

# CURRICULUM VITAE

JEAN RENÉ BRAGARD MONIER

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Researcher ID:

C-8086-2012

Orcid: 0000-0003-3450-9609

Professional Address:

**Dpto. Física y Matemática Aplicada &  
Institute of Data Science and Artificial  
Intelligence,  
Universidad de Navarra  
Calle Irunlarrea 1  
31008 Pamplona  
SPAIN**

Telephone number:

**+34 948 425600 Ext. 806422**

Electronic mail:

**[jbragard@unav.es](mailto:jbragard@unav.es)**

Home page:

**<https://jeanbragard.github.io>**

## PERSONAL DATA

Surname, names: Bragard, Jean René Alfred

Researcher ID: C-8086-2012  
Orcid: 0000-0003-3450-9609

Citizenship dual: Belgian (NIE: X3999400E),  
Spanish (since 2014)

Present Professional Status: Catedrático (Full Professor)

Institution: University of Navarra

Faculty: School of Science

Department: Department of Physics and Applied Mathematics

Address: Dpto. Física y Matemática Aplicada, Facultad de Ciencias, Universidad de Navarra c/Irunlarrea 1, 31080 Pamplona (Spain)

Telephone number: +34 948 425600 Ext. 806422

Electronic mail: [jbragard@unav.es](mailto:jbragard@unav.es)

Home page: <https://jeanbragard.github.io>

**1. ACADEMIC TITLES**

Title	Organization	Centre	Date	Grade
Ms. Eng. Science Mécanique-Physique	University of Liege (Belgium)	Faculty of Applied Sciences	17 <sup>th</sup> September 1992	<i>La plus grande distinction (Summa Cum Laude)</i>
Ph.D. in Theoretical Physics (Fluid)	University Complutense Madrid (Spain)	Faculty of Physics	11 <sup>th</sup> February 1997	<i>Summa Cum Laude (por unanimidad)</i>
Habilitation in Applied Physics	Ministry of Education and Sciences (Spain)	National Council of University Coordination	13 <sup>th</sup> March 2008	<i>Without grading</i>
Accreditation for Full Professor	Ministry of Education and Sciences (Spain)	National Council of University Coordination (ANECA)	7 <sup>th</sup> June 2016	<i>Without grading</i>

## 2. UNIVERSITY POSITIONS

Level	Organization	Status	Start date	End date
Lecturer (Tenure-Track)	University of Navarra	Full time	9/1/2001	9/30/2005
Senior Lecturer (Tenured)	University of Navarra	Full time	10/1/2005	9/30/2008
Associate Professor (Profesor Titular)	University of Navarra	Full time	10/1/2008	9/30/2017
Full Professor (Catedrático)	University of Navarra	Full time	10/1/2017	---

## 3. RESEARCH EXPERIENCE

### 3.1 RESEARCH POSITIONS

1. **Student Internship.** Dept. of Thermodynamics. Faculty of Sciences. University of Liege (Belgium). October 1991 until June 1992.
2. **Scholarship researcher.** Dept. of Thermodynamics. Faculty of Sciences. University of Liege (Belgium). November 1992 until March 1994.
3. **"Marie Curie" Scholarship recipient. European Union.** Dept. of Fluid Physics. Instituto Pluridisciplinar. University Complutense Madrid (Spain). April 1994 until February 1997.
4. **Postdoctoral associate.** "Fondation Duesberg-Baily". Israel Institute of Technology (TECNION, Applied Mathematics dept.). March 1997 until June 1997.
5. **Postdoctoral associate. European Union.** Istituto Nazionale di Ottica (INO, Florence, Italy). August 1997 until December 1998.
6. **Research associate.** Physics dept., Faculty of Science. University of Liege (Belgium). January 1999 until January 2000.
7. **Research associate.** Physics dept., Northeastern University (Boston, USA). February 2000 until July 2001.
8. **Lecturer (Tenure-track)** (UNAV) Physics and Applied Math. Dept. September 2001 until September 2005.
9. **Senior Lecturer** (UNAV) Physics and Applied Math. Dept. October 2005 until September 2008.
10. **Associate Professor** (UNAV) Physics and Applied Math. Dept. October 2008 until September 2017.
11. **Full Professor** (UNAV) Physics and Applied Math. Dept. September 2017 until now.
12. **"Fulbright" Fellowship recipient. US-Spain Association.** CVRTI, University of Utah. January 2018 until June 2018.

### 3.2 MAIN AREAS OF RESEARCH

- **Analysis of Biomedical images and signals (e.g. cardiac):** since the year 2008
- **Parallel computation for the solution of PDE of Mathematical Physics:** since the year 2007.
- **Biophysics and mathematical modeling of the cardiac dynamics:** since the year 2005.
- **Nonlinear optics and condensed matter theory:** since the year 1997.
- **Control and synchronization of dynamical chaotic systems:** since the year 1997.
- **Convection and nonlinear waves in fluid systems (including polymeric and ferroelectric fluids):**  
Theoretical and numerical analysis of pattern formation and wave stability since the year 1992.

**Recognition of 4 "Sexenios de investigación" (1993-1999, 2000-2005, 2006-2011, 2012-2017)**  
(Recognition by CNEAI (Spain) of 4 x 6 year of international-quality research from 1993 until 2017).

### 3.3 PAST SHORT RESEARCH STAYS

1. **Istituto Nazionale di Ottica (Italy)**  
Activity: Synchronization in spatially extended chaotic systems.  
Place: Largo E. Fermi, Florence, Italy 3/1/2003 until 3/31/2003.  
Position: Invited researcher. Responsible: Dr. S. Boccaletti and Prof. FT. Arecchi.
2. **Institute for Theoretical Physics of the Technical University of Berlin (Germany)**  
Activity: Synchronization and control in spatially extended systems.  
Place: Technical University of Berlin, Germany 12/13/2003-12/20/2003.  
Position: Invited researcher. Responsible: Prof. Eckehard Schöll.
3. **Instituto de Física, U. Pontificia de Valparaíso (Chile)**  
Activity: Study of convection in ferroelectric fluids.  
Place: Pontificia U. C. Valparaíso, Chile 6/20/2006-7/20/2006.  
Position: Invited professor. Responsible: Prof. Javier Martínez-Mardones.
4. **Department of Biomedical Sciences, Cornell University (USA)**  
Activity: Realization of a computer code for modeling the three dimensional electrical activity of the heart.  
Place: Cornell University, Ithaca (USA) 8/1/2007-8/31/2007.  
Position: Invited professor. Responsible: Prof. Robert Gilmour and Dr. Flavio Fenton.
5. **Department of Biomedical Sciences, Cornell University (USA)**  
Activity: Numerical simulations of defibrillation in a model of cardiac tissue.  
Place: Cornell University, Ithaca (USA) 5/1/2012-8/31/2012.  
Position: Visiting Fellow Cornell University. Responsible: Prof. Robert Gilmour and Dr. Flavio Fenton.
6. **Department of Applied Mathematics, UNESP, Sao Paulo (Brazil).**  
Activity: Study of the classical billiards (Numerical and theoretical dynamical systems, i.e. billiards)  
Place: UNESP, Rio Claro, Sao Paulo (Brazil) 10/6/2012-10/22/2012.  
Position: Visiting Professor. Responsible: Prof. Ricardo Egydio de Carvalho.
7. **Department of Physics, U. Liege, Liege (Belgium).**  
Activity: Numerical study of the electro-mechanical coupling in cardiac tissue.  
Place: University Liege, Liege (Belgium) 8/1/2013-9/24/2013.  
Position: Visiting Professor. Responsible: Prof. Pierre C. Dauby.
8. **Nora Eccles Harrison Cardiovascular Research and Training Institute (CVRTI), University of Utah (USA)**  
Activity: Numerical simulations of the tridomain model and application to defibrillation in a model of cardiac tissue.  
Place: University of Utah, SLC (Utah, USA) 1/2/2018-6/29/2018.  
Position: "Fulbright" Research Fellow. Responsible: Prof. Frank B. Sachse.

### 4. PARTICIPATION IN FINANCED RESEARCH PROJECTS (indication of approx budget when PI)

1. **Microgravity and capillary properties (PAI-II- N° 29)**  
Sponsored by: Ministry of Sciences Belgium.  
Participants: University of Brussels, Gent, Leuven, Mons and Liege.  
Duration: from: 1990 until: 1995  
Principal Investigator: Prof. Jean-Claude Legros (ULB)  
Number of researchers: > 30  
Role: Pre-doctoral researcher
2. **Nonlinear dynamics and statistical physics of spatially extended systems (FMRX-CT96-0010)**  
Sponsored by: European Union  
Participants: ULB (Brussels), ENS (Paris), INLN (Nice), Cambridge, Warwick, Niels Bohr Institute, University College London, INO (Florence), U. Milano, Eotvos Univ. (Budapest), Weizmann Institute and Technion (Israel).  
Duration, from: 1996 until: 1999  
Principal Investigator: Prof. F. T. Arecchi (Florence)  
Number of researchers: > 40  
Role: Postdoctoral researcher

- 3. Fundamental aspects of hydrodynamic instabilities in multiphase and multicomponent (PAI-IV- N° 6)**  
Sponsored by: Ministry of Sciences Belgium.  
Participants: University of Brussels, Leuven, Mons and Liege.  
Duration: from: 1997 until: 2001  
Principal Investigator: Prof. Jean-Claude Legros (ULB)  
Number of researchers: > 20  
Role: Postdoctoral researcher
- 4. Microstructural evolution based on fundamental interfacial properties (DE-FG02-92ER45471)**  
Sponsored by: Department of Energy (USA).  
Participants: Carnegie Mellon, Michigan, Princeton, Illinois, Northeastern, Northwestern, Ohio State, Penn State University, Sandia in California and New Mexico, Los Alamos National Laboratory, Ames Laboratory, Argonne National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, National Institute of Standards and Technology, etc.  
Duration: from: 1999 until: 2004  
Principal Investigator: Prof. Alain Karma (Northeastern University).  
Number of researchers: > 50  
Role: Postdoctoral researcher
- 5. Control, Synchronization and Chaos of spatially extended nonlinear systems (HPRN-CT-2000-00158)**  
Sponsored by: European Union  
Participants: Univ. Potsdam (Germany), Weizman Institute (Israel), INOA (Italy), Univ. Complutense (Spain), Tech. Inst. Krakow (Poland), Univ. de Lisboa (Portugal), Univ. de Navarra (Spain)  
Duration: from: 2000 until: 2003  
Principal Investigator: Prof. H. L. Mancini (UNAV)  
Number of researchers: > 40  
Role: Researcher
- 6. Dinàmiques no lineals d'autoorganització espaciotemporal (2000-XT-0005)**  
Sponsored by: Xarxa temàtica, CURE, Generalitat de Catalunya (Spain)  
Participants: U. Santiago de Compostela, U. Barcelona, U. Politècnica de Catalunya, CSIC, U. de Navarra.  
Duration: from: 2001 until: 2002  
Principal Investigator: Prof. José M<sup>a</sup> Sancho Herrero  
Number of researchers: > 20  
Role: Researcher
- 7. Dinàmiques no lineals d'autoorganització espaciotemporal (2002-XT-0010)**  
Sponsored by: Xarxa temàtica, DURSI, Generalitat de Catalunya (Spain)  
Participants: U. de Santiago de Compostela, U. de Barcelona, U. Politècnica de Catalunya, CSIC, U. de Navarra, U. Carlos III, UNED, U. Complutense.  
Duration: from: 2002 until: 2003  
Principal Investigator: Prof. Laureano Ramírez de la Piscina  
Number of researchers: > 30  
Role: Researcher
- 8. Sistemas modelados mediante ecuaciones en derivadas parciales (BFM2001-4809E)**  
Sponsored by: Ministry of Science and Technology (Spain)  
Participants: U. Castilla la Mancha, U. Complutense, U. de Navarra (Spain)  
Duration: from: 2002 until: 2003  
Principal Investigator: Henar Herrero Sanz  
Number of researchers: 8  
Role: Researcher
- 9. Inestabilidades, formación de estructuras y control de fluidos (BFM2002-02011)**  
Sponsored by: Ministry of Science and Technology (Spain)  
Participants: Univ. de Navarra (Spain)  
Duration: from: 2002 until: 2005  
Principal Investigator: Hector Luis Mancini  
Number of researchers: 12  
Role: Researcher

- 10. Caracterización, control y sincronización de dinámica cardíaca (FIS2005-06912-C02-02)**  
Sponsored by: Ministry of Education and Science (Spain)  
Participants: Univ. de Navarra and U. Politécnica de Cataluña (Spain)  
Duration from: January 2006 until: December 2008  
Principal Investigators: Jean Bragard (UNAV) and Blas Echebarria (UPC).  
Number of researchers: 3+3  
**BUDGET:** approx. \$40,000.  
Role: **co-PI**
- 11. Red temática de dinámica cardíaca y simulación multiescala cardiovascular (MEC-2008)**  
Sponsored by: Ministry of Education and Science (Spain)  
Participants: U. Zaragoza, U. Politécnica de Valencia, U. de Navarra and U. Politécnica de Cataluña (Spain).  
Duration from: January 2008 until: December 2009  
Principal Investigators: Jose-Felix Rodriguez (U. Zaragoza), Jose-Maria Ferrero (UPV), Jean Bragard (UNAV) and Blas Echebarria (UPC).  
Number of researchers: 10  
**BUDGET:** approx. \$10,000.  
Role: **co-PI**
- 12. Modelización y Control de Dinámica Cardíaca. (FIS2008-06335-C02-02)**  
Sponsored by: Ministry of Education and Science (Spain)  
Participants: Univ. de Navarra and U. Politécnica de Cataluña (Spain)  
Duration from: January 2009 until: December 2011  
Principal Investigators: Jean Bragard (UNAV) and Blas Echebarria (UPC).  
Number of researchers: 3+3  
**BUDGET:** approx. \$40,000.  
Role: **co-PI**
- 13. The role of anatomical structure in ventricular and atrial arrhythmias. (NSF TG-IBN050000N)**  
Sponsored by: Teragrid Computing (NSF, USA)  
Participants: Univ. Cornell, U. Rochester and Univ. Navarra  
Duration from: January 2010 until: August 2014  
Principal Investigators: Elizabeth Cherry (Rochester), J. Bragard (Co-PI, UNAV) and F.H. Fenton (co-PI, Cornell).  
Number of researchers: 3  
**BUDGET:** CPU hours in the thousands  
Role: **co-PI**
- 14. Modelización de Dinámica Cardíaca y su Potencial Control. (FIS2011-28820-C02-02)**  
Sponsored by: Ministry of Education and Science (Spain)  
Participants: Univ. de Navarra and U. Politécnica de Cataluña (Spain)  
Duration from: January 2012 until: June 2016  
Principal Investigators: Jean Bragard (UNAV) and Blas Echebarria (UPC).  
Number of researchers: 3+4  
**BUDGET:** approx. \$40,000.  
Role: **co-PI**
- 15. Desarrollo y Aplicación de Modelos de Miocitos Auricular para Investigar Mecanismos que Confieren a los Pacientes un Mayor Riesgo de Fibrilación Auricular. (SAF2014-58286-C2-2-R)**  
Sponsored by: Ministry of Economy and Competitiveness (Spain)  
Participants: Univ. de Navarra, U. Politécnica de Cataluña, CSIC (Spain)  
Duration from: January 2015 until: December 2017  
Principal Investigators: Leif Hove (CSIC) and Blas Echebarria (UPC).  
Number of researchers: 6+5  
**BUDGET:** approx. \$30,000.  
Role: **co-PI**
- 16. Evaluación de las variaciones en la presión intraocular en el síndrome de apnea obstructiva del sueño**  
Sponsored by: University of Navarra, PIUNA project (Spain)  
Participants: Univ. de Navarra, University Hospital Navarra (CUN)  
Duration from: September 2016 until: September 2017  
Principal Investigators: Elena Carnero (UNAV).

Number of researchers: 4  
**BUDGET:** approx. \$5,000.  
Role: **Grant beneficiary**

**17. Study of the Influence of Patient Variability on the Efficiency of Cardiac Defibrillation (PRX-17/00064)**

Sponsored by: Fulbright US-Spain Association and Ministry of Education and Science (Spain)  
Participant: Jean Bragard University of Navarra (Spain)  
Duration from: January 2018 until: June 2018  
Place: CVRTI, University of Utah, (Salt Lake City, USA).  
**BUDGET:** approx. \$20,000.  
Role: **Grant beneficiary**

**18. Development of mathematical atrial models at tissue, cellular and subcellular levels to study mechanisms that confer patients a high risk of atrial fibrillation. (SAF2017-88019-C3-2-R)**

Sponsored by: Ministry of Economy and Competitiveness (Spain)  
Participants: Univ. de Navarra, U. Polit cnica de Catalu a, CSIC (Spain)  
Duration from: January 2018 until: August 2021  
Principal Investigators: Leif Hove (CSIC) and Blas Echebarria (UPC).  
Number of researchers: 6+5  
**BUDGET:** approx. \$30,000.  
Role: **co-PI**

**19. Red tem tica de Investigaci n en Modelizaci n Computacional Cardiac: V-HeartSN (MINECO, DPI2016-81873-REDT)**

Sponsored by: Ministry of Economy and Competitiveness (Spain)  
Participants: U. Universitat Polit cnica de Val ncia, Universidad de Navarra, Universitat de Val ncia, Universitat Polit cnica de Catalunya, Basque Center for Applied Numerical Methods, Universitat Pompeu Fabra, Barcelona Supercomputing Center (BSC-CNS), Universidad de Zaragoza  
Duration from: June 2017 until: December 2019  
Principal Investigators: Francisco Javier Saiz Rodr guez (UPV), Jean Bragard (UNAV) and 8 other co-PIs.  
Number of researchers: 30  
**BUDGET:** approx. \$10,000.  
Role: **co-PI**

**20. An lisis de la utilidad de la caracterizaci n electro-anat mica de la aur cula izquierda y del uso de biomarcadores circulantes de fibrosis mioc rdica para predecir el riesgo de recurrencia y evoluci n de la fibrilaci n auricular en pacientes sometidos a terapia de ablaci n. Implicaciones pron sticas en la estratificaci n del riesgo de ictus.**

Sponsored by: Instituto de Investigaci n Sanitaria de Navarra (IdiSNA) , Spain.  
Participants: Univ. de Navarra, CIMA (UNAV), CUN (UNAV)  
Duration from: January 2019 until: December 2022  
Principal Investigators: Susana Ravassa (CIMA & UNAV).  
Number of researchers: 6  
**BUDGET:** approx. \$80,000.  
Role: **Grant beneficiary**

**21. Computational Analysis of the Impact of Genetic and Clinical Risk on Molecular Signaling and Electrophysiological Dysfunction in Atrial Fibrillation. (PID2020-116927RB-C22 )**

Sponsored by: State Research Agency, Ministry of Economy and Competitiveness (Spain)  
Participants: Univ. de Navarra, U. Polit cnica de Catalu a, CSIC (Spain)  
Duration from: September 2021 until: September 2024  
Principal Investigators: Leif Hove (CSIC), Blas Echebarria, Raul Benitez (UPC).  
Number of researchers: 6+5  
**BUDGET:** approx. \$100,000.  
Role: **Grant beneficiary**

## **5. FELLOWSHIPS AND AWARDS (with indicative monetary amount granted)**

- **Fellowship “F. Pisart”** financial support for the study of English in the UK. University of Liege. July 1991. (**AMOUNT**: approx. \$1,000.)
- **“Marie Curie” Fellow** for the study of the doctoral program at U. Complutense Madrid (duration 24 months from June 1<sup>st</sup> 1994). Reference: ERBCHBICT 941046. **AMOUNT**: approx. \$60,000.)
- **Fellowship of the “Duesberg-Bailly” foundation** for a postdoctoral stay at the Israel Institute of Technology, Technion (Israel) from March until June 1997. **AMOUNT**: approx. \$10,000.)
- **European Union grant** for a postdoctoral stay at the Istituto Nazionale di Ottica (INO, Florence, Italy) from August 1997 until December 1998. Reference: Nonlinear dynamics and statistical physics of spatially extended systems (FMRX-CT96-0010). **AMOUNT**: approx. \$50,000.)
- **Fellowship of the US Department of Energy** for a postdoctoral stay at the Physics department (Northeastern University, Boston) from January 2000 until August 2001. Reference: DOE-FG02-92ER45471. **AMOUNT**: approx. \$60,000.)
- **Fellowship “Salvador Madariaga”** financial support for a visiting research stay at Cornell University (May to August 2012) (**AMOUNT**: approx. \$16,000.)
- **“Fulbright” Fellow** for the study of numerical cardiac defibrillation at the University of Utah, Salt Lake City (duration 6 months from January 2<sup>nd</sup> 2018 to June 29<sup>th</sup> of 2018). Reference: PRX-17/00064. **AMOUNT**: approx. \$20,000.)

## **6. PUBLICATIONS, BOOKS, THESIS**

1. **J. BRAGARD** “Instabilités convectives d’amplitudes finie induites par des effets de tension de surface”. Master thesis (in French), University of Liege (Belgium), 1992 (87 pages). Thesis Supervisor: Prof. G. Lebon.
2. **J. BRAGARD** “Estructuras convectivas y ondas inducidas por gradientes térmicos en capas fluidas”. Ph.D. thesis (in Spanish), Physical Sciences Faculty, University Complutense Madrid 1996 (214 pages). Thesis Supervisor: Prof. M.G. Velarde.

## **7. PUBLICATIONS IN REFEREED JOURNALS**

3. **J. BRAGARD & G. LEBON.** Non-linear Marangoni convection in a layer of finite depth. *Europhys. Lett.* **21**. Pgs. 831- 838 (1993).
4. **J. BRAGARD & G. LEBON.** Capillary ascension in porous media: A scaling law. *Transport porous med.* **16**. Pgs. 253- 261 (1994).
5. **J. BRAGARD, S. SLAVTCHEV & G. LEBON.** Nonlinear solutal Marangoni instability in a liquid layer with an adsorbing upper surface. *J. Colloid Interf. Sci.* **168**. Pgs. 402-413 (1994).
6. **J. BRAGARD, J. PONTES & M.G. VELARDE.** Patterns, defects and evolution of Bénard-Marangoni cells. *Int. J. Bifurcat. Chaos.* **6(9)**. Pgs. 1665-1671 (1996).
7. **J. BRAGARD & M.G. VELARDE.** Bénard convection flows. *J. Non-Equil. Thermody.* **22**. Pgs. 1-19 (1997).
8. **J. BRAGARD & M.G. VELARDE.** Bénard-Marangoni convection : planforms and related theoretical predictions. *J. Fluid Mech.* **368**. Pgs. 165-194 (1998).
9. **S. BOCCALETTI, J. BRAGARD & F.T. ARECCHI.** Controlling and synchronizing space-time chaos. *Phys. Rev. E.* **59(6)**. Pgs. 6574-6578 (1999).
10. **S. BOCCALETTI, J. BRAGARD, F.T. ARECCHI & H. MANCINI.** Synchronization in nonidentical extended systems. *Phys. Rev. Lett.* **83**. Pgs. 536-539 (1999).
11. **J. BRAGARD, P.L. RAMAZZA, F.T. ARECCHI, S. BOCCALETTI & L. KRAMER.** Domain segregation in a two-dimensional system in the presence of drift. *Phys. Rev. E.* **61**. Pgs. R6045-R6048 (2000).
12. **F.T. ARECCHI, J. BRAGARD & L. CASTELLANO.** Dissipative dynamics of an open Bose-Einstein condensate. *Opt. Commun.* **179**. Pgs. 149-156 (2000).



13. **J. BRAGARD & S. BOCCALETTI.** Integral behaviour for localized synchronization in nonidentical extended systems. *Phys. Rev. E*. **62(5)**. Pgs. 6346-6351 (2000).
14. **J. BRAGARD, F.T. ARECCHI & S. BOCCALETTI.** Characterization of synchronized spatiotemporal states in coupled nonidentical complex Ginzburg-Landau equations. *Int. J. Bifurcat. Chaos*. **10(10)**. Pgs. 2381-2389 (2000).
15. **P.C. DAUBY, T. DESAIVE, J. BRAGARD & P. CERISIER.** Amplitude equations for Rayleigh-Bénard convective rolls far from threshold. *Phys. Rev. E*. **64(6)**. Pgs. 6301-1—6301-7 (2001).
16. **J. BRAGARD, S. BOCCALETTI & F.T. ARECCHI.** Control and synchronization of space extended systems. *Int. J. Bifurcat. Chaos*. **11(11)**. Pgs. 2715-2729 (2001).
17. **J. BRAGARD, A. KARMA, Y. LEE & M. PLAPP.** Linking phase-field and atomistic simulations to model dendritic solidification in highly undercooled melts. *Interface Sci.* **10**. Pgs. 121-136 (2002).
18. **J. BRAGARD, S. BOCCALETTI & H. MANCINI.** Asymmetric coupling effects in the synchronization of spatially extended chaotic systems. *Phys. Rev. Lett.* **91(6)**. Pgs. 4103-1—4103-4 (2003).
19. **I. BOVE, S. BOCCALETTI, J. BRAGARD, J. KURTHS & H. MANCINI.** Frequency entrainment of non autonomous chaotic oscillators. *Phys. Rev. E*. **69(1)**. Pgs. 6208-1—6208-4 (2004).
20. **A. BERNARDINI, J. BRAGARD & H. MANCINI.** Synchronization between two Hele-Shaw cells. *Math. Biosci. Eng.* **1(2)**. Pgs. 339-346 (2004).
21. **J. BRAGARD, S. BOCCALETTI, C. MENDOZA, H.G.E. HENTSCHEL & H. MANCINI.** Synchronization of spatially extended chaotic systems in the presence of asymmetric coupling. *Phys. Rev. E*. **70(3)**. Pgs. 6219-1—6219-9 (2004).
22. **J. BRAGARD, E. MONTBRIO, C. MENDOZA, S. BOCCALETTI & B. BLASIUS.** Defect-enhanced anomaly in frequency synchronization of asymmetrically coupled spatially extended systems. *Phys. Rev. E*. **71(2)**. Pgs. R5201-1—R5201-4 (2005).
23. **S. BOCCALETTI, C. MENDOZA & J. BRAGARD.** Synchronization of spatially extended chaotic systems with asymmetric coupling. *Braz. J. Phys.* **35**. Pgs. 411-417 (2005).
24. **S. BOCCALETTI, C. MENDOZA & J. BRAGARD.** Anomalous synchronization of spatially extended chaotic systems in the presence of asymmetric coupling. *Fluct. Noise Lett.* **5**. Pgs. 251-258 (2005).
25. **S. BOCCALETTI & J. BRAGARD.** Controlling spatio-temporal chaos in the scenario of the one dimensional complex Ginzburg-Landau equation. *Philos. T. Roy. Soc. A* **364**. Pgs. 2383-2395 (2006).
26. **D. LAROZE, J. MARTINEZ-MARDONES, J. BRAGARD & P. VARGAS.** Convection in a rotating binary ferrofluid. *Physica A* **371**. Pgs. 46-49 (2006).
27. **C. MENDOZA, J. BRAGARD, P.L. RAMAZZA, J. MARTINEZ-MARDONES & S. BOCCALETTI.** Pinning control of spatio-temporal chaos in the LCLV device. *Math. Biosci. Eng.* **4(3)**. Pgs. 523-530 (2007).
28. **D. LAROZE, J. MARTINEZ-MARDONES, J. BRAGARD & C. PEREZ-GARCIA.** Realistic rotating convection in a DNA suspension. *Physica A* **385**. Pgs. 433-438 (2007).
29. **D. LAROZE, J. MARTINEZ-MARDONES, & J. BRAGARD.** Thermal convection in a rotating binary viscoelastic liquid mixture. *Eur. Phys. J. SP* **146**. Pgs. 291-300 (2007).
30. **J. BRAGARD, G. VIDAL, H. MANCINI, C. MENDOZA & S. BOCCALETTI.** Chaos suppression through asymmetric coupling. *Chaos* **17(4)**. Pgs. 043107 (2007).
31. **N. VELEZ DE MENDIZABAL, J. BRAGARD, J. GOÑI, I. MARTINEZ-FORERO, S. PASAMAR, J. SEPULCRE & P. VILLOSLADA.** The relapsing dynamics of multiple sclerosis depends on control properties of peripheral immune tolerance. *J. of Neuroimmunology* **203(2)**. Pgs. 132 (2008).
32. **I.R. CANTALAPIEDRA, A. PEÑARANDA, B. ECHEBARRIA & J. BRAGARD.** Phase-2 reentry in cardiac tissue: Role of the slow calcium pulse. *Phys. Rev. E*. **82(1)**. Pgs. 011907 (2010).
33. **L.M. PEREZ, J. BRAGARD, D. LAROZE, J. MARTINEZ-MARDONES & H. PLEINER.** Thermal convection thresholds in a Oldroyd magnetic fluid. *Journal of Magnetism and Magnetic Materials* **323**. Pgs. 691-698 (2011).
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45. A. COLLET, J. BRAGARD, P.C. DAUBY. Temperature, geometry and bifurcations in the numerical modeling of the cardiac mechano-electric feedback. *Chaos* **27**(9). Pgs. 3924 (2017).
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59. **AC. SANKARANKUTTY, J. GREINER, J. BRAGARD, J.R. VISKEER, T. S. SHANKAR, C.P. KYRIAKOPOULOS, S. G. DRAKOS & FB. SACHSE.** Etiology-Specific Remodeling in Ventricular Tissue of Heart Failure Patients and its Implications for Computational Modeling of Electrical Conduction. *Frontiers in Physiology*, **12**. Pgs. 730933 (2021).  
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62. **MU. SHETTAR, M. RUDRAIAH, J. BRAGARD & D. LAROZE.** Induced Navier's slip with CNTs on a Stretching/Shrinking Sheet under the combined effect of inclined MHD and Radiation. *Energies* **16(5)**. Pgs. 2365 (2023).
63. **M. IBARZ, J. HERNANDEZ, J. BRAGARD, L. MORALES, L. RODRIGUEZ-CARILLO, F. GALDON, P. TAÑA & M.A. TEUS.** Bleb geometry and morphology after Preserflo Microshunt surgery: Risk factors for surgical failure. *Plos One* **18(6)**, Ref. e0286884, (2023)).
64. **F.J. TALAVERA, S. ARDANZA, J. BRAGARD & J. ELORZA.** Aggregation of T-subgroups of groups whose subgroup lattice is a chain. *Fuzzy Sets and Systems* **473**, 108717. (2023).
65. **A. SANCHO\_ARAIZ, Z. PARRA-GUILLEN, J. BRAGARD, S. ARDANZA, V. MANGAS & IF. TROCONIZ.** Mechanistic characterization of oscillatory patterns in unperturbed tumor growth dynamics: The interplay between cancer cells and components of tumor microenvironment. *Plos Comp. Biology* **19(10)**. Ref. e1011507 (2023).

## 8. NON-REFEREED PUBLICATIONS

### 8.1 AS AN ASSOCIATE EDITOR

1. **J. BRAGARD, J. BURGUETE, A. GARCIMARTÍN, W. GONZÁLEZ-VIÑAS, D. MAZA & C. PÉREZ GARCÍA.** XII FÍSICA ESTADÍSTICA, FisEs '03. DL: NA-2583/2003-ISBN: 84-688-3354-1. XII Statistical Physics National Conference, Dept. of Physics, University of Navarra, Pamplona (2003).

### 8.2 BOOK CHAPTERS AND CONFERENCE PROCEEDINGS

2. **J. BRAGARD, J. PONTES & M.G. VELARDE.** "Patterns, defects, and evolution of Benard-Marangoni cells" in "Proceedings of the Workshop on Discretely-Coupled Dynamical Systems", ed. Univ. Santiago-Compostela, Volume 9. (1997), pgs. 61-67.
3. **F.T. ARECCHI, J. BRAGARD & L.M. CASTELLANO.** "Dissipative dynamics of an open Bose-Einstein condensate" in "Bose-Einstein Condensate and Atom Lasers", ed. by S. Martellucci et al., Springer. ISBN 978-0306464713 (2000), pgs. 187-201.
4. **S. BOCCALETTI & J. BRAGARD** "Controlling spatiotemporal chaos: The paradigm of the complex Ginzburg-Landau equation" in "Handbook of Chaos Control", ed. by E. Schoell and H.G. Schuster, Wiley, 2007, ISBN 978-3-527-40605-0.
5. **J. ELORZA, R. FUENTES-GONZALEZ, J. BRAGARD & P. BURILLO.** "Fuzzy Closing Operators and their coherence as Fuzzy Consequence Operators" in "Proceedings of the Workshop on Technology and Fuzzy Logic ESTYLF 2008", ed. by European Centre for Soft Computing. ISBN 978-8469158074 (2008), pgs. 221-227.
6. **J. BRAGARD & J. ELORZA.** "Ageing of the heart through the analysis of electrocardiograms" in "Proceedings of the Congress on Computation on Complex Networks and Related Topics (Net-Works 2008)", ed. by Uni. Navarra. ISBN 978-8469138199 (2008), pgs. 39.
7. **J. BRAGARD, J. ELORZA & S. MARIN.** "Advances in defibrillation studies through numerical simulations" in "Proceedings of the Congress on Differential Equations and Applications", ed. by Uni. Castilla-la-Mancha. ISBN 978-8469264737 (2009), pgs. 1-7.

8. J. BRAGARD, S. MARIN, E. CHERRY & F. FENTON. "Validation of a Model of Cardiac Defibrillation" Springer-book (2013). DOI 10.1007/978-3-642-34070-3.
9. J. ELORZA, R. FUENTES-GONZALEZ, J. BRAGARD & P. BURILLO. "On the relation between fuzzy closing morphological operators, fuzzy consequence operators induced by fuzzy preorders and fuzzy closure and co-closure systems" in *Fuzzy Sets and Systems*, 218, 73-89 (2013).
10. N. CARMONA, J. -C. RUA-SEOANE, J. ELORZA, E. SAENZ DE PIPAON & J. BRAGARD. "Ageing of ECG Characteristics at Five Years Distance" *Computers in Cardiology proceedings book* (2013). Pgs. 1031-1034.
11. J. BRAGARD, J. ELORZA, E. CHERRY & F. FENTON. "Validation of a Computational Model of Cardiac Defibrillation". *Computers in Cardiology proceedings book* (2013). Pgs. 851-854.
12. A. SIMIC, I.R. CANTALAPIEDRA, J. ELORZA & J. BRAGARD. "Huge reduction of defibrillation thresholds using four electrode defibrillators". *Computers in Cardiology (Cinc)*, 505-508 (2014).
13. C. HAWKS, J. ELORZA, B. ECHEBARRIA, I. CANTALAPIEDRA, A. PENARANDA & J. BRAGARD. "Influence of Gap Junction Dynamics on the Stability of Reentrant Waves in Cardiac Tissue". *Computers in Cardiology (Cinc)*, (2015).
14. J. BRAGARD, L. MORIONES, B. ECHEBARRIA, S. RAVASSA, J. IBERO & I. GARCIA-BOLAO. "Using high-resolution voltage maps to predict "redo" in the treatment of atrial fibrillation (AF)". *Computers in Cardiology proceedings book* (2022). Volume (498).
15. J. BRAGARD, L. MORIONES, B. ECHEBARRIA, S. RAVASSA, J. IBERO & I. GARCIA-BOLAO. "A Comparison of Methodologies for Pulmonary Veins Segmentation in High Definition Voltage Maps of Patients with Atrial Fibrillation (AF)". *Computers in Cardiology proceedings book* (2023). Volume (499).

## 9. OTHER RESEARCH and TRAINING TASKS

### 9.1 SUPERVISION OF DOCTORAL THESES

1. **Análisis de Fenómenos de Sincronización en Sistemas Caóticos de Alta Dimensión.**  
Ph.D. recipient: Carolina Mendoza Parra.  
University of Navarra. Faculty of Sciences. September 2003  
Grade: *Sobresaliente Cum Laude*.
2. **Synchronization between two Hele-Shaw Cells.**  
Ph. D. recipient: Angela Bernardini  
University of Navarra. Faculty of Sciences. October 2005  
Grade: *Sobresaliente Cum Laude*.
3. **Numerical study of defibrillation mechanisms using a one-dimensional model of cardiac tissue.**  
Ph. D. recipient: Ana Simic  
University of Navarra. Faculty of Sciences. December 2014.  
Grade: *Sobresaliente Cum Laude*.
4. **Cardiac dynamics with computational models.**  
Ph. D. recipient: Claudia E. Hawks Gutierrez  
University of Navarra. Faculty of Sciences. June 2019.  
Grade: *Sobresaliente (European mention)*.
5. **Hamilton-Jacobi-Belman equation in optimal market making.**  
Ph. D. candidate: Christian Ojeda Trejo  
University of Navarra. Faculty of Sciences. Since January 2022.
6. **Combined approach of personalized computer simulations and data analysis to stratify the risk of relapse in atrial fibrillation in human patients.**  
Ph. D. candidate: Leire Moriones Imirizaldu  
University of Navarra. Faculty of Sciences. Since October 2022.

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**9.2 SUPERVISION OF MASTER THESES**

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**7. Creación de un modelo computacional para el estudio de la desfibrilación ventricular.**

Master recipient: Samuel Marín Calvo.

University of Navarra. Faculty of Applied Sciences (TECNUN). July 2009.

Grade: *Sobresaliente* (9/10).

**8. Análisis de la morfología de electrocardiogramas de una población estudiantil.**

Master recipient: Sergio García Riocerezo.

University of Navarra. Faculty of Applied Sciences (TECNUN). May 2011.

**9. Análisis de electrocardiogramas utilizando transformadas de wavelets.**

Master recipient: Juan-Carlos Rúa Seoane.

University of Navarra. Faculty of Applied Sciences (TECNUN). June 2013.

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**9.3 SUPERVISION OF UNDERGRADUATE HONOR THESIS**

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**10. Análisis Estadístico de indicadores del ECG.**

Undergraduate student in Biochemistry: María Alemán Ramos.

University of Navarra. Faculty of Sciences. June 2015.

Grade: *Sobresaliente* (9/10).

**11. Predictores de la evolución de pacientes sometidos a ablación de las venas pulmonares para tratar la fibrilación auricular.**

Undergraduate student in Biochemistry: Janire Erasun Martinez.

University of Navarra. Faculty of Sciences. May 2020.

**12. Estudio de imágenes de aurículas cardiacas (Estadística).**

Undergraduate student in Biochemistry: Iván Sala García.

University of Navarra. Faculty of Sciences. May 2020.

**13. Estudio del Potencial de Acción Cardíaco en un modelo computacional en MatLab**

Undergraduate student in Biochemistry: Javier Latorre Fernandez.

University of Navarra. Faculty of Sciences. May 2020.

**14. Simulaciones numéricas de Potencial de Acción (baja conductancia).**

Undergraduate student in Biochemistry: Gregorio Rabago Sainz.

University of Navarra. Faculty of Sciences. June 2020.

**15. Determinación de un parámetro desconocido en un sistema de ecuaciones biofísicas mediante redes neuronales de convolución.**

Undergraduate student in Biochemistry: Santiago Padilla Navarro.

University of Navarra. Faculty of Sciences. June 2021.

**16. Estudio de imágenes de aurículas cardiacas.**

Undergraduate student in Biochemistry: Iker González Larrea.

University of Navarra. Faculty of Sciences. June 2023.

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**9.4 SUPERVISION OF POSTDOCTORAL RESEARCHER**

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**17. Analysis of synchronization in non-autonomous dynamical systems.**

Dr. I. Bove (now Faculty in Montevideo University, Uruguay).

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**9.5 SUPERVISION OF VISITING DOCTORAL STUDENTS**

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**18. Synchronization of dissipative optical solitons.**

Mr. Pablo Díaz Riquelme (Ph.D. candidate from the University Federico Santa-María, Valparaíso, Chile).

Stay at UNAV from October 2009 until December 2009.

**19. Study of bistability and chaos in the Landau-Lifshitz-Gilbert equations.**

Mr. Omar Suárez Támara (Ph.D. candidate from the University Federico Santa-María, Valparaíso, Chile).  
Stay at UNAV from October 2010 until January 2011.

**10. TEACHING EXPERIENCE (COURSES and RESPONSIBILITY)**

(for graduate courses please see section 11.1; (#s.n) indicates the approx. number of enrolled students):

1. **1998-1999: Teaching Assistant U. Liege.** Course: **Analytical Mechanics** for first year undergraduate students in Engineering. 30h theory and 30h problem sessions. **Personal participation:** problem sessions (30 h.). (**#s.40**).
2. **1999-2000: Teaching Assistant U. Liege.** Course: **Nonlinear Systems** for fourth year undergraduate students in Engineering (orientation: Mech.-Physics and Electronic-Physics). 30 h theory and 15h problem sessions. **Personal participation:** 10 h of theory (analysis of nonlinear systems). (**#s.20**).
3. **2001-2002: Lecturer UNAV.** Course: **Mathematical methods** for second year undergraduate Chemistry students. 45 h theory and 15h problem sessions (including MATLAB sessions). **Personal participation:** course holder (theory+problems). (**#s.30**).
4. **2002-2003: Lecturer UNAV.** Course: **Mathematical methods** for second year undergraduate Chemistry students. 45 h theory and 15h problem sessions (including MATLAB sessions). **Personal participation:** course holder (theory+problems). (**#s.30**).
5. **2002-2003: Lecturer UNAV.** Course: **Quantum Chemistry** for third year undergraduate Chemistry students. 30 h theory and 15h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.40**).
6. **2003-2004: Lecturer UNAV.** Course: **Mathematical methods** for second year undergraduate Chemistry students. 45 h theory and 15h problem sessions (including MATLAB sessions). **Personal participation:** course holder (theory+problems). (**#s.30**).
7. **2003-2004: Lecturer UNAV.** Course: **Lasers and their applications to chemistry** for third year undergraduate Chemistry students. 30 h theory and 15h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.40**).
8. **2004-2005: Lecturer UNAV.** Course: **Mathematics II (calculus in several variables)** for first year undergraduate Chemistry students. 45 h theory and 15h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.30**).
9. **2004-2005: Lecturer UNAV.** Course: **Quantum Chemistry** for third year undergraduate Chemistry students. 30 h theory and 15h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.30**).
10. **2005-2006: Senior Lecturer UNAV.** Course: **Mathematics I (Linear Algebra)** for first year Architecture students. 60 h theory and 30h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.90**).
11. **2005-2006: Senior Lecturer UNAV.** Course: **Mathematics II (calculus in several variables)** for first year Architecture students. 30 h theory and 30h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.90**).
12. **2005-2006: Senior Lecturer UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.180**).
13. **2006-2007: Senior Lecturer UNAV.** Course: **Mathematics I (Linear Algebra)** for first year Architecture students. 60 h theory and 30h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.80**).
14. **2006-2007: Senior Lecturer UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.60**).
15. **2007-2008: Senior Lecturer UNAV.** Course: **Mathematics I (Linear Algebra)** for first year Architecture students. 60 h theory and 30h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.80**).
16. **2007-2008: Senior Lecturer UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.40**).
17. **2007-2008: Senior Lecturer UNAV.** Course: **Medical Physics** for Master in Biomedical engineering students (UNAV-TECUN-CUN). 30 h theory and 30 h problem sessions. **Personal participation:** course co-holder together with Dr. J. Burguete (15h theory + 15h problem sessions). (**#s.20**).
18. **2008-2009: Associate Professor UNAV.** Course: **Mathematics I (Linear Algebra)** for first year Architecture students. 60 h theory and 30h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.80**).
19. **2008-2009: Associate Professor UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.40**).

20. **2009-2010: Associate Professor UNAV.** Course: **Mathematics I (Linear Algebra)** for first year Architecture students. 60 h theory and 30h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.80**).
21. **2009-2010: Associate Professor UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.30**).
22. **2010-2011: Associate Professor UNAV.** Course: **Mathematics I (Linear Algebra)** for first year Architecture students. 60 h theory and 30h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.70**).
23. **2010-2011: Associate Professor UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.30**).
24. **2011-2012: Associate Professor UNAV.** Course: **Mathematics (Linear Algebra & Calculus)** for first year Architecture students. 80h theory and 45h problem sessions. **Personal participation:** special seminars on various topics (theory, 15h participation). (**#s.40**).
25. **2011-2012: Associate Professor UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
26. **2012-2013: Associate Professor UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 45 h theory and 20 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
27. **2012-2013: Associate Professor UNAV.** Course: **Basic Statistics** for second year undergraduate Biochemistry and Chemistry students. 30 h theory and 10 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R software). (**#s.20**).
28. **2013-2014: Associate Professor UNAV.** Course: **Biophysics** for third year undergraduate Biochemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
29. **2013-2014: Associate Professor UNAV.** Course: **Basic Statistics** for second year undergraduate Biochemistry and Chemistry students. 30 h theory and 10 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R software). (**#s.20**).
30. **2013-2014: Associate Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 40 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB software). (**#s.30**).
31. **2014-2015: Associate Professor UNAV.** Course: **Biophysics** for fourth year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.15**).
32. **2014-2015: Associate Professor UNAV.** Course: **BioStatistics** for first year undergraduate Biochemistry and Chemistry students. 30 h theory and 15 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R Studio software). (**#s.180**).
33. **2014-2015: Associate Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.25**).
34. **2015-2016: Associate Professor UNAV.** Course: **Biophysics** for fourth year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.10**).
35. **2015-2016: Associate Professor UNAV.** Course: **BioStatistics** for first year undergraduate Biochemistry and Chemistry students. 45h theory and 15 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R Studio software). (**#s.180**).
36. **2015-2016: Associate Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.20**).
37. **2016-2017: Associate Professor UNAV.** Course: **Biophysics** for fourth year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.10**).
38. **2016-2017: Associate Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.20**).
39. **2016-2017: Associate Professor UNAV.** Course: **Differential Equations** for second year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
40. **2017-2018: Full Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.20**).

41. **2017-2018: Full Professor UNAV.** Course: **Differential Equations** for second year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
42. **2018-2019: Full Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.20**).
43. **2018-2019: Full Professor UNAV.** Course: **Differential Equations** for second year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
44. **2018-2019: Full Professor UNAV.** Course: **BioStatistics** for first year undergraduate Biochemistry and Chemistry students. 45h theory and 15 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R Studio software). (**#s.140**).
45. **2019-2020: Full Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.20**).
46. **2019-2020: Full Professor UNAV.** Course: **Differential Equations** for second year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
47. **2019-2020: Full Professor UNAV.** Course: **BioStatistics** for first year undergraduate Biochemistry and Chemistry students. 45h theory and 15 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R Studio software). (**#s.140**).
48. **2020-2021: Full Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.20**).
49. **2020-2021: Full Professor UNAV.** Course: **Differential Equations** for second year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.20**).
50. **2020-2021: Full Professor UNAV.** Course: **BioStatistics** for first year undergraduate Biochemistry and Chemistry students. 45h theory and 15 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R Studio software). (**#s.140**).
51. **2021-2022: Full Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.35**).
52. **2021-2022: Full Professor UNAV.** Course: **Differential Equations** for second year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.35**).
53. **2021-2022: Full Professor UNAV.** Course: **BioStatistics** for first year undergraduate Biochemistry and Chemistry students. 50h theory and 30 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R Studio software). (**#s.140**).
54. **2022-2023: Full Professor UNAV.** Course: **Basic Numerical Methods with MATLAB** for second year undergraduate Biochemistry and Chemistry students. 20 h theory and 50 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with MATLAB computer software). (**#s.45**).
55. **2022-2023: Full Professor UNAV.** Course: **Differential Equations** for second year undergraduate Biochemistry and Chemistry students. 25 h theory and 5 h problem sessions. **Personal participation:** course holder (theory+problems). (**#s.35**).
56. **2022-2023: Full Professor UNAV.** Course: **BioStatistics** for first year undergraduate Biochemistry and Chemistry students. 50h theory and 30 h practical computer sessions. **Personal participation:** course holder (theory + computer practices with R Studio software). (**#s.140**).



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## 11. GRADUATE COURSES AND INVITED SEMINARS

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### 11.1 GRADUATE COURSES

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#### 1. Numerical Methods (40 hours)

Department of Physics and Applied Mathematics. Faculty of Science. Doctoral program "Instability in dissipative systems". University of Navarra. Pamplona, Academic years: **2002-2003; 2003-2004; 2005-2006; 2007-2008; 2010-2011**

#### 2. Medical Physics (30 hours)

Department of Physics and Applied Mathematics. Faculty of Science. Program in Master in Biomedical Engineering. Collaboration: University Navarra-TECNUN-CIMA. Pamplona, from January until February 2008.

#### 3. Advanced Biophysics (30 hours)

Department of Physics and Applied Mathematics. Faculty of Science. Program in Master in Biomedical Engineering. Collaboration: University Navarra-TECNUN-CIMA. Pamplona, from September until October 2008.

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### 11.2 INVITED SEMINARS

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#### 4. "Patterns formation in non linear optical systems"

CIRCS Seminars. Northeastern University, Boston, USA, 10<sup>th</sup> October 2000.

#### 5. "Sincronización anómala en sistemas caóticos extendidos"

Dept. of Applied Physics, U. Politècnica Catalunya, Barcelona. 4<sup>th</sup> November 2004.

#### 6. "Aplicación del programa informático Matlab a la resolución numérica de cinética química"

Summer school "Química y Física interactuando en el mundo de hoy", UNAV, Pamplona. 8<sup>th</sup> September 2005.

#### 7. "Fractal growth of malignant cells"

Seminar, Center for Applied Medical Research, UNAV, Pamplona, Spain. 17<sup>th</sup> November 2005.

#### 8. "Análisis de series temporales; Aplicación a los ECG"

Seminar, U.P.C. Valparaíso, Chile. 5<sup>th</sup> July 2006.

#### 9. "Model of defibrillation in rabbit heart"

Seminar, Universidad de Cornell (EE.UU.) 31<sup>st</sup> August 2007.

#### 10. "Model of defibrillation in rabbit heart"

Seminar, Universidad Politecnica de Barcelona, 19<sup>th</sup> December 2007.

#### 11. "Modelización de la propagación del potencial de acción en los ventrículos cardiacos y sus posibles aplicaciones"

Seminar, University of Malaga, 19<sup>th</sup> May 2008.

#### 12. "La Biofísica: un matrimonio entre la Biología y la Física"

Seminar for the general public, Public Library of Pamplona, 2<sup>nd</sup> September 2008.

#### 13. "Nobel Laureates in Physics 2008"

Seminar for the general public, UNAV, Pamplona, 17<sup>th</sup> November 2008.

#### 14. "Numerical study of defibrillation"

Seminar in the Engineering Dept., Uni. Zaragoza, 26<sup>th</sup> February 2009.

#### 15. "Electrical activity in the heart"

Seminar in the Engineering Dept., UNAV, TECNUN, Campus Ibaeta, 8<sup>th</sup> February 2010.

#### 16. "Calcium wave stability"

Seminar in the Physics Dept., UPC, Barcelona, 10<sup>th</sup> March 2010.

17. **“Bioelectricidad. La física al encuentro de la Medicina”**  
Seminar for the general public, Public Library of Pamplona, 14<sup>th</sup> June 2010.
18. **“Bioelectricidad. La física al encuentro de la Medicina”**  
Seminar for the general public, Public Library of Pamplona, 27<sup>th</sup> June 2011.
19. **“Study of defibrillation through numerical simulations”**  
Seminar, Physics Dept., University of Liege (Belgium), 22<sup>nd</sup> November 2011.
20. **“Arritmias y defibrilación: Modelos numéricos y visualización de la actividad eléctrica del corazón”**  
Colloquium, University Alfonso X, Madrid (Spain), 15<sup>th</sup> December 2011.
21. **“Arrhythmias and defibrillation: Numerical models of electrical activity in the heart”**  
Invited seminar. Indiana University, Bloomington, IN (USA), 21<sup>st</sup> of May 2012.
22. **“Arrhythmias and defibrillation: Numerical models of electrical activity in the heart”**  
Invited seminar. Indiana School of Medicine, Indianapolis, IN (USA), 22<sup>nd</sup> of May 2012.
23. **“Arrhythmias and defibrillation: Numerical models of electrical activity in the heart”**  
Invited seminar. Dept. Physics, Georgia Tech. University, Atlanta, GA (USA), 9<sup>th</sup> of July 2012.
24. **“Arrhythmias and defibrillation: Numerical models of electrical activity in the heart”**  
Invited seminar. Dept. Applied Mathematics, UNESP, Rio Claro, SP (Brazil), 19<sup>th</sup> of October 2012.
25. **“Arritmias y desfibrilación: Modelos numéricos y visualización de la actividad eléctrica del corazón”**  
Invited seminar. Dept. of Applied Physics, University of Malaga, Malaga, (Spain), 4<sup>th</sup> of December 2012.
26. **“Bioelectricidad. La física al encuentro de la Medicina”**  
Seminar for the general public, Public Library of Pamplona, 25<sup>th</sup> of June 2014.
27. **“Advantage of the four- versus two-electrode defibrillators”**  
Invited seminar. Dept. Electrical Engineering, U. Liege, (Belgium), 2<sup>nd</sup> of October 2015.
28. **“Advantage of the four- versus two-electrode defibrillators”**  
Invited seminar. Center for Applied Medicine CIMA, Pamplona, (Spain), 29<sup>th</sup> of January 2016.
29. **“Comparison of defibrillation protocols through a simple cardiac dynamic model”**  
Invited seminar. Max-Planck Institute for Dynamics and self-organization, Gottingen, Germany, 6<sup>th</sup> of June 2016.
30. **“La Biofísica: el encuentro entre la Biología y la Física”**  
Seminar for the general public, Navarra University, 15<sup>th</sup> of June 2016.
31. **“Red Española de Modelización Cardíaca : Presentación del grupo de la UNAV”**  
Launch meeting of the Virtual-Heart Spanish Network, UP Valence, 22<sup>nd</sup> of November 2016.
32. **“Fenómenos eléctricos en el interior del cuerpo”**  
Seminar for the general public, Public Library of Pamplona, 27<sup>th</sup> June 2017.
33. **“Study of high-resolution voltage maps of the left atrium”**  
Invited seminar. CVRTI, University of Utah, (USA), 29<sup>th</sup> of January 2018.
34. **“Computational model of defibrillation: Importance of fibrotic content in modifying the virtual electrode strengths”**  
Invited seminar. Center for Applied Medicine CIMA, Pamplona, (Spain), 26<sup>th</sup> of March 2019.

## **12. COMMUNICATIONS AND PARTICIPATIONS AT CONFERENCES**

### **12.1 INVITED CONFERENCE**

1. **J. BRAGARD.** "Asymmetry in the synchronization of extended systems". TRENDS IN PATTERN FORMATION: FROM AMPLITUDE EQUATIONS TO APPLICATIONS. Dresden (Germany) 25-30 August 2003.
2. **J. BRAGARD.** "Modelization of action potential propagation through heart's ventricles". WORKSHOP IN SYSTEM BIOLOGY IN MEDICINE. Hospital Clinic, University of Barcelona 8-10<sup>th</sup> May 2008.
3. **J. BRAGARD.** "Computational model of defibrillation: Importance of fibrotic content in modifying the virtual electrode strengths". 2<sup>ND</sup> TRANSCARDIO WORKSHOP, TRANSLATIONAL SCIENCES IN CARDIOLOGY, Barcelona 19<sup>th</sup> December 2018.
4. **J. BRAGARD.** "Biomedical images and cardiac dynamics". AUTUMN SCIENCE DAYS, University of Almeria 26<sup>th</sup> September 2019.

### **12.2 PARTICIPATION IN CONFERENCE ORGANIZING COMMITTEE**

5. **Organizing committee.** XII STATISTICAL PHYSICS, FISÉS '03, FÍSICA ESTADÍSTICA. Pamplona, Spain. 23-25 October 2003.
6. **Organizing committee.** FÍSICA DE LOS SISTEMAS FUERA DE EQUILIBRIO. Pamplona, Spain. 17-19 February 2011.
7. **Organizing and scientific committees.** WEEK OF SCIENCE (IN HONOR OF PR. M.G. VELARDE). Madrid, Spain. 12-16 September 2011.
8. **Organizing committee.** VI<sup>TH</sup> SUMMER SCHOOL ON STATISTICAL PHYSICS AND COMPLEX SYSTEMS. Pamplona, Spain. 20<sup>th</sup> June-1<sup>st</sup> July 2016.

### **12.3 TALKS AT CONFERENCES**

9. **J. BRAGARD** "Patterns, defects and evolution of Bénard-Marangoni cells". WORKSHOP ON DISCRETELY COUPLED DYNAMICAL SYSTEMS. Santiago de Compostela 24-28 June 1995.
10. **J. BRAGARD** "Planforms selection in thermocapillary convection". DYNAMICS OF MULTIPHASE FLOWS ACROSS INTERFACES (EUROPEAN UNION NETWORK MEETING). Wavre (Belgium) 7-8 January 1997.
11. **J. BRAGARD** "Nonlinear longitudinal waves". FROM UNITS TO SYNERGETICS IN NEUROBIOLOGY (EUROPEAN UNION NETWORK MEETING). Madrid February 1998.
12. **P.L. RAMAZZA, J. BRAGARD & S. F.T. ARECCHI** "Drift controlled domain generation in two-dimensional patterns". PINOS, EUROCONFERENCE ON TRENDS IN OPTICAL NONLINEAR DYNAMICS: PHYSICAL PROBLEMS AND APPLICATIONS. Pueblo Acanilado, Alicante, Spain, 21-23 May 1998.
13. **J. BRAGARD** "Pattern selection induced by a through flow". EUROPEAN UNION MID-TERM NETWORK MEETING. Cargese (France) 31 August-4 September 1998.
14. **F.T. ARECCHI, J. BRAGARD & L.M. CASTELLANO** "Dissipative dynamics of an open Bose-Einstein condensate". INTERNATIONAL SCHOOL E. MAJORANA ON BOSE-EINSTEIN CONDENSATION. Erice (Italy) 19-24 Octobre 1999.
15. **A. KARMA & J. BRAGARD** "Extracting fundamental noiseless anisotropic interfacial properties from noise" I<sup>IND</sup> CMSN (COMPUTATIONAL MATERIALS SCIENCE NETWORK) WORKSHOP ON MICROSTRUCTURAL EVOLUTION BASED ON FUNDAMENTAL INTERFACIAL PROPERTIES. Northwestern University, Evanston, IL (USA) 11-12 April 2000.
16. **J. BRAGARD, A. KARMA & M. PLAPP** "Bridging length scales in solidification by linking atomistic and phase-field simulations" 2000 MRS (MATERIALS RESEARCH SOCIETY) FALL MEETING. Boston, NE, (USA) 27-30 November 2000.
17. **J. BRAGARD, & A. KARMA** "Phase-field simulations of rapid dendritic growth" III<sup>RD</sup> CMSN (COMPUTATIONAL MATERIALS SCIENCE NETWORK) WORKSHOP ON MICROSTRUCTURAL EVOLUTION BASED ON FUNDAMENTAL INTERFACIAL PROPERTIES. Santa Fe, NM, (USA) 11-12 January 2001.

18. **J. BRAGARD, A. KARMA, Y. LEE & M. PLAPP** "Dendritic growth in highly undercooled Ni melts" IV<sup>TH</sup> CMSN (COMPUTATIONAL MATERIALS SCIENCE NETWORK) WORKSHOP ON MICROSTRUCTURAL EVOLUTION BASED ON FUNDAMENTAL INTERFACIAL PROPERTIES. Northeastern University, Boston, NE (USA) 24-25 September 2001.
19. **B. ECHEBARRIA, J. BRAGARD & A. KARMA** "Role of crystalline anisotropy in directional solidification of dilute binary alloys" IV<sup>TH</sup> CMSN (COMPUTATIONAL MATERIALS SCIENCE NETWORK) WORKSHOP ON MICROSTRUCTURAL EVOLUTION BASED ON FUNDAMENTAL INTERFACIAL PROPERTIES. Northeastern University, Boston, NE (USA) 24-25 September 2001.
20. **J. BRAGARD** "Non-symmetric coupling effects in synchronization of complex Ginzburg-Landau equations" WORKSHOP ON SYNCHRONIZATION, COLLECTIVE BEHAVIOR AND COMPLEX PHENOMENA IN CHAOTIC SYSTEMS. Florence (Italy) 15-16 October 2002.
21. **J. BRAGARD, A. BERNARDINI & H. MANCINI** "Synchronization between two Hele-Shaw cells". NOLINEAL 2004 NUEVOS RETOS Y PERSPECTIVAS DE LA DINÁMICA NO LINEAL Y SUS APLICACIONES. Toledo (Spain) 1-4 June 2004.
22. **J. BRAGARD** "Using Lyapunov exponents to detect synchronized states". NOLINEAL 2007 NUEVOS RETOS Y PERSPECTIVAS DE LA DINÁMICA NO LINEAL Y SUS APLICACIONES. Ciudad Real (Spain) 5-8 June 2007.
23. **J. BRAGARD & S. Boccaletti** "Generalized synchronization between two identical chaotic oscillators" INTERNATIONAL SYMPOSIUM ON SYNCHRONIZATION IN COMPLEX NETWORKS. Leuven (Belgium) 2-4 July 2007.
24. **J. BRAGARD** "Electrical model of rabbit heart for the study of defibrillation". WORKSHOP ON HEART DYNAMICS HELD AT UPC. Barcelona (Spain) 5<sup>th</sup> March 2008.
25. **J. BRAGARD** "Electrical model of rabbit heart for the study of defibrillation". SIAM CONFERENCE ON NONLINEAR WAVES AND COHERENT STRUCTURE (NW08). Rome (Italy) 24<sup>th</sup> July 2008.
26. **J. ELORZA, R. FUENTES-GONZÁLEZ, J. BRAGARD AND P. BURILLO**, "Fuzzy Closing Operators and their coherence as Fuzzy Consequence Operators." XIV CONGRESO ESPAÑOL SOBRE TECNOLOGÍAS Y LÓGICA FUZZY (ESTYLF 2008). Mieres (Spain) 17<sup>th</sup> September 2008.
27. **J. BRAGARD, A. AMANN AND E. SCHOELL**, "Improving pinning control of nonlinear waves using Floquet modes". INTERNATIONAL IMACS6 CONFERENCE. Athens, GA (US) 23<sup>rd</sup> -26<sup>th</sup> March 2009.
28. **J. BRAGARD**, "Advances in defibrillation studies through numerical simulations". WORKSHOP OF THE CARDIADYN NETWORK. UPC Barcelona (Spain) 3<sup>rd</sup> April 2009.
29. **J. BRAGARD, J. ELORZA AND S. MARIN**, "Advances in defibrillation studies through numerical simulations". XXI CONGRESS ON DIFFERENTIAL EQUATION AND APPLICATIONS (CEDYA09). Ciudad Real (Spain) 21<sup>st</sup> -25<sup>th</sup> September 2009.
30. **J. BRAGARD, S. MARIN, E. CHERRY AND F. FENTON** "Advances in defibrillation studies through numerical simulations". INTERNATIONAL CONFERENCE ON EMERGING TOPICS IN DYNAMICAL SYSTEMS AND PARTIAL DIFFERENTIAL EQUATIONS. Barcelona (Spain) 31<sup>st</sup> May – 4<sup>th</sup> June 2010.
31. **I. R. CANTALAPIEDRA, A. PEÑARANDA, B. ECHEBARRIA AND J. BRAGARD**, "Reexcitations in cardiac tissue with heterogeneity in repolarization induced by a pulse due to Calcium current". IV SPANISH-PORTUGUESE CONGRESS ON BIOPHYSICS. Zaragoza (Spain) 7<sup>th</sup> – 10<sup>th</sup> July 2010.
32. **J. BRAGARD, D. LAROZE, O. SUAREZ, H. PLEINER** "Chaotic dynamics in anisotropic magnetic nanoparticles". IEEE INTERNATIONAL MAGNETIC CONFERENCE, INTERMAG. Taipei (Taiwan) 25<sup>th</sup> – 29<sup>th</sup> April 2011.
33. **D. LAROZE, J. BRAGARD, H. PLEINER** "Chaotic dynamics of a biaxial anisotropic nanoparticle". 4<sup>th</sup> CHAOS INTERNATIONAL CONFERENCE. Creta (Greece) 25<sup>th</sup> – 29<sup>th</sup> April 2011.
34. **J. BRAGARD, E. CHERRY AND F. FENTON** "Advances in defibrillation studies through numerical simulations". INTERNATIONAL CONFERENCE PHYSCON 2011. Leon (Spain) 31<sup>st</sup> May – 3<sup>rd</sup> June 2011.
35. **J. BRAGARD, E. CHERRY AND F. FENTON** "Advances in defibrillation studies through numerical simulations". WEEK OF SCIENCE 2011 (IN HONOUR OF 70<sup>TH</sup> BIRTHDAY OF PROF. M.G. VELARDE. Madrid (Spain) 12<sup>th</sup> – 16<sup>th</sup> September 2011.

36. **J. BRAGARD** "Defibrillation mechanisms on a one-dimensional ring of cardiac tissue". 9<sup>TH</sup> AIMS CONFERENCE ON DYNAMICAL SYSTEMS, DIFFERENTIAL EQUATIONS AND APPLICATIONS. Orlando, FL. (USA) 1<sup>st</sup> – 5<sup>th</sup> July 2012.
37. **J. BRAGARD** "Defibrillation mechanisms on a one-dimensional ring of cardiac tissue". 2013 SIAM CONFERENCE ON APPLICATIONS OF DYNAMICAL SYSTEMS. Snowbird, Utah (USA) 19<sup>th</sup> – 23<sup>rd</sup> May 2013.
38. **J. BRAGARD** "Defibrillation mechanisms on a one-dimensional ring of cardiac tissue". 40<sup>TH</sup> CONFERENCE IN COMPUTING IN CARDIOLOGY. Zaragoza, (Spain) 22<sup>nd</sup> – 25<sup>th</sup> September 2013.
39. **J. BRAGARD, A. COLLET AND P.C. DAUBY** "Influence of the temperature in the RDGC model". 1<sup>ST</sup> BCAM WORKSHOP ON NONLINEAR DYNAMICS IN BIOLOGICAL SYSTEMS. Bilbao, (Spain) 19<sup>th</sup> -20<sup>th</sup> June 2014.
40. **J. BRAGARD, A. SIMIC AND J. ELORZA** "Comparison of two and four electrode defibrillators through a simple cardiac dynamical model". SOCIETY FOR MATHEMATICAL BIOLOGY ANNUAL MEETING. Atlanta, (USA) 30<sup>th</sup> June- 3<sup>rd</sup> July 2015.
41. **J. BRAGARD, A. SIMIC AND J. ELORZA** "Comparison of two and four electrode defibrillators through a simple cardiac dynamical model". 35<sup>TH</sup> DYNAMICS DAYS EUROPE. Exeter, (UK), 6<sup>th</sup> - 10<sup>th</sup> September 2015.
42. **J. BRAGARD** "Comparison of defibrillation protocols through a simple cardiac dynamic model". 2<sup>ND</sup> BCAM WORKSHOP ON NONLINEAR DYNAMICS IN BIOLOGICAL SYSTEMS. Bilbao, (Spain) 1<sup>st</sup> -2<sup>nd</sup> of September 2016.
43. **J. BRAGARD** "Gap junctions induced bistability conductance in cardiac tissue". 2019 SIAM CONFERENCE ON APPLICATIONS OF DYNAMICAL SYSTEMS. Snowbird, Utah (USA) 19<sup>th</sup> – 23<sup>rd</sup> May 2019.

#### 12.4 POSTER PRESENTATIONS

44. **J. BRAGARD** "Derivation of Amplitude Equations for Bénard-Marangoni Convection". XIII<sup>TH</sup> ELGRA (EUROPEAN LOW GRAVITY RESEARCH ASSOCIATION) MEETING. Madrid 11-14 December 1994.
45. **J. BRAGARD** "Non-variational dynamics in Bénard-Marangoni convection". IIR<sup>RD</sup> LIQUID MATTER CONFERENCE. Norwich (UK) 6-10 July de 1996.
46. **J. BRAGARD** "Patterns, defects and other aspects of non-variational dynamics". PATTERNS AND WAVES: FROM PHYSICS TO BIOLOGY (EUROPEAN UNION NETWORK CONFERENCE). Nice (France) 12-16 January 1997.
47. **J. BRAGARD, A. KARMA, Y. LEE & M. PLAPP** "Linking phase-field and atomic simulations to model dendritic solidification in highly undercooled melts" 2001 GORDON RESEARCH CONFERENCE (GRAVITATIONAL EFFECTS IN PHYSICO-CHEMICAL SYSTEMS: INTERFACIAL EFFECTS). Colby College, New London, NH (USA) 8-13 July 2001.
48. **J. BRAGARD, A. KARMA, Y. LEE & M. PLAPP** "Linking phase-field and atomic simulations to model dendritic solidification in highly undercooled melts" II<sup>ND</sup> XARXA MEETING (DINÀMIQUES NO LINEALS D'AUTOORGANITZACIÓ ESPACIO-TEMPORAL). Palau de les Eures, UB, Barcelona 6-8 February 2002.
49. **J. BRAGARD, A. KARMA, Y. LEE & M. PLAPP** "Linking phase-field and atomic simulations to model dendritic solidification in highly undercooled melts" WORKSHOP ON COMPUTATIONAL PHYSICS OF TRANSPORT AND INTERFACE DYNAMICS. Dresden (Germany) 18<sup>th</sup> February until 8<sup>th</sup> March 2002.
50. **J. BRAGARD, H. MANCINI & S. BOCCALETTI** "Asymmetric coupling effects in the synchronization of spatially extended chaotic systems". XII<sup>TH</sup> CONGRESO DE FÍSICA ESTADÍSTICA. Pamplona (Spain) 23-25 Octubre 2003.
51. **A. BERNARDINI, J. BRAGARD & H. MANCINI** "Synchronization between two Hele-Shaw cells". XII<sup>TH</sup> CONGRESO DE FÍSICA ESTADÍSTICA. Pamplona (Spain) 23-25 October 2003.
52. **J. BRAGARD, H. MANCINI & S. BOCCALETTI** "Characterization of synchronization in spatially extended chaotic systems". SCHOOL AND CONFERENCE ON FUNDAMENTAL ASPECTS OF COMPLEXITY. Trieste (Italy) 6-10 September 2004.
53. **D. LAROZE, J. MARTINEZ-MARDONES, J. BRAGARD & C. PÉREZ-GARCÍA** "Rotating realistic convection in DNA suspensions". MEDYFINOL '04. La Serena (Chile) 6-10 December 2004.

54. **J. BRAGARD, H. MANCINI & S. BOCCALETTI** "Characterization of synchronization in spatially extended chaotic systems" 2005 GORDON RESEARCH CONFERENCE (NONLINEAR SCIENCE). Colby College, Waterville, ME (USA) 26<sup>th</sup> June until 1<sup>st</sup> July 2005.
55. **J. BRAGARD, J. ELORZA & P. ELIZALDE** "Analysis of Physiological time series". XX SITGES CONFERENCE ON STATISTICAL MECHANICS, Sitges, 5-9 June 2006.
56. **J. BRAGARD, J. ELORZA & P. ELIZALDE** "Analysis of Physiological time series". 9<sup>th</sup> GRANADA SEMINAR ON COMPUTATIONAL PHYSICS, Granada 11-16 September 2006.
57. **D. LAROZE, J. MARTINEZ-MARDONES, J. BRAGARD** "Realistic convection in a rotating binary ferrofluid". XIV<sup>th</sup> CONGRESO DE FÍSICA ESTADÍSTICA. Granada (Spain) 14-16 September 2006.
58. **N. VÉLEZ DE MENDIZÁBAL, J. GOÑI, J. SEPULCRE, F. ESTEBAN, J. BRAGARD, F. TORREALDEA & P. VILLOSLADA** "Relevance of lymphocyte deregulation in the dynamics of autoimmune processes". 7<sup>th</sup> SPANISH SYMPOSIUM ON BIOINFORMATICS AND COMPUTACIONAL BIOLOGY. Zaragoza (Spain) 20-22 November 2006.
59. **E. ALVAREZ-LACALLE, B. ECHEBARRIA, J. BRAGARD** "Study of heart disfunction through statistical analysis of heart rate variability". NOLINEAL 2007 NUEVOS RETOS Y PERSPECTIVAS DE LA DINÁMICA NO LINEAL Y SUS APLICACIONES. Ciudad Real (Spain) 5-8 June 2007.
60. **J. BRAGARD, E. CHERRY, N. OTANI, F. FENTON**, "Realistic model of action potential propagation in rabbit heart". XV<sup>th</sup> CONGRESO DE FÍSICA ESTADÍSTICA. Salamanca (Spain) 27-29 March 2008.
61. **J. BRAGARD, E. CHERRY, N. OTANI, F. FENTON**, "Realistic model of action potential propagation in rabbit heart: application to defibrillation studies". WORKSHOP SYSTEMS BIOLOGY IN MEDECINE. Barcelona (Spain) 8-10 May 2008.
62. **J. BRAGARD, P. ELIZALDE, J. ELORZA, E. DIAZ-CALAVIA AND I GARCIA-BOLAO**, "Ageing of the heart measurements through the analysis of ECG". INTERNATIONAL CONFERENCE ON MODELLING AND COMPUTATION ON COMPLEX NETWORKS AND RELATED TOPICS (NET-WORK08). Pamplona (Spain) 9<sup>th</sup> -11<sup>th</sup> June 2008.
63. **J. BRAGARD, S. MARIN, E. CHERRY AND F. FENTON** "Advances in defibrillation studies through numerical simulations". ESF SCIENCE MEETING ON CARDIAC DYNAMICS. Smolenice (Slovakia) 24<sup>th</sup> – 27<sup>th</sup> August 2009.
64. **I.R. CANTALAPIEDRA, A. PEÑARANDA, J. BRAGARD AND B. ECHEBARRIA**, "Cardiac Dynamics: a simplified model for the action potential". XVI<sup>th</sup> CONGRESO DE FÍSICA ESTADÍSTICA. Huelva (Spain) 10<sup>th</sup> – 12<sup>th</sup> September 2009.
65. **J. GOÑI, B. COROMINAS-MURTRA, G. ARRONDO, M.A. PASTOR AND J. BRAGARD** "Cognitive random-walks: the interplay of structure, switching and working memory". INTERNATIONAL WORKSHOP ON SYNCHRONIZATION AND MULTISCALE COMPLEX DYNAMICS IN THE BRAIN. MPIPKS Dresden (Germany) 2<sup>nd</sup> -6<sup>th</sup> November 2009.
66. **J. BRAGARD, AND J. GOÑI** "Chaos suppression in brain network motifs". INTERNATIONAL WORKSHOP ON SYNCHRONIZATION AND MULTISCALE COMPLEX DYNAMICS IN THE BRAIN. MPIPKS Dresden (Germany) 2<sup>nd</sup> -6<sup>th</sup> November 2009.
67. **A. SIMIC, AND J. BRAGARD** "Cardiac dynamics: Spiral meandering in heterogeneous tissues". II SCHOOL ON NUMERICAL SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS. Malaga (Spain) 8<sup>th</sup> – 12<sup>th</sup> February 2010.
68. **A. SIMIC, AND J. BRAGARD** "Numerical simulations of spiral drift in heterogeneous heart tissue". INTERNATIONAL CONFERENCE ON EMERGING TOPICS IN DYNAMICAL SYSTEMS AND PARTIAL DIFFERENTIAL EQUATIONS. Barcelona (Spain) 31<sup>st</sup> May – 4<sup>th</sup> June 2010.
69. **I.R. CANTALAPIEDRA, A. PEÑARANDA, B. ECHEBARRIA AND J. BRAGARD** "Reexcitations in cardiac tissue with heterogeneity in repolarization induced by a Calcium pulse". INTERNATIONAL CONFERENCE ON EMERGING TOPICS IN DYNAMICAL SYSTEMS AND PARTIAL DIFFERENTIAL EQUATIONS. Barcelona (Spain) 31<sup>st</sup> May – 4<sup>th</sup> June 2010.
70. **A. SIMIC, AND J. BRAGARD**, "Cardiac dynamics: Spiral drift and meandering in heterogeneous heart tissue". IV SPANISH-PORTUGUESE CONGRESS ON BIOPHYSICS. Zaragoza (Spain) 7<sup>th</sup> – 10<sup>th</sup> July 2010.
71. **J. BRAGARD, S. MARIN, E. CHERRY AND F. FENTON** "Advances in defibrillation studies through numerical simulations". IV SPANISH-PORTUGUESE CONGRESS ON BIOPHYSICS. Zaragoza (Spain) 7<sup>th</sup> – 10<sup>th</sup> July 2010.

72. **A. SIMIC, AND J. BRAGARD**, "Drift of a spiral wave in a heterogeneous heart tissue". INTERNATIONAL WORKSHOP ON TIMING AND DYNAMICS IN BIOLOGICAL SYSTEMS. MPIPKS Dresden (Germany) 27<sup>th</sup> September -1<sup>st</sup> October 2010.
73. **A. SIMIC, AND J. BRAGARD**, "Drift of a spiral wave in a heterogeneous heart tissue". INTERNATIONAL SYMPOSIUM: PHYSICS OF OUT OF EQUILIBRIUM SYSTEMS. Pamplona (Spain) 17<sup>th</sup> -19<sup>th</sup> February 2011.
74. **D. LAROZE, J. BRAGARD, L. PEREZ, J. MARTINEZ-MARDONES, H. PLEINER**. "Thermal convection in viscoelastic magnetic fluids". EUROMECH. CONFERENCE: PATTERNS IN SOFT MAGNETIC MATTER. TU Dresden (Germany) 21<sup>st</sup> - 23<sup>rd</sup> March 2011.
75. **J. BRAGARD, A. SIMIC, E. CHERRY, F. FENTON AND N. OTANI** "Cardiac defibrillation on a one-dimensional ring." EXPERIMENTAL CHAOS CONFERENCE 2012. ANN Arbor, MI (USA) 15<sup>th</sup> - 19<sup>th</sup> May 2012.
76. **A. SIMIC, I.R. CANTALAPIEDRA, J. ELORZA AND J. BRAGARD** "Huge reduction of defibrillation thresholds using four electrode defibrillators". 41<sup>ST</sup> CONFERENCE IN COMPUTING IN CARDIOLOGY. Cambridge, (USA) 7<sup>th</sup> -10<sup>th</sup> September 2014.
77. **C. HAWKS, J. ELORZA, I. CANTALAPIEDRA, A. PENARANDA, B. ECHEBARRIA AND J. BRAGARD** "Influence of gap junction dynamics on the stability of reentrant waves in cardiac tissue". 42<sup>ND</sup> CONFERENCE IN COMPUTING IN CARDIOLOGY. Nice, (France) 6<sup>th</sup> -9<sup>th</sup> September 2015.
78. **C. HAWKS, J. ELORZA, I. CANTALAPIEDRA, A. PENARANDA, B. ECHEBARRIA AND J. BRAGARD** "Influence of gap junction dynamics on the stability of reentrant waves in cardiac tissue". 20<sup>TH</sup> FISES (NATIONAL STATISTICAL PHYSICS CONFERENCE) Badajoz, (Spain) 5<sup>th</sup> -7<sup>th</sup> October 2015.
79. **J. BRAGARD, G. BALLESTEROS, S. RAVASSA, B. ECHEBARRIA, P. RAMOS, B. LOPEZ, A. GONZALEZ, M. MORENO, J. DIEZ, I. GARCIA-BOLAO** "Are high-resolution voltage maps a predictor tool in the treatment of atrial fibrillation?". CARDIAC PHYSIOME 2019. Maastricht, (Netherlands) 4<sup>th</sup> -6<sup>th</sup> December 2019.

### **13. PARTICIPATIONS AT SUMMER SCHOOLS**

1. **Summer school "Chaos and turbulence"** Universidad Internacional Menéndez Pelayo (UIMP), Santander, September 1994.
2. **Summer school "Experimental techniques and numerical methods"** Universidad Internacional Menéndez Pelayo (UIMP), Santander, July 1995.
3. **Summer school "Polymeric materials"** Universidad Complutense de Madrid, Almería, July 1995.
4. **Summer school "Drops, bubbles and thin liquid films"** Universidad Internacional Menéndez Pelayo (UIMP), Santander, September 1996.
5. **Summer school "Dynamical systems in Biology"** Foundation Gulbekian Porto (Portugal), August 1997.
6. **Summer school "Turbulence"** Max-Planck Institute Dresden (Germany), July 1998.
7. **Course "How to write a competitive proposal for framework 6"** ICT-UNAV, Pamplona, 11<sup>th</sup> February 2005.
8. **Course "Adaptación de las asignaturas al sistema de créditos europeos"** UNAV, Pamplona, 4<sup>th</sup> November 2005.

### **14. UNIVERSITY COMMUNITY SERVICES**

- **Member of the Faculty of Science commission for University quality supervision (since 2008).**  
The task of this commission is to collect indicators measuring the satisfaction level of the students and the University community in general. This will in turn allow for providing some improvements at the level of the Faculty of Science. My particular task is related to the International students exchanges (incoming and outgoing student programs).

- **Member of the award commission for the best doctoral thesis in Chemistry (University of Navarra, since 2006).**
- **Member of the commission for University admission exam for the people over 25 and over 40 years old.**  
This commission will decide the material and also prepare the exams for people (over 25 and 40 years old) who are willing to pursue University studies.
- **Secretary of the Master thesis committee** of the Doctoral program "Instabilities in dissipative systems" in the **Dept. of Physics and Applied mathematics** of the University of Navarra. From 2002 until 2005 and from 2007 until now.

## **15. PROFESSIONAL SERVICES**

- **Evaluation of research projects of the Belgian research council FNRS (Belgium).**
- **"Referee"** for the following international scientific journals:
  - ☐ *Physical Review Letters*
  - ☐ *Physical Review E*
  - ☐ *Chaos*
  - ☐ *Physica D*
  - ☐ *Journal of Fluid Mechanics*
  - ☐ *Journal of Mathematical and Bioscience Engineering*
  - ☐ *Transport in Porous Media*
  - ☐ *Journal of Colloid and Interface Science*
  - ☐ *Chaos, soliton & Fractals*
  - ☐ *International J. of Bifurcat. & Chaos*
  - ☐ *Entropy*
  - ☐ *Mathematical problems in Engineering*
  - ☐ *Mathematics and Computers in Simulation*
  - ☐ *Chinese Journal of Physics*
  - ☐ *Frontiers in Physiology*
  - ☐ *Physiological Measurement*
  - ☐ *Integrative Organismal Biology*
  - ☐ *Plos One*
  - ☐ *Plos Computational Biology*

## **16. ADDITIONAL MERITS**

- **ACCREDITATIONS** (recognition of the University Lecturer level by an independent Spanish national committee), **Profesor Contratado Doctor**, certified by the National Council for Universities (**ANECA**), October 2004.  
References: PCD 2004-3717.
- **HABILITACIÓN NACIONAL DE FÍSICA APLICADA** : recognition of the University Associate Professor level ("Profesor Titular") through an examination at the national level, realized at University Carlos III (Madrid), certified by National Council for Universities (MEC), publication in the national official gazette BOE: 27<sup>th</sup> March 2008.
- **ACCREDITATIONS** (recognition of the University Full Professor level by an independent Spanish national committee), **Catedrático de Universidad**, certified by the National Council for Universities (**ANECA**), June 2016.
- **4 "Sexenios de investigación" (1993-1999, 2000-2005, 2006-2011, 2012-2017)** (recognition by CNEAI of 24 years of international-quality research from 1993 until 2017).
- **Member of the doctoral committee examination of 9 Ph.D. theses** (6 from U. Navarra, 1 of U. Barcelona, 1 of U. Zaragoza and 1 of U. Liege).
- **"Chair of the Department Seminars" of the Physics and Applied mathematics department.** From 2001 until 2008.



**17. OTHERS SKILLS**

- **System administrator of the computer cluster in the department.** (Unix, Linux,...).
- **Investigator in charge for the start and maintenance of a computer cluster** in the Physics and Applied mathematics department for numerical intensive calculations.
- **Expertise in parallel programming on various supercomputers.** (MPI programming, C++, Fortran90, Matlab, Python, R).
- **External collaborator with the Neuroscience, Ophthalmology and Cardiology departments** of the Research Centre of Applied Medicine (CIMA) of the U. Navarra.
- **External collaborator with the Cardiology department** of the University Hospital (CUN) of the U. Navarra.
- **Languages:**
  1. **French:** Native language.
  2. **English:** Good oral and writing skills (Cambridge Proficiency Exam C2 passed in December 2008)
  3. **Spanish:** Fluent.
  4. **Italian:** Fluent.
  5. **Dutch:** Basic knowledge.

**18. SCIENTIFIC COLLABORATORS (Partial listing)**

- Prof. G. Lebon, U. of Liege, Belgium  
(Master thesis supervisor).  
Research area: Fluid Dynamics, Chaotic Dynamics, and Thermodynamics.
- Prof. M.G. Velarde, U. Complutense Madrid, Spain  
(PhD thesis supervisor).  
Research area: Theoretical Fluid Dynamics.
- Prof. F.T. Arecchi, U. Florence, Italy  
Research area: Non-linear Optics, Dynamical systems, Bose-Einstein condensates.
- Prof. A. Nepomnyashchy, Technion, Haifa, Israel  
Research area: Stability of partial differential equations, CGLE.
- Dr. S. Boccaletti, U. Florence, Italy  
Research area: Control and synchronization of spatially extended dynamical systems.
- Prof. E. Schöll, T.U. Berlin, Germany  
Research area: Control of dynamical systems, Condensed matter theory.
- Prof. J. Martinez-Mardonez, U. Valparaiso, Chile  
Research area: Fluid Dynamics (Ferrofluids and polymeric fluids).
- Prof. D. Laroze, U. de Tarapaca, Arica, Chile  
Research area: Fluid Dynamics (Ferrofluids and polymeric fluids).
- Prof. P.C. Dauby, U. of Liege, Belgium  
Research area: Benard-Marangoni convection, heart mechanics modelization.
- Dr. T. Desaive, U of Liege, Belgium  
Research area: Heart modelling.
- Dr. B. Echebarria, U. Polytechnic Barcelona, Spain  
Research area: Heart dynamics.

- Prof. A. Karma, Northeastern U., Boston, USA  
Research area: Condensed matter theory, Solidification modelization.
- Dr. M. Plapp, Ecole Polytechnique, Palaiseau, France  
Research area: Condensed matter theory, Solidification modelization.
- Prof. J. Bush, MIT, Cambridge, USA  
Research area: Experimental Fluid dynamics.
- Prof. R. F. Gilmour, Jr., UPEI, Charlottetown, Canada  
Research area: Heart dynamics.
- Prof. F. Fenton, Georgia Tech., Atlanta, USA  
Research area: Heart dynamics (Theory and Experiments).
- Prof. R. Grigoriev, Georgia Tech., Atlanta, USA  
Research area: Cardiac dynamics (Theory)
- Prof. E. Cherry, Georgia Tech., Atlanta, USA.  
Research area: Experimental, computational and theoretical Biophysics.
- Prof. N. Otani, RIT, Rochester, USA.  
Research area: Mathematical modeling of the cardiac dynamics.
- Dr. A. Witt, Max-Planck for Dynamics and self-organization, Gottingen, Germany.  
Research area: Statistical analysis of physiological data.
- Prof. J. Elorza, U. of Navarra, Spain  
Research area: Analysis of physiological time series & Theoretical Fuzzy Logic.
- Dr. P. Mossay, U. of Newcastle, UK  
Research area: Spatial dynamics in Economy and social sciences.
- PhD, MD, P. Villoslada, Hospital Clinic Barcelona, Spain + U. California, SF, USA  
Research area: Immunology, System Biology, Dynamical systems.
- PhD, R. Egydio de Carvalho, UNESP, Rio Claro, SP, Brazil.  
Research area: Dynamical systems and chaos (classical and quantum billiards).
- Prof. F.B. Sachse, University of Utah, Salt Lake City, USA  
Research area: Cardiac dynamics (Theory and Experiments).