

## CURRICULUM VITAE

**NAME :** Dante R. Chialvo

Physiology, David Geffen School of Medicine, UCLA.

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Birth place: Argentina. Citizenship: Argentina /USA.

### MAJOR RESEARCH INTERESTS:

Dynamics of complex systems and neuroscience. Approaches from statistical physics are used to understand large-scale collective phenomena across systems, including the development of novel methods to analyze brain fMRI spatiotemporal patterns in health and disease.

### EDUCATION:

- Colegio Nacional (Rafaela, Argentina) Bachillerato 1973 Sciences
- Universidad de Rosario (Rosario, Argentina) M.D. 1982 Medicine

### CURRENT PROFESSIONAL APPOINTMENTS:

- Research Physiologist, Department of Physiology, University of California, Los Angeles, CA.
- Senior Scientist, Brentwood Biomedical Research Institute, West Los Angeles Veterans Adm. Medical Center. Los Angeles, CA.
- Adjunct Professor, Physiology, Northwestern Univ. Feinberg Med. School, Chicago, Illinois.
- CONICET. Principal Investigator in Physics of the National Council for Scientific and Technological Research of Argentina.

### EDITORIAL:

- Assoc. Editor "Frontiers in Fractal Physiology".
- Assoc. Editor "Chaos, Solitons and Fractals".

- Editorial Board “PLoS One”.
- Advisory Board Editor “Papers in Physics”.
- Review Editor “Frontiers in Neuroinformatics”.
- Review Editor “Frontiers in Integrative Neuroscience”.

#### **HONORS AND AWARDS:**

- Fellow of the American Physical Society (2007).
- American Physical Society Outstanding Reviewer (2009).
- Distinguished Lecturer, The Frank and Elaine Moss Hospitality Fund. University of Saint Louis, Missouri (2007).
- The Santander Distinguished Visiting Professor. Psychology Department, Universidad Complutense de Madrid (UCM), Madrid, Spain (2007).
- Fulbright US Scholar Award (2005).
- Young Investigator Award. North American Society of Pacing and Electrophysiology (NASPE), (1989).
- Pre-doctoral Fellowship, CONICET (Argentine National Research Council) (1982-85).

#### **PREVIOUS PROFESSIONAL APPOINTMENTS:**

- Professor (Research), Physiology, Northwestern Univ. Feinberg Med. School, Chicago, Illinois. (2009-2010).
- Associate Professor (Research), Physiology, Northwestern Univ. Feinberg Med. School, Chicago, Illinois. (2000 to 2009).
- Senior Scientist BBRI, West Los Angeles Veterans Adm. Medical Center. (2000- 2003).
- Research Assistant Professor, Department of Physiology. University of Arizona, Tucson. (1993 to 1997).
- Research Assistant Professor, Computational Neuroscience. SUNY/Health Science Center at Syracuse (1991 to 1993).
- Research Assistant Professor, Pharmacology. SUNY/Health Science Center at Syracuse. New York. (1990 to 1991).
- Postdoctoral Research Associate, Pharmacology. SUNY/Health Science Center at Syracuse, New York. (February 1987 to September 1990).
- Professor (Tenured). Department of Physiology, School of Medical Sciences, National University of Rosario, Argentina. (1986 to 1989).

- Instructor, Human Physiology, School of Medicine, National University of Tucuman, Argentina. (1982 to 1986). Course: Human Physiology for Medicine.
- CONICET Research Fellowship (National Research Council). Insibio. Bioengineering Department. Tucumán. Argentina. Supervisor: Dr M. E. Valentinuzzi. (April 1984 to April 1985).
- CONICET Research Fellowship (National Research Council). Insibio. Bioengineering Department. Tucumán. Argentina. Supervisor: Dr M. E. Valentinuzzi. (April 1982 to March 1984).
- Teaching Assistant, Human Physiology, School of Medical Sciences, National University of Rosario, Argentina. (1977 - 1982). Course: Human Physiology for Medicine.

#### **VISITING AND ADJUNCT PROFESSIONAL APPOINTMENTS:**

- Associate Scientist, Center for Stochastic Modeling, Mathematical and Sciences Department, Universidad de San Andrés, Buenos Aires, Argentina (2009- present)
- Visiting Professor, Instituto Universitario Ciencias de la Salud, University of the Balearic Islands, Palma de Mallorca, Spain. (July-August 2009. Host: Dr. Pedro Montoya).
- Visiting Professor, Physics Department, University of the Balearic Islands, Palma de Mallorca, Spain. (October 2007. Host: Dr. Oscar Calvo).
- Professor, PhD Program in Biomedical Sciences. School of Medicine, Universidad Nacional de Rosario, Rosario, Argentina (2004 - present).
- Visiting Associate Professor, Department of Physiology, Cornell University, Ithaca, NY, USA. (2001 - 2005).
- Visiting Professor, Psychology Department, University of the Balearic Islands, Palma de Mallorca, Spain. (June-July 2004. Host: Dr. Pedro Montoya).
- Adjunct Faculty, Center for Studies in Physics & Biology. The Rockefeller University. New York. (1999-2004).
- Visiting Professor, Cross-Disciplinary Physics Department, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands, Palma de Mallorca, Spain. (June-July 2003, Host: Dr. Manuel Matyas).
- Visiting Professor, Physics Department, University of the Balearic Islands, Palma de Mallorca, Spain. (May-June-July 2002. Host: Dr. Raul Toral).
- Visiting Professor, Cross-Disciplinary Physics Department, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands, Palma de Mallorca, Spain. (June-July 2000. Host: Dr. Oreste Piro).
- Visiting Professor, Physics. Niels Bohr Institute. Copenhagen, Denmark (Summers of 1996 and 1999. Host: Dr. Per Bak).
- Visiting Professor, Center for Studies in Physics and Biology. The Rockefeller University, New

York (1997 and 1998, Hosts: MJ Feigenbaum and M Magnasco).

- Guest Scientist and External Faculty, Biomedical Engineering Dept., Favaloro University. Buenos Aires, Argentina (1997 - 2000).
- External Faculty, Computational Neuroscience Program, SUNY/Health Science Center at Syracuse. Syracuse, NY (1993 - 1996).
- Visiting Assistant Professor, Santa Fe Institute, Santa Fe, New Mexico (1992 -1995).
- Adjunct Professor, Department of Ecology and Evolutionary Biology. University of Arizona, Tucson (1993 -1994).

## **GRANTS: (Ongoing Completed or pending, last five years)**

### **National Institute of Health (USA) :**

- 2008-2012. "Resting state brain networks and chronic pain" Dante R. Chialvo, PI. Agency: NIH/NINDS. Type: R01, Total Granted Costs: US\$1,510,000 (active).
- 2008-2013: "Chronic pain and emotional learning and memory". (Vania Apkarian PI, Dante R. Chialvo, Co-PI.) Agency: NIH/NINDS. Type: RO1, Total Granted Costs: US\$ 1,739,000 (closed).
- 2009-2014: "Cortical Pathophysiology of Pain". (Vania Apkarian PI, Dante R. Chialvo, Co-PI). Agency: NIH/NINDS Type: RO1 Total Granted Costs: US\$3,769,197 (closed)
- 2002-2008: "Cortical Pathophysiology of Pain". (Vania Apkarian PI, Dante R. Chialvo, Co-PI). Agency: NIH/NINDS Type: RO1 Direct Granted Costs: US\$ 1,250,000. (closed)
- 2006-2008: "Characterizing temporal dynamics of spontaneous pain". Dante R. Chialvo, CoPI. Agency: NIH/NINDS. Type: R21, Total Granted Costs: US\$389,945. (closed)
- 2002-2006: "Cortical Dynamics for Pain Perception in Behaving Rats". (Vania Apkarian PI, Dante R. Chialvo, Co-PI.) Agency: NIH/NINDS. Type: RO1, Direct Granted Costs: US\$ 1,125,000. (closed)

### **National Science Foundation (USA):**

- 2006-2007: "U.S.-Argentina Program: Workshop on Brain Physics and Mind Dynamics"; Mar del Plata, Argentina; December 2006. Dante R Chialvo PI- Agency: National Science Foundation, Americas Program. Total Granted Costs: US\$11,000. (closed)

### **CNPQ/FAPERN (Brazil):**

- 2005-2007 "Cooperação entre saguís callithrix jacchus" (Ritmos biológicos e processos de aprendizagem ). PI: Veronica S. Valentinuzzi, John Fontenelle Araujo. Universidade Federal de Rio Grande do Norte, Brazil. (closed)

### **Agencia Nacional de Promoción Científica y Tecnológica (Argentina):**

- 2007-2010 "Complexity and dynamics of cognitive processes: High-resolution studies of cortical information-flow during a cognitive task". Mariano Sigman PI, Dante R. Chialvo, CoPI, Agency:

Agencia Nacional de Promoción Científica y Tecnológica. Fondo para la Investigación Científica y Tecnológica Argentina. Type: PICT, Total Granted Costs: 280,000 Arg. Pesos. (closed)

**Dirección General de Investigación del Ministerio de Educación y Ciencia (España):**

- 2008-2010 “Dinámica de la actividad cerebral y la percepción del dolor crónico”. Pedro Montoya PI, Dante Chialvo, CoPI,. Project SEJ2007-62312/PSIC. Agency: MEyC, España: Organismo receptor: Facultad de Psicología, Universidad de las Islas Baleares, Palma de Mallorca, España. Total Granted Costs: 225.000 Euros. (closed)
- 2010-2012 “Dinámica de la actividad cerebral y la percepción del dolor crónico”. Pedro Montoya PI, Dante Chialvo, CoPI,. Project SEJ2007-62312/PSIC. Agency: MEyC, España: Organismo receptor: Facultad de Psicología, Universidad de las Islas Baleares, Palma de Mallorca, España. Total Granted Costs: 205.000 Euros. (active)

**Fundació La Marató de TV3. (Spain).**

- **2008-2011** “Brain dynamic of cognitive and affective processing in patients with fibromyalgia” Pedro J. Montoya PI, Dante Chialvo CoPi, Total Granted Costs: 199.668 Euros.(active)

**SERVICE**

- CIMA, Capacitación e Investigación para la Medicina Argentina, Asociación Civil. (Founding member and current Secretary). [ <http://www.cimaprofisio.net> ]
- HEFTA, Health for the Americas, NGO (Founding member and Vice-President).

**PROFESSIONAL ACTIVITIES:**

**Organization of Workshops and Courses:**

**2012**

- Organizer. “Brain Critical Dynamics” – an International Conference. Eight days Cruise Conference at the Mediterranean. Port of Palma de Mallorca, Spain.

**2011**

- Member of the International Advisory Committee of the XI Latin American Workshop on Nonlinear Phenomena, LAWNP11, San Luis Potosi, Mexico, 10-14 October , 2011.

**2010**

- Lecturer, “Music & Neuroscience, Neural basis of consonance in tonal music”. Universidad de la República, Montevideo, Uruguay (June, 2010).
- Organizer, “I International Symposium for the Study of Chronic Pain and Fibromyalgia” Universidad Nacional de Rosario, Rosario Argentina, October 26-27, 2010.

**2009**

- Member of the International Scientific Committee of the 8th International Workshop in Neuronal Coding 2009. National Cheng Kung University, Taiwan, (May 2009).
- Member of the International Advisory Committee of the XI Latin American Workshop on Nonlinear Phenomena, LAWNP09, Buzios, Brazil, 5-9 October , 2009.

## 2008

- Member of the Scientific Program Committee of the ECCB08 European Conference in Computational Biology, Cagliari, Italy. September 22-26, 2008.

## 2007

- Member of the International Scientific Committee of the 7th International Workshop in Neuronal Coding 2007. Uruguay, November 2007.
- Member of the International Scientific Committee SPIE BioMEMS and Nanotechnology III (AU02) 4-7 December, Canberra, Australia, 2007
- Co-Organizer (with Maya Paczuski and Kim Sneppen) Workshop on “Computational Philosophy: Lessons from simple models” Niels Bohr Institute, Copenhagen, Denmark October 11-13, 2007.
- Lecturer, “Complejidad sin Matemáticas: Redes de interaccion”. Universidad Complutense de Madrid, Spain (May-June, 2007).
- Lecturer, Second Latin-American School on Statistical Physics and Interdisciplinary Applications” organized by the UFRGS’s Complex Fluids group (Brazil) and the ICTP (Trieste, Italy), Bento Gonçalves, Brazil.

## 2006

- Lecturer, “Introducción a la Complejidad”. V Curso Boliviano de Sistemas Complejos. Universidad Mayor de San Andrés Carrera de Física, La Paz, Bolivia.
- Organizer and Chairperson, “Workshop on Brain Physics and Mind Dynamics”. Satellite activity to MEDYFINOL'06. Mar del Plata, Argentina, December 5, 2006.
- Member of the International Scientific Committee. XV Conference on Nonequilibrium Statistical Mechanics and Nonlinear Physics (MEDYFINOL'06). Mar del Plata, Argentina, December 4-6, 2006.

## 2005

- Director and Lecturer Post-Graduate Course (US Fulbright Scholar Award) on “Sistemas Complejos en Biología y Medicina”. Departamento de Física, Facultad de Matemática Astronomía y Física. Universidad Nacional de Córdoba. Córdoba, Argentina. August-October, 2005.
- Member of the Program Committee of the Third SPIE International Symposium on Fluctuations

and Noise in Biological, Biophysical, and Biomedical Systems, Austin, TX, USA. July 2005.

- Member of the International Scientific Committee of the VIII Latin American Workshop on Nonlinear Phenomena, LAWNP05, Bariloche, Argentina, October 24-28, 2005.

#### **2004**

- Director (with JM Parrondo) and Lecturer Summer Course “Mente y Complejidad”. Universidad Complutense de Madrid. El Escorial. Spain. August 2004.
- Member of the International Scientific Committee of the Second SPIE International Symposium on Fluctuations and Noise in Biological, Biophysical, and Biomedical Systems (FN01). 25-28 May 2004. Maspalomas, Gran Canaria, Spain.

#### **2003**

- Lecturer, in the Summer Course “Emocion y Cerebro”. Universidad Complutense de Madrid. El Escorial. Spain. August 6-9, 2003.
- Organizer, International Workshop on “Complexity & Criticality in Networks” held at the Computational Neuroscience Meeting CNS 2003, Alicante, Spain University Miguel Hernández (Medical School Campus) July 8 - 9, 2003.
- Member of the International Scientific Committee and Lecturer, European Interdisciplinary School on Nonlinear Dynamics for System and Signal Analysis, EUROATTRACTOR2002, Warsaw, June 18 to June 27, 2002, Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences, Poland.

#### **1996**

- Co-Director and Lecturer, “MEDYFINOL 96”. Latin-American Summer School on Statistical Mechanics and Nonlinear Physics, Tucuman, Argentina, October 1996.

#### **1994**

- Co-Director: Interdisciplinary Autumn School on “Nonlinear Analysis of Physiological Time Series”. Philosophiezentrum der Universitaet Am Hubland, Wuerzburg, Germany, September 26 to 30, 1994.
- Co-Organizer International Workshop on “Nonlinear Dynamics, Fractality, and Self-organization of Complex Systems”, Philosophiezentrum der Universitaet Am Hubland, Wuerzburg, Germany, October 1-3, 1994.
- Co-Organizer: “The Role of Noise in Signal Transmission”, Symposium at the Biophysical Society Annual Meeting, New Orleans, March 1994 (with Frank Moss, Physics, University of Missouri)

#### **1992**

- Member of the Scientific Committee, Workshop on “Chaos, Fractals, 1/f Fluctuations and Self-organized Criticality in Biology and Medicine”, Wuerzburg, Germany, February 29, 1992.
- Co-Director: Workshop on “Power laws, Noise and Neural Code”, Syracuse, November 1992. (with AV Apkarian, SUNY/Syracuse).

## 1990

- Director: Invited Graduate Course “Four days of fractals, chaos and rhythms”. August 1990. School de Medicine, University of Rosario, Argentina.

## 1985

- Co-Director: Special Graduate Course on “Dynamical Systems and Chaos”. June 1985. Physics Department. National University of Tucumán, Argentina (with Drs. Iglesias and A. Coviello) .

## Grants, Promotions and Thesis Committees:

- Grants and promotion reviewer for:

### USA:

National Institute of Health, NHBLI Cardiovascular Study Section (ad-hoc reviewer) (1992-1994)

National Institute of Health, Geriatrics and Rehabilitation Medicine Study Section (ad-hoc reviewer) (1998). Neurotoxicology and Alcohol (NAL) Study Section (2009-2011)

National Science Foundation (2003, 2006).

John D. and Catherine T. MacArthur Foundation (2008).

### Europe:

Complexity Expert Reviewer for the NEST (“New Emerging Science & Technology”) 6<sup>th</sup> Framework Programme of the European Commission, Brussels (2006).

Italian National Institute for the Physics of Matter (INFM) (ad-hoc grant reviewer, 1998).

United Kingdom Biotechnology and Biological Sciences Research Council (BBSRC) (Grant reviewer, 2007).

Swiss Federal Institute of Technology, Zurich, ETH Zurich Research Commission (ad-hoc grant reviewer, 2008).

### Argentina:

Grant Reviewer for the “Area de Ciencias Físicas y Matemáticas” de la “Agencia Nacional de Promocion Cientifica y Tecnologica” (ANPCyT), Argentina (1999-2001, 2003, 2004, 2005, 2006,2009,2010).

Promotion Reviewer for Conicet, Argentina (2005, 2006, 2007, 2010).

- Member of thesis committees:

**USA:**

Departments of Neuroscience (1995) and Mathematics (1996), University of Arizona, Tucson, AZ, Northwestern Univ. , (2002).

**Europe:**

University of Palermo, Italy. Corso di DOTTORATO DI RICERCA in FISICA APPLICATA DOTTORATO INTERNAZIONALE (XXII CICLO) – 2011.

Helsinki Univ. Finland, External PhD Examiner (2002, 2010).

ETH Zurich, Switzerland, External Examiner (2005).

University of Islas Baleares, Mallorca, Spain, Psychology Dept. External PhD Examiner (2008).

**Argentina:**

Dept. of Physics, FCEN, University of Buenos Aires, Argentina External PhD Examiner (2005),

University of Cordoba, Biology PhD Program. Thesis Committee Member (2007).

Instituto Tecnológico Buenos Aires (ITBA) Buenos Aires, Argentina. External PhD Examiner (2010).

**Journals and Societies:**

- Advisory Editorial Board Member for “Chaos” (2002-2008).
- Review Editor for “Frontiers in Neuroinformatics” (since 2007).
- Review Editor for “Frontiers in Integrative Neuroscience” (since 2009).
- Advisory Board Member for “Papers in Physics” (since 2009).
- Associate Editor for “Frontiers in Fractal Physiology ” (since 2010).
- Associate Editor for “Chaos, Solitons and Fractals ” (since 2010).

- Referee for:

Physics Letters A, Physical Review Letters, Physical Review E, Physica A, Physica D, Science, Nature, Biological Cybernetics; Journal of Theoretical Biology, Circulation, Journal of Clinical Investigation, Journal of Neuroscience, Journal of Neurophysiology, Journal of Cardiovascular Electrophysiology, Chaos, Neuroscience Letters, Trends in Neurosciences, Experimental Neurology, Mathematical Bioscience, Europhysics Letters, Advances in Complex Systems, Neurocomputing, Nature Physics, Acta Biotheoretica, BioSystems, New Journal of Physics, Journal of Physics A, J. Physiology (Paris), Neurobiology of Disease, PLOSone, PLOS Computational Biology, Epilepsia.

Anesthesia and Analgesia.

- Member of the American Physical Society, the Society for Neuroscience, and the Argentinian Physical Society.

#### **DIRECTION AND SUPERVISION OF TRAINEES:**

- Alain Vinet, Ph.D. Physics, U. of Montreal, Postdoctoral Fellow. SUNY, Syracuse. (1990-1991).
- Brant Hinrichs, Ph.D. student, Physics, Urbana-Champaign and Santa Fe Institute for Complex Systems, Thesis "Characterizing complex time-series from the scaling of prediction error", Co-Advisor, Norman Packard). (1992-1994)
- Tim Elston, Ph.D. Physics, Georgia Tech. Postdoctoral Fellow, Santa Fe Institute. Summer of 1994.
- Johannes Muller-Gerking, Ph.D. Physics and Cognitive Sciences, Univ. of Paris, Postdoctoral Fellow. University of Arizona (1995-1996).
- Katalin Gothard, Ph.D. student, Neuroscience. University of Arizona. (1994-1996).
- Chandra Ivey, Master student, Neuroscience, SUNY, Syracuse. (1995-1997).
- Guillermo Cecchi, PhD student, Center for Studies in Physics and Biology. The Rockefeller University. (1997-1999)
- Young Soo Kim, PhD student, Physiology and Neuroscience, Northwestern University Medical School. Chicago IL. (2000-2001).
- Marwan Baliki, PhD student, Neuroscience, Northwestern University Medical School. Chicago IL. (2002- 2008).
- Simona Lavarello, Visiting Scholar, Northwestern Univ. (2002-2004).
- Dr. Hector Berra, Visiting Fellow, Northwestern Univ. (2002-2004).
- MS Maria V. Centeno, Research Associate, Northwestern Univ. (2003-2008)
- Dr. Paul Geha, Postdoctoral Fellow, Northwestern Univ. (2003-2008).
- Dr. Jennifer Foss, Postdoctoral Fellow, Northwestern Univ. (2004-2005).
- Dr. Chuck Rudick, Postdoctoral Fellow, Northwestern Univ. (2005- 2006).
- Dr. Daniel Fraiman, Postdoctoral Fellow, Northwestern Univ. & Univ. of San Andres, Argentina.
- Dr. Ignacio Cifre, Postdoctoral Fellow, Northwestern Univ & UIB, Mallorca, Spain (2008-2009).
- Dr. Carol Sitges Quiroz, Postdoctoral Fellow, Northwestern Univ. (2009).
- Enzo Tagliazucchi. Co-director (with Pablo Balenzuela) Tesina de Licenciatura en Física, FCEN,

UBA, (2008-2010). Currently PhD student with full scholarship in Goethe University, Germany.

- Sebastian Quiroga Lombardi. Co-director (with Pablo Balenzuela) Tesina de Licenciatura en Física, FCEN, UBA, (2008-2010). Currently PhD student with full scholarship in Heidelberg University, Germany.
- Leonardo Hess MD. Advisor PhD thesis, Universidad Nacional de Rosario, Argentina. (2010-present).
- Ariel Haimoivci, Advisor MS thesis, Physics, FCEN, Universidad de Buenos Aires, (2010-present).
- Sergio Manterolo, Advisor MS thesis, Physics, FCEN, Universidad de Buenos Aires, (2010-present).

## **TEACHING EXPERIENCE:**

### **Taught and lectured in topics of :**

Medical Physiology, Medical Pharmacology, Medical Neuroscience, Biophysics, Bioinstrumentation, Complex Systems in Biology and Medicine. Statistics and Computational Methods.

### **Recent Courses:**

- "Cardiovascular reflexes". Univ. of California, Los Angeles. Physiology and Biophysics Course.
- "Nonlinear dynamics in Biology". University of Arizona (Undergraduate Honors).
- "Biophysics and dynamics of nerve excitation". SUNY Computational Neuroscience Program. (Graduate course)
- "Nonlinear physics & cardiology" SUNY Computational Neuroscience Program. (Graduate course)
- "Introducción a la Complejidad en Biología y Medicina". Departamento de Física, Facultad de Matemática Astronomía y Física. Universidad Nacional de Córdoba. Córdoba, Argentina. Graduate Course, (3 months, 2005).
- "Introducción a la Complejidad". Universidad Mayor de San Andrés, Carrera de Física, La Paz, Bolivia, (2 weeks, 2006).
- "Complejidad sin Matemáticas: Redes de interaccion". Facultad de Psicología, Universidad Complutense, Somosaguas, Madrid, Spain (40 hours, 2.5 Credits, 2007).
- "Curso Modular de Introduccion a las Neurociencias". Universidad Nacional de Rosario, Rosario, Argentina (120 hours, 2010).

## **SHORT INVITED VISITS TO OTHER INSTITUTIONS**

- Cornell University (1988, 1989, 1990).

- Los Alamos National Laboratory, Center for Nonlinear Science (July 1989).
- Tulane University, Physics Department (1998).
- Santa Fe Institute. (1993-1994, 1995, 1996,2000).
- The University of Paris IV, France (1994).
- Wuerzburg University, Physiology Department, Germany (1992, 1993).
- Niels Bohr Institute. Denmark (1996, 1999).
- Cross-Disciplinary Physics Department IMEDEA, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands (UIB), Palma de Mallorca Spain (summers of 2000, 2002, 2003 & 2004).
- Psychology Department. University of the Balearic Islands (UIB), Palma de Mallorca Spain (summers of 2004 & 2005).
- Riken Brain Science Institute, Perceptual Brain Dynamics Laboratory, Wakoshi, Japan (2005).
- Peter Wall Institute for Advanced Studies at the University of British Columbia in Vancouver, British Columbia, Canada. (2005).
- Physics Department, Facultad de Matemática Astronomía y Física, Universidad Nacional de Córdoba, Córdoba, Argentina (2005).

## PUBLICATIONS

### A) PUBLICATIONS WITH MAJOR IMPACT:

#### DATA FROM SCIENCE CITATION INDEX ; H Index = 26 (UPDATED TO Jan 2011).

- Sporns O, Chialvo DR, Kaiser M, and Hilgetag CC. Organization, Development and Function of Complex Brain Networks. Trends in Cognitive Sciences, 8 (9): 418-425 (2004). **Citations: 325**
- Eguiluz V, Chialvo DR, Cecchi G, Baliki M, Apkarian AV. Scale-free brain functional networks. Phys. Rev. Letters 92, 018102 (2005). Also as arxiv.org/abs/cond-mat/0309092. **Citations: 269**
- Chialvo DR, Gilmour RF, Jalife J. (1990) Low dimensional chaos in cardiac tissues. Nature 343: 653-657. **Citations: 142**
- Chialvo DR, Longtin A. Muller-Gerking J. (1997) Stochastic resonance in models of neuronal ensembles. Physical Review E. 55(2) 1798. **Citations: 138**
- Chialvo DR, Jalife J. (1987) Nonlinear dynamics in cardiac excitation and impulse propagation. Nature 330: 749-752. **Citations: 127**
- Chialvo DR, Michaels D, Jalife J. (1990) Supernormal excitability as a mechanism of chaotic dynamics of activation in cardiac Purkinje fibers. Circulation Res. 66: 525-545. **Citations: 122**
- Chialvo DR, Millonas MM. (1995) Asymmetric unbiased fluctuations are sufficient for the

operation of a correlation ratchet. *Physics Letters A* 209, 26-30.

**Citations: 105**

- Longtin A and Chialvo DR. (1998) Stochastic and deterministic resonances for excitable systems. *Phys. Rev. Letters* 81(18) 4012-4015. **Citations: 87**
- Apkarian AV, Sosa Y, Krauss B, Thomas PS, Fredrickson BE, Levy RE, Harden RN, Chialvo, DR. Chronic pain patients are impaired on an emotional decision-making task. *Pain* 108 (1-2) 129-136 (2004). **Citations: 89**
- Baliki M, Chialvo DR, Levy RE, Harden R, Parrish T, Apkarian AV. Chronic pain and the emotional brain: Specific brain activity associated with spontaneous fluctuations of intensity of chronic back pain. *Journal of Neuroscience* 26 (47): 12165 (2006). **Citations: 89**

### **B) COMPLETE LIST OF PUBLICATIONS IN PEER REVIEW JOURNALS ( > 2800 CITATIONS RECORDED IN SCIENCE CITATION INDEX)**

1. Balenzuela P, Braun H, & Chialvo, DR. Ghost stochastic resonance: An introductory review *Contemporary Physics*, (2011).
2. Expert P, Lambiotte R, Chialvo DR, Christensen K, Jensen HJ, Sharp DJ & Turkheimer F. Self-similar correlation function in brain resting-state functional magnetic resonance imaging. *Journal of The Royal Society Interface* 8, 472-479 (2011).
3. Walteros C, Sánchez-Navarro JP, Muñoz-García MA, Martínez-Selva JM, Chialvo DR, & Montoya P. Altered associative learning and emotional decision-making in fibromyalgia. *Journal of Psychosomatic Research* 70, 294-301 (2011).
4. Cifre I, Sitges C, Fraiman D, Muñoz MA, Balenzuela P, González Roldán A, Martínez-Jauand M, Larbig W, Birbaumer N, Chialvo DR & Montoya P. *Journal of Psychosomatic Research* in press (2011).
5. Scremin OU, Chialvo DR, Lavarello S, Berra HH & Lucero MA. The environmental pollutant endosulfan disrupts cerebral cortical function at low doses. *Neurotoxicology*. 2010 Dec 7. [Epub ahead of print] PMID: 21144862
6. Tagliazucchi E, Balenzuela P, Fraiman D, Montoya P & Chialvo DR. Spontaneous BOLD event triggered averages for estimating functional connectivity at resting state. *Neurosci. Lett* 488(2):158-163 (2010).
7. Chialvo DR. Emergent complex neural dynamics, *Nature Physics* 6, 744-750 (2010).
8. Balenzuela P, Chernomoretz A, Fraiman D, Cifre I, Sitges C, Montoya P & Chialvo DR. Modular organization of brain resting state networks in chronic back pain patients. *Front. Neuroinform.* 4:116. doi: 10.3389/fninf.2010.00116 (2010).
9. Ribeiro TL, Ribeiro S, Caixeta F, Belchior H, Chialvo DR, Nicolelis MAL, Copelli M. Spike avalanches exhibit unified dynamics across the sleep-wake cycle. *Plos One*, 30;5(11):e14129 (2010).
10. Tagliazucchi E, Balenzuela P, Fraiman D & Chialvo DR. Brain resting state is disrupted in chronic back pain patients, *Neurosci. Lett.* 485 (1): 26-31 (2010)

11. Quiroga Lombard CS, Balenzuela B, Braun H & Chialvo DR. A simple conceptual model to interpret the 100,000 years dynamics of paleo-climate records. *Nonlin. Processes Geophys.* (2010).
12. Anteneodo C, Malmgreen D & Chialvo DR. Poissonian bursts in e-mails correspondence. *European Physics Journal*, (2010).
13. Perotti JI, Billoni OV, Tamarit FA, Chialvo DR, Cannas SA. Emergent self-organized complex network topology out of stability constraints. *Physical Rev. Letters*, 103, 108701 (2009).doi: 10.1103/PhysRevLett.103.108701.
14. Anteneodo C & Chialvo DR. Unraveling the fluctuations of animal motor activity. *Chaos*, 19, 033123 (2009).
15. Peterman T, Thiagarajan T, Lebedev M, Nicolelis M, Chialvo D, Plenz D. Spontaneous Cortical activity in awake monkeys composed of neuronal avalanches, *Proc. Natl. Acad. Sci. USA*, doi: 10.1073/pnas.0904089106, (2009).
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17. Baliki MN, Geha PY, Apkarian AV & Chialvo DR. Beyond feeling: chronic pain hurts the brain disrupting the default-mode network dynamics. *Journal of Neuroscience* 28(6): 1398-1403, (2008).
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51. Centeno MV, Geha PY, Apkarian AV, Katz JA, Baliki MN, Chialvo DR. Brain Activity for Osteoarthritis Pain: an fMRI Study. Atlanta, GA. Society for Neuroscience, 2006
52. Geha PY, Narang A, Baliki MN, Harden NR, Bauer W, Chialvo DR, Apkarian AV. Fractional anisotropy of white matter tracts contrasted between complex regional pain syndrome and normal controls. Atlanta, GA. Society for Neuroscience, 2006.
53. Apkarian A V, Rudick CN, Centeno MV, Chialvo DR. Emotional learning and memory deficits in a neuropathic pain rat model. Atlanta, GA. Society for Neuroscience, 2006.
54. Baliki MN, Geha PY, Apkarian AV, Chialvo DR. So, what brain areas are specific for pain perception? Atlanta, GA. Society for Neuroscience, 2006.
55. Perotti JL, Billoni OV, Tamarit FA, Chialvo DR, Cannas SA, Estabilidad dinamica en redes complejas. Annual Meeting Argentinian Physics Society, AFA San Luis, Argentina (2006).
56. Geha PY, Baliki MN, Bauer W, Harden N, Chialvo DR, Apkarian AV. Fractional anisotropy of white matter tract contrasted between complex regional pain syndrome and normal controls (Poster #175 W-AM) Org. Human Brain Mapping, 13th Annual Meeting, 2007 Chicago, USA.

57. Baliki MN, Geha PY, Chialvo DR, Apkarian AV. Dissociating nociception from magnitude rating in the human brain. (Poster #168 W-PM) Org. Human Brain Mapping 13th Annual Meeting, 2007, Chicago, USA.
58. Baliki MN, Geha PY, Apkarian AV, Chialvo DR. Impaired brain de-activation in chronic pain, Society for Neuroscience, San Diego, 2007. Poster 825.2/III19.
59. Montoya P, Geha PY, Baliki MN, Apkarian AV, Chialvo DR, Differences in the temporal dynamics of daily activity between chronic pain patients and healthy controls. Society for Neuroscience, San Diego, 2007. Poster 70.11/DD3.
60. Apkarian AV, Geha PY, Baliki MN, Centeno, MV, Harden RN, Parrish T., W Bauer, Chialvo DR. Grey and white matter changes in patients with complex regional pain syndrome. Society for Neuroscience, San Diego, 2007. Poster 285.15/JJ25.
61. Fraiman D, Balenzuela P, Chialvo DR. Redes funcionales en el punto critico: similitudes entre dinamica cerebral y el modelo de Ising. Asociación Argentina de Física . Buenos Aires, 2008.
62. Chialvo DR. Brain Resting State is critical. Society for Neuroscience, Washington DC, 2008. Poster 798.5/UU90.
63. Plenz D, Chialvo DR. Scaling of neuronal avalanches. Society for Neuroscience, Washington DC, 2008. Poster
64. Scremin OU, Chialvo DR, Lavarello S, Lucero MA. Altered cortical dynamics in Endosulfan exposed rats. Society for Neuroscience, Chicago IL, 2009. Poster.
65. Chialvo DR, Budelli, R, Caputi A, Lavarello S. A model for the neural basis of tonal consonance. Society for Neuroscience, Chicago IL, 2009. Poster.
66. Cifre I, Fraiman D, Balenzuela P, Apkarian A, Chialvo DR. Global and local properties of brain resting state networks in chronic pain. Society for Neuroscience, Chicago IL, 2009. Poster.
67. Cifre I, Sitges C, Muñoz-García MA, Larbig W, Fraiman D, Balenzuela P, Birbaumer N, Chialvo DR, Montoya P. Altered resting state networks dynamics in fibromyalgia. Society for Neuroscience, Chicago IL, 2009. Poster.
68. Ribeiro TL, Ribeiro S, Caixeta F, Belchior H, Chialvo DR, Nicolelis MAL, Copelli M. Neuronal Avalanches: Scaling, Power Laws and Undersampling in Freely Behaving and Anesthetized Rats. XXIV Reunión Anual da FeSBE (Federacao de Sociedades de Biologia Experimental), Águas de Lindóia, SP- Brasil (19/08/2009 a 22/08/2009). Poster 08.012.
69. Chialvo DR, Montoya P, Malagrava J, Garcia-Banda G. Diferencias individuales en salud y enfermedad: un modelo de contingencia. Poster, Spanish Research Society of Individual Differences (SEIDI) XI Meeting. Mallorca Spain, October 8, 2009.
70. Zirovich MD, Tagliazucchi E, Victor TL, Fraiman D, Balenzuela P, Scremin OU, Chialvo DR, Resting brain functional connectivity is disrupted in chronic back pain patients. Society for Neuroscience, San Diego CA, 2010. Poster 60.8/W13.
71. Chialvo DR, Fraiman D. Optimal information-sharing in brain resting state networks. Society for Neuroscience, San Diego CA, 2010. Poster 109.5/MMM64.

## F) PATENTS:

“Interface for sound processing for cochlear implants in humans” by DR Chialvo and AV Apkarian. On file at the SUNY Office of Technology Transfer, Albany, N.Y. (Invention number R0950-211)

“Apparatus and method for pain measurement” U.S. Patent Application 20060129069. AV Apkarian and DR Chialvo.

## RECENT MEDIA IMPACT:

- “20 orders of magnitude”. Hour long debate between James Gimzewski and Dante Chialvo about our work on criticality, atomic switches and the brain. Produced by Japanese TV Public Broadcasting (2011).
- Media comments of the article Baliki et al. Journal of Neuroscience (2008). “Beyond feeling: chronic pain hurts the brain disrupting the default-mode network dynamics”. (This is a selection from many hundreds clips that can be found at [www.chialvo.net/Press](http://www.chialvo.net/Press)).

### 1. Reuters US:

<http://www.reuters.com/article/healthNews/idUSN0521570320080205>

### 2. MSNBC:

<http://www.msnbc.msn.com/id/23017866/>

### 3. ABC News, Health:

<http://abcnews.go.com/Health/WireStory?id=4246223&page=1>

### 4. Washington Post:

<http://www.washingtonpost.com/wpdyn/content/article/2008/02/08/AR2008020802285.html>

### 5. Medscape Medical News:

[www.medscape.com/viewarticle/569851](http://www.medscape.com/viewarticle/569851)

### 6. Nature Reviews Neuroscience:

<http://www.nature.com/nrn/journal/v9/n3/full/nrn2352.html#Pain>

### 7. Times of India:

[http://timesofindia.indiatimes.com/Chronic\\_pain\\_can\\_alter\\_the\\_brain/rssarticleshow/2762925.cms](http://timesofindia.indiatimes.com/Chronic_pain_can_alter_the_brain/rssarticleshow/2762925.cms)

### 8. China Daily:

[http://www.chinadaily.com.cn/world/2008-02/17/content\\_6460673.htm](http://www.chinadaily.com.cn/world/2008-02/17/content_6460673.htm)

9. Reuters, America Latina:

<http://lta.reuters.com/article/worldNews/idLTAN0626716720080206>

10. Clarín (Argentina):

<http://www.clarin.com/diario/2008/02/10/sociedad/s-04101.htm>

- Comments on the general concept of Criticality and Brain function:

1. National Geographic News:

“Dominoes, Avalanches Give Insight Into Brain Function” by John Roach (November 6, 2006)  
<http://news.nationalgeographic.com/news/2006/11/061106-brain-cascade.html>

- Comments of the article Chialvo DR. "How we hear what isn't there: a neural mechanism for the missing fundamental illusion". Chaos, 13(4) 1226-1230 (2003)

1. Hearing ghosts, Phillip Ball, Nature, 425, 914, (2003).

2. Juegos matemáticos. La frecuencia fantasma. JMR Parrondo, Investigación y Ciencia (Spanish Edition of Scientific American, January 2004).

- Selected media comments of the article Eguiluz et al. “Scale-free brain functional networks”. Phys. Rev. Letters 94, 018102 (2005) :

1. 2005-01-5. MSN NBC (USA). “How your brain is like the Internet. Mind’s geography traces classic network pattern”

2. 2005-01-16. Science Daily (USA). “Magnetic Resonance Imaging Deconstructs Brain's Complex Network”.

3. 2005-01-16. Clarin, Buenos Aires, Argentina. “Nueva tecnica de imagenes ”

4. 2005-01-14. Ultima Hora, Madrid, Spain. “Brain areas have similarities with other networks”

5. 2005-01-16. Diario de Mallorca, Mallorca Spain. “New imaging technique”.

6. 2005-01-5. Innovations report, Germany. “Magnetic resonance imaging deconstructs brain’s complex network”.

7. 2005-01-5. Medical News Today, UK - “Magnetic resonance imaging deconstructs brain's complex network”

**INVITED SEMINARS AND PLENARY TALKS (SINCE 1996)**

1. September 30, 1996: Plenary Talk "Maps in our heads: Self-organization of topology-preserving maps". XI Conference on Nonequilibrium Statistical Mechanics and Nonlinear Physics Conference (MEDYFINOL'96), MEDYFINOL 96, University of Tucuman, San Miguel de Tucuman, (Rep. Argentina)
2. October 11, 1996: Universidad Favaloro, Buenos Aires (Rep. Argentina) "Maps in our heads: Self-organization of topology-preserving maps".
3. October 10, 1996: Physics Department Colloquium, School de Exact and Natural Sciences. University of Buenos Aires. "Self-organization in brain maps. Experiments and theory."
4. November 14, 1996: Center for Studies in Physics and Biology. The Rockefeller University, NY, USA. "Maps in our heads: Self-organization of topology-preserving maps."

### 1997

5. April 4, 1997: "What do brains compute?" Annual Computational Neuroscience Symposium. Speakers: Dante Chialvo, Per Bak, Teuvo Kohonen, J Field, D Ballard. Organized by the Computational Neuroscience Program, Syracuse University and SUNY Health Science Center at Syracuse 4-5 April 1997, Syracuse, NY, USA.
6. April 8, 1997: Invited Speaker. Plenary Talk. "Fractal 97, Fractals in the Natural and Applied Sciences" 4th International Multidisciplinary Conference Denver, Colorado, USA. "Mapping sameness into neighboriness".
7. July 20, 1997: Niels Bohr Institute. Copenhagen, Denmark. Physics Colloquium. "Learning from mistakes".
8. August 3, 1997: Höchstleistungsrechenzentrum HLRZ, Forschungszentrum Jülich , Germany. (P. Grassberger's lab) "What we don't know and we should know about brains?"
9. September 1997: Center for Studies in Physics and Biology. The Rockefeller Univ., NY, USA. "Learning from Mistakes".
10. October 1997: McGill University. Montreal, Quebec, Canada. "Learning from mistakes could be critical and self-organized." Centre for Nonlinear Dynamics in Biology and Medicine, Colloquium.
11. October 1997: Cornell University, Ithaca, NY. Physiology Colloquium. "Learning and self-organization".
12. October 1997: NEC Research Institute. Princeton. NJ. "Dynamical consequences of dendritic nonlinear conductances."
13. November 1997: SUNY Health Science Center at Syracuse, NY. Physiology and Neuroscience Colloquium, "Learning from mistakes".

### 1998

14. January 10, 1998: SUNY Health Science Center at Syracuse, NY. Neurosurgery Research Day. Special Invited Lecture. "Learning from mistakes".

15. April 8, 1998: Penn State University. State College, PA. Center for Gravitational Physics and Geometry, Special Seminar. "Learning from Mistakes".
16. May 9, 1998: Arcidoso, (Toscana), Italy. International conference on stochastic resonance in biology. "Criticality in excitable systems. Who started the fire?"
17. September 14, 1998: Municipal Council of Rafaela (Santa Fe) Rep. Argentina. "Complexity in Nature"
18. September 14, 1998: High School Luisa R. de Barreiro (EEM N° 428, ex "Colegio Nacional de Rafaela"), Rafaela, (Santa Fe), Rep. Argentina. Special Class: "Doing Science".
19. September 25, 1998: Universidad Favaloro. Buenos Aires (Rep. Argentina) Colloquium in Biophysics. "Reading a neural code".
20. September 28, 1998: Colloquium, Physics Department. School of Exact and Natural Sciences. University of Buenos Aires. (Rep. Argentina) "Dynamical systems: complex, complicated or confused?"

#### 1999

21. June 14, 1999: "Self-organized memory in extended systems". Niels Bohr Institute. Copenhagen, Denmark. Colloquium.
22. October 1-11, 1999: "The dynamics of complex systems", Post-graduate course. School of Exact Sciences and Technology. National Univ. of Tucuman, San Miguel de Tucuman. Argentina.
23. October 16, 1999: Plenary Talk, "Noise Induced Memory", VI Latin American Workshop on Nonlinear Phenomena, (LAWNP'99) and XII Conference on Nonequilibrium Statistical Mechanics and Nonlinear Physics Conference (MEDYFINOL'99), Huerta Grande. Cordoba. Argentina.
24. October 24-27, 1999: "The dynamics of complex systems", Post-graduate course. PhD Program in Biomedical Sciences. School of Medical Sciences. Univ. Nacional de Rosario. Rosario. Argentina.

#### 2000

25. April 13, 2000: "Biological learning: Beyond Hebb ideas", Georgia Institute of Technology. Atlanta, GA.
26. June 19, 2000: "Self-organization of ants' trails", Cross-Disciplinary Physics Department IMEDEA, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands (UIB), Palma de Mallorca, Spain.
27. July 10, 2000: "Pitch perception revisited" Cross-Disciplinary Physics Department IMEDEA, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands (UIB), Palma de Mallorca Spain.
28. October 20, 2000: "Nonlinear pitch perception". Physiology Dept. Northwestern Med. School. Chicago IL.

29. October 24, 2000: "Revisiting the problem of pitch perception", McGill University. Physiology, Montreal, Quebec, Canada. Centre for Nonlinear Dynamics in Biology and Medicine.
30. October 31, 2000: "Nonsense sounds created by our nonlinear senses", Physiology Colloquium. Physiological Sciences Dept, Cornell University, Ithaca N.Y.

## 2002

31. January 20, 2002: "Per Learning", Santa Fe Institute. Santa Fe, NM.
32. April 24, 2002: "Issues in Complexity and Emergence". Institute of Pure and Applied Mathematics, UCLA. Los Angeles, CA.
33. May 3, 2002: "The Equations of E-motion". International Symposium "Modeling complex biophysical processes". Colonia, Uruguay.
34. May 5, 2002: "A neural mechanism for the missing fundamental illusion and the perception of pitch". Dept. of Physiology, University of Montevideo, Uruguay.
35. May 7, 2002: "Illusory synchronization". University of Rosario. Medical School, Rosario, Argentina.
36. June 3, 2002: "The auditory perception of pitch and illusory phase-locking". Biocomp 2002, Vietri sur Mare, Italy.
37. June 18-27, 2002: Invited Lectures in the European Interdisciplinary School on Nonlinear Dynamics for System and Signal Analysis, EUROATTRACTOR2002, Warsaw, June 18 to June 27, 2002, Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences.
38. July 18, 2002: "Excitable Systems" Cross-Disciplinary Physics Department IMEDEA, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands (UIB), Palma de Mallorca Spain.
39. July 22, 2002: "What nonlinear physics can do for cardiology". Cardiology Dept., Hospital Son Dureta, Palma de Mallorca, Spain.
40. July 30, 2002: "Exploraciones matemáticas del dolor crónico" Cross-Disciplinary Physics Department IMEDEA, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands (UIB), Palma de Mallorca, Spain.
41. September 3, 2002: "Subharmonic Stochastic Resonance: a Neural Mechanism for the Missing Fundamental Illusion and the Perception of Pitch", UPON 2002 Int. Conference on Unsolved Problem of Noise. National Institute of Health Campus (NIH). Bethesda, MD.
42. October 8, 2002: "Ghost resonance, how brain can see what isn't there". National Institute of Health Campus (NIH). Bethesda, MD.
43. October 22, 2002: "Ghost stochastic resonance: A neural mechanism for the missing fundamental illusion". House Ear Institute, Los Angeles, CA.
44. November 29, 2002: "Ghost resonances in Physics and Biology", Faculty of Technical Physics, Helsinki Univ., Finland.

45. December 9-13, 2002: "Modeling nonlinear aspects of perception and emotion". Invited plenary talk, XIII Conference on Nonequilibrium Statistical Mechanics and Nonlinear Physics. Colonia, Uruguay.

## 2003

46. February 7, 2003: "Modeling brain perception". Univ. Southern California, Information Sciences Institute, Marina del Rey, CA.
47. April 23, 2003: "El dolor no sólo duele, también lastima" University of Rosario Medical School, (Rep. Argentina)
48. April 29, 2003: Colloquium, Physics Department. School of Exact and Natural Sciences. University of Buenos Aires. (Rep. Argentina). " Sobre emociones, dolor y placer".
49. June 24, 2003: "Nonlinear processes in the heart" Cross-Disciplinary Physics Department IMEDEA, Institut Mediterrani d'Estudis Avançats (Mediterranean Institute for Advanced Studies), University of the Balearic Islands (UIB), Palma de Mallorca, Spain.
50. July 9, 2003: "Complexity and Criticality in Networks". Workshop on Complexity and Criticality, Computational Neuroscience Meeting CNS 2003, University Miguel Hernández, Alicante, Spain
51. August 8, 2003: "Complexity in brain networks". Talk and roundtable in the "Curso sobre Emoción y Cerebro". Universidad Complutense de Madrid. El Escorial. Spain.
52. August 22, 2003: "Brain complexity". Niels Bohr Summer Institute on Complexity and Criticality. A workshop honoring late Prof. Per Bak. Copenhagen, Denmark.
53. August 25, 2003: "How we can hear what isn't there". Niels Bohr Summer Institute on Complexity and Criticality. A workshop honoring late Prof. Per Bak. Copenhagen, Denmark.
54. September 23, 2003: "How sensory neurons code what isn't out there". 5th International Workshop in Neuronal Coding 2003, Aulla, Tuscany, Italy.
55. October 9, 2003: Colloquium "Complexity of brain networks". Physics Dept. University of Houston, Houston, USA.
56. October 27, 2003: "Brains are critical". Mathematics Dept., Harvey Mudd College, Claremont, CA, USA.
57. November 19, 2003: "Scale-free brain networks". Dept de Física, Universidad de las Islas Baleares, Palma de Mallorca. Spain.
58. November 21, 2003: "How sensory neurons see what is not there". Physiology Dept., Marburg University. Marburg, Germany.
59. November 25, 2003: "Brain networks", Dipartimento di Fisica, Università di Roma "La Sapienza" Rome, Italy.
60. November 27, 2003: "Critical brains", Departament de Física Fonamental, Universitat de Barcelona, Barcelona, Spain.

61. December 9, 2003: "Scale-free brain functional networks". Electrical Engineering Department, UCLA. Los Angeles, CA.

## 2004

62. March 3, 2004: "Scale free brain networks" Invited Lecture for the Inaugural Symposium of the Natal Neuroscience Institute, Natal. Brazil.
63. March 9, 2004: "Critical brain networks", Physics Department. School of Exact and Natural Sciences. University of Buenos Aires, Buenos Aires, Argentina.
64. Mayo 12, 2004: "Scale free brain functional networks", Facultad de Astronomia Matematica y Fisica, University of Cordoba, Argentina
65. Mayo 14, 2004: "Complex networks in biology and medicine", Physics Dept., Univ. of Rosario, Rosario, Argentina.
66. May 22, 2004: "Brain networks". Symposium celebrating Frank Moss 70th birthday. Institute of Biology of the Humboldt University, Berlin, Germany.
67. June 14, 2004: "Ghost Resonances in sensory systems". Univ. Politecnica de Cataluña, Terrazas, Spain.
68. August 2, 2004: "Simplificando los sistemas complejos". Introductory lecture for the Summer Course in Complex Systems: Mente y Complejidad., Universidad Complutense. El Escorial. Spain.
69. October 22, 2004: "Avalanches and brain networks". Mini-Conference at University of Missouri St. Louis Celebrating Frank Moss's 70th Birthday, UMSL, St. Louis, Missouri.
70. December 6-10, 2004: "Scale free brain networks". Plenary Talk MEDYFINOL'04 XIV Conference on Nonequilibrium Statistical Mechanics and Nonlinear Physics, La Serena, Chile.

## 2005

71. March 11, 2005: BSI Forum "De-constructing brain functional networks", Riken Brain Science Institute. Perceptual Dynamics Laboratory, Saitama, Japan.
72. March 14, 2005: "Critical Brain networks", Kaneko Lab, Department of Pure and Applied Sciences, Tokyo University, Komaba-Todai-Ma, Japan.
73. March 16, 2005: BSI Forum "Perception can be an objective illusion: the case of ghost resonances in auditory and visual sensory systems", Riken Brain Science Institute. Perceptual Dynamics Laboratory, Saitama, Japan.
74. March 29, 2005: "Brain segregation-integration or just plain phase transition?" Complex System Group ICREA, (Catalan Institute for Research and Advanced Studies), Universitat Pompeu Fabra, Barcelona, Spain.
75. March 31, 2005: "Critical brain networks" Service Hospitalier Frédéric Joliot, Département de Recherche Médicale du CEA, Orsay, France.

76. April 20-22, 2005: "Self-organization of scale free brain networks". Invited Plenary Talk. Los Alamos National Laboratory. Workshop on Collectives formation and specialization in biological and social systems, Santa Fe, New Mexico.
77. May 6, 2005: "Critical brain networks". Colloquium. IGERT, Interdisciplinary Nonlinear Seminar. Northwestern Univ. Evanston, IL, USA.
78. June 15-18, 2005: "Rhythms, Dynamics and Avalanches" Plenary Talk, Rhythms Sleep & Learning Workshop. University of Rio Grande do Norte, Natal, Brazil.
79. July 19, 2005: "The abc of fMRI analysis" Psychology Department, University of the Balearic Islands (UIB), Palma de Mallorca, Spain.
80. July 26-August 1st, 2005: Invited Plenary Talk. "Critical brain networks". STOCHDYN "100 Years of theory on Brownian motion" celebrating the centennial of Einstein's work on Brownian motion. Ettore Majorana Center, Erice, Sicily, Italy.
81. August 8-12, 2005: Plenary Talk. International Summer Institute "Synchrony in Mind, Brain and Consciousness". Peter Wall Institute for Advanced Studies at the University of British Columbia in Vancouver, British Columbia, Canada.
82. September 7, 2005: Round Table, "Avances multidisciplinarios en neurofisiología cognitiva: Desde la percepción musical al canto de los pájaros". Congreso Argentino de Fonoaudiología, Rosario, Santa Fe, Argentina.
83. September 21-23, 2005: "Critical brain networks". Plenary Talk, SABI 2005, Meeting of the Sociedad Argentina de Bioingeniería, Paraná, Argentina.
84. September 28, 2005: Plenary Talk, "Critical brain networks". Argentinian Physics Society (AFA) Annual Meeting, La Plata, Argentina.
85. October 8-9, 2005: Invited Talk. European follow-up of the Peter Wall Institute "Synchrony in Mind, Brain and Consciousness". University Paris Sorbonne, France.
86. October 26, 2005: "Critical brain networks". Plenary Talk VIII Latin American Workshop on Nonlinear Phenomena, LAWNP05, Bariloche, Argentina.
87. October 28, 2005: "Perception, objective illusions and ghost resonances in auditory and visual sensory systems". Series of Public Lectures Celebrating the 50<sup>th</sup> Aniversary of the Instituto Balseiro, Bariloche, Argentina.
88. December 1, 2005: Invited Colloquium. "How and why to study fluctuations in neural systems". 2005 Argentine School of Neuroscience IBRO /INMHA Advanced School Receptors, Channels, and Synapses" INGEBI (CONICET), Buenos Aires, Argentina.
89. December 7, 2005: First Argentine School of Mathematics and Biology. Argentine National Program BIOMAT, National University of Córdoba, La Cumbre, Córdoba, Argentina. (Cancelled due to scheduling conflict)
90. December 12-16: Invited Plenary Talk. "BIOCOMP2005: Diffusion processes in neurobiology and subcellular biology". Vietri sul Mare, Italy. (Cancelled due to scheduling conflict).

## 2006

91. March 3, 2006: Public Lecture "Brain Complexity" Cicle de Conferences "Cervell Conducta i Societat" Universitat de les Illes Balears i Fundacio "La Caixa", Palma de Mallorca, Mallorca, Spain.
92. April 5, 2006: "Critical aspects of brain function". Computation in Physics Colloquium, James Franck Institute, University of Chicago, Chicago.
93. July 17-21, 2006: Meeting on Constructive Role of Noise in Complex Systems (Seminar and Workshop: June 26 - July 21, 2006) at the Max-Planck Institute for Physics of Complex in Dresden (Cancelled due to scheduling conflict)
94. September 7, 2006: Invited Colloquium. "How and why to study fluctuations". Physiology Department, Scholl of Pharmacy, University of Barcelona, Barcelona. Spain.
95. September 11-15, 2006: 9<sup>th</sup> Granada Seminar in Computational and Statistical Physics. Organized by the Institute "Carlos I" for Theoretical and Computational Physics, University of Granada. Spain. Computational and Mathematical Modeling of Cooperative Behavior in Neural Systems.
96. September 25-29, 2006: Twelve Lectures in the V Curso Boliviano de Sistemas Complejos (with emphasis on Neuroscience). Organized by Carrera de Física, Universidad Mayor de San Andrés, La Paz, Bolivia.
97. December 1, 2006: Physics Colloquium. Dept. of Physics and Astronomy, University of Missouri, Saint Louis (UMSL) (Cancelled due to bad weather).
98. December 4-6, 2006: Plenary Talk. XV Conference on Nonequilibrium Statistical Mechanics and Nonlinear Physics (MEDYFINOL'06). Mar del Plata, Argentina.
99. December 14-16, 2006: Plenary Talk "Where in the world is the brain?". Workshop on "Embodying cognition: Towards an integrated approach", Department of Psychology, Universitat de les Illes Balears, Palma de Mallorca, Spain.
100. December 18, 2006: "Critical Brain Networks", Biophysics Colloquium. Radboud University, Nijmegen. The Netherlands.

## 2007

101. February 4-14, 2007: Two invited lectures in the "Second Latin-American School on Statistical Physics and Interdisciplinary Applications" organized by the UFRGS's Complex Fluids group (Brazil) and the ICTP (Trieste, Italy), Bento Gonçalves, Brazil.
102. February 21, 2007. Defense Department Advance Research Program (DARPA) HAND Meeting, Defense Science Office, Arlington, Virginia. What is next in advanced brain research?
103. May 16, 2007: Complexity without complications. Psychology Department. Universidad Complutense, Madrid, Spain.
104. September 24-28, 2007: Invited Plenary Talk. BIOCAMP2007 - Collective Dynamics: Topics on Competition and Cooperation in the Biosciences. Vietri sul Mare, Italy.

105. October 11–13, 2007: Invited Plenary Talk. Computational philosophy: lessons from simple models. Niels Bohr Institute, Copenhagen, Denmark.
106. October 19, 2007: Colloquium. Life Sciences Interface Chair. Southampton University, UK.
107. November 3-7, 2007: Plenary Talk. 8th International Workshop in Neural Coding 2007. Montevideo, Uruguay.
108. November 16, 2007: Colloquium. Physics, The Frank and Elaine Moss Hospitality Fund Distinguished Lecture Series. University of Saint Louis, Missouri, 2007. (Cancelled).

## 2008

109. April 11, 2008: Invited Colloquium. How is that the brain works? Instituto de Biología y Medicina Experimental, (IByME). Buenos Aires, Argentina.
110. June 24, 2008: Invited Colloquium, The brain: What is critical about it? Institute for Mathematical Sciences. Complexity Science Seminar Series. Imperial College, London, UK.
111. August 17-21, 2008: Invited Speaker. Stochastic Resonance 2008 International Conference. Perugia, Italy.
112. September 4, 2008: Invited Lecture at the “The physics and computational aspects of neural coding” Symposium. IBRO, NEUROLATAM I. First Ibero-Latin-American and Caribbean Meeting on Neuroscience. Buzios, Brazil.
113. December 1-4, 2008: Invited Speaker. XVI Conference on Non-Equilibrium Statistical Mechanics and Nonlinear Physics (MEDYFINOL'08). Punta del Este, Uruguay.
114. December 15, 2008: Invited Colloquium. Instituto Tecnológico Buenos Aires (ITBA), Buenos Aires, Argentina.
115. December 17, 2008: Invited Colloquium. “The brain is critical, and why should we care ”. International Institute of Neuroscience, Natal , Brazil.
116. December 19, 2008: Invited Colloquium. “Reading the mind and understanding the brain, all at once”. Physics Department. UFRP, Recife , Brazil.

## 2009

117. January 6, 2009: Invited Plenary Talk. “How critical is the brain: physics and computational aspects”. XXXVIII Winter Meeting on Statistical Physics, Taxco, Guerrero, Mexico.
118. March 19, 2009: Invited Colloquium. “Brain’s statistical physics”. Swiss Institute of Technology, (ETH). Zurich.
119. March 25, 2009: Invited Lecture. “Brain’s statistical physics”. Institute for Mathematical Sciences. Imperial College, London, UK Meeting on Complexity and Networks. Neuroscience: Complexity analysis of signals.
120. August 25, 2009: Invited Lecture. “Beyond Feeling: how pain hurts the brain”. Research Day, Physical Medicine & Rehabilitation, Veterans Administration, West LA, Los Angeles.
121. September 25, 2009: Invited Lecture. “Brain balance in health and disease”, Psychology Dept.

UIB, Mallorca, Spain

122. October 5, 2009: Invited Lecture. "Criticality and brain function". X Latin American Workshop on Nonlinear Phenomena, LAWNP09, Buzios, Brazil. (Canceled due to last minute schedule conflict)
123. November 13, 2009: Invited Colloquium. "Experimental evidence of improved human performance with aging". Programa De-Volvamos, Profisio CIMA, UNR, Rosario. Argentina.

## 2010

124. January 10-13, 2010: Invited Speaker. Workshop on "Decision-Making models". Physics, University of North Texas, Denton, TX.
125. March 1-5, 2010: Invited Speaker. Brain Coordination Dynamics - an International Conference. Conference at Sea - Florida and Western Caribbean.
126. June 7, 2010: Invited Colloquium "Large scale brain dynamics". Institute Carlos Estable, Montevideo, Uruguay.
127. July 3-7, 2010: Invited Speaker Symposium on "Structure, dynamics and function in large scale neuronal ensembles" in the Forum of European Neurosciences (FENS 2010, Amsterdam). (Cancelled due to scheduling conflict)
128. September 13-17, 2010: Invited Speaker 11th Granada Seminar on Computational and Statistical Physics. La Herradura, Tropical Coast of Granada. Organized by the Institute "Carlos I for Theoretical and Computational Physics", University of Granada. Spain
129. September 21, 2010: Invited Lecture. "Novel non linear techniques of fMRI analysis", Psychology Dept. UIB, Mallorca, Spain
130. October 26, 2010: Chairman and Organizer. Workshop on "I International Symposium for the Study of Chronic Pain and Fibromyalgia". Facultad de Medicina, Universidad de Rosario, Rosario, Argentina.

## 2011

131. March 18-20, 2011: Invited Speaker. Workshop on "Brain Criticality". Physics, University of North Texas, Denton, TX.
132. April 14, 2011, Invited Speaker. 6th Annual NIH Pain Consortium Symposium. "Mechanisms and Management of Overlapping Chronic Pain and Associated Conditions". Natcher Auditorium. NIH Campus, Bethesda, USA.
133. April 15-16, 2011, Invited Discussant. "Collaborating with CTSA's to Advance Pain Research", Natcher Conference Center, NIH, Bethesda, USA.
134. April 18, 2011, Invited Speaker. "Lessons from atomic switches and neuron's synapses: universal dynamics across 20 orders of magnitude". California NanoSystems Institute, UCLA, Los Angeles, CA, USA.
135. May 5-7, 2011. Keynote Speaker. "New challenges in brain imaging of pain". VI Multidisciplinary Mediterranean Pain Forum & I European Multidisciplinary Pain Meeting,

Menorca, Spain.

136. May 12-13, 2011. Invited Speaker. II International Symposium for the Study of Chronic Pain and Fibromyalgia, Universidad de las Islas Baleares. Palma de Mallorca, Spain.
137. June 23, 2011. Physics Colloquium. "What physics can do for brain science". Physics Department, University of Buenos Aires, Argentina.
138. July 26, 2011. Physics Colloquium. "Criticality in Brain physics & Mind dynamics". Institute for Cross-disciplinary Physics and Complex Systems, University of Islas Baleares, Mallorca Spain.
139. July 27-28, 2011: Invited Speaker. Workshop on Noise and nonlinear dynamics in neural information processing (Honoring the late Frank Moss), Stockholm. (Canceled due to schedule conflict).
140. September 5-9, 2011: Invited Speaker, International Workshop on Nonlinear Physics and Applications, NOLPA2011, Joao Pessoa, Paraiba University, Brazil.(Canceled due to schedule conflict).
141. September 19-23, 2011: Invited Plenary Speaker. "The physics of the brain". Bienal de Física de la Real Sociedad Española de Física, Palacio de La Magdalena de Santander, Spain.
142. September 26, 2011. Invited seminar. Criticality in brain physics and mind dynamics. EPFL. Lausanne, Switzerland.
143. September 27, 2011. Invited seminar. Criticality in brain physics and mind dynamics. Geneva Medical School - University of Geneva.
144. December 7, 2011. Invited seminar. "Como leer la mente y entender el cerebro." Segundo Coloquio Internacional de Neurociencia, Psicología Cognitiva y Sociedad, Instituto Rosario de Ciencias de la Educacion, UNR/Conicet, Rosario, Argentina.

## 2012

145. May 2-3, 2012 Invited Speaker. NIH Sponsored Conference on Critical Brain Dynamics. "Two decades of critical brain dynamics". Natcher Auditorium. NIH Campus, Bethesda, USA.
146. May 5-7, 2012. Keynote Speaker. "Brain imaging of pain". VII Multidisciplinary Mediterranean Pain Forum & I European Multidisciplinary Pain Meeting, Menorca, Spain.
147. September 17-21, 2012, Plenary Speaker, Physics, Computation, and the Mind- Advances and Challenges at Interfaces. Granada Seminar. La Herradura, Spain.