
Max-Planck-Institut fuer Hirnforschung, March 2001,  
Frankfurt, Germany.  
(Invited by Prof. Dr. W. Singer)

- "Neurokognitiven Mechanismen zur aktiven Bildverarbeitung"  
Deutsches Zentrum für Luft- und Raumfahrt, March 2001,  
Berlin, Germany.  
(Invited by Dr. van der Meer)

- "An Interactive Neurodynamical Model of Biased Competition for Attentive Object Recognition and Visual Search"  
University of Alberta, April 2001,  
Edmonton, Canada.  
(Invited by Prof. Dr. T. Caelli)
  
- "The Computational Neuroscience of Visual Attention"  
Department of Neurological and Vision Sciences  
Section of Physiology, University of Verona, May 2001,  
Verona, Italy.  
(Invited by Prof. Dr. L. Chelazzi)
  
- "The Computational Neuroscience of Visual Attention"  
Max-Planck-Institut fuer biologische Kybernetik, May 2001,  
Tübingen, Germany.  
(Invited by Dr. F. Volker)
  
- "The Computational Neuroscience of Visual Attention"  
Universität Paderborn, July 2001,  
Paderborn, Germany.  
(Invited by Prof. Dr. H. Grotstollen)
  
- "Neurodynamical Modeling in Vision"  
Sommer School on "Connectionist Modeling".  
University of Oxford, Dept. of Psychology, July 2001,  
Oxford, England.  
(Invited by Prof. Dr. E. Rolls)
  
- "The Neurodynamics of Spatial and Object Attention"  
2001 Autumn School in Cognitive Neuroscience  
McDonnell-Pew and MRC IRC Centres for Cognitive Neuroscience  
University of Oxford, September 2001,  
Oxford, England.
  
- "Computational Neuroscience of Vision"  
Max-Planck-Institut für extraterrestrische Physik, October 2001,  
Munich, Germany.  
(Invited by Prof. Morfill)
  
- "Neurokognitiven Mechanismen zur aktiven Bildverarbeitung"  
Universität Innsbruck, Institut für Informatik, October 2001,  
Innsbruck, Austria.  
(Invited by Prof. S. Hellebrand)
  
- "Neurokognitiven Mechanismen zur aktiven Bildverarbeitung"  
Universität Osnabrück, Fachbereich Mathematik/Informatik, October 2001,  
Osnabrück, Germany.  
(Invited by Prof. S. Sperschneider)

- "The Computational Neuroscience of Visual Attention"  
Universität Lübeck, Institut für Neuroinformatik, Februar 2002,  
Lübeck, Germany.  
( Invited by Prof. Th. Martinetz)
  
- "The Computational Neuroscience of Visual Attention"  
Universität München, Medizinische Fakultät (Alzheimer Institut), Februar 2002,  
Munich, Germany.  
( Invited by Prof. H. Hampel)
  
- "Neurodynamische Mechanismen der Informationsverarbeitung im visuellen Cortex"  
Universität Düsseldorf, Physikalische Fakultät, Juni 2002,  
Düsseldorf, Germany.  
( Invited by Prof. R. Egger)
  
- "Neurocortical Mechanisms Underlying Visual Attention"  
SISSA / ISAS, Scuola Internazionale Superiore di Studi Avanzati, Juli 2002,  
International School for Advanced Studies.  
Trieste, Italy.  
( Invited by Prof. M. Diamond)
  
- "Computational Neuroscience of Visual Cognition"  
Laboratory of Computational Neuroscience, Oktober 2002,  
Ecole Polytechnique Fédérale de Lausanne.  
Lausanne, Switzerland.  
( Invited by Prof. M. Gerstner)
  
- "Computational Neuroscience of Visual Cognition: Attention and Working Memory"  
Department of Computer Science, Oktober 2002,  
Universitat Pompeu Fabra.  
Barcelona, Spain.  
( Invited by Prof. V. Lopez)
  
- "Computational Neuroscience of Visual Cognition: Attention and Working Memory"  
Department of Psychology, Oktober 2002,  
University of Barcelona.  
Barcelona, Spain.  
( Invited by Prof. N. Sebastian Galles)
  
- "Computational Neuroscience of Visual Cognition"  
BENEFRI Course 2003,  
Neocortical Functions: From Neurons to Behavior, March 2003,  
University of Bern.  
Bern, Switzerland.  
( Invited by Prof. W. Senn)
  
- "``What" and ``Where" in Visual Working Memory: A Computational Neurodynamical  
Perspective for Integrating fMRI and Single-Neuron Data"  
Institute of Neuroscience, April 2003,  
University of Plymouth.

Plymouth, United Kingdom.  
(Invited by Prof. Jochen Braun)

- "The Neurodynamics of Attention, Working Memory and Reward Reversal"  
Institute of Neuroinformatics, May 2003,  
ETH-University of Zurich.  
Zurich, Switzerland.  
(Invited by Prof. P. König)

- "Attention, Memory and Reward Learning: A Computational Neuroscience Perspective"  
2003 Autumn School in Cognitive Neuroscience  
McDonnell-Pew and MRC IRC Centres for Cognitive Neuroscience  
University of Oxford, October 2003,  
Oxford, England.  
(Invited by Prof. E. Rolls)

- "The Computational Neuroscience of Visual Cognition"  
EPSRC Research Cluster in Brain-Inspired Computation  
Finnstown Center, October 2003,  
Dublin, Ireland.  
(Invited by Prof. M. Deham)

- "Neural and Cortical Modeling of Visual Attention, Memory and Reward Learning"  
Gemeinsames Forschungs-Kolloquium „Allgemeine und Experimentelle Psychologie“  
Max-Planck- Institut für Psychologische Forschung und  
Ludwig-Maximilians-Universität München, November 2003,  
Munich, Germany.  
(Invited by Prof. H. Müller)

- "Neural and Cortical Modeling of Visual Attention, Memory and Reward Learning"  
Instituto de Neurociencia  
Universidad Miguel Hernandez, November 2003,  
Alicante, Spain.  
(Invited by Prof. M. Sanchez-Vives)

- "Neural and Cortical Modeling of Visual Attention, Memory and Reward Learning"  
Escuela Superior Politecnica  
Universidad Autonoma de Madrid, November 2003,  
Madrid, Spain.  
(Invited by Prof. E. Serrano)

- "Neurodynamical Competition and Cooperation in Cortical Networks: From Spiking  
Neurons to Cognition"  
Institut for Theoretical Biology  
Humboldt-Universität zu Berlin, June 2004,  
Berlin, Germany.  
(Invited by Prof. A. Herz)

- "Neurodynamical Competition and Cooperation in Cortical Networks"  
Department of Computer Science



University of Helsinki, December 2004  
Helsinki, Finland.  
(Invited by Prof. A. Hyvärinen)

- "Computational Neuroscience of Visual Cognition I - II"  
Departamento de Física y Departamento de Psicología  
Universidad de las Islas Baleares, February 2005,  
Palma de Mallorca, Spain.  
(Invited by Prof. C. Mirasso)

- "Neural Mechanisms Underlying a Decision-Making Task"  
Department of Psychology  
University of Oxford, February 2005,  
Oxford, United Kingdom.  
(Invited by Prof. E. Rolls)

- "Theories of the Cerebral Cortex"  
Department of Neuroscience, Division of Brain Research  
Karolinska Institute, May 2005  
Stockholm, Sweden.  
(Invited by Prof. P. Roland)

- "The Computational Neuroscience of Visual Cognition"  
Department of Psychology  
Universidad de Almería, May 2005  
Almería, Spain.  
(Invited by Prof. J. Ortells)

- "Competition and Cooperation in Cortical Networks"  
Fundación Duques de Soria, Seminario de Neurociencias, July 2006  
„Brain Mechanisms of Attention: Biological and Computational Approaches“  
Soria, Spain.  
(Invited by Prof. C. Belmonte)

- "The Neurophysiology of Decision-Making"  
Centre de Recherche Cerveau et Cognition  
Université Paul Sabatier, and CNRS, May 2006  
Toulouse, France.  
(Invited by Prof. S. Thorpe)

- "Neurodynamical Mechanisms Underlying Probabilistic Aspects of Decision-Making:  
Weber's Law"  
Kognitionsbiologie  
Otto-von-Guericke-Universität Magdeburg, November 2006  
Magdeburg, Germany.  
(Invited by Prof. J. Braun)

- "The Neurophysiology of Decision-Making"  
Ruhr-Universität Bochum, January 2007,  
Bochum, Germany.

(Invited by Prof. G. Schoener)

- "Neuronal and Cortical Mechanisms Underlying Decision-Making"  
Max-Planck Institute for Biological Cybernetics, October 2007,  
Tübingen, Germany.

(Invited by Prof. N. Logothetis)

- "The Neuronal Basis of Decision-Making and Perception"  
Universitätsklinikums Hamburg-Eppendorf, October 2008,  
Hamburg, Germany.

(Invited by Prof. A. Engel)

- "Neurodynamical Mechanisms Underlying Decision-Making"  
Harvard University, November 2009,  
Boston, USA.

(Invited by Prof. G. Kreiter)

- "The Intrinsic properties of the Brain"  
Brain and Mind Center, École polytechnique fédérale de Lausanne, February 2010,  
Laussane, Switzerland.

(Invited by Prof. W. Gerstner)

- "Stochastics Dynamics in Decision-Making"  
Universite Paris Descartes, March 2010,  
Paris, France.

(Invited by Prof. P. Mamassian)

- "The Intrinsic Properties of the Brain: The Resting State"  
Forschungszentrum Jülich, May 2010,  
Jülich, Germany.

(Invited by Prof. G. Fink)

- "The Resting State of the Brain"  
Columbia University, September 2010,  
New York, USA.

(Invited by Prof. S. Fusi)

- "Stochastic Dynamics and Ongoing Brain Activity"  
New York University, September 2010,  
New York, USA.

(Invited by Prof. N. Rubin)

- "The Resting State of the Brain: A Mechanistic View"  
Oxford University, Dept. Of Psychiatry, September 2010,  
Oxford, United Kingdom.

(Invited by Prof. M. Kringelbach)

- "Ongoing Cortical Activity at Rest: The Global Attractor Structure of the Brain"  
Instituto de Medicina Gamma. December 2011,  
Rosario, Argentina

-“Ongoing Cortical Activity at Rest: The Global Attractor Structure of the Brain”  
Universidad Autonoma de Madrid. Facultad de Medicina, January 2012,  
Madrid, Spain.

-“Ongoing Cortical Activity at Rest: The Global Attractor Structure of the Brain”  
Institute of Bioengineering of Catalonia, March 2012,  
Barcelona, Spain.

-“Ongoing Cortical Activity at Rest: The Global Attractor Structure of the Brain”  
Universidad de Salamanca - Instituto de Neurociencias, March 2012,  
Salamanca, Spain.

-“A Resting Brain never Rests”  
Free University of Amsterdam. Netherlands, September 2012,  
Amsterdam, Netherlands

-“A Resting Brain never Rests”  
Hospital del Mar. Univeristat Pompeu Fabra, October 2012,  
Barcelona, Spain

-“The Resting Brain Never Rests”  
Institut f. Neuro- und Bioinformatik, University of Luebeck, October 2012,  
Luebeck, Germany

-“The Resting Brain Never Rests: Dynamics and structure of Global Spontaneous Brain Activity”  
Forschungszentrum Jülich - Dept of Neuroscience. January 2013,  
Jülich, Germany

-“The Importance of Being Balanced”  
Dept. of Psychiatry- University of Cambridge, March 2013,  
Cambridge, United Kindom

-“The Importance of Being Balanced: How to Introduce Spontaneous Inter-Area Correlations Properly”  
Bernstein Center for Computational Neuroscience, July 2013,  
Munich, Germany

- “Linking the Functional and Structural Human Connectome”  
Max-Planck Institute for Human Cognitive and Brain Sciences, January 2014,  
Leipzig, Germany

- “The human connectome: linking structure and function”  
University Medical Center Hamburg-Eppendorf, March 2014,  
Hamburg, Germany

- “Linking the Functional and Structural Human Connectome”  
Neurospin. France, July 2014,  
Paris, France

- “Towards a global model of whole-brain activity: Lessons from the human connectome”  
Max-Planck Institute for Human Development Berlin, September 2015,  
Berlin, Germany
  
- “Large-scale mean field models of resting fluctuations”  
European Institute for Theoretical Neuroscience. February 2016,  
France
  
- “Whole-Brain Models: Lessons from the Human Connectome”  
Institut de Biologie de l'École Normale Supérieure ENS . CNRS. February 2016,  
France
  
- “The effect of deep brain stimulation on brain activity: A computational Perspective  
Applying Computational Modeling to Clinical Neuroscience.”  
The Royal Society. Chicherley Hall. April 2016,  
London, United Kingdom
  
- “Towards Whole Brain Models: New Concepts”  
Centro de Neurociencia, March 2017,  
Alicante, Spain
  
- “Towards causal neuroimaging: whole-brain dynamics and modelling”  
Invited talk Universitaet Klinik Eppendorf, Jun, 2019,  
Hamburg, Germany
  
- “Turbulence-like Dynamics in Human Brain Activity”  
Invited talk Neurosciences Seminar Series School of Behavioural and Brain Sciences The  
University of Texas at Dallas, November, 2020  
Dallas USA
  
- “Awakening: Predicting External Stimulation to Force Transitions Between Different Brain  
States”  
Invited talk Hertie Institute for Clinical Brain Research University of Tuebingen Germany,  
December, 2020  
Tuebingen Germany
  
- “The Turbulent Brain”  
Invited talk University California San Fransisco (UCSF), San Fransisco, USA.  
February, 2021  
USA - United States of America
  
- “Turbulence in the Brain: Discovering the homogeneous isotropic functional core  
organisation of the human brain”  
Invited talk Bernstein Center for Computational Neuroscience Berlin, March, 2021  
Germany
  
- “The Turbulent Brain”  
Invited talk University of Magderburg, May, 2021  
Magderburg, Germany

-“Turbulence Dynamics in the Human Brain”  
Invited talk National Brain Research India, May, 2021  
Manesar, India

-“The Turbulent Brain”  
Invited talk University of Cambridge, UK, July, 2021  
Cambridge, United Kingdom

-“The arrow of time in brain dynamics: non-equilibrium in different brain states”  
Invited talk Monash University, September, 2021  
Melbourne, Australia

-“The Turbulent Brain”  
Invited talk University of Leuven, September, 2021  
Leuven, Belgium

-“The Turbulent Brain”  
Invited talk EUSNN Webinar, October, 2021  
Hamburg, Germany

- “The Turbulent Brain”  
Invited talk Columbia University, Center for Theoretical Neuroscience, November, 2021  
New York, USA

-“Turbulence in Human Brain Dynamics”  
Invited talk Adrian Seminar Series University of Cambridge, Jan, 2022  
Cambridge, United Kingdom

-„The thermodynamics of mind“  
Invite talk Department of Mathematics, Oxford University, 25 May, 2023  
UK - United Kingdom

-„Leonardo and the turbulence of Mind“  
Invited talk Centre for Eudaimonia and Human Flourishing, Oxford, 23 May, 2023  
Oxford, United Kingdom

-„The Thermodynamics of Mind“  
Invited talk University of Barcelona, Mathematical Dept. 11 Apr, 2023  
Barcelona, Spain

“Turbulent dynamics based analysis of brain in health and disease”.  
Invited talk SFB 936 1 Mar, 2023  
Hamburg, Germany

„Complex Harmonics reveal low-dimensional manifolds in critical brain dynamics“  
Seminar Fudan University 10 Sep 2024  
China

## Talks in Conferences:

- "Ultrarelativistic Electron Capture in Ion-Atom Collisions"  
The XIV International Conference on the Physics of Electronic and Atomic Collisions,  
July 1985, Stanford University, USA.
- "Relativistic Effects: CDW Approximations"  
IX International Seminar on Ion-Atom Collisions,  
July 1985, Flagstaff, Northern Arizona University, USA.
- "Mechanical Charge Exchange Processes in Relativistic Atomic Collisions"  
International Seminar on Ion Atom Collisions X,  
July 1987, Bad Soden, Germany.
- "Pair Creation as Intermediate Mechanism of Electron Capture"  
International Seminar on ion Atom Collisions X,  
July 1987, Bad Soden, Germany.
- "Colisiones a Altas Energias con Producción de Pares Electrón-Positrón"  
Encuentro Latinoamericano de Fisica Atómica,  
August 1988, Brasil.
- "Doppelladungsaustausch im Alpha-Helium Stößen im Hoch-Energiebereich"  
X Energiereiche Atomare Stöße Tagung  
January 1989, Mittelberg, Austria.
- "First Order Perturbation Calculations of Ionization in Relativistic Collisions"  
European Conference of Atomic and Molecular Physics  
April 1989, Bordeaux, France.
- "Pair Production in Relativistic Atomic Collisions"  
XVI International Conference on Physics of Electronic and Atomic Collisions,  
July 1989, New York, USA.
- "Elimination of Overtraining by a Mutual Information Network"  
International Conference on Artificial Neural Network  
September 1993, Amsterdam, Netherland.
- "Handwritten Digit Recognition with PCA and RBF"  
International Joint Conference on Neural Networks  
October 1993, Nagoya, Japan.
- "Self-Organization in Stochastic Neural Networks"  
International Joint Conference on Neural Networks  
October 1993, Nagoya, Japan.
- "A Stochastic Network with Rotor Neurons"  
International Joint Conference on Neural Networks  
October 1993, Nagoya, Japan.

- "Lernen von Dynamischen Invarianten von Chaotischen Reihen mit Neuronalen Netzen"  
3. Jahrestagung: Chaos und Strukturbildung,  
November 1993, München, Germany.
  
- "Principal Component Analysis: A Factorial Learning Approach"  
International Conference on Artificial Neural Networks  
May 1994, Sorrento, Italy.
  
- "Inherent Information Flow in Chaos",  
Dynamics and Control of Physical Systems,  
May 1995, Cortona, Italy.
  
- "Statistical Features Extraction"  
Dynamics and Control of Physical Systems,  
May 1995, Cortona, Italy.
  
- "Information Flow in Chaotic Systems"  
International Conference on Complexity and Self-Organization,  
September 1995, Berlin, Germany.
  
- "Infomax and Redundancy Minimization in Linear and Non-Linear Architectures"  
Interdisciplinary Workshop on Neural Networks,  
October 1995, Würzburg, Germany.
  
- "An Information-Theoretic Approach to Unsupervised Learning"  
Workshop on Information Theory and Coding,  
December 1995, Vail, USA.
  
- "Nonparametric Data Selection for Improvement of Parametric Neural Learning:  
A Cumulant-Surrogates Method"  
International Conference on Artificial Neural Networks,  
July 1996, Bochum, Germany.
  
- "Training Data Selection by Detecting Predictability in Non-Stationary Time Series  
by a Surrogate-Cumulant Based Approach"  
International Workshop on Neural Networks for Identification, Control, Robotics,  
and Signal/Image Processing,  
August 1996, Venedig, Italy.
  
- "Neuronale und informationstheoretische Methoden zur Analyse  
nichtlinearer dynamischer Systeme"  
2. Cottbuser Workshop: Aspekte Neuronalen Lernens,  
October 1996, Cottbus, Germany.
  
- "Testing Nonlinear Markovian Hypotheses in Dynamical Systems"  
Fourth SIAM Conference on Applications of Dynamical Systems  
May 1997, Snowbird, Utah, USA.
  
- "An Information-Theoretic Analysis of Temporal Coding Strategies by Spiking  
Central Neurons"

International Conference on Artificial Neural Networks,  
October 1997, Lausanne, Swiss.

- "Spatio-Temporal Coding in the Cortex"  
Workshop on Neurostatistics and Cell Assemblies,  
December 1997, Breckenridge, USA.

- "Nonlinear Dynamics of the Daily Heart Rhythm"  
Computational Tools and Industrial Applications of Complexity,  
January 1998, Thessaloniki, Greece.

- "A Neuronal Model of Binding and Selective Attention for Visual Search"  
5th Neural Computation and Psychology Workshop,  
Connectionist Models in Cognitive Neuroscience  
September 1998, Birmingham, England.

- "Spatio-Temporal Coding in the Cortex: Information Flow Based Learning in Spiking  
Neural Networks"  
Winterschool: Spiking Neurons and Synaptic Plasticity,  
December 1998, Berlin, Germany.

- "Nonlinear Markovian Dynamics of the Daily Heart Rhythm"  
Workshop: Computational Tools and Industrial Applications of Complexity,  
February 1999, Moskau, Russia.

- "A Neurodynamical Model of Visual Attention: Feedback Enhancement of Spatial  
Resolution"  
Workshop on "Visual Selection Mechanisms",  
December 1999, Breckenridge, USA.

- "Biased Competition Mechanisms for Visual Attention in a Multimodular Neurodynamical  
System"  
Workshop on "Current Computational Architectures Integrating Neural Networks and  
Neuroscience",  
August 2000, Durham, England.

- "A Neurodynamical Model of Visual Attention: Feedback Enhancement of Spatial  
Resolution in a Hierarchical System"  
3. Workshop Dynamische Perzeption  
November 2000, Ulm, Germany.

- "The Neurodynamics of Spatial and Object Attention"  
International Workshop on "The Mathematical, Computational and Biological Study of  
Vision"  
November 2001, Oberwolfach, Germany.

- "Neurodynamical Mechanisms Underlying Visual Attention"  
II. Sino-German Advanced Workshop in Cognitive neuroscience and Psychology,  
April 2002, Munich, Germany.



- "A Neurodynamical Theory of Visual Attention: Comparisons with fMRI- and Single-Neuron Data"  
International Conference on Artificial Neural Networks,  
August 2002, Madrid, Spain.
- "Neurodynamical Modeling of Visual Cognition: Attention and Working Memory"  
Workshop on System Level Modeling,  
November 2002, Columbus (Ohio), USA.
- "Neurodynamische Mechanismen der visuellen Kognition: Aufmerksamkeit und Arbeitsgedächtnis",  
TWK 2003, 6<sup>th</sup> Perception Conference at Tübingen,  
February 2003, Tübingen, Germany.
- "The Neurodynamics of Visual Search",  
Munich Visual Search Symposium,  
June 2003, Holzhausen am Ammersee, Germany.
- "The Role of Attention in Visual Perception: A Computational Neuroscience Model"  
The 16th International Conference on Vision Interface,  
June 2003, Halifax, Canada.
- "Integrating fMRI and Single-Cell Data of Visual Working Memory"  
CNS 2003, The Annual Computational Neuroscience Meeting,  
July 2003, Alicante, Spain.
- "The Role of Attention in Vision and Action"  
Reinforcement Learning: Dopamine, Attention and Computational Models  
April 2004, Amsterdam, The Netherlands.
- "Neurodynamical Competition and Cooperation in Cortical Networks"  
New Perspectives on Visual Cortex  
April 2004, Tobermory, Isle of Mull, United Kingdom.
- "Learning to Attend Relevant Features in a Categorization Task"  
II Workshop on Concepts and Category  
June 2004, Barcelona, Spain.
- "The Computational Neuroscience of Visual Cognition: Attention, Memory and Reward",  
Plenary Talk, in 2<sup>nd</sup> International Workshop on Attention and Performance in Computational  
Vision, by the Eighth European Conference on Computer Vision  
May 2004, Prague, Czech Republic.
- "Neural and Synaptic Dynamics Underlying Cross-modal and Cross-temporal Firing Rate  
Activity in Association Cells of the Prefrontal Cortex"  
Fifth Meeting of the International Multisensory Research Forum  
June 2004, Sitges, Spain.
- "Spiking and Synaptic Mechanisms Underlying Biased Competition and Cooperation in  
Attention"

Fourth Forum of European Neuroscience  
July 2004, Lisbon, Portugal.

- "Neurodynamical Competition and Cooperation in Cortical Networks: From Spiking Neurons to Behaviour"

International Workshop on Object Recognition, Attention and Action  
August 2004, Kyoto, Japan.

- "Computational Vision"

European Summer School: "Visual Neuroscience: From Spikes to Awareness"  
September 2004, Schloss Rauischholzhausen, Germany.

- "The Spiking and Synaptic Basis of fMRI-Signal in the Prefrontal Cortex Associated with Cognitive Flexibility"

Brain Functioning: Advances in Magnetic Resonance Imaging  
November 2004, Barcelona, Spain.

- "Neurodynamical Mechanisms Underlying Brain Functions"

Knowledge Exploration in Life Science Informatics,  
November 2004, Milano, Italy.

- "Dinámica Neuronal, Sináptica y Cortical en Percepción y Cognición Visual"

Imagen y Vision  
April 2005, Santiago de Compostela, Spain.

- "A Computational Neuroscience Approach to Visual Cognition"

First Iberian Congress on Perception,  
July 2005, Barcelona, Spain.

- "A Computational Neuroscience Approach to Visual Cognition"

International Workshop on Bioinspired Information Processing: Cognitive Modeling and Gaze-Based Communication,  
September 2005, Lübeck, Germany.

- "The Role of Fluctuations in Decision-Making"

Second Cajal Winter Conference, Cerebral Cortex: From Development to Cognition  
March 2006, Benasque, Spain.

- "A Neurophysiological Model of Decision-Making and Weber's Law"

Experimental Psychology Society, Birmingham Meeting,  
April 2006, Birmingham, United Kingdom.

- "Competition and Cooperation Mechanisms in Neural and Cortical Dynamics: Attention, Memory and Decision-Making"

Fifth Brain Connectivity Workshop  
May 2006, Sendai, Japan.

- "Fluctuation-driven Neurodynamics: A model of Decision-Making"

Workshop on "Information Theory, Neurobiology and Cognition"  
Max-Planck Institute for Mathematics in the Sciences

July 2006, Leipzig, Germany.

- "The Neurodynamics of Visual Search"

50 Años de la Inteligencia Artificial, XVI Escuela de Verano de Informatica, EVI-2006  
July 2006, Alabacete, Spain.

- "The Role of Statistical Fluctuations in Probabilistic Decision-Making"

NEUROMATH 06, Conference on Mathematical Neuroscience  
August 2006, Andorra.

- "Theoretical Neuroscience"

First Summer School on "Theoretical Neuroscience and Complex Systems"  
FIAS: Frankfurt Institute for Advanced Studies  
August 2006, Frankfurt, Germany.

- "Computational and Theoretical Neuroscience"

European Summer School: "Visual Neuroscience: From Spikes to Awareness"  
September 2006, Schloss Rauischholzhausen, Germany.

- "A Neurophysiological Model of Decision-Making: The Role of Fluctuations in Neurodynamics"

9th Granada Seminar on Computational and Statistical Physics  
September 2006, Granada, Spain.

- "Neurodynamical Competition and Cooperation in Cortical Networks: From Spiking Neurons to Behavior"

Deutsche Gesellschaft für Psychiatrie, Psychotherapie und Nervenheilkunde  
DGPPN Kongress  
November 2006, Berlin, Germany.

- "A Computational Model of Schizophrenic Symptoms in Attractor Networks"

Deutsche Gesellschaft für Psychiatrie, Psychotherapie und Nervenheilkunde  
DGPPN Kongress  
November 2006, Berlin, Germany.

- "Competition and Cooperation Cortical Mechanisms in Cognition"

First GOSPEL Workshop on Bioinspired Signal Processing  
January 2007, Barcelona, Spain.

- "Neurodynamical Mechanisms Underlying Visual Cognition"

Honda International Workshop: "Creating Brain-Like Intelligence"  
February 2007, Frankfurt, Germany.

- "Weber's Law in Decision-Making: Integrating Behavioral Data in Humans with a Neurophysiological Model"

International BBSRC-Workshop: Closing the Gap Between Neurophysiology and Behavior: A Computational Modelling Approach, University of Birmingham.  
July 2007, Birmingham, United Kingdom.

- "Neurodynamical Mechanisms Underlying Decision-Making"

Nolineal 2007.

June 2007, Ciudad Real, Spain.

- "The Cortical Dynamics Underlying Decision-Making: From Neurons to Behaviour"  
Plenary Talk at the International Conference on Artificial Neural Networks, ICANN 2007. September 2007, Porto, Portugal.

- "Neural and Computational Mechanisms Underlying Decision-Making"  
Symposium 11, XII Congreso Sociedad Española de Neurociencia, SENC 2007.  
September 2007, Valencia, Spain.

- "Neurodynamical Mechanisms Underlying Decision-Making: The Role of Statistical Fluctuations"  
XX Congreso de Ecuaciones Diferenciales y Aplicaciones, CEDYA 2007.  
September 2007, Sevilla, Spain.

- "Neural and Computational Mechanisms Underlying Decision-Making "  
Autumn School in Cognitive Neuroscience, University of Oxford.  
September 2007, Oxford, United Kingdom.

- "Zur Bedeutung der "Computational Neuroscience" für die Psychiatrie-Konzepte, Methoden, Modelle"  
Symposium XIV : Computational Neuropsychiatry (Orgs. F. Tretter/G. Winterer), AGNP: Arbeitsgemeinschaft für Neuropsychopharmakologie und Pharmacopsychiatrie.  
October 2007, Munich, Germany.

- "Stochastic Neurodynamics as a Basic Mechanism for Perception"  
Plenary Talk at Coherent Behavior in Neural Networks.  
October 2007 Mallorca, Spain.

- "Neurocomputational Models of Neurocommunication"  
The Marie Curie School in Neuroscience:  
Large-Scale Interactions in Brain Networks and  
Their Breakdown in Brain Diseases.  
March 2008, Santo Stefano di Sessanio, Italy.

- "The Neurodynamics of Decision Making"  
Nolineal 2008.  
June 2008, Ciudad Real, Spain.

- "The Neural Basis of Attention: Rate vs. Synchronization Modulation"  
Symposium "Neural Correlates of Spatial and Feature-based Attention."  
International Graduate School of Neuroscience.  
Ruhr-Universität Bochum.  
June 2008, Bochum, Germany.

- "Models in Cognitive Neuroscience"  
Educational Courses, Human Brain Mapping.  
June 2008, Melbourne, Australia.

- "Cortical Dynamics at Rest: The Role of Fluctuations and Delays"  
Brain Connectivity Workshop.  
June 2008, Sidney, Australia.
  
- "Computational Neuroscience"  
European Summer School: "Visual Neuroscience: From Spikes to Awareness"  
September 2008, Schloss Rauischholzhausen, Germany.
  
- "Computational Neuropsychiatry: Neuronal Fluctuations, Dynamics and Schizophrenia"  
ESF Workshop on Computational Disease Modeling.  
September 2008, Barcelona, Spain.
  
- "Computational Modeling"  
PENS WICN Summer School Programme.  
September 2008, Bangor, United Kingdom.
  
- "The Intrinsic Properties of the Brain: The Role of Fluctuations During Rest"  
Conference française de Neurosciences Computationnelles.  
October 2008, Marseille, France.
  
- "Stochastic Dynamics a Principle of Perception"  
3<sup>rd</sup> Toyota CRDL Workshop: Mathematical Methods in Complex Systems.  
October 2008, Gemenos, France.
  
- "Integrating Behavioral Data in Humans with a Neurophysiological Model"  
Deutsche Gesellschaft für Psychiatrie, Psychotherapie und  
Nervenheilkunde (DGPPN) Kongress.  
November 2008, Berlin, Germany.
  
- "The Intrinsic Properties of the Brain: The Role of Fluctuations During Rest"  
Resting State Workshop.  
December 2008, Magdeburg, Germany.
  
- "Stochastic Dynamics as a Principle of Perception and Decision Making"  
Plenary Lecture at Neuro-Mechanics, Dynamics and Decision Making.  
The James H. Belfer Memorial Symposium Series, Technion.  
February 2009, Haifa, Israel.
  
- "The Neurodynamics of Attention, Memory, and Decision Making "  
Advanced Course at the Workshop on Deterministic and Stochastic Modeling in  
Computational Neuroscience and Other Biological Topics, Centre de Recerca Matemàtica.  
May 2009, Barcelona, Spain.
  
- "Stochastic Dynamics as a Principle of Brain Function"  
Cognition Workshop at the 31<sup>st</sup> Annual Meeting of the Cognitive Science Society.  
July 2009, Amsterdam, The Netherlands.
  
- "The Computational Neuroscience of Attention, Memory, and Decision Making"  
Plenary Lecture at the Summer Program 2009, RIKEN Brain Science Institute.  
July 2009, Tokyo, Japan.

- "Large- Scale Architecture of Visual Perception"  
Computational Vision Course (European Training Workshop CODDE)  
September 2009, Schloss Rauischholzhausen, Germany.
- "The Neurodynamical Basis of Attention "  
Autumn School in Cognitive Neuroscience, University of Oxford.  
September 2009, Oxford, United Kingdom.
- "The Intrinsic Properties of the Brain: Resting State"  
Symposium II, XIII Congreso Sociedad Española de Neurociencia.  
September 2009, Tarragona, Spain.
- "Neurobiological Basis of Attention"  
4th Computational Cognitive Neuroscience Conference,  
November 2009 Boston, USA.
- "Cortical Models of Brain Dynamics"  
"Macroscopic Aspects of Neuronal Activity: VSD, LFP, and Macroscopic Models",  
December 2009, Marseille, France.
- "A Computational Neuroscience Approach to Attention, Memory, and Decision-Making"  
Plenary Lecture at the 3<sup>rd</sup> Mediterranean Conference of Neuroscience,  
December 2009, Alexandria, Egypt
- "The Intrinsic Properties of the Brain: Resting State"  
VI Reunion de la Red Tematica de Neurociencia Cognitiva.  
July 2010, Murcia, Spain.
- "Models in Cognitive Neuroscience"  
Human Brain Mapping Educational Course:  
Dynamics Models in System Neuroscience  
June 2010, Barcelona, Spain.
- "Decision-Making and Synaptic Dynamics"  
International Workshop: Working memory in Rehovot,  
March 2010, Rehovot, Israel.
- "Theoretical Studies of Resting State Activity in the Brain"  
Workshop on Default Mode network and Resting State, Sant Boi de Llobregat,  
June 2010, Barcelona, Spain.
- "Modelling the Role of Local Oscillations in Resting Brain Correlations"  
Brain Connectivity Workshop 2010,  
June 2010, Berlin, Germany.
- "A Neurocomputational Framework for Understanding the Dynamics and Consequences of Ongoing Activity"  
7<sup>th</sup> FENS: Forum of European Neuroscience,

July 2010, Amsterdam, The Netherlands.

- "Local Fast Oscillations Can Lead to Slow Brain-Wide Neural Activity Correlations During Rest",  
Second Biennial International Conference on Resting-State Functional Brain Connectivity,  
September 2010, Milwaukee, USA.

- "The Intrinsic Properties of the Brain: The Resting State"  
Invited lecture at the Bernstein Center Computational Neuroscience Retreat,  
October 2010, Heidelberg, Germany.

- "Ongoing Brain Activity During Rest"  
Invited lecture at the Symposium on Working Memory and Decision Making,  
Université Paris-Descartes  
March 2011, Paris, France.

- "Ongoing Brain Activity During Rest: The Global Attractor Structure of the Brain"  
Invited keynote lecture at the Computational Neuroscience and Neurotechnology Bernstein  
Conference and Neurex Annual Meeting,  
October 2011, Freiburg, Germany.

- "Neuronal and Synaptic Mechanisms Underlying Attention"  
Invited lecture at the Summer School: Mechanisms of Attention: From Experimental Studies  
to Technical Systems Conference and Neurex Annual Meeting,  
October 2011, Bielefeld, Germany.

- "Ongoing Neuronal Mechanisms Underlying Attention: Firing Rates, Oscillations, and  
Neuropharmacology"  
Invited lecture at the Rovereto Attention Workshop: Attention and Objects,  
October 2011, Rovereto, Italy.

- "Ongoing Brain Activity During Rest: The Global Attractor Structure of the Brain"  
Invited lecture at the Workshop on Mathematical Models of Cognitive Architectures,  
December 2011, Marseille, France.

- "Ongoing Brain Activity During Rest: The Global Attractor Structure of the Brain"  
Invited lecture at the International Opening Symposium Multi-Site Communication in the  
Brain, University medical Center Hamburg-Eppendorf,  
December 2011, Hamburg, Germany.

- "New Approaches for Brain Networks Modelling"  
Invited lecture at the Symposium "Complex Systems and Brain Networks" Hanse-  
Wissenschaftskolleg Institute of Advanced Studies,  
September, 2012, Delmenhorst, Germany.

- "The Resting Brain Never Rests: Structure and Dynamics of the Brain"  
Keynote Speaker at the Annual Seminar of Computational Science Research Programme  
Academy of Finland,  
November 2012, Helsinki, Finland

- “The Importance of Being Balanced”  
Oral communication at the ESF Exploratory Workshop: Noise in Decision-Making: Theory Meets Experiments,  
May 2012, Sant Fruitós de Bages, Spain
  
- "Computational and Theoretical Neuroscience"  
European Summer School: “Visual Neuroscience: From Spikes to Awareness”  
September 2012, Schloss Rauischholzhausen, Germany.
  
- "Global Brain Structure and Dynamics: The Resting State"  
IBRO FENS Winter School  
November 2012, Oetztal, Austria.
  
- “The Importance of Being Balanced”  
Invited talk at the Brain Connectivity Workshop,  
June 2013, Vancouver, Canada
  
- “The dynamical structure of brain fluctuations at rest”  
Oral communication at the Organization for the Human Brain Mapping 2013  
June 2013, Seattle, United States
  
- “The link between Structure and Dynamics in Whole Brain Models”  
Invited talk at the Workshop: Metastable Dynamics of Neural Ensembles. CNS 2013 Paris  
July 2013, Paris, France
  
- “The importance of being balanced”  
Invited talk at the Workshop: Advances in neural mass modeling. CNS 2013 Paris.  
July 2013, Paris, France
  
- “How to model resting and task whole brain activity in a unifying framework?”  
Invited talk at the Workshop: Full Brain Network Dynamics. CNS 2013 Paris.  
July 2013, Paris, France
  
- “Attractor Networks and the Dynamics of Visual Perception”  
Bernstein Tutorials Computational Neuroscience meets Visual Perception  
36<sup>th</sup> European Conference on Visual Perception  
August 2013, Bremen, Germany
  
- “The Computational Neuroscience of Resting State”  
Invited Lecture at the Berlin Computational Neuroscience Retreat  
August 2013, Berlin, Germany
  
- “Theory of network spikes in vitro and in vivo”  
Oral communication. CORONET (EU Project) Review Meeting in Rome.  
September 2013, Rome, Italy
  
- “The link between Structure and Function in the Brain: The Resting State”  
Keynote speaker. European Conference on Complex Systems.  
September 2013, Barcelona, Spain



- “The Resting State of the Brain: The Importance of Being Balanced”  
Invited talk. Workshop CONSOLIDER: Cognitive Neuroscience and Bilingualism.  
September 2013, Barcelona, Spain
  
- “Modeling Cognitive Architectures”  
Invited talk. Foundation of the European Institute of Theoretical Neuroscience.  
February 2014, Paris, France
  
- “Linking structure and function: the role of modelling in understanding the pathophysiology”.  
Invited talk. European Congress of Radiology.  
March 2014, Vienna, Austria
  
- “Linking the Structural and Functional Human Connectome”  
Keynote speaker. ABS Physiological Methods Workshop.  
April 2014, Leuven, Belgium
  
- “Temporal aspects of resting state”  
Oral communication. HBP Workshop on Large-Scale and Cognitive Models.  
June 2014, Paris, France
  
- “The structural and functional human connectome”  
Invited talk. ESI Systems Neuroscience Conference (ESI-SyNC).  
July 2014, Frankfurt, Germany
  
- “The Computational Neuroscience of a Resting Brain”  
Invited talk. Computational and Cognitive Neuroscience Summer School.  
July 2014, Shanghai, China
  
- “Integration and Segregation in the Brain”  
Invited talk. Bernstein Conference 2014.  
September 2014, Goettingen, Germany
  
- “Linking the Structural and Functional Human Connectome”  
Keynote speaker. UCL-Max Planck Meeting on Computational Psychiatry.  
September 2014, Munich, Germany
  
- “Linking the structural and functional human connectome”  
Invited talk. Magnetic Resonance Imaging in Attention Research.  
September 2014, Magdeburg, Germany
  
- “Temporal Aspects of Spontaneous Brain Activity”  
Keynote speaker. Bernstein Center for Computational Neuroscience Retreat.  
September 2014, Pforzheim, Germany
  
- “Linking the Structural and Functional Human Connectome”  
Invited talk. 4th Frontiers in Neuromorphic Computing.  
October 2014, Heidelberg, Germany
  
- “Missing interactions at the functional level: The role of oscillations in global brain activity”

Invited talk. Workshop: Missing Interaction terms in spike-based computations - European Institute for Theoretical Neuroscience.  
October 2014, Paris, France

-“Plasticity in the functional and structural human connectome”  
Invited talk. Workshop: The Adaptive Brain, Pleasure and Plasticity.  
October 2014, Munich, Germany

-“Resting State: Experiments and Modelling”  
Invited talk. CCNi Debate: Spontaneous Brain Activity – Spook or Spirit?  
University of Glasgow.  
March 2015, Glasgow, United Kingdom

-“The Computational Neuroscience of Resting Brains”  
Invited talk. INCF Training Course on Information Processing in Neural Systems  
University of Osnabrueck.  
May 2015, Osnabrueck, Germany

-“Integration and Segregation of Information in the Brain”  
Invited talk. B-Debate: A Dialogue with the Cerebral Cortex: Cortical Function and Interfacing  
May 2015, Barcelona, Spain

-“The Dynamics of Resting Fluctuations in the Brain”  
Keynote. Computational Neuroscience Conference CNS 2015  
July 2015, Prague, Czech Republic

-“ Towards a global model of whole-brain activity: Lessons from the human connectome”  
Keynote. SENC (XVI National Congress of the Spanish Society of Neuroscience)  
September 2015, Granada, Spain

-“The Human Connectome: Towards Whole-Brain Modeling”  
Invited talk. B-Debate: A Brain Health: From Genes to Behavior Improving our Life  
October 2015, Barcelona, Spain

-“A Network Approach for Characterizing Different Brain States”  
Invited talk. International Symposium Frontiers in Network Science, Academy of Sciences and Humanities  
June 2016, Hamburg, Germany.

-“Can we simulate the brain?”  
Keynote speaker ESOF Workshop Manchester 2016  
July 2016, Manchester, United Kingdom

-“Towards Neuronal Principles: The dynamical complexities underlying different brain states”  
Invited talk. Workshop: How the brain works?, Carlsberg Academy  
September, 2016 Copenhagen. Denmark

-“The dynamical complexities underlying different brain states”

Invited talk. Resting State Brain Connectivity 2016.  
September 2016 Vienna, Austria

-“Tracking states of vigilance and consciousness with dynamic functional connectivity  
Resting State Brain Connectivity”  
Invited talk. Satellite Symposia: Dynamic Functional Connectivity.  
September, 2016 Austria

-“Towards a Whole Brain Model: Lessons from the Human Connectome”  
Keynote speaker. Child and Brain Development (Organized by the CIFAR).  
October 2016, Boston, USA

-“Towards a Whole Brain Model: Lessons from the Human Connectome”  
Invited talk. Brain Modes 2016 - The Royal Flemish Academy of Science.  
December, 2016, Brussels, Belgium

-“Towards a Global Model of Brain Activity: How to Identify Brain States?”  
Keynote speaker. Monash University, MICCN Computational Neuroscience Symposium  
2017  
February 2017, Melbourne, Australia

-“Novel Concept of Intrinsic Ignition Characterises the Broadness of Communication  
Underlying Different Brain States”  
Keynote speaker. 37th European Winter Conference on Brain Research  
March, 2017. Les Arcs 1800, France

- “Whole-brain models: Identifying brain states”  
Invited Talk. The 6th International Conference on Cognitive Neurodynamics  
4 August, 2017. Seville, Spain

- “Whole Brain Modeling and Connectomics: The Role of the Underlying Oscillations”  
Invited talk. Gamma Oscillations Workshop  
11 September, 2017. St Edmund Hall, Oxford, UK

- “The Incoherence of Incoherence”  
Keynote speaker. System Neuroscience Symposium  
October, 2017 Tuebingen, Germany

-“Theoretical and Computational Neuroscience: Whole-Brain Dynamics and Modelling”  
Invited talk. Workshop on Collaborative Research in Computational Neuroscience (USA  
Spain) NIH, NSF, Spanish Ministry  
15 February, 2018 Spain

-“Brain Songs: discovering the relevant timescale of the human brain”  
Invited talk. Analysis and Modeling of Complex Oscillatory Systems (AMCOS) Conference  
20 March, 2018 Barcelona, Spain

-“Whole Brain Dynamics and Modelling”  
Invited talk. Brainhack Global 2018  
4 May, 2018 Spain

-“Towards Causal Neuroimaging: Whole Brain Dynamics and Modeling  
Keynote speaker. Organization for Human Brain Mapping  
19 June, 2018 Singapore

-“Computational Models of Stroke”  
Invited talk Workshop on Stroke from the Human Brain Project,  
10 September, 2018 Florence, Italy

-“Overview of Ignition approaches and modeling in epilepsy”  
Invited talk Workshop and Scientific Retreat of the Sinergia Project (Swiss Project),  
12 September, 2018 Commeire, Switzerland

-“Stimulation Driven Transitions Between Different Brain States: A Probabilistic State  
Space Framework”  
Keynote Speaker. 2nd International Workshop on Connectomics in NeuroImaging (CNI)  
CNI'18: A MICCAI 2018 Workshop  
20 September, 2018 Spain

-“Brain Songs: Discovering the relevant timescale and richness of repertoire of the human  
brain”  
Keynote speaker. NeuroEng 2018, the 11th Australasian Workshop on Neuro-Engineering  
and Computational Neuroscience  
27 Nov, 2018, Australia

-“Brain Songs: Discovering the relevant timescale and richness of repertoire of the human  
brain”  
Invited talk / Symposium. How tools and models resolve the neuronal networks in the  
mammalian brain: Six years of collaborative research  
6 Jun, 2019, Hamburg Germany

-“Awakening: Predicting external stimulation to force transitions between different brain  
states  
Invited talk Mystery of the Brain Science's Ultimate Frontier Symposium in Honor Prof. Dr.  
Nikos Logothetis  
16 Sep, 2019 Germany

-“The Next Brain”  
Invited talk: The Bankinter Innovation Foundation XXXIII Future Trends. Forum in Madrid  
12 Nov, 2019 Madrid

-“Turbulence in Human Brain Dynamics”  
Invited Talk The Interdisciplinary Forum on Brain-Mind Forefronts-University of Shanghai  
22 Sep 2020 Shanghai China

-“The Turbulent Brain: Discovering the homogeneous isotropic functional core organization  
of the human brain”  
Invited Talk Bernstein Conference 2020, Workshop: Crossing scales: understanding  
collective neural activity  
29 Sep, 2020 Juelich Germany

-“Turbulence in Human Brain Dynamics”

Invited Talk Brain Criticality

7 Oct, 2020 Bethesda, USA

-“Awakening – promoting transitions between different brain states in a probabilistic state space framework”

Invited talk 7th International Conference on Non-invasive Brain Stimulation 64th Annual Meeting of the German Society for Clinical Neurophysiology and Functional Imaging (DGKN) 4th European Conference of Brain Stimulation in Psychiatry

Nov, 2020 Germany

-“Turbulent-like Dynamics in the Human Brain”

Invited talk Brain Connectivity Workshop 2021

May, 2021 Toronto, Canada

-“Resting-state brain turbulence in major depressive disorder vs healthy controls”

Invited talk NeuroPharm Annual Meeting,

June, 2021 Denmark, Copenhagen

-“The arrow of time in brain dynamics: non-equilibrium in different brain states”

Invited Talk Workshop on Dynamic properties of brain states and their transitions

Computational Neuroscience CNS2021

July 2021

-“Functional and effective connectivity - useful concepts for network neuroscience?”

Invited talk Generative anatomically-constrained connectivity and effective connectivity Workshop

August, 2021 Hamburg Germany

-“Turbulence in the Human Brain Dynamics”

Invited talk Dynamics Days Europe 2021

August, 2021 Nice, France

-“The Turbulent Brain”

Keynote speaker The 6th International Congress on Complex Systems in Sport

(<https://www.iccss2020.com/>)

September, 2021 Germany

-“The Turbulent Brain: A new Framework for Whole-brain Dynamics”

Keynote speaker Psychonomic Society Annual Meeting: Society of Computational Psychology

Nov, 2021

-“Thermodynamics of Mind”

Keynote speaker First International Conference on "Brain Dynamics and Consciousness", 20 Apr, 2022 Jaen, Spain.

-“The arrow of time in brain signals: assessing causality.”

Workshop: In2PrimateBrains Università degli Studi di Roma La Sapienza Roma, Italy

4 May, 2022 Italy

-“The Thermodynamics of Mind”

Workshop Project Galvani (Organized by Neuroelectronics, and Marseille University)

6 May, 2022 Barcelona Spain

-“Generative modeling of brain functions using turbulence”

Organization Human Brain Mapping OHBM 2022 Glasgow

19 Jun, 2022 Glasgow Scotland

-“The Thermodynamics of Mind”

Keynote speaker Summer School ABC Amsterdam Brain and Cognition (ABC)

1 Jul, 2022 Amsterdam The Netherlands

-“Towards Causal Neuroimaging: Whole-Brain dynamics and models”

Keynote speaker Microstates Conference,

1 Sep, 2022 Bern Switzerland

-“The Thermodynamics of Mind”

BrainComp22, Cetraro, Italy

19 Sep, 2022 Italy

-“The Thermodynamics of Mind”

Keynote speaker Mathematics of The Interactions Between Brain Structure and Brain Functions, MATRIX Workshop at the University of Melbourne, Australia

Nov, 2022 Australia

-“The Thermodynamics of Mind”

Brain Modes 2022, Viña del Mar, Chile

19 Nov 2022 Chile

-“Progress in Whole-Brain Dynamics”

Keynote speaker Royal Academy of Science and Arts, Barcelona

04 Oct 2023, Spain

-“Thermodynamics of Mind”

Nat Conference - The language of neurons Museo de Ciencias Naturales, Barcelona

15 Sep 2023 Spain

-“The Thermodynamics of Mind”

Keynote speaker 33rd Annual Meeting of the Japanese Neural Network Society Japan

05 Sep 2023, Japan

-“The Thermodynamics of Mind”

Keynote speaker INTERPRETABLE BRAIN DATA WORKSHOP, STOCKHOLM,

08 Jun 2023, Sweden

-“Progress in Whole-Brain Dynamics and Modeling”

Human Brain Project Summit Marseille

28 Mar 2023, France

-“The Thermodynamics of Mind”

2nd Keynote speaker Brain and Mind Conference Hospital DSt Joan de Deu Barcelona  
17 Mar 2023, Spain

-“The Thermodynamics of Mind”

Keynote speaker Annual conference of the German Society for Clinical Neurophysiology  
and Functional Imaging University Clinic Eppendorf, Hamburg  
02 Mar 2023, Germany

-“Turbulent dynamics based analysis of brain in health and disease”

SFB 936 & euSNN symposium on “Role of neural oscillations in the healthy and  
diseased brain”. Hamburg,  
01 Mar 2023 Germany

-“Complex harmonics reveal low-dimensional manifolds of critical brain dynamics”

The role of artificial intelligence in diagnostic imaging  
23 Oct 2024 Italy

-“Revealing fundamental dynamic network scaffolding for cognition”

Keynote speaker  
18 June 2024, Germany

-“Whole-brain Dynamics, modelling, and the thermodynamics of mind”

Keynote speaker FENS (Federation of European Neuroscience Societies). Satellite  
workshop on “Too complex to understand? Bridging neuroscience and philosophy to  
build new tools to study the brain”. University of Vienna  
June 2024, Austria

-“The thermodynamics of mind”

Summer School International Center for Primate Research  
09-15 Sep 2024, China

## Patents:

- 1) 1995P02051 DE "Lernverfahren und Anordnung zur Nachbildung eines dynamischen Prozesses", G. Deco and J. Storck  
conceded in: Germany, USA
- 2) 1996P01205 DE "Verfahren zur Klassifikation einer Zeitreihe, die eine vorgebbare Anzahl von Abtastwerten aufweist, insbesondere eines elektrischen Signals, durch einen Rechner", G. Deco und B. Schürmann  
conceded in: Germany, France and England
- 3) 1996P01207 DE "Verfahren zur Klassifikation einer Zeitreihe, die eine vorgebbare Anzahl von Abtastwerten aufweist, insbesondere eines elektrischen Signals, durch einen Rechner", G. Deco and B. Schürmann  
conceded in: Germany, USA
- 4) 1996P01246 DE "Verfahren zur Klassifikation einer Zeitreihe, die eine vorgebbare Anzahl von Abtastwerten aufweist, beispielsweise eines elektrischen Signals, durch einen Rechner und Verwendung des Verfahrens ", G. Deco and B. Schürmann  
conceded in: Germany, USA
- 5) 1996P01608 DE "Verfahren zur Klassifikation einer Zeitreihe, die eine vorgebbare Anzahl von Abtastwerten aufweist, beispielsweise eines elektrischen Signals, durch einen Rechner", G. Deco and C. Schittenkopf  
conceded in: Germany, USA
- 6) 1996P01855 DE "Rechnergestütztes Verfahren zur Auswahl von Trainingsdaten für ein neuronales Netz", G. Deco, D. Obradovic and B. Schürmann  
conceded in: Germany, France, England
- 7) 1996P02453 DE "Verfahren zur Klassifikation der statistischen Abhängigkeit einer ersten Zeitreihe, die eine vorgebbare Anzahl von Abtastwerten, insbesondere eines elektrischen Signals, aufweist, durch einen Rechner", G. Deco and C. Schittenkopf  
conceded in: Germany, Netherlands, England  
pending in: Japan, USA.
- 8) 1997P01352 DE "Verfahren zur rechnergestützten Extraktion statistisch unabhängiger digitaler Signale aus digitalen Eingangssignalen", G. Deco and D. Obradovic  
conceded in: Germany, Netherlands, England, Finnland, Japan, USA
- 9) 1997P08002 DE "Verfahren zur Detektion von Synchronizität zwischen mehreren digitalen Messreihen mit Hilfe eines Rechners", G. Deco and L. Martignon  
conceded in: Germany, Netherlands, England, Austria, Israel, Japan, USA



- 10) 1997P08003 DE "Zur Detektion von Synchronizität zwischen mehreren digitalen Messreihen mit Hilfe eines Rechners", G. Deco and L. Martignon  
conceded in: Germany, Netherlands, England, Austria, Israel, Japan, USA.
- 11) 1997P08119 DE "Verfahren und Vorrichtung zur Klassifikation einer ersten Zeitreihe und einer zweiten Zeitreihe", G. Deco and C. Schittenkopf and R. Silipo  
conceded in: Germany
- 12) 1997P08121 DE "Anordnung zur Vorhersage einer Abnormalität eines Systems und zur Durchführung einer der Abnormalität entgegenwirkenden Aktion", G. Deco and L. Dubé  
conceded in: Germany, France, England, Italy, USA.
- 13) 1998P02394 DE "Verfahren zum Trainieren eines neuronalen Netzes, Verfahren zur Klassifikation einer Folge von Eingangsgrößen unter Verwendung eines neuronalen Netzes, neuronales Netz und Anordnung zum Trainieren eines neuronalen Netzes", G. Deco and B. Schürmann  
conceded in: Germany, France, England, Austria, Belgien, USA
- 14) 1999P01906 DE "Mustersuche", G. Deco and B. Schürmann  
conceded in: Germany, France, England, Austria, Italy, Netherlands, Japan, USA.
- 15) 1999P01907 DE "Mustersuche", G. Deco and B. Schürmann  
conceded in: Germany, France, England, Austria, Italy, Netherlands, Japan, USA.
- 16) 1999P01908 DE "Mustererkennung", G. Deco and B. Schürmann  
conceded in: Germany, France, England, Austria, Italy, Netherlands, Japan, USA.
- 17) 2001P09039 DE "Diskriminierung kontinuierlicher und multivariater Signale mit einem Netzwerk von pulsgekoppelten Oszillatoren", G. Deco and J. Storck  
Patent pending.
- 18) GR 99E2492 DE "Rekurrente Netze zur Klassifizierung dynamischer Signale", G. Deco and B. Schürmann  
Patent pending.
- 19) 2001P14962 DE "Gabor-rekurrente Netze zur effizienten Bildkodierung", G. Deco and B. Schürmann  
Patent pending.
- 20) 2000P19382 DE "Neurodynamisches System aus gepulsten Oszillatoren zur Aufmerksamkeitsgetriebenen Suche von Objekten", G. Deco and S. Corchs  
pending in: Germany.
- 21) GR 99E6770 DE "Multimodulares neurodynamisches System zur intelligenten, aufmerksamkeitsgesteuerten visuellen Suche", G. Deco and B. Schürmann

- pending in: Germany, France, England, Austria, Italy, Netherlands, Japan, USA.
- 22) 2001P09068 DE "Netzwerke aus gepulsten Neuronen mit dynamischen Synapsen zur Klassifizierung der Verkehrsdynamik in Rechnernetzen", G. Deco, J. Storck and B. Schürmann  
Patent pending.
  - 23) 2000P01870 DE "Neurokognitives System zur visuellen Objekterkennung", G. Deco and B. Schürmann  
Patent pending.
  - 24) 2000E14212 DE "Thought-Mouse", C. Hoffmann, J. Storck, G. Deco and B. Schürmann  
Patent pending.
  - 25) 2000E16468 DE "Sprachsignalfilterung durch eine rekurrente aufmerksamkeitsbasierte Independent Component Analysis Prozedur", G. Deco and B. Schürmann  
pending in: Germany, France, England, Austria, Italy, Netherlands, Japan, USA.
  - 26) 2001P14963 DE "IDENTIFY: Image-Based Diagnostics by Extraction, Neurocognitive Testing and Identification of Feature Yield", B. Schürmann, M. Stetter, G. Deco, and J. Storck.  
Patent pending.
  - 27) 2000E18262 DE "SmartBot: Saccade-Based User Intention Detection", G. Deco, J. Storck, B. Schürmann, and M. Stetter.  
Patent pending.
  - 28) 2001P14964 DE "ImageBot: Web Image Mining", G. Deco, J. Storck, B. Schürmann, and M. Stetter.  
Patent pending.
  - 29) 2000E18297 DE "NeuroWarp: Vollautomatische inhaltsbasierte Bildüberlagerung (Warping) durch ein neurokognitives Modul", M. Stetter, G. Deco, J. Storck, and B. Schürmann.  
Patent pending.
  - 30) 2001P16787 DE "CALIBRATOR: Calculation of Instantaneous BOLD-to-Spike Ratio by Accumulation of Total Oxygen", M. Stetter, S. Corchs, G. Deco, B. Schürmann, and J. Storck.  
Patent pending.
  - 31) 2001P08864 DE "DIAMOND: Diagnostic Aid by Modelling of Neurocognitive Dynamics", S. Corchs, G. Deco, B. Schürmann, M. Stetter, and J. Storck.  
Patent pending.
  - 32) 2001P08873 DE "Neurodynamische Architektur zur Aufmerksamkeitsbasierten Objekterkennung and visuelle Suche", G. Deco.  
Patent pending.

- 33) 2000E22858 DE "Speech Processing with Networks of Spiking Neurons and Dynamic Synapses", J. Stork, F. Jäkel, G. Deco, M. Stetter, and B. Schürmann.  
Patent pending.
- 34) 2001E04431 DE "Autonome Fahrzeugsteuerung basierend auf visuelle Suche", M. Stetter, G. Deco, and B. Schürmann.  
Patent pending.
- 35) 2002P12914 DE "fMRI-basierte Modellierung zur computergestützten Diagnostic: Extrahierung der funktionellen Konnektivität", G. Deco, and N. Galm.  
Patent pending.
- 36) 2002P12938 DE "fMRI-basierte Modellierung zur computergestützten Diagnostic: Verwendung nichtlinearer Konnektivitätsgleichungen", G. Deco, and N. Galm.  
Patent pending.
- 37) 2002P12929 DE "fMRI-basierte Modellierung zur computergestützten Diagnostic: Verwendungen von Statistiken höherer Ordnungen im Rahmen der "Structural Equatin Modeling"", G. Deco, and N. Galm.  
Patent pending.
- 38) 2002P12915 DE "fMRI-basierte Modellierung zur computergestützten Diagnostik", G. Deco, and N. Galm.  
Patent pending.
- 39) 2002E03585 DE "Hierarchical Neurodynamical Cortical Architecture for Invariant Object recognition", G. Deco.  
Patent pending.
- 40) 2002P12816 DE "Computer-Aided Drug Evaluation with fMRI for Cerebral Disorders", G. Deco, M. Stetter and N. Galm  
Patent pending .
- 41) 2002E18963 DE "Method for Quantitative Evaluation of fMRI Event-Related Signals by a Neurodynamical Model", G. Deco, S. Corchs  
Patent pending .
- 42) 2002E18964 DE "An Implementation of Working Memory for Intelligent Systems by a Network of Spiking Neurons", G. Deco  
Patent pending.
- 43) 2002E18964 DE "Neurodynamical Model of Event-related fMRI Measurements for Clinical Diagnosis", G. Deco  
Patent pending.
- 44) 2004P11578 DE "Dynamic Shaping of Feature Selectivity in IT by Visual Categorization", M. Stetter, R. Almeida, M. Szabo and G. Deco  
Patent pending.

- 45) 2004P03492 DE "Efficient Information Storage in Task-Relevant Working Memory by Propagation of Competition", R. Almeida , G. Deco and M. Stetter  
Patent pending.
- 46) 2003E13999 DE "Extended Biased Competition-Cooperation Neurocognitive Model for Attentional Filtering of Irrelevant Inputs", R. Almeida , G. Deco, M. Szabo and M. Stetter  
Patent pending.
- 47) 2004P11500 DE "Bioanalogue Mechanisms of Reward-Processing for Cognitive Flexibility", G. Deco and M. Stetter  
Patent pending.
- 48) 2004P14971 DE "Sequential Learning by Neurodynamical Mechanisms", G. Deco and M. Stetter  
Patent pending.
- 49) 2005E10500 DE "Bioanalogen Belohnungs-basiertes Lernverfahren zur Klassifizierung mit emergenter Merkmals-Selektivität im Inputraum", G. Deco, M. Szabo and M. Stetter  
Patent pending.
- 50) 2005E11915 DE "A Neurodynamical Architecture for Cross-Modal and Cross-Temporal Integration", G. Deco and M. Stetter  
Patent pending.
- 51) 2006 E22954 DE "Verfahren zur probabilistischen Entscheidungsfindung bei unsicherer Information", G. Deco and M. Stetter  
Patent pending.
- 52) 2006 E22959 DE "Verfahren zur intelligenten Situationserkennung in selbstorganisierenden Sensornetzen", G. Deco, M. Stetter, and L. Tambosi  
Patent pending.

## List of Publications of Gustavo Deco

### A) Publications of books:

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

#### B-0: Special Edited Issues

- 1) Special issue on: „Theoretical and Computational Neuroscience: Understanding Brain Functions“, Journal of Physiology (Paris), **100**, Nos. 1-3, July/September 2006 (Ed. G. Deco).
- 2) Special issue on: „50 Years of Artificial Intelligence: a Neuronal Approach, Campus Multidisciplinary in Perception and Intelligence“, Neurocomputing, **71**, Nos. 4-6, 2008 (Eds.: A. Fernandez-Caballero, J. Mira, and G. Deco).
- 3) Special issue on: „Computational Models of the Brain“, Neuroimage, **52**, Nos. 3, September 2010 (Eds.: M. Breakspear, V. Jirsa, and G. Deco).
- 4) „Cortico-cortical Communication Dynamics“, Frontiers in System Neuroscience, 8:19. doi: 10.3389/fnsys.2014.00019, 2014 (eds.: G. Deco, P. Roland, C. Hilgetag).

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- 6) "Symmetric Eikonal Theory for Electron Capture in Ion-Atom Collisions", G. Deco, R. Piacentini and R. Rivarola, J. Phys. B: Atom. Mol. Phys., **19**, 3727, 1986.
- 7) "Application of a First-Born-Approximation for 2l-Electron Capture in Ion-Atom Collisions", G. Deco, J. Hanssen and R. Rivarola, J. Phys. B: Atom. Mol. Phys., **19**, L635, 1986.
- 8) "A Theoretical Model for Charge Transfer at Relativistic Energies", G. Deco and R. Rivarola, J. Phys. B: Atom. Mol. Phys., **20**, 317, 1987.
- 9) "Relativistic Distorted Wave Model for Electron Capture", G. Deco and R. Rivarola, J. Phys. B: Atom. Mol. Phys., **B24/25**, 134, 1987.
- 10) "On Spin Flip-Charge Exchange in Relativistic Ion-Atom Collisions", G. Deco and R. Rivarola, Nuclear Instruments and Methods, **B28**, 154, 1987.
- 11) "Relativistic Electron Capture in Ion-Atom Collisions", G. Deco and R. Rivarola, J. Phys. B: Atom. Mol. Phys., **20**, 3853, 1987.
- 12) "Relativistic Continuum Distorted Wave Model for Arbitrary Initial and Final Shells-Electron Capture in Ion-Atom Collisions", G. Deco and R. Rivarola, J. Phys. B: Atom. Mol. Phys., **20**, 5117, 1987.
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- 36) "Continuous Boltzmann Machine with Rotor Neurons", L. Parra and G. Deco, *Neural Networks*, **8**, 375-385, 1995.
- 37) "Nonlinear Higher Order Statistical Decorrelation by Volume-Conserving Neural Networks", G. Deco and W. Brauer, *Neural Networks*, **8**, 525-535, 1995.
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- 39) "Redundancy Reduction with Information Preserving Nonlinear Maps", L. Parra, G. Deco and S. Miesbach, *Network: Computation in Neural Systems*, **6**, 61-72, 1995.
- 40) "Neural Learning of Chaotic Dynamic", G. Deco and B. Schürmann, *Neural Processing Letters*, **2**, 23-26, 1995.
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- 49) "Non-linear Feature Extraction by Redundancy Reduction in an Unsupervised Stochastic Neural Network", G. Deco and L. Parra, *Neural Networks*, **10**, 683-691, 1997.
- 50) "Testing Nonlinear Markovian Hypotheses in Dynamical Systems", C. Schittenkopf and G. Deco, *Physica D*, **104**, 61-74, 1997.



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- 52) "Information Flow in Chaotic Symbolic Dynamics", G. Deco, C. Schittenkopf and B. Schürmann, *Int. Journal of Bifurcation and Chaos*, **7**, 97-105, 1997.
- 53) "Nonlinear Independent Component Analysis and Multivariate Time Series Analysis", J. Storck and G. Deco, *Physica D*, **108**, 335-349, 1997.
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- 55) "Identification of Deterministic Chaos by an Information-Theoretic Measure of the Sensitive Dependence on the Initial Conditions", C. Schittenkopf and G. Deco, *Physica D*, **110**, 173-181, 1997.
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- 59) "Information Maximization and Independent Component Analysis: Is there a Difference?", D. Obradovic and G. Deco, *Neural Computation*, **10**, 2085-2101, 1998.
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- 68) "Neurodynamical Mechanism of Binding and Selective Attention for Visual Search", G. Deco and J. Zihl, *Neurocomputing*, **32-33**, 693-699, 2000.
- 69) "Neural Coding: Higher-Order Correlations in the Neurostatistics of Cell Assemblies", L. Martignon, G. Deco, K. Lasky, M. Diamond, W. Freiwald, and E. Vaadia, *Neural Computation*, **12**, 2621-2653, 2000.
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- 74) "Temporal Clustering with Spiking Neurons and Dynamics Synapses: Towards Technological Applications", J. Storck, F. Jäkel, and G. Deco, *Neural Networks*, **14**, 275-285, 2001.
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