Rodrigo Cofre

(+33) 0619059545
rodrigo.cofre-torres@inria.fr

EDUCATION

Mathematical Engineering Pontificia Universidad Católica de Chile, 2002 to 2009. Graduated with honors. Professional degree (12 semesters).

Bachelor in Aesthetics Pontificia Universidad Católica de Chile, 2004 to 2009.

Master II in Computational Biology and Biomedicine École Polytechnique Universitaire de Nice Sophia Antipolis, 2010 to 2011.

Ph.D Specialty: Control, Signal and Image Processing. University of Nice- Sophia-Antipolis. Thesis developed at INRIA Neuromathcomp team from October 2011 to November 2014 under the supervision of Bruno Cessac (Neural Networks, Spike Trains Statistics and Gibbs distributions). Mention Trés honorable
Jury Members: Pierre Collet, Roberto Fernandez, Fred Wolf, Olivier Faugeras, Jean Marc Gambaudo, Alain Destexhe, Adrian Palacios, Olivier Marre, Bruno Cessac.

HDR University of Paris-Saclay "Mathematical and Statistical Models of Brain Activity at Different Scales" September 2023, Jury Members: Gaute Einevoll, Demian Wassermann, Sebastiano Stramaglia, Sabir Jacquir, Jorge Mejias, Denis Le Bihan.

Honors and Awards

Honor Scholarship for academic excellence at Pontificia Universidad Católica de Chileto study both engineering and Aesthetic simultaneously.
(From 2005 to 2009)

Full Scholarship from INRIA to study at École Polytechnique Universitaire de Nice Sophia Antipolis the Msc in Computational Biology and Biomedicine.
(From September 2010 to February 2011)

Full Scholarship from École Doctorale de Sciences et Technologies de l'Information et de la Communication et des télécommunications, to study the PhD at INRIA under the supervision of Bruno Cessac.
(From October 2011 to October 2014)

EXPERIENCE

Undergraduate thesis November 2007 to March 2009.
Stochastic analysis laboratory at Pontificia Universidad Católica de Chile
Work with Rolando Rebolledo, Patricio Orio and Wolfgang Kliemann.
"A Stochastic model of ion channel gating kinetic based on Langevin process in a double well potential"

Research Assistant March 2009 to August 2010
Stochastic analysis laboratory at Pontificia Universidad Católica de Chile
Part-time work in research in stochastic processes with Rolando Rebolledo.

Research Assistant March 2009 to August 2010.
Economy Department at Pontificia Universidad Católica de Chile
Part-time work in research in education.

Master-Internship March 2011 to August 2011.
INRIA-Sophia Antipolis, Neuromathcomp team
"From statistical analysis of spike trains to network structure" under the supervision of Bruno Cessac.

Ph.D Student From October 2011 to November 2014.
INRIA-Sophia Antipolis, Neuromathcomp team

under the supervision of Bruno Cessac.

Scientific Collaborator (Postdoc) From February 2015 to June 2017.
Department of Theoretical Physics, University of Geneva under the supervision of
Jean-Pierre Eckmann.

Joint Professor at CIMFAV From July 2017 to April 2021
Faculty of Engineering, University of Valparaiso.

Postdoc BRICON project From June 2021 to September 2023.
Institute of Neuroscience (NeuroPSI), Paris-Saclay University, Centre National de
la Recherche Scientifique (CNRS), Gif-sur-Yvette, France under the supervision of
Alain Destexhe.

Postdoc ENS From October 2023 to May 2024 .
Laboratoire de physique de l'école normale supérieure (PSL University), CNRS, Sor-
bonne Université, and Université de Paris, 75005 Paris, France, under the supervision
of Thierry Mora.

Postdoc FLAG-ERA project From June 2024 to January 2025.
Institute of Neuroscience (NeuroPSI), Paris-Saclay University, Centre National de
la Recherche Scientifique (CNRS), Gif-sur-Yvette, France under the supervision of
Alain Destexhe.

INRIA ISFP From February 2025.
Permanent Researcher CRONOS Team.

Publications

**A computational approach to evaluate how molecular mechanisms impact
large-scale brain activity** Maria Sacha, Federico Tesler, Rodrigo Cofre, Alain Des-
texhe A computational approach to evaluate how molecular mechanisms impact large-
scale brain activity
https:- Acccepted in Nature Computational Science

**Benchmarking macaque brain gene expression for horizontal and vertical
translation** Andrea I Luppi, Zhen-Qi Liu, Justine Y Hansen, Rodrigo Cofre, Elena
Kuzmin, Sen Froudist-Walsh, Nicola Palomero-Gallagher, Bratislav Misic *Science
Advances 11 (9), eads6967*

Entropy and Complexity Tools Across Scales in Neuroscience: A Review
Rodrigo Cofre, Alain Destexhe *Entropy, 27(2), 115, 2025*

**Neural mass modelling for the masses: Democratising access to whole-
brain biophysical modelling with FastDMF** Ruben Herzog, Pedro Mediano,
Fernando E Rosas, Andrea I Luppi, Yonatan Sanz Perl, Enzo Tagliazucchi, Morten L
Kringelbach, Rodrigo Cofre, Gustavo Deco *Network Neuroscience 8 (4), 1590-1612*

**Dynamical structure-function correlations provide robust and generaliz-
able signatures of consciousness in humans** Pablo Castro, Andrea Luppi, Enzo
Tagliazucchi, Yonatan Sanz Perl, Lorina Naci, Adrian M Owen, Jacobo Sitt, Alain
Destexhe, Rodrigo Cofre *Naturee Communications Biology 7 (1), 1224*

**Transcranial direct current stimulation modulates primate brain dynam-
ics across states of consciousness** Guylaine Hoffner, Pablo Castro, Lynn Uhrig,
Camilo Miguel Signorelli, Morgan Dupont, Jordy Tasserie, Alain Destexhe, Rodrigo
Cofre, Jacobo Sitt, Bechir Jarraya *eLife13:RP101688*

**Local Orchestration of Global Functional Patterns Supporting Loss and
Restoration of Consciousness in the Primate Brain** Andrea I. Luppi, Lynn
Uhrig, Jordy Tasserie, Camilo M. Signorelli, Emmanuel Stamatakis, Alain Destexhe,
Bechir Jarraya, Rodrigo Cofre *Nature Communications, 15, 2171 (2024)*

Computational modeling in disorders of consciousness: closing the gap towards personalized models for restoring consciousness Andrea I. Luppi, Joana Cabral, Rodrigo Cofre, Pedro A.M. Mediano, Fernando E. Rosas, Abid Y. Qureshi, Amy Kuceyeski, Enzo Tagliazucchi, Federico Raimondo, Gustavo Deco, James M. Shine, Morten L. Kringelbach, Patricio Orio, Jacobo Diego Sitt *NeuroImage, 275 (15) 2023, 120162*

A whole-brain model of the neural entropy increase elicited by psychedelic drugs Herzog, R., Mediano, P.A.M., Rosas, F.E. Lodder, P., Carhart-Harris, R., Sanz-Perl, Y., Tagliazucchi, E., Cofre, R. *Sci Rep 13, 6244 , 2023*

Entropy production of Multivariate Ornstein-Uhlenbeck processes correlates with consciousness levels in the human brain Matthieu Gilson, Enzo Tagliazucchi, Rodrigo Cofre *Phys. Rev. E 107, 024121, 2023*

Whole-brain modeling explains the context-dependent effects of cholinergic neuromodulation C Coronel-Oliveros, C Giessing, V Medel, R Cofre, P Orio *NeuroImage, Volume 265, 119782, 2023*

Dynamical models to evaluate structure-function relationships in network neuroscience AI Luppi, J Cabral, R Cofre, A Destexhe, G Deco, ML Kringelbach. *Nature Reviews Neuroscience, 1-2, 2022*

High-order functional interactions in ageing explained via alterations in the connectome in a whole-brain model Marilyn Gatica, Fernando E Rosas, Pedro AM Mediano, Ibai Diez, Stephan P Swinnen, Patricio Orio, Rodrigo Cofre*, Jesus M Cortes* *PLoS Comput Biol 18(9), 20221*

Structural Features of the Human Connectome That Facilitate the Switching of Brain Dynamics via Noradrenergic Neuromodulation Coronel-Oliveros C. & Castro S .& Cofre R. & Orio P.
Front. Comput. Neurosci. 15:687075, 2021

Scalable and accurate automated method for neuronal ensemble detection in spiking neural networks Herzog R. & Morales A.& Mora S. & Escobar M.J. & Palacios A. & Cofre R.
PLoS ONE 16(7): e0251647, 2021

Hyperharmonic analysis for the study of high-order information-theoretic signals Medina-Mardones, A., & Rodriguez, S.& Rosas F. & Cofre R.
J. Phys. Complex. 2(3) 035009, 2021

High-Order Brain Interactions in aging Gatica M., Cofre R., Mediano P.A.M, Rosas F., Diez I, Swinner S., Orio P., & J. Cortes
Brain Connectivity, Vol. 11, No. 9, 2021

Cholinergic neuromodulation of inhibitory interneurons facilitates functional integration in whole-brain models Coronel C., & Cofre R. & Orio P.
PLoS Comput Biol 17(2): e1008737, 2021

Towards an interdisciplinary framework about intelligence Palanca N. & Sanchez-Tajadura B. & Cofre R. *Heliyon 7(2), 2021*

Linear Response of General Observables in Spiking Neuronal Network Models. Cessac B., I. Ampuero & Cofre R. *Entropy 23(155), 2021*

Thermodynamic Formalism in Neuronal Dynamics and Spike Train Statistics Cofre R. & Maldonado C. & Cessac B.
Entropy 22(11), 1330, 2020

A mechanistic model of the neural entropy increase elicited by psychedelic drugs Herzog R., Mediano P.A.M, Rosas F, Carhart-Harris R, Sanz-Perl Y, Tagliazucchi E. & Cofre R. *Sci. Rep. 10:17725, 2020.*

Whole-Brain Models to Explore Altered States of Consciousness from the Bottom Up Cofre R. & Herzog R. & Mediano, P.A. & Piccinini, J. & Rosas, F.E. & Sanz Perl, Y. & Tagliazucchi, E. *Brain Sci. 10(9), 626, 2020.*

A Comparison of the Maximum Entropy Principle Across Biological Spatial Scales Cofre R. & Herzog R. & Corcoran D. and Rosas F. *Entropy 21(10), 1009, 2019*

An Introduction to the Non-Equilibrium Steady States of Maximum Entropy Spike Trains Cofre R. & Videla L. and Rosas F. *Entropy 21(9), 884, 2019*

Large Deviations Properties of Maximum Entropy Distributions of Spike Trains Cofre R. & Maldonado C. and Rosas F. *Entropy 20(8), 573, 2018*

Information Entropy Production of Maximum Entropy Markov Chains from Spike Trains, Cofre R. & Maldonado C. *Entropy 20(1), 34, 2018*

Exact computation of the Maximum Entropy Potential from spiking neural networks models, Cofre R & Cessac B. *Physical Review E, Volume 89, Issue 5, May 2014.*

Spike train statistics and Gibbs distributions, Cessac B. & Cofre R. *J. Physiol. Paris, Volume 107, Issue 5, Pages 360-368, November 2013*

Dynamics and spike trains statistics in conductance-based Integrate-and-Fire neural networks with chemical and electric synapses, Cofre R. & Cessac B. *Chaos, Solitons and Fractals, Volume 50, May 2013, Pages 13-31.*

Achievement versus aptitude in college admissions: a cautionary note based on evidence from Chile. Koljatic M & Silva M. & Cofre R , International Journal of Educational Development Volume 33, Issue 1, Pages 106-115 (January 2013)

Book Chapters
Information Theory in Neuroscience: Information Entropy Production of Maximum Entropy Markov Chains from Spike Trains Cofre R. & Maldonado C. *Stefano Panzeri and Eugenio Piasini Editors, Reprinted from: Entropy 2019, 21, 62, doi:10.3390/e21010062*

A General and Accurate Method for Neuronal Ensemble Detection in Spiking Neural Networks R Herzog-Amuntegui, S Mora, G Prada, JG Minonzio, MJ Escobar, Cofre R. , A. Palacios *Carrillo-Reid, L. (eds) Identification, Characterization, and Manipulation of Neuronal Ensembles. Neuromethods, vol 215. Humana, New York, NY. https://doi.org/10.1007/978-1-0716-4208-5₃*

Submitted Work
Network structure and neuromodulation orchestrate the informational architecture of mammalian brains Andrea Luppi, Lynn Uhrig, Jordy Tasserie, Pedro A. M. Mediano, Fernando E. Rosas, Daniel Gutierrez-Barragan, Camilo M. Signorelli, Daniel Golkowski, Andreas Ranft, Rdiger Ilg, Denis Jordan, S. Parker Singleton, Yohan Yee, Alain Destexhe, Rodrigo Cofre, David K. Menon, Alessandro Gozzi, Bechir Jarraya, Emmanuel A. Stamatakis
https:- Submitted to Science Human Behavior

Emergence of High-Order Functional Hubs in the Human Brain Fernando A.N. Santos, Prejaas K.B. Tewarie, Pierre Baudot, Antonio Luchicchi, Danillo Barros de Souza, Guillaume Girier, Ana P. Milan, Tommy Broeders, Eduarda G.Z. Cen-

teno, Rodrigo Cofre, Fernando E Rosas, Davide Carone, James Kennedy, Cornelis J. Stam, Arjan Hillebrand, Mathieu Desroches, Serafim Rodrigues, Menno Schoonheim, Linda Douw, Rick Quax https://doi.org/10.1101/2023.02.10.528083 Submitted to Nature Communications

Grants	***INRIA RISE-ESTHETICS*** *Exploring the functional Structure of THe rETIna with Closed loop Stimulation A Physiological and computational approach, (Joint Researcher) with Bruno Cessac, Adrian Palacios.* *(From 2023 to 2024)*
	PIM-IPICYT-MEXICO *"Numerical exploration of data in neuroscience, networked systems and out-of-equilibrium systems" (Joint Researcher) with Cesar Maldonado, Cesare Ovando, Daniel Salgado, Jorge Littin, Gerardo Barrera.* *(From 2023 to 2025)*
	FONDECYT-1211750 *Revealing the relationship between high-order Interdependencies and critical-like behavior in Biophysical neural networks, (Joint Researcher).* *(From 2021 to 2023)*
	STIC/AMSUD-SILIDOC *In silico modeling of single-subject neuroimaging data for the characterization and prognosis of patients with disorders of consciousness Project with Jacobo Sitt at Institut du Cerveau et de la Moelle épinière, (Joint Researcher).* *(From 2021 to 2023)*
	MAGMA-EQA-041903 *INRIA associated team, Joint project with Biovision team INRIA, France. (Joint Researcher).* *(From 2019 to 2022)*
	REDI-170457 *Interdisciplinary Network of Complex Systems in Neuroscience. Joint project with the Centre for Complexity Science, Imperial College, U.K. (PI).* *(From 2018 to 2019)*
	FONDECYT-11181072 *Population Coding in the Retina: Revealing the role of non-synchronous Correlations in the Markov Maximum Entropy Approach, (PI).* *(From 2019 to 2021)*
	REDES-180151 *Interdisciplinary network on dynamical systems, graph theory, and biological networks, Joint project with Institute of Physics, San Luis, Mexico. (Joint Researcher).* *(From 2019 to 2021)*
	REDES-170217 *International Research Network to Study Predictive Coding in the Retina. Joint project with Biovision team INRIA, France. (Joint Researcher)* *(From 2018 to 2019)*
	PAI-79160120 *Fortalecimiento de la investigación en Matemática Aplicada y apoyo a programas de pregrado y postgrado en el CIMFAV-Facultad de Ingeniería de la Universidad de Valparaíso (PI).* *(From 2017 to 2020)*
Conferences and Meetings	***ENSCM 2024.*** *San Luis Potosi, Mexico, September 2024, Escuela Nacional de Supercomputo* **3 Lectures on Time Series in Neuroscience** *(invited by Cesar Maldonado)*
	Collège de France 2024. *Paris, March 2024, UNICOG NeuroSpin Seminar* **Talk Title:** *"Three faces of the structure-function interdependence of the brain under diverse consciousness states"*

Strasbourg 2023. *Strasbourg, May 2023, Funsy Team Seminar* **Talk Title:** *"Novel perspectives on the structure-function dynamics of the primate and human brain under diverse consciousness states"*

Saclay 2023. *INRIA SACLAY, March 2023, MIND team Seminar* **Talk Title:** *"Novel perspectives on the structure-function dynamics of the primate and human brain under diverse consciousness states"*

EBRAINS 2023. *EBRAINS Workshop, March 2023, Anatomy and function of the prefrontal cortex across species* **Talk Title:** *"Dynamical aspects of the structure-function relationship modulation by anesthetics of the primate and human brains"*

IHP 2023. *Institute Henri Poincare, March 2023, Stochastic proccess in the brain* **Talk Title:** *"Scalable and accurate method for neuronal ensemble detection in spiking neural networks"*

IAS 2023. *Institute of Advanced studies Amsterdam, December 2023, High-Order Interactions in Complex Systems* **Talk Title:** *"High-order interdependencies in the brain"*

IAS 2022. *Amsterdam, December 2022, Workshop on Perspectives and Challenges in High-Order Interactions in Complex Systems* **Talk Title:** *"High-order interdependencies in the brain"*

FENS 2022. *Paris, July 2021,* **Talk Title:** *"Whole-brain simulations of wakefulness, slow-wave sleep, and anesthetized states in the macaque monkey"*

CNS 2021. *(Online), July 2021, Workshop on Methods of Information Theory in Computational Neuroscience* **Talk Title:** *"High-order interdependencies in the aging brain'*

NETSCI-TOPONETS 2020. *Rome, Italy (online), September 2020,* **Talk Title:** *"Dimensionality reduction of high-order signals via hyperharmonic modes"*

NETSCI-TOPONETS 2020. *Rome, Italy (online), September 2020,* **Talk Title:** *"High-order interdependencies in the aging brain"*

LASCON 2020. *Sao Paulo, Brazil, January 2020, LASCON Summer School* **3 Lectures on Retinal Coding** *(invited by Antonio Roque)*

PSY 2019. *London, U.K, December 2019, Group meeting Centre for psychedelics science, Imperial College, London* **Talk Title:** *"Multivariate information theory in psychedelics science"*

CNS 2019. *Barcelona Spain, July 2019, Workshop on Methods of Information Theory in Computational Neuroscience* **Talk Title:** *"Exploring information-theoretic high-order effects of LSD in a Whole-Brain Model"*

MATPUC 2019. *Santiago, Chile, June 2019, Math Colloquium* **Talk Title:** *"Neurons, Brains and Birds: Characterizing Collective Behavior in Neuroscience"*

LACONEU 2019. *Valparaiso, Chile, January 2019, 3 Weeks Summer School* **Speaker and 1 of the 3 Main Organizers**

UCN 2018. *Antofagasta, Chile, December 2018, V Encuentro de Investigadores Emergente,* **Talk Title:** *"Ideas and Tools From Statistical Mechanics to Characterize Collective Behavior in Neuroscience"*

CMM 2018. *Santiago, Chile, Noviembre 2018, Seminario Nucleo Milenio en Modelos Estocsticos y Desordenados* **Talk Title:** *"Collective behavior of spiking neuronal*

networks and other biological systems inferred from the Maximum Entropy Principle"

ICMN 2018. *Nice, France, June 2018, 4th International Conference on Mathematical NeuroScience* **Talk Title:** *"Linear Response of General Observables in Spiking Neuronal Network Models"*

ICL 2018. *London, U.K, February 2018, Group meeting Centre of complexity science, Imperial College, London* **Talk Title:** *"Criticality of inferred processes from Spike Trains"*

SCHN 2017. *Chiloé, Chile, September 2017, Symposium From Neural Connectivity to Network Dynamics* **Talk Title:** *"Irreversibility and Non-equilibrium Maximum Entropy Processes from Spike Trains"*

CNS 2017. *Antwerp, Belgium, July 2017, Workshop on Methods of Information Theory in Computational Neuroscience* **Talk Title:** *"Information Entropy Production and Large deviations of Maximum Entropy Processes from Spike Trains"*

BERNSTEIN 2016. *Berlin, Germany, September 2016, 12-th Annual Computational Neuroscience Meeting. Poster Presentation.*

STATPHYS 2016. *Paris, France, July 2016, Statistical physics methods in biology and computer science Poster Presentation.*

APS 2016. *Baltimore, USA, March 2016, American Physical Society, Maximum Entropy Models: A Promising Link Between Statistical Physics, Inference, and Biology* **Talk Title:** *"From Maximum Entropy Models to Non-Stationarity and Irreversibility"*

NETT 2015. *Barcelona, Spain, September 2015, International Conference on System Level Approaches to Neural Engineering. Poster Presentation.*

BERNSTEIN 2015. *Heidelberg, Germany, September 2015, 11-th Annual Computational Neuroscience Meeting. Poster Presentation.*

MATHSTATNEURO 2015. *Nice, France, September 2015, MathStatNeuro workshop.*

UTRECHT 2015. *Utrecht, Netherlands, September 2015, invited by Roberto Fernandez to Utrecht university.*

ICMP 2015. *Santiago, Chile, August 2015, Young Research Symposium* **Talk Title:** *"Spatio-temporal Linear Response of Spiking Neuronal Network Models"* **PUC 2015.** *Santiago, Chile, January 2015, Probability Seminar/Nucleo Minenio Oral Presentation (invited by Gregorio Moreno).*

UAI 2015. *Santiago, Chile, January 2015, UAI science faculty Seminar* **Talk Title:** *"Spiking Neuronal Networks and Gibbs distributions" (invited by Eric Goles).*

CIMFAV 2014. *Valparaiso, Chile, December 2014, CIMFAV Seminar* **Talk Title:** *"Can we hear the shape of a spatio-temporal potential?" (invited by Jean-Francois Jabir).*

NICE 2014. *NICE, France, October 2014, From Statistical Physics to Neuronal Network Dynamic Mini-Symposium (Organized after my Phd defense).*

EPFL 2014. *Lausanne, Switzerland, April 2014, Computational Neuroscience Seminar* **Talk Title:** *"Can we hear the shape of a spatio-temporal potential?" (invited by Wulfram Gerstner).*

NICE 2014. *Nice, France, Mars 2014, Séminaire de probabilités.* **Talk Title:** *""Exact computation of the maximum-entropy potential of spiking neural-network models". (invited by Matthieu Lerasle).*

LACONEU 2014. *Valparaiso, Chile, January, 2014, Summer School Computational Neuroscience. Participation as a Tutor.*

AMIENS 2013. *Amiens, France, September 2013, Séminaire de probabilités et théorie ergodique.* **Talk Title:** *"Can we hear the shape of a spatio-temporal potential?". (invited by Samuel Petite).*

UTRECHT 2013. *Utrecht, Netherlands, September 2013, Mathematics and Neuroscience: A dialogue.* **Talk Title:** *"Space-time correlations in spike trains and the neural code". (invited by Roberto Fernandez).*

BERNSTEIN 2013. *Tubingen, Germany, September 2013, Ninth Annual Computational Neuroscience Meeting. Poster Presentation.*

CNS 2013. *Paris, France, July 2013, Twenty Second Annual Computational Neuroscience Meeting. Poster Presentation.*

MTP 2013. *Strasbourg, France, June 2013, 91th Encounter between Mathematicians and Theoretical Physicists.*

GDR MEA 2012. *Marseille, France, October, 2012. Encoding And Decoding of Neural Ensembles. Poster Presentation.*

NEUROCOMP 2012. *Bordeaux, France, October, 2012. The NeuroComp/KEOpS 2012 workshop. Poster Presentation.*

SCNE 2012. *Klosterneuburg, Austria , September 2012. Sensory Coding and Natural Environment. Poster Presentation.*

AREADNE 2012. *Santorini, Greece, July, 2012. Encoding And Decoding of Neural Ensembles. Poster Presentation.*

LACONEU 2012. *Valparaiso, Chile, January, 2012. Neural Coding and Natural Image Statistics.*

Research Visitor   **IPICYT 2024.** *SLP Mexico, June 2024. Nonequilbrium Statistical Mechains and Neuroscience. Invited by Cesar Maldonado, IPICYT.*

IAS 2022. *Amsterdam, December 2022. Perspectives and Challenges in High-Order Interactions in Complex Systems. Invited by Fernanndo Nobriega, Fellow of the Institute for Advanced Study (IAS) Amsterdam.*

NICE 2022. *NICE, FRANCE, July 2022, MAGMA Project with Biovision group at INRIA Sophia-Antipolis.*

NICE 2021. *NICE, FRANCE, September 2021, MAGMA Project with Biovision group at INRIA Sophia-Antipolis.*

LONDON 2019. *London, U.K., December 2019, P.I REDI170457 with Fernando Rosas to the Centre of psychedelics science at the Imperial College London.*

NICE 2019. *NICE, FRANCE, September 2019, MAGMA Project with Biovision group at INRIA Sophia-Antipolis.*

LONDON 2018. *London, U.K., February 2018, P.I REDI170457 with Fernando Rosas and Henrik Jensen to the Complexity group at the Imperial College London.*

NEW YORK 2016. *New York, USA, March 2016, invited by Marcelo Magnasco to Rockefeller University*

UTRECHT 2015. *Utrecht, Netherlands, September 2015, invited by Roberto Fernandez to Utrecht University.*

GSSI 2013 *L'Aquila, Italy, December 2013, Contex-tree model selection with applications to neurosciences Invited by Errico Presutti to the Phd course given by Antonio Galves.*

Computer Skills	***Scripting/Programming and Data Analysis*** *Python, MATLAB, R.*
	Productivity Software. *LaTeX, Mathematica.*
Teaching	***Discrete Mathematics, Mathematics, Numerical Analysis, Geometry, Electricity and Magnetism, Mathematical Problems, Mathematical Thought, Calculus III, Probability, Time Series, Data Mining, Graph Theory, Probability, Statistics (graduate Level), Stochastic Calculus (graduate Level)*** *. Teaching Assistant (Undegraduate Level) Pontificia Universidad Católica de Chilefrom August 2004 to December 2009*
	Analyse de Signaux (TP), *École Polytechnique Universitaire de Nice Sophia Antipolis 2013-2014.*
	Méthodes Mathématiques pour Physiciens (TD), Méthodes Mathématiques de la Mécanique Classique (TD), *Université de Genève 2015-2016-2017.*
	Modern Physics, Introduction to Mathematical Engineering, *Universidad de Valparaíso, 2017-2018-2019-2020.*
	Topics in Computational Neuroscience, *PhD program on Biophysics and Computational Biology, Universidad de Valparaíso, 2017-2018-2019-2020.*
	Introduction to Modeling in Neuroscience and Cognition, *Msc. Modeling for Neuronal and Cognitive systems, 2 lectures, main lecturer Bruno Cessac 2025.*
Posters since 2020	***Dynamical richness and statistical synergy are maximized in networks with small-world topology***, *Presented at CNS 2023 Cofre R., J.Palma, S. Orellana & Orio P.*
	High-Order Functional Connectivity: A Data-driven Approach for Studying States of Consciousness *Presented at ASSC 2023 By R.Herzog*
	Multiscale responsiveness following microstimulation of the prefrontal cortex in wakefulness and anesthesia, *Human Brain Project Summit, Marseille, France 2023*
	Simulating the emergence of conscious and unconscious states at the wholebrain level *Human Brain Project Summit, Marseille, France 2023.*
	High-order interactions in aging explained through changes in the connectome in a whole brain model *Advances in Theoretical and Computational Neuroscience Meeting, University of Nottingham.*
	Whole-brain simulations of wakefulness, slow-wave sleep, and anesthetized states in the macaque monkey *FENS 2022.*
	Modeling the context-dependent effects of cholinergic neuromodulation on functional network topology *FENS 2022.*

A mechanistic model of the neural entropy increase elicited by psychedelic drugs ASSC 2022

High-order interactions in aging explained through changes in the connectome in a whole brain model OHBM 2022

Whole-Brain Modelling Suggests Mechanisms Behind Pro-Segregation Effects of Cholinergic Neuromodulation SCHN 2021, 31th XVII Reunin Anual Sociedad Chilena de Neurociencia 2021

High-order interdependencies and the functional balance of segregation-integration in the aging brain Annual Computational Neuroscience Meeting CNS2020

Inhibitory gain allows transitions between integrated and segregated states: a neuromodulatory analysis from whole-brain models Annual Computational Neuroscience Meeting CNS2020

Whole-Brain Modelling Suggest Mechanisms Behind Pro-Segregation Effects of Cholinergic Neuromodulation Annual Computational Neuroscience Meeting CNS2020

Reviewer activities	*Regular reviewer for the journals: Nature Communications, Journal of Statistical Mechanics: Theory and Experiment (IOP), PLOS Computational Biology, Neuroscience (Elsevier), Journal of Mathematical Neuroscience, Neural Processing Letters (Springer), Entropy, IEEE Transactions on Cognitive and Developmental Systems, Network Neuroscience (MIT Press).*
Referee	*Referee Ciencia de frontera 2019 CONACYT (Mexico), Fondecyt Iniciacion 2021 (Chili), DATAIA Felowships 2025 (France).*
PhD programs	*Collaborator of the PhD program on Biophysics and Computational Biology and Applied Informatics at the University of Valparaiso.*
PhD Jury	*Carlos Coronel, Biophysics and Computational Biology at the University of Valparaiso*
HdR Jury	*Matteo Di Volo, University of Lyon 1.*
CST Comité de suivi de thèse	*Ivan Mindlin: PhD student at the Sorbonne University (ED3C Cerveau - Cognition - Comportement), under the direction of Jacobo Sitt, ICM Paris.*
	Clement Picard: PhD student at the Paris-Saclay University (Ècole doctorale Biosigne), under the direction of Valerie Ego-Stern, NeusoPsi Saclay.
	Louise Martineau: PhD student at IRMA Strasbourg University (Ècole doctorale Mathèmatiques, Sciences de l'information et de l'ingenieur), under the direction of Sègolen Geffray et Christophe Pouzat.
Undergraduate students	***Engineering professional internship*** *Ignacio Ampuero, Ariadne Sandoval, Alonso Lagos, Ivan Mansilla (University of Valparaiso, Chile).*
Graduate students	***Master thesis co-advisor*** *Angelica Di Domenico, Master Physics of Complex Systems jointly operated by Sorbonne University, Paris-Saclay University and University of Paris, together with Politecnico di Torino, SISSA and ICTP in Trieste.* ***Master thesis co-advisor*** *Pablo Castro, Master Computational Neurosciences and Neuroengineering-Université Paris-Saclay* ***Master thesis co-advisor*** *Chloé Duprat, Master Computational Neurosciences*

and Neuroengineering-Université Paris-Saclay

PhD co-advisor *Marilyn Gatica, PhD in Biophysics and Computational Biology, UV and Biomedicine at UPV. Joint Advisor with Patricio Orio UV Chile, and Jesus Cortes UPV Spain. (Now Postdoc at Nottingham University under the direction of Marcus Kaiser)*

PhD advisor *Rubén Herzog, PhD in Biophysics and Computational Biology, UV. (Now Postdoc at ICM Paris, under the direction of Thomas Andrillon)*

Master thesis co-advisor *Alexis Beck Master in Informatics, Université de Geneve*

Languages ***Spanish.*** *Native language.*
English. *Fluent spoken and written.*
French. *Fluent spoken and written.*
Italian. *Fluent spoken and written.*
German. *Working knowledge.*