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PROFESSOR CRISTINA MASOLLER

Physics Department, Universitat Politecnica de Catalunya

PERSONAL INFORMATION

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EDUCATION

1999 PhD Physics, Bryn Mawr College, USA
1991 Master Physics, Universidad de la Republica, Uruguay
1989 Bachelor Physics, Universidad de la Republica, Uruguay

CURRENT POSITION

2018 – Full Professor (Profesora catedratica contratada), Physics Department, Universitat Politecnica de Catalunya (UPC), Spain

PREVIOUS POSITIONS

2009 – 2018 Associate Professor (Profesora agregada contratada), Physics Department, UPC, Spain
2004 – 2009 Postdoctoral Researcher (Ramon i Cajal), Physics Department, UPC, Spain
1986 – 2004 Teaching assistant (1986 – 1993) / Assistant Professor (1993 – 2003) / Associate Professor (2003,2004), Instituto de Física, Facultad de Ciencias, Universidad de la República, Uruguay

HONORS AND AWARDS

2021 – 2025 ICREA Academia Award, Institució Catalana de Recerca i Estudis Avançats
2015 – 2020 ICREA Academia Award, Institució Catalana de Recerca i Estudis Avançats
2016 Fellow of the Optical Society (OSA).
2009 – 2014 ICREA Academia Award, Institució Catalana de Recerca i Estudis Avançats

RESEARCH LINES

Nonlinear photonics, nonlinear dynamics, complex systems and data analysis.
I am interested in dynamics of semiconductor lasers, neuronal excitability, complex networks, and nonlinear methods of time series analysis applied to climate data and biomedical signals.

ON-GOING GRANTS (Principal Investigator)

2022 – 2024 Experiments and data analysis tools to characterize forecast and control the behavior of complex systems
Agencia Estatal de Investigacion: PID2021-123994NB-C21
2019 – 2022 Marie Sklodowska-Curie action (MSCA) Innovative Training Network (ITN) *Climate Advanced Forecasting of sub-seasonal Extremes* (CAFE)
Web page: http://www.cafes2se-itn.eu/
European Commission reference number: 813844

PREVIOUS GRANTS (Principal Investigator, last 10 years)

2019 – 2021 *Complex dynamical systems and advanced data analysis tools*
Agencia Estatal de Investigación, Spain: PGC2018-099443-B-I00
2015 – 2019 MSCA ITN *Advanced Biomedical Optical Imaging and Data Analysis* (BE-OPTICAL)
European Commission reference number: 675512. Coordinator: C. Masoller
2016 – 2018 *Complex physical and biophysical systems: towards a comprehensive view of their dynamics and fluctuations*
Agencia Estatal de Investigación, Spain: FIS2015-66503-C3-2-P
2011 – 2015 MCSA ITN *Learning about Interacting Networks in Climate* (LINC)
European Commission reference number: 289447. Coordinator: C. Masoller

TEACHING ACTIVITIES

2004 – to date At Universitat Politecnica de Catalunya[1]:
Nonlinear systems, chaos and control in engineering for bachelor degrees of the School of Industrial, Aerospace and Audiovisual Engineering of Terrassa (ESEIAAT)
Nonlinear time-series analysis for the bachelor degree in Mathematics of the School of Mathematics and Statistics (FME), and for ESEIAAT master degrees
Applications of photonics technologies for ESEIAAT master degrees
Laser systems and applications for the Master in Photonics.

1986 – 2004 At Instituto de Física, Facultad de Ciencias, Universidad de la República, Uruguay: introductory and advanced physics courses for bachelor, master and PhD degrees.

SUPERVISION OF PHD STUDENTS

06/2011 J. Zamora Munt, Nonlinear and stochastic dynamics of semiconductor lasers: modulation, transient dynamics and synchronization (co-supervised with J. Garcia Ojalvo)

02/2014 S. Perrone, *Exploiting nonlinearity and noise in optical tweezers and semiconductor lasers: from resonant damping to stochastic logic gates and extreme pulses* (co-supervised with R. Vilaseca)

06/2014 A. Aragoneses, *Experimental study of feedback-induced dynamics in semiconductor lasers: from symbolic analysis to subwavelength position sensing* (co-supervised with M. C. Torrent)

02/2015 I. Deza, *Climate networks constructed by using information-theoretic measures and ordinal time-series analysis* (co-supervised with M. Barreiro)

06/2015 G. Tirabassi, *Disentangling climate interactions and inferring tipping points by using complex networks*

07/2015 T. Sorrentino, *Experimental and numerical study of the symbolic dynamics of modulated semiconductor lasers with optical feedback* (co-supervised with M. C. Torrent)

03/2017 C. Quintero-Quiroz, *Temporal correlations and dynamical transitions in semiconductor lasers with optical feedback* (co-supervised with M. C. Torrent)

04/2019 D. Zappala, *Hilbert analysis of air temperature dynamics*

12/2019 D. Halpaap, *Experimental study of speckle generated by semiconductor light sources: application in double pass imaging* (co-supervised with M. Vilaseca)

02/2020 P. Amil, *Machine learning methods for the characterization and classification of complex data*

02/2020 M. Masoliver, *Neuronal encoding and transmission of weak periodic signals*

07/2022 R. Silini, *Causal inference and forecasting methods for climate data analysis* (co-supervised with M. Barreiro)

SCIENTIFIC ACTIVITIES

Biometric indicators: Coauthor of more than 190 peer-reviewed articles that have received more than 4600 citations (H index: 35, data from Web of Science)[2].

Book *Networks in Climate*, by H. A. Dijkstra, E. Hernandez-Garcia, C. Masoller, M. Barreiro, Cambridge University Press 2019, ISBN 9781316275757.

Patent *Image processing method for detecting glaucoma in subject*. Patent #: WO2019116074-A1, date: 20/6/2019, inventors: P. Amil, E. Arrondo, C. Salinas, C. Masoller, U. Parlitz.

Editorial activity: Editor of *Chaos, Solitons & Fractals*, *Optics Letters*, and *Scientific Reports*, and member of the Editorial Board of *Chaos*, *Front. in Network Physiology* and *J. of Physics Complexity*.

Selected invited talks[3]*:* Europe Dynamics Days 2022 (Plenary), Conference on Complex Systems (CCS) 2020, European Semiconductor Laser Workshop (ESLW) 2020, VIII Jornada de Complexitat (2019), International Symposium on Physics and Applications of Laser Dynamics (IS-PALD 2018, Keynote), Dynamics Days Latin America and the Caribbean 2016 (Plenary).

[1] Lecture notes can be found here: http://www.fisica.edu.uy/~cris/teaching2.htm
[2] The list publications can be found here: http://www.fisica.edu.uy/~cris/publications.html
[3] Invited and contributed talks can be found here: http://www.fisica.edu.uy/~cris/Conferences2.htm