

SCIENTIFIC CURRICULUM OF LUCA FAES

1 PERSONAL DETAILS

- Name: Luca Faes
- Date of birth: September 14, 1973
- Place of birth: Levico Terme (TN), Italy
- Nationality: Italian
- Marital status: Married
- Address: Via Don E. Angeli, 38050 Calceranica al Lago (TN), Italy
- Phone Number: +39 3495889733
- E-mail: luca.faes@unipa.it – faes.luca@gmail.com
- Personal website: www.lucafaes.net

2 EDUCATION

- 1998: Master degree (Italian Laurea) in Electronic Engineering (*cum laude*) at the University of Padova, Italy
- 2003: PhD degree in Electronic Devices at the University of Trento, Italy

3 PROFESSIONAL EXPERIENCE

3.1 Work Experience

- 1999-2000: Research Fellow on system identification and modeling at the Medical Biophysics Division of ITC-irst (Institute for Scientific and Technologic Research), Trento, Italy
- 2000-2003: PhD student at the Department of Physics, University of Trento, Italy
- 2003-2008: Postdoctoral Fellow at the Biophysics and Biosignals Laboratory of the Department of Physics, University of Trento, Italy
- 2008-2013: Postdoctoral Fellow at the interdepartmental Center for Biotechnologies (BIOTech) of the University of Trento, Italy
- 2014-2017: Researcher, Healthcare Research and Innovation Program, Bruno Kessler Foundation (FBK), Trento, Italy
- 2018-2022: Associate Professor, Department of Engineering, University of Palermo, Italy
- 2023-Present: Full Professor, Department of Engineering, University of Palermo, Italy

3.2 Funded Research Stays Abroad

- May-Jul 2007: Appointed Research Fellow, Dept. of Biomedical Engineering, State University of New York, Stony Brook, NY, USA (working with Prof. Ki H. Chon)
- Sep-Dec 2010: Visiting Researcher (US Navy Research Grant N0001409WX20220), Dept. of Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA, USA (working with Prof. Ki H. Chon)

- Mar-Jun 2013: Visiting Researcher (Special Research Grant, Flanders Research Foundation), Dept. of Data Analysis, Faculty of Psychological and Pedagogical Sciences, Gent, Belgium (working with Prof. D. Marinazzo)
- Apr-May 2015: Visiting Researcher (“Science without borders” Research Grant), Dept. of Electronic Engineering, Federal University of Minas Gerais, Belo Horizonte, Brazil (working with Prof. A. Beda)
- Apr-Jul 2016: Visiting Researcher (“FBK Mobility Program” Research Grant), Dept. of Physics, Boston University, Boston, MA, United States (working with Prof. P. Ch. Ivanov)

3.3 Acknowledgments

- 1999: achievement of the qualification to practice the profession of Engineer
- 2014: achievement of the Italian National Scientific Qualification to function as associate professor in Italian Universities (09/G2 - Bioengineering)
- 2015: project InPhyNet - “Information Dynamics of the human physiologic network: a novel integrated approach to uncover function and impairment of neuroautonomic regulation” passed to the final step of the ERC Consolidator Grant 2015
- The Annual Review 2015-2016 of the Institute of Physics (IOP) included Research News briefs on the special issue ESGCO2014 (Eds. A Porta, G Nollo, L Faes) with mention of the paper “Linear and nonlinear brain-brain and brain-heart interactions during sleep” (L. Faes et al, Phys. Meas 2015), and on the focus issue on Network Physiology (Ed. P. Ch. Ivanov) with mention of the paper “information dynamics of brain-heart physiological networks during sleep” (L. Faes et al., New J Phys 2014).
- Winner of the “Entropy” Best Paper Award for 2018 with the top-voted paper “Multiscale Information Decomposition: Exact Computation for Multivariate Gaussian Processes”, by Luca Faes, Daniele Marinazzo and Sebastiano Stramaglia; Entropy 2017, 19(8), 408; Editorial article “Entropy 2018 Best Paper Award”: <https://doi.org/10.3390/e21020130>
- The paper “Univariate and multivariate conditional entropy measures for the characterization of short-term cardiovascular complexity under physiological stress”, by M Valente, et al, Physiological Measurement, 2018, 39:014002; was selected for inclusion in the “2018 Highlights collection” of the journal Physiological Measurement (vol. 39), which collects articles with high quality reviewer reports, impressive usage statistics and citations and personal recommendation by the Editorial board of the journal.
- June 2019: elevated to the grade of *IEEE Senior Member* by the IEEE Admission and Advancement Committee
- 11 September 2019: achievement of the Italian National Scientific Qualification to function as associate professor (02/D1 – Applied Physics) and full professor (09/G2 - Bioengineering) in Italian Universities
- 2021, 2022: Inclusion in the World’s Top 2% Scientists, elaborated by Stanford University, representing the top 2% of the most influential scientists; discipline: Biomedical Engineering; categories: whole career, last year - <https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/3>
- 2003-present: Italian Society of Chaos and Complexity, Member
- 2007-present: IEEE Engineering in Medicine and Biology Society, Member
- 2014-present: European Study Group on Cardiovascular Oscillations (ESGCO), Board Member
- 2024-present: European Alliance of Medical and Biological Engineering (EAMBES), Fellow Member

4 ACADEMIC ACTIVITY

- 2016-2017: Member of the Doctorate in Cognitive and Brain Sciences Committee, CiMeC, University of Trento, Italy
- 2018-present: Member of the Doctorate in Information and Communication Technologies, Department of Engineering, University of Palermo, Italy
- 2018: Member of The Organizing Committee of the Master Degree in Biomedical Engineering, University of Palermo, Italy
- 2018-present: Vice coordinator and delegate for tutoring, Study Council of the Bachelor Degree in Biomedical Engineering, University of Palermo, Italy
- 2018-2021: Academic coordinator of the Erasmus+ Program for the Higher Education Student and Staff Mobility between the University of Palermo and the Universities of Kyiv (Ukraine) and Novi Sad (Serbia)
- 2019-present: Academic coordinator of the Erasmus Program for the Higher Education Student and Staff Mobility between the University of Palermo and the Universities of Jena (Germany), Angers (France), Thessaloniki (Greece), Novi Sad (Serbia), Valladolid (Spain, from 2022) – both bachelor and master
- 2021-present: Representative delegate for the Curriculum “Biomedical Information Technologies”, Study Council of the Master Degree in Biomedical Engineering, University of Palermo, Italy
- 2021-present: Delegate for tutoring, Study Council of the Master Degree in Biomedical Engineering, University of Palermo, Italy
- 2021: Member of The Organizing Committee of the MED-IT Joint Degree in Medicine and Biomedical Engineering, University of Palermo, Italy
- Organizer of seminars and courses taught by external lecturers for BS students in Biomedical, Cybernetics and Electronic Engineering: Prof. G. Nollo (University of Trento; 22/2/2019); Prof. D. Kugiumtzis (University of Thessaloniki, Greece; 15-19/3/2019; 4-8/10/2021; 3-6/5/2022; 2-6/10/2023), Dr. I. Lazic and S. Etinski (University of Novi Sad, Serbia; 8/4/2019); Prof. A. Popov (Kyiv Polytechnic Institute; 8/5/2019); Dr. Yuri Antonacci (2021); Dr. Mirvana Hilal (University of Angers; 11-13/5/2022); Prof. M. Javorka (Comenius University Bratislava, 26/4/2023); Dr. Ludovico Minati (University of Electronic Science and Technology of China, Chengdu; 18/5/2023).

4.1 Teaching Activity

- 1999-2005: teaching assistant of General Physics II at the Engineering Faculty of the University of Trento, Italy (academic years: from 1999/2000 to 2004/2005)
- 2002-2007: teaching assistant of Signal and Image Processing for Clinical Diagnostics at the graduation course in Physics and Biomedical technologies of the University of Trento, Italy (academic years: from 2002/2003 to 2006/2007)
- 2015: Faculty of Electronic Engineering, Federal University of Minas Gerais, Belo Horizonte, Brazil, short course (10 hours) on Information theory and time series analysis, April 2015
- 2016: Lesson on “Network Physiology” for the Massive Open Online Course (MOOC) ‘A Primer on Health Technology Development for Smart City’ of the IEEE.

- 2017: Center of Mathematics of the University of Porto (CMUP), Portugal, 1-day Workshop on Signal Processing and Data Analysis, on the topic “Information theory for the analysis of physiological time series”, Oct 13, 2017
- 2018: tenured professor of “Sensors”, graduation course on Cybernetic Engineering, University of Palermo, Italy (academic years: 2017/2018, 2018/2019)
- 2018-present: tenured professor of “Sensors and Biomedical Devices”, graduation course on Biomedical Engineering, University of Palermo, Italy (academic years: 2018/2019, 2019/2020, 2020/2021, 2021/2022, 2022/2023)
- 2019-present: tenured professor of “Statistical Analysis of Biomedical Signals”, Master degree course on Biomedical Engineering, University of Palermo, Italy (academic years: 2019/2020, 2020/2021, 2021/2022, 2022/2023)

4.2 Lectures and Seminars

- Jun 18, 2001: Department of Physics, University of Trento, *Seminari di aggiornamento di Biofisica e Biosegnali* – seminar lecture
- May 28, 2002: Università di Padova, *Corso di Tecnologie Biomediche* – seminar lecture
- Feb 11, 2003: Department of Physics, University of Trento, *Seminari di aggiornamento di Biofisica e Biosegnali* – seminar lecture
- Jun 1, 2007: Faculty of Biomedical Engineering of the State University of New York; Stony Brook, NY, USA – invited seminar lecture
- Nov 2008: Department of Physics, University of Trento, *Experimental Workshop of the Department of Physics* – seminar lecture
- 2009: Department of Biomedical Engineering of the University of Lund; Lund, Sweden, Nov 11, 2009 – invited seminar lecture
- Nov 19, 2010: Department of Biomedical Engineering of the Worcester Polytechnic Institute; Worcester, MA, USA – invited seminar lecture
- Apr 14, 2011: CiMeC, University of Trento, *EEG lab seminars* – seminar lecture
- Mar 18, 2013: Faculty of Psychological and Pedagogical Sciences; Gent, Belgium – invited seminar lecture
- Jul 15, 2016: Department of Physics, Boston University; Boston, MA, USA – invited seminar lecture
- Jul 7, 2017: School of Systems Science, Beijing Normal University, Beijing – invited seminar lecture
- Mar 14, 2018: Department of Physics, University of Palermo – invited seminar lecture
- Mar 20, 2019: Azienda Ospedaliera Universitaria Policlinico “Paolo Giaccone” di Palermo, invited lecture titled: “L’ICT in ambito cardiologico e respiratorio: esperienze sull’acquisizione e l’elaborazione dei segnali sincronizzati per estrazione di indicatori fisiopatologici”
- May 25, 2021: Department of Engineering, University of Palermo; cycle of seminars: “Approfondimenti di Matematica Applicata” – invited seminar lecture

4.3 Supervision/tutoring of PhD Students

- 2009-2012: Silvia Erla, supervision of the PhD in Cognitive Neuroscience, University of Trento, Italy; her thesis “Computational methods for the assessment of brain connectivity” has been awarded with the prize of best PhD thesis of 2012 in Cognitive Neuroscience at the University of Trento

- 2010: Ulrike Richter, University of Lund, Sweden, tutoring during PhD research stage at the BIOTech Center of the University of Trento (4 months)
- 2013-2016: co-supervisor of Alessandro Montalto, PhD student at the Faculty of Psychological and Pedagogical Sciences, University of Gent, Belgium (visiting stage: 3 months in 2016)
- 2014: Alejandro Alcaine Otin, University of Zaragoza, Spain, tutoring during PhD research stage at the BIOTech Center of the University of Trento (4 months)
- 2015: Dorota Wejer, University of Gdansk, Poland, tutoring during PhD research stage at the BIOTech Center of the University of Trento (1 month)
- 2015-2016: co-supervisor of Josè Melo, master student at the Federal University of Minas Gerais, Belo Horizonte, Brazil
- 2016: Wanting Xiong, Normal University of Beijing, China, tutoring during PhD research stage at the Department of Physics of Boston University, MA, USA (3 months)
- 2018: Jana Krohova, Comenius University in Bratislava and Biomedical Center Martin, Slovakia, tutoring during PhD research stage at the University of Palermo (2 months)
- 2019: Ivan Kotiuchyi, Kyiv Polytechnic Institute, Kiev, Ukraine, tutoring during PhD research stage at the University of Palermo (3 months)
- 2021-2023: Gabriele Volpes, PhD program in Information and Communication Technologies, University of Palermo, Italy
- 2021-2023: Simone Valenti, PhD program in Information and Communication Technologies, University of Palermo, Italy
- 2021-2024: Laura Sparacino, PhD program in Information and Communication Technologies, University of Palermo, Italy
- 2022-2025: Chiara Barà, PhD program in Information and Communication Technologies, University of Palermo, Italy
- 2022-2025: Marta Iovino, PhD program in Information and Communication Technologies, University of Palermo, Italy
- 2023-2026: Roberta Saputo, PhD program in Information and Communication Technologies, University of Palermo, Italy
- 2023-2026: Valeria Rosalia Vergara, PhD program in Information and Communication Technologies, University of Palermo, Italy

4.4 Supervision/tutoring of BS/MS Students

- 2003: Chiara Gasperi, Laurea in Fisica, University of Trento, Italy
- 2003: Roberta Cucino, Laurea in Ingegneria dei Sistemi, Politecnico di Milano, Italy
- 2004: Alessandro Cristoforetti, Laurea in Fisica, University of Trento, Italy
- 2005: Emanuele Zivelonghi, Laurea in Fisica, University of Trento, Italy
- 2005: Daniele Scarpari, Laurea Specialistica in Ingegneria delle Telecomunicazioni, University of Trento, Italy
- 2008: Silvia Erla, Laurea Specialistica in Fisica e Tecnologie Biomediche, University of Trento, Italy
- 2008: Susanne Greiner, Laurea Specialistica in Fisica e Tecnologie Biomediche, University of Trento, Italy
- 2012: Lucia Schiatti, Laurea Specialistica in Ingegneria Meccatronica, University of Trento, Italy
- 2013: Simone D'Amario, Laurea Magistrale in Scienze Cognitive, University of Trento, Italy

- 2016: Mauro Paganini, Laurea in Fisica, University of Trento, Italy
- 2017: Martina Valente, Laurea Magistrale in Ingegneria delle Telecomunicazioni, University of Trento, Italy
- 2018: Viviana Lo Giudice, Laurea in Ingegneria Elettronica, University of Palermo
- 2018: Beatrice Alfonso, Laurea in Ingegneria Elettronica, University of Palermo
- 2018: Filippo Ciulla, Laurea in Ingegneria Cibernetica, University of Palermo
- 2019: Walter Minneci, Laurea in Ingegneria Cibernetica, University of Palermo
- 2019: Salvatore Ferro, Laurea in Ingegneria Cibernetica, University of Palermo
- 2019: Giuseppe Infantone, Laurea in Ingegneria Cibernetica, University of Palermo
- 2019: Lorenzo Santoro, Laurea in Ingegneria Cibernetica, University of Palermo
- 2019: Giacomo Baiamonte, Laurea in Ingegneria Elettronica, University of Palermo
- 2019: Giulia Vitti, Laurea Magistrale in Ingegneria delle Telecomunicazioni, University of Palermo
- 2019: Rita Bagnasco, Laurea Magistrale in Ingegneria delle Telecomunicazioni, University of Palermo
- 2019: Prova finale, Laurea in Ingegneria Biomedica, University of Palermo: Chiara Barà, Giulia Beccali, Dario Del Cuore, Daniele Iachetta; Laura Sparacino; Laura Bajardi; Martina Fricano; Marta Iovino; Simona Gandah
- 2020: Prova finale, Laurea in Ingegneria Biomedica, University of Palermo: Giuseppe Caracciolo, Giulia Cannella, Gaetano Tripoli, Rosalinda Iachetta
- 2020: Dario Bonanno, Laurea in Ingegneria Cibernetica, University of Palermo
- 2020: Claudia Trombino, Laurea in Ingegneria Cibernetica, University of Palermo
- 2020: Roberta Alessi, Laurea in Ingegneria Cibernetica, University of Palermo
- 2020: Prova finale, Laurea in Ingegneria Biomedica, University of Palermo: Marika Giuseppina Gennaro, Michele Fiore, Marco Iride, Valentina Oliveri, Evelin Omobono, Martina Valentino, Giovanni Terranova, Giulia Marceca, Roberta Patti, Chiara Schirru
- 2021: Prova finale, Laurea in Ingegneria Biomedica, University of Palermo: Eleonora Abbate, Roberta Impollonia, Riccardo Russo, Maria Teresa Sammartano, Violetta Vaccaro, Fabrizio Fiorello, Davide Tuzzolino
- 2021: Prova finale, Laurea in Ingegneria Cibernetica, University of Palermo: Tamara Chinnici
- 2021: Laura Sparacino, Master Degree in Biomedical Engineering, University of Palermo
- 2021: Paolo Giaccone, Master Degree in Biomedical Engineering, University of Palermo
- 2021: Chiara Barà, Master Degree in Biomedical Engineering, University of Palermo
- 2021: Martina Fricano, Master Degree in Biomedical Engineering, University of Palermo
- 2022: Prova finale, Laurea in Ingegneria Biomedica, University of Palermo: Roberta Ferlita, Valerio D'Atria, Emmanuel Sorce, Andrea Patricolo, Pietro Medici, Lodovica Pia Maria Sutera
- 2022: Filippo Ciulla, Master Degree in Electronics Engineering, University of Palermo
- 2022: Valeria Rosalia Vergara, Master Degree in Biomedical Engineering, University of Palermo
- 2022: Marika Giuseppina Gennaro, Master Degree in Biomedical Engineering, University of Palermo
- 2022: Roberta Saputo, Master Degree in Biomedical Engineering, University of Palermo
- 2022: Giulia Cannella, Master Degree in Biomedical Engineering, University of Palermo
- 2022: Giovanni Terranova, Master Degree in Biomedical Engineering, University of Palermo
- 2023: Daniele Mazzoni, Master Degree in Biomedical Engineering, University of Palermo
- 2023: Cristina Angela Catania, Master Degree in Biomedical Engineering, University of Palermo
- 2023: Martina Valentino, Master Degree in Biomedical Engineering, University of Palermo

- 2023: Sarah Noemi Caserta, Master Degree in Biomedical Engineering, University of Palermo
- Traineeship of master students (Academic tutor) –2021: Chiara Barà, Martina Fricano, Laura Sparacino, Paolo Giaccone; 2022: Roberta Saputo, Giulia Gulino, Giulia Cannella, Giovanni Terranova, Chiara Galfano; 2023: Martina Valentino, Viviana Di Maggio, Giuseppe Caldarera, Sarah Noemi Caserta, Alessia Di Novo, Irene Franzone

5 SCIENTIFIC ACTIVITY

5.1 Editorial Activity

- 2008-2022: Associate Editor for the Signal Processing Theme, *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*
- 2013-2017: Associate Editor, *International Scholarly Research Notices* (former *ISRN Biomedical Engineering*, Hindawi Publishing Corp.)
- 2014-present: Associate Editor, *Computational and Mathematical Methods in Medicine*
- 2014-2018: Editorial Board Member, *Frontiers in Computational Physiology and Medicine*,
- 2017-2018: Editorial Board Member, *Frontiers in Autonomic Neuroscience*
- 2016-present: International Advisory Board Member, *Physiological Measurement*
- 2017-present: Editorial Board Member, *Entropy*
- 2019-present: **Associate Editor**, *Entropy*
- 2018-2019: Review Editor, *Frontiers in Computational Physiology and Medicine*, *Frontiers in Autonomic Neuroscience*
- 2019-present: Associate Editor, *Frontiers in Autonomic Neuroscience* (specialty Section of *Frontiers in Neurology*, *Frontiers in Neuroscience* and *Frontiers in Physiology*)
- 2020-present: Associate Editor, *Frontiers in Physiology* (specialty Section of *Frontiers in Fractal and Network Physiology*)
- 2021-present: **Editor in Chief**, *Frontiers in Network Physiology*, specialty Section on “Information Theory”
- 2023-present: **Associate Editor**, *IEEE Transactions on Biomedical Engineering*
- 2012: Lead Guest Editor, *Computational and Mathematical Methods in Medicine*, Special Issue “Methodological Advances in Brain Connectivity” - <http://www.hindawi.com/journals/cmmm/si/359045/>
- 2013: Guest Editor, *Philosophical Transactions of the Royal Society A*, Special Issue “Assessing Causality in Brain Dynamics and Cardiovascular Control” - <http://rsta.royalsocietypublishing.org/content/371/1997.toc>
- 2015: Guest Editor, *Physiological Measurement*, Special Issue “8th Conference of the European Study Group on Cardiovascular Oscillations, ESGCO 2014” - <http://iopscience.iop.org/0967-3334/page/8th%20ESGCO%202014>
- 2018: Lead Guest Editor, *Entropy*, Special Issue “Information Dynamics in Brain and Physiological Networks” http://www.mdpi.com/journal/entropy/special_issues/Physio_Networks
- 2019: Guest Editor, *Entropy*, Special Issue “Assessing Complexity in Physiological Systems through Biomedical Signals Analysis” https://www.mdpi.com/journal/entropy/special_issues/Biomedical_Signals; related book published by MDPI: DOI 10.3390/books978-3-03943-369-8
- 2020: Guest Editor, *Entropy*, Topical Collection “Feature Papers in Information Theory” https://www.mdpi.com/journal/entropy/special_issues/feature_inf
- 2020: Guest Editor, *Biomedical Signal Processing and Control*, Special Issue “Biomedical signal processing and modelling for cardiovascular oscillations”

- 2021: Guest Editor, *Philosophical Transactions of the Royal Society A*, Special Issue “Advanced Computation in Cardiovascular Physiology: New Challenges and Opportunities”
- 2022: Guest Editor, *Entropy*, Special Issue “Assessing Complexity in Physiological Systems through Biomedical Signals Analysis II” https://www.mdpi.com/journal/entropy/special_issues/NQ3RZ17964

5.2 Committee Service

- 2008-2015: Program Committee member, and co-chair of the Track on Connectivity and Causality of the Signal Processing Theme, *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*
- 2010: Program Committee member, *MEDICON 2010 - 12th Mediterranean Conference on Medical and Biological Engineering and Computing*, Chalkidiki (Greece), May 27-30, 2010
- 2014: Program Committee member, *BIOSIGNALS 2014 - International Conference on bio-inspired systems and signal processing*, Eseo, Angers, Loire Valley (France), Mar 3-6, 2014
- 2014: Program Chair, Scientific Committee member, *ESGCO 2014 - 8th Conference of the European Study Group on Cardiovascular Oscillations*, Fai della Paganella, Trento (Italy), May 25-28, 2014
- 2014: Program Committee member, *ITISE 2014 - International Work-Conference on Time Series*, Granada (Spain), Jun 25-27, 2014
- 2015: Program Committee member, *BIOSIGNALS 2015 - International Conference on bio-inspired systems and signal processing*, Lisbon (Portugal), Jan 12-15, 2015
- 2015: Program Committee member, *ITISE 2015 - International Work-Conference on Time Series*, Granada (Spain), Jul 1-3, 2015
- 2015: Program Committee member, *AMBN 2015 - Workshop on Advanced Methodologies for Bayesian Networks*, Yokohama (Japan), Nov 16-18, 2015
- 2015: member of the Technical Committee on Biomedical Signal Processing of the IEEE Engineering in Medicine and Biology (EMB) Society
- 2016: Scientific committee member, *ESGCO 2016 – 9th ESGCO meeting and International Conference on Biological Oscillations*, Lancaster (UK), Apr 10-14, 2016
- 2016: Program Committee member, *BIOSIGNALS 2016 – 9th International Conference on bio-inspired systems and signal processing*, Rome (Italy), Feb 21-23, 2016
- 2016: Program Committee member, *MEDICON 2016 - 14th Mediterranean Conference on Medical and Biological Engineering and Computing*, Cyprus, Mar 31 - Apr 2, 2016
- 2016: Program Committee member, *ITISE 2016 - International Work-Conference on Time Series Analysis*, Granada (Spain), Jun 27-29, 2016
- 2017: Program Committee member, *AMBN 2017 - Workshop on Advanced Methodologies for Bayesian Networks*, Kyoto (Japan), Sep 20-22, 2017
- 2017: Program Committee member, 2017 IEEE First Ukraine Conference on Electrical and Computer Engineering (UKRCON) May 29-June 2, 2017
- 2017: Program Committee member, *BIOSIGNALS 2017 – 10th International Conference on bio-inspired systems and signal processing*, Porto (Portugal), Feb 21-23, 2017
- 2018: Scientific committee member, *ESGCO 2018 – 10th ESGCO meeting and International Conference on Biological Oscillations*, Graz (Aut), Sep 17-20, 2018
- 2018: Program Committee member, *BIOSIGNALS 2018 – 11th International Conference on bio-inspired systems and signal processing*, Madeira (Portugal), Jan 19-21, 2018

- 2019: Program Committee member, *MEDICON 2019 - 15th Mediterranean Conference on Medical and Biological Engineering and Computing*, Coimbra, Portugal, Sep 26-28, 2019
- 2020: Scientific committee member, *ESGCO 2020 – 11th ESGCO meeting and International Conference on Biological Oscillations*, Pisa, Italy (online meeting)
- 2021: Program Committee member, *AIxIA2021 - 20th International Conference of the Italian Association for Artificial Intelligence*
- 2022: Scientific committee member, *ESGCO 2022 – 12th ESGCO meeting and International Conference on Biological Oscillations*, Štrbské Pleso, Slovakia, Oct 9-12, 2022
- 2019: Program Committee member, *MELECON 2024 - Porto*, Portugal, 2024

5.3 Organization of Conferences and Conference Sessions

- **Organizer of the Conference** *ESGCO 2014 – 8th Conference of the European Study Group on Cardiovascular Oscillations*, Fai della Paganella, May 25-28, Trento (Italy), International Conference with 145 attendees (<http://events.unitn.it/en/esgco2014>); Program Chair of the Conference and organizer of the revision process of the contributions (125 peer-reviewed papers, indexed as IEEE proceedings)
- **Conference co-chair** of the Conference *ESGCO 2020 – 11th Conference of the European Study Group on Cardiovascular Oscillations*, Pisa, Italy, April 27-29, 2020
- Organizer of the Invited Session ‘Causality in brain dynamics and cardiovascular control’, *33rd International Conference of the IEEE-EMBS (EMBC ’11)*, Boston, MA, USA, Sep 3, 2011
- Organizer of the Invited Session ‘Model-Free and Non-Linear Interdependence Measures for Neurophysiological and Cardiovascular Time Series Analysis’, *34th International Conference of the IEEE-EMBS (EMBC ’12)*, San Diego, CA, USA, Aug 30, 2012
- Organizer of the Invited Session ‘Entropy-Based Analysis of Physiological Time Series’, *35th International Conference of the IEEE-EMBS (EMBC ’13)*, Osaka, Japan, Jul 5, 2013
- Organizer of the Session ‘Multivariate Analysis of Cardiovascular Variability’, *8th Conference of the European Study Group on Cardiovascular Oscillations (ESGCO 2014)*, Trento, Italy, May 27, 2014
- Organizer of the Invited Session ‘Advances in Multivariate Physiological Variability Analysis’, *36th International Conference of the IEEE-EMBS (EMBC ’14)*, Chicago, IL, USA, Aug 29, 2014
- Organizer of three invited sessions at the *37th International Conference of the IEEE-EMBS (EMBC ’15)*, Milano, Italy, Aug 25-29, 2015: ‘Information Dynamics in Networks of Biomedical Signals’; ‘Disentangling Patho-Physiological Mechanisms from Multivariate Cardiovascular Variability Series’; ‘Solving the Brain Connectivity Puzzle: Methodological Advancements and Future Challenges’
- Organizer of the Session ‘Entropy Measures to Evaluate Dynamics’, *International Conference on Biological Oscillations (9th ESGCO meeting 2016)*, Lancaster, UK, Apr 10-14, 2016
- Organizer of the mini-symposium ‘Advances in brain connectivity analysis: perspectives and pitfalls’, *38th International Conference of the IEEE-EMBS (EMBC ’16)*, Orlando, FL, USA, Aug 19, 2016
- Organizer of the Invited Session ‘Brain and Physiological Networks: Methods and Applications’, *39th International Conference of the IEEE-EMBS (EMBC ’17)*, Jeju Island, Korea, Jul 11-15, 2017
- Organizer of the Invited Session ‘Multiscale Complexity Analysis of Biomedical Signals: Methods and Applications’, *40th International Conference of the IEEE-EMBS (EMBC ’18)*, Honolulu, Hawaii (USA), Jul 15-19, 2018
- Organizer of the Symposium ‘Multiscale Analysis of Biological Oscillations’, *10th Conference of the European Study Group on Cardiovascular Oscillations (ESGCO 2018)*, Vienna, Austria, Sep 18, 2018

- Organizer of the mini-symposium ‘Causality and coupling in cardiovascular and respiratory systems: techniques and applications’, *43th International Conference of the IEEE-EMBS (EMBC '21)*, Guadalajara, Mexico, Nov 1-5, 2021

5.4 Participation in Conferences

- Participation with oral presentation in over 70 national and international conferences (in 32 occasions as invited speaker)
- Chairman of Scientific Sessions at international Conferences – 32 chaired sessions
- Chairman of the Workshop *Applied Mathematics in Biosciences, Physics and Engineering*, Gdansk, Poland, Nov 27, 2014
- Co-chair of the Track on Bioengineering & Robotics, *IEEE Ukraine Conference on Electrical and Computer Engineering (UKRCON)*, Kyiv, Ukraine, May 2017
- Co-chair of the Biomedical Signal Processing Theme, *40th international conference of the IEEE Engineering in Medicine and Biology Society (IEEE-EMBS)*, Honolulu, US, July 2018
- Theme Chair of the Track “Smart Health Care”, *20th IEEE Mediterranean Electrotechnical Conference, MELECON2020*, Palermo, Italy, 16-18th June 2020
- Theme Chair of the Theme “Big Data Integration and Personalised Medicine”, *MELECON 2022 – Mediterranean Electrotechnical Conference*, Palermo, Italy, June 14-16th, 2022

5.5 International Invited presentations

- Sep 1, 2010 : *32th Annual International Conference IEEE-EMBS*, Buenos Aires, Argentina, session on “Nonlinear Dynamic Analysis of Biomedical Signals” – invited talk
- Sep 1, 2010: *32th Annual International Conference IEEE-EMBS*, Buenos Aires, Argentina, session on “Interactions, Coupling & Synchronizations” – invited talk
- May 7, 2011: *Meeting of the Society of Autonomic Neuroscience*, Thessaloniki, Greece, workshop on “Effective connectivity analysis of the EEG” – invited talk
- Sep 3, 2011: *33th Annual International Conference IEEE-EMBS*, Boston, MA, USA, session on “Causality in Brain Dynamics and Cardiovascular Control” – invited talk
- Apr 27, 2012: *NeFF-Symposium on Non-linear and model-free Interdependence Measures in Neuroscience*, Frankfurt, Germany – invited talk
- Aug 30, 2012: *34th Annual International Conference IEEE-EMBS*, San Diego, CA, USA, session on “Model-Free and Non-Linear Interdependence Measures for Neurophysiological and Cardiovascular Time Series Analysis” – invited talk
- Jul 5, 2013: *35th Annual International Conference IEEE-EMBS*, Osaka, Japan, session on “Entropy-based analysis of physiological time series” – invited talk
- Aug 29, 2014: *36th Annual International Conference of the IEEE-EMBS*, Chicago, USA, session on “Advances in multivariate physiological variability analysis” – invited talk
- Sep 10, 2014: *34th Dynamics Days Europe*, Bayreuth, Germany, workshop on “Multivariate time series, causality and networks” – invited talk
- Nov 27, 2014: Workshop on *Applied Mathematics in Biosciences, Physics and Engineering*, Gdansk, Poland – **invited opening lecture**
- Dec 12, 2014: Workshop on *Neural Information Dynamics, Causality, and Computation near Criticality*, Frankfurt, Germany – invited talk

- Feb 18, 2015: Workshop on *Quantitative Biomedicine for Health and Disease*, Bilbao, Spain – invited talk
- Aug 26, 2015: *37th Annual International Conference of the IEEE-EMBS*, Milano, Italy, session on “Disentangling Patho-Physiological Mechanisms from Multivariate Cardiovascular Variability Series” – invited talk
- Aug 27, 2015: *37th Annual International Conference of the IEEE-EMBS*, Milano, Italy, session on “Information Dynamics in Networks of Biomedical Signals” – invited talk
- Aug 19, 2016: *38th Annual International Conference of the IEEE-EMBS*, Orlando, FL, USA, minisymposium on “Advances in Brain Connectivity Analysis: Perspectives and Pitfalls” – invited talk
- May 30, 2017: *IEEE Ukraine Conference on Electrical and Computer Engineering (UKRCON)*, Kyiv, Ukraine – **invited keynote lecture**
- Jul 13, 2017: *39th Annual International Conference of the IEEE-EMBS*, Jeju island, Korea, session on “Brain and Physiological Networks: Methods and Applications” – invited talk
- Jul 28, 2017: *1st International Summer Institute on Network Physiology*, Como, Italy – invited lecture
- Jul 19, 2018: *40th Annual International Conference of the IEEE-EMBS*, Honolulu, Hawaii (USA), session on “Multiscale Complexity Analysis of Biomedical Signals: Methods and Applications” – invited talk
- Jun 6, 2019: *Adriatica Summer School*, Pescara, Italy – invited lecture
- Jun 26-27, 2019: *Brain Network dynamics (BRANDY) Summer School*, Terzolas, Trento, Italy – two invited lectures
- Jul 3, 2019: *EUROCON 2019*, Novi Sad, Serbia – invited talk
- Jul. 26, 2019: *41th Annual Int Conf IEEE-EMBS*, Berlin, Germany, session “Challenges and Advances of Signal and Image Processing in Epilepsy: Brain-Heart Interactions” – invited talk
- Aug 2, 2019: *2nd International Summer Institute on Network Physiology*, Como, Italy – invited lecture
- Nov 15, 2021: *Symposium* at KU Leuven, Belgium – invited talk
- Nov 18, 2021: EHB2021 – 9th *IEEE International Conference on e-Health and Bioengineering*, IASI, Romania – **invited keynote lecture**
- May 30, 2022: *MMSEOR conference*, Cinisi, Italy, – invited talk
- Jul 18, 2022: *3rd International Summer Institute on Network Physiology*, Como, Italy – invited lecture
- Mar 9, 2023: Entropy Webinar - *Entropy Measures to Assess Irregularity and Complexity of Time Series and Multidimensional Data*; invited talk. <https://entropy-2.sciforum.net/>
- Jun 26, 2023: *Summer School on Biomedical Data Science*, Thessaloniki, Greece – invited lecture
- Jul 10, 2023: *Network Neuroscience 2023 at NetSci*, Vienna, Austria – invited talk
- Jul 25, 2023: *45th Annual International Conference of the IEEE-EMBS*, Sydney, Australia, session on “Advances in Multivariate Analysis of Cardiovascular and Cerebrovascular Networks” – invited talk

5.6 Reviewer Activity

Verified reviewer at Web of Science: <https://www.webofscience.com/wos/author/record/995371>

Awarded as top reviewer for Biology and Biochemistry – September 2018, September 2019

Awarded as top reviewer in Cross-Field – September 2019

Referee for the following journals (about 20 papers per year):

- Engineering
Advances in Adaptive Data Analysis; Annals of Biomedical Engineering; BioMedical Engineering OnLine; Biomedical Engineering (Biomedizinische Technik); Biomedical Signal processing and Control;

Computers in Biology and Medicine; Cardiovascular Engineering and Technology; IEEE Signal Processing Letters; IEEE Transactions on Biomedical Engineering; IEEE Transactions on Cybernetics; IEEE Transactions on Signal Processing; IEEE Transactions on Neural Systems & Rehabilitation Engineering; Journal of Neural Engineering; Methods of Information in Medicine; Journal of the Royal Society Interface; Proceedings of the IEEE; Medical and Biological Engineering and Computing; Sensors

- Neuroscience

Behaviormetrika; Brain Connectivity; Brain Topography Cognitive Neurodynamics; Journal of Neuroscience Methods; Human Brain Mapping; Neuroimage

- Physics/Applied Mathematics

Physical Review Letters; Chaos; Chaos, Solitons and Fractals; Entropy; EPJ Nonlinear Biomedical Physics; Fluctuation and Noise Letters; Physical Review E; Philosophical Transactions A; International Journal of Statistical Mechanics; IEEE Trans. on Cybernetics; Physiological Measurement; Statistics in Medicine; Statistical Methods in Medical Research

- Multidisciplinary Journals

Discrete Dynamics in Nature and Society; PLOS One; PLOS Computational Biology; Scientific Reports; SoftwareX

- Physiology/Medicine

Autonomic Neuroscience: Basic and Clinical; European Journal of Applied Physiology; International Journal of Psychophysiology; Journal of Physiology; Physiological Research; Microcirculation

Reviewer for special issue proposals: journal *Computational and Mathematical Methods in Medicine*, 12 proposals evaluated (2014-2018)

5.7 Scientific Evaluator

Grant reviewer activity

- 2011: *Research Program University-Region 2010-2012- Regione Emilia-Romagna, Italy*
- 2014, 2015: *Postdoctoral Fellow grant applications, The Research Foundation – Flanders (FWO), Belgium*
- 2017: *US National Science Foundation (NSF), evaluator of research proposals in the field of Neuroscience*
- 2018: *Netherlands Organisation for Scientific Research (NWO) Research Council for Earth and Life Sciences, evaluator of a research proposal in the field of Neuroscience and Physiology*
- 2018: *Swiss National Science Foundation, division of Biology and Medicine, evaluator of a research proposal in the field of Cardiovascular Physiology and Rehabilitation*
- 2020: *evaluator of a research project grant funded by Leverhulme Trust, UK*
- 2020: *evaluator of a research project grant, Czech Science Foundation, Czech Republic*
- 2021: *evaluator of a post-doc research project grant, University of Milan, Italy*
- 2023: *evaluator of a research project grant, Joint NSFC-ISF, China-Israel Foundation*

Degree examination board

- 2015: *External member, Examination Committee – PhD candidate: Devy Widjaja, KU Leuven, Belgium*
- 2017: *External referee, PhD program in Computer Science, University of Milan, Italy*

- 2017: External referee, PhD program “Automatica, Bioingegneria e Ricerca Operativa”, University of Rome Sapienza, Italy
- 2019: External referee and president of the Examination Committee – PhD candidates: Luca Maule, Matteo Zanetti, University of Trento, Italy
- 2019: External referee and member of the Examination Committee – PhD candidate: Diana Elisa Chiari, University of Trento, Italy
- 2020: External referee, PhD program in “Scienze e Ingegneria dell'Ambiente, delle Costruzioni e dell'Energia”, University of Calabria, Italy
- 2020: member of the Examination Committee, PhD Program in “Automatica, Bioingegneria e Ricerca Operativa (ABRO)”, Sapienza University, Roma, Italy
- 2020: External referee – PhD candidate: Leonardo Novelli, the University of Sidney, Australia
- 2021: External member, Examination Committee – PhD candidate: John Morales, KU Leuven, Belgium
- 2021: External member, Examination Committee – PhD candidate: Dries Hendriks, KU Leuven, Belgium
- 2022: External member, Examination Committee – PhD candidate: Alexandre Guillet, University of Bordeaux, France
- 2022: Internal member, Examination Committee – PhD candidate: Nunzio Cancilla, University of Palermo, Italy
- 2022: Italian National Group of Bioengineering Reviewer of 6 master theses
- 2023: Italian National Group of Bioengineering Reviewer of 6 master theses and 2 PhD Theses
- 2023: External referee – PhD candidate: Fatima El-Hamad, University of Adelaide, Australia
- 2023: External member, Examination Committee – Habilitation Diriger des recherches (French habilitation) – candidate: Ahmad Karfoul, University of Rennes, France

5.8 Membership in Scientific Societies

- 2003-present: Italian Society of Chaos and Complexity, Member
- 2007-present: IEEE Engineering in Medicine and Biology Society, Member
- 2014-present: European Study Group on Cardiovascular Oscillations (ESGCO), Board Member
- 2018-present: Italian National Bioengineering Group (GNB)
- 2019-present: IEEE Senior Member
- 2024-2026: Secretary of the Executive Committee of the EMB18 IEEE Italy Chapter
- 2024-present: European Alliance of Medical and Biological Engineering and Science (EAMBES), Fellow

5.9 Software

I release Matlab codes which implement the algorithms for biomedical data analysis and signal processing developed during my research activity (see www.lucafaes.net):

- 2011: eMVAR - Toolbox for extended multivariate autoregressive modeling – computation of classic and advanced frequency domain connectivity measures
- 2013: eMVAR - Toolbox for block-based MVAR connectivity analysis – computation of connectivity measures for multiple blocks of interacting time series
- 2014: cTE - Toolbox for Corrected Transfer Entropy analysis – computation of information transfer in multivariate time series

- 2015: eGC - Toolbox for extended Granger Causality analysis – computation of classic and advanced time domain measures of directional interaction among multiple signals
- 2016: ITS - Matlab Tool for the computation of Information Dynamics – implementation of several information-theoretic measures for the analysis of physiological time series
- 2017: ARres - Matlab Tool for Computing Confidence Limits of Measures derived from Autoregressive Modeling of Time Series
- 2017: LMSE - Matlab Tool for the computation of Linear Multiscale Entropy
- 2017: MSGC - Matlab Tool for the computation of multiscale Granger Causality
- 2018: MSID - Matlab Tool for multiscale Information Decomposition
- 2019-2020: MSE-ARFI & MSE-VARFI - Matlab Tools for the computation of Linear Information Storage in Processes with long-range correlations
- 2020: fdPID - Matlab Tool for frequency domain Partial Information Decomposition
- 2022: OIR - Matlab Tool for the parametric computation of high-order interactions

5.10 Funding Information

- 2001: Participant, IV Programma Quadro - Progetto EPIMEDICS 2001 - "Enhanced, Personal, Intelligent and Mobile system for Early Detection and Interpretation of Cardiological Syndromes" (36 months)
- 2005: Co-Investigator, Provincia Autonoma di Trento - Commissione Ricerca Scientifica 2005 - "The combined role of visual attention and stochastic resonance on human perception" (12 months)
- 2005: Co-Investigator, Progetti di Ricerca Tecnologica Applicata 2005, Fondazione Cassa di Risparmio di Trento e Rovereto - "Integrazioni di immagini multimodali in cardiologia interventistica per il trattamento con ablazione della fibrillazione atriale permanente" (30 months)
- 2007: Co-Investigator, Progetto Industriale SIMM_PAC 2007 - "Sistema di monitoraggio multiparametrico per la gestione integrata di pazienti e soggetti ad alto rischio di malattia cardiovascolare" (24 months)
- 2008: Co-Investigator, Bando FIRB "Futuro in Ricerca" 2008 – "Cardiorespiratory dysregulation in hypertensive cardiomyopathy and chronic obstructive pulmonary disease: a nonlinear signal processing approach to diagnostics, optimizing mechanical ventilation and reducing peri- and postoperative morbidity" (36 months)
- 2015: UNCAP - Participant with Bruno Kessler Foundation (FBK, Trento Italy), H2020-PHC-2014 "Advancing active and healthy ageing with ICT: ICT solutions for independent living with cognitive impairment partner institution", project: "Ubiquitous iNteroperable Care for Ageing People" (24 months)
- 2013: Coordinator, Project Unit "Physiological and clinical data analysis" – Healthcare Research Implementation Program (IRCS), Special Program activated by the Autonomous Province of Trento, Italy (36 months)
- 2015: Task Leader, Co-Investigator, Bando Progetti di Ricerca 2014 of the University of Trento – "Of bees and men: Development of an optogenetic animal model to study oscillatory neural networks", project involving the Center of Mind/Brain sciences (CIMeC), Center of Integrative Biology (CIBIO), Department of Physics, Dept. of Industrial Engineering of the University of Trento and FBK, Trento (18 months – from 01-09-2015 to 28-02-2017)

- 2018: Task leader, Co-Investigator, Strategic projects of the University of Trento – “Brain Network Dynamics - BRANDY” (36 months), coordinator of the external partner unit – University of Palermo
- 2019-2022: PRIN Progetti di Rilevante Interesse Nazionale 2017, “Stochastic forecasting in complex systems -SFCS”, project code 2017WZFTZP – Role: Task leader, Co-Investigator
- 2020: Co-Investigator, Progetti Obiettivo di Piano Sanitario Nazionale, “VALUTAZIONE NON INVASIVA DELLO STRESS LAVORO-CORRELATO PER LA PREVENZIONE DEGLI INFORTUNI NELLE STRUTTURE SANITARIE DELLA REGIONE SICILIANA”
- 2020-2023: Piano Operativo Nazionale 2015-2020, “Sensoristica intelligente, infrastrutture e modelli gestionali per la sicurezza di soggetti fragili – 4FRAILITY”, project code ARS01_00345 - Role: Task leader, Co-Investigator
- 2021: Principal Investigator, Projects of the Department of Engineering of the University of Palermo, Information-Theoretic Characterization of the Dynamics of Biological and Engineered Networks (InTheNet)
- 2022: Bando Ministeriale, fondo per la promozione e lo sviluppo delle politiche del Programma nazionale per la ricerca (PNR), legge 30 dicembre 2020 n. 172, “Novel Computational Tools for Patient Stratification in Cardiovascular Diseases and Brain Disorders - COPS”, project code PRJ-1004 – Role: Project Coordinator, Principal Investigator
- 2022-2025: Piano Nazionale di Ripresa e Resilienza (PNRR), Ecosistema dell’Innovazione “Sicilian MicronanoTech Research And Innovation Center – SAMOTHRACE”, ID ECS00000022 – Role: Task coordinator for the University of Palermo, Co-Investigator
- 2022-2026: Piano Nazionale per gli investimenti Complementari al PNRR, “DARE - Digital Life-Long Prevention”, code PNC0000002 - Role: WP coordinator for the University of Palermo, Co-Investigator
- 2023: Co-Investigator, National Project “Building living spaces and Smart Services to support Active and Healthy Ageing” (Building AhA)
- 2023-2025: PRIN Progetti di Rilevante Interesse Nazionale 2022, “High-Order Dynamical Networks in Computational Neuroscience and Physiology: an Information-Theoretic Approach” (HONEST) , project code 2022YMHNPY – Role: Project Coordinator, Principal Investigator

6. PUBLICATIONS (see full publication list in attachment)

- Total Publications: **326**
 - Book Chapters: **9**
 - Articles in Peer-reviewed indexed Journals: **154** (first author: 45; second author: 37; last author: 36)
 - Articles in peer-reviewed indexed Conference Proceedings: **112**
 - Other articles in Conference Proceedings: **36**
 - Editorial/abstracts in indexed Journals: **16**
- Co-Author (with A. Porta) of the book “Information Theory for Time Series Analysis”, in preparation (to be published by Cambridge University Press)
- Bibliometric indexes from Scholar Database (Nov 2023):
 - total citations received: **7054**
 - Hirsch Index: **h=49**
 - i10-index (papers cited more than 10 times): **133**

- Bibliometric indexes from Scopus Database (Nov 2023):
 - total citations received: **5129**
 - citing articles: **2661**
 - Hirsch Index: **h=41**
- Cumulative impact factor of published papers at the year of publication: **417** (font: Journal Citation Reports)

7. COLLABORATION PROJECTS

7.1 Active Collaborations

- 2001-present: Department of Technologies for Health, University of Milano, Italy (Alberto Porta)
- 2013-present: Department of Data Analysis, Faculty of Psychological and Pedagogical Sciences, University of Gent, Belgium (Daniele Marinazzo)
- 2013-present: Department of Electrical and Computer Engineering, Faculty of Engineering, Aristotle University of Thessaloniki, Greece (Dimitris Kugiumtzis)
- 2014-present: Department of Physiology, Comenius University, Jessenius Faculty of Medicine, Martin, Slovakia (Michal Javorka)
- 2014-present: Centro E. Piaggio, Bioengineering and Robotics Research Center, Pisa, Italy (Gaetano Valenza)
- 2014-present: Department of Physics, University of Bari, Italy (Sebastiano Stramaglia)
- 2016-present: Department of Physics, Boston University, MA, USA (Plamen Ch. Ivanov)
- 2017-present: Institute of Innovative Research, Tokyo Institute of Technology, Tokyo, Japan (Ludovico Minati)
- 2017-present: Faculty of Sciences of the University of Porto, Portugal (Ana Paula Rocha)
- 2018-present: Department of Industrial Engineering, University of Trento, Italy (Giandomenico Nollo)
- 2019-present: Department of Power, Electronics and Telecommunications, University of Novi Sad, Serbia (Tatjana Loncar Turukalo, Gorana Mijatovic)
- 2019-present: Laboratoire Angevin de Recherche en Ingénierie des Systèmes (LARIS) Université d'Angers (Anne Humeau-Heurtier)
- 2023-present: ISMETT, Palermo (Dr. Gianvincenzo Sparacia)

7.2 Past Collaborations

- 1999-2007: Cardiology and Neurology divisions, S. Chiara Hospital of Trento, Italy (M. Disertori, Dr. D. Orrico)
- Department of Electrical and Information Technology, University of Lund, Sweden (L. Sörnmo)
- 2000-2005: Laboratorio per l'analisi e la modellizzazione della variabilità cardiorespiratoria, Fondazione S. Maugeri, Istituto Scientifico di Montescano, Italy (G.D. Pinna)
- 2000-2004: Department of Pre-clinical Science, University of Milano, Italy (M. Pagani, Prof. N. Montano)
- 2002-2005: ET Medical Devices, Cavareno-Milano, Italy (A. De Giuli)
- 2007-2012: Department of Biomedical Engineering, Worcester Polytechnic Institute, MA, USA (Ki H. Chon)

- 2011-2016: US Navy Experimental Diving Unit, Panama City, FL, USA (John P. Florian)
- 2013-2014: Radiation Sciences Group, University of Umea, Sweden (Urban Wiklund)
- 2013-2015: Department of Psychiatry, Erasmus Academic Hospital of Free University of Brussels, Belgium (Fabrice Jurysta)
- 2014-2017: Biomed Group, Department of Electrical Engineering, KU Leuven, Belgium (Sabine Van Huffel)
- 2014-2017: Aragon Institute of Engineering Research, University of Zaragoza, Spain (Juan Pablo Martinez)
- 2015-2016: Institute of Theoretical Physics and Astrophysics, Gdansk University, Poland (Danuta Makowiec)
- 2015-2017: Departamento de Engenharia Eletrônica, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil (Alessandro Beda)
- 2015-2017: , Engineering and the Environment University of Southampton Highfield, Southampton, UK (David Simpson)
- 2012-2018: Department of Neurology, Sacro Cuore Don Calabria Hospital, Negrar (VR), Italy (Gianluca Rossato)
- 2018-200: Department of Physics, University of Malaga (Pedro Bernaola-Galvan)
- 2018-2021: Department of Electronic Engineering, Kyiv Polytechnic institute, Kyiv, Ukraine (Anton Popov)

8. RESEARCH INTERESTS

- **Research Activity:** Development of advanced biomedical signal processing methods for the analysis of complex physiological systems, aimed at mechanism understanding and disease assessment
- **Methodological approach:** Measurement of physiological time series from biomedical signals; development of methods for multivariate time series analysis in the time domain (prediction methods), frequency domain (spectral analysis) and information domain (entropy-based measures) for the quantitative description of the complexity of individual systems, the coupling between systems and their causal interaction.
- **Applicative contexts:** neurophysiology; brain connectivity; cognitive neuroscience; cardiovascular neuroscience; cardiac, cardiorespiratory and cerebrovascular regulation; heart rate variability; cardiac atrial fibrillation; brain-heart interactions; network physiology.
- **Aims:** characterization of brain, cardiac and multi-organ physiological mechanisms in physiological states (e.g.: aging, sleep, cognition, resting states, physiological stressors) and diseased conditions (e.g.: sleep disorders, syncope, epilepsy, cardiac fibrillation)

I hereby grant permission to use my personal data in accordance with the Legislative Decree no. 196/2003 – Italian Personal Data Protection Code (June 2003).

Nov 30, 2023



Attachment – List of Scientific Publications – Luca Faes

A. Book Chapters

1. H Azami, **L Faes**, J Escudero, A Humeau-Heurtier, LEV Silva: 'Entropy analysis of univariate biomedical signals: review and comparison of methods', in *Frontiers in Entropy Across the Disciplines*, W Freeden and MZ Nahes (Eds), World Scientific Publishing, 2022, pp. 233-286. ISBN: 978-981-125-939-5. DOI: 10.1142/12920
2. M Zanetti, **L Faes**, M De Cecco, A Fornaser, M Valente, GMA Guandalini, G Nollo: 'Assessment of mental stress through the analysis of physiological signals acquired from wearable devices', *Lecture Notes in Electrical Engineering*, Springer, 2018, vol. 544, pp 243-256. ISSN: 18761100; DOI: 10.1007/978-3-030-05921-7_20
3. **L Faes**, G Nollo, A Porta: 'Information decomposition: a tool to break down cardiovascular and cardiorespiratory complexity', *Complexity and Nonlinearity in Cardiovascular Signals*, R Barbieri, EP Scilingo, G Valenza, (eds), Springer; 2017, pp. 87-113; ISBN: 978-3-319-58708-0; DOI: 10.1007/978-3-319-58709-7
4. A Porta, **L Faes**, G Nollo, ACM Takahashi, AM Catai: 'Assessing complexity and causality in heart period variability through a model-free data-driven multivariate approach', in *ECG Time Series Variability Analysis: Engineering and Medicine*; H Jelinek, D Conforth, A Khandoker, (eds), CRC Press; 2017, pp. 117-140; ISBN: 978-1-4822-4347-5; DOI: 10.1201/9781315372921
5. **L Faes**, A Porta, 'Conditional entropy-based evaluation of information dynamics in physiological systems', in *Directed Information Measures in Neuroscience*, R Vicente, M Wibral, J Lizier (eds), Springer-Verlag; 2014, pp. 61-86; ISBN: 978-3-642-54473-6; DOI: 10.1007/978-3-642-54474-3_3
6. **L Faes**, 'Assessing connectivity in the presence of instantaneous causality', in *Methods in Brain Connectivity Inference through Multivariate Time Series Analysis*; L Baccalà, K Sameshima (eds); CRC press, Taylor and Francis; 2014, pp. 87-112. ISBN: 9781439845721. DOI: 10.1201/b16550-8
7. **L Faes**, G Nollo, 'Multivariate frequency domain analysis of causal interactions in physiological time series', in *Biomedical Engineering, Trends in Electronics, Communications and Software*; AN Laskovski (ed); INTECH, 2011; pp. 403-428. ISBN: 978-953-307-475-7. DOI: 10.5772/13065
8. F Ravelli, **L Faes**, V Corino, L Mainardi: 'Organization measures of atrial activity during fibrillation', in *Understanding Atrial Fibrillation. The Signal Processing Contribution*; L Mainardi, L Sornmo, S Cerutti (eds); Morgan & Claypool, 2008; pp. 127-150.
9. F Ravelli, **L Faes**, V Corino, L Mainardi: 'Organization measures of atrial activity during fibrillation', in *Understanding Atrial Fibrillation. The Signal Processing Contribution*; L Mainardi, L Sornmo, S Cerutti (eds); Morgan & Claypool, 2008; pp. 127-150.

B. Articles and communications in Peer-reviewed indexed journals

1. L Sparacino, Y Antonacci, C Barà, D Svec, M Javorka, **L Faes**, 'A method to assess linear self-predictability of physiologic processes in the frequency domain: application to beat-to-beat variability of arterial compliance', *Front. Netw. Physiol.*, **2024**; in press. DOI: 10.3389/fnetp.2024.1346424
2. G Mijatovic, L Sparacino, Y Antonacci, M Javorka, D Marinazzo, S Stramaglia **L Faes**, 'Assessing high-order links in cardiovascular and respiratory networks via static and dynamic information measures', *IEEE Open J. Eng. Med. Biol.*, **2024**; 3:1335808. DOI: 10.1109/OJEMB.2024.3374956
3. T Scagliarini, L Sparacino, **L Faes**, D Marinazzo, S Stramaglia, 'Gradients of O-information highlight synergistic informational circuits in physiological applications', *Front. Netw. Physiol.*, **2024**; 3:1335808. DOI: 10.3389/fnetp.2023.1335808
4. L Sparacino, Y Antonacci, C Barà, A Valenti, A Porta, **L Faes**, 'A method to assess Granger causality, isolation and autonomy in the time and frequency domains: theory and application to cerebrovascular variability', *IEEE Trans. Biomed. Eng.*, **2024**; in press. DOI: 10.1109/TBME.2023.3340011
5. I Pirovano, Y Antonacci, A Mastropietro, C Barà, L Sparacino, E Guanziroli, F Molteni, M Tettamanti, **L Faes**, G Rizzo, 'Rehabilitation modulates high-order interactions among large-scale brain networks in subacute stroke', *IEEE Trans. Rehab. Eng.*, **2023**; 31: 4549-4560. DOI: 10.1109/TNSRE.2023.3332114
6. L Sparacino, **L Faes**, G Mijatovic, G Parla, V Lo Re, R Miraglia, J de Ville, G Sparacia, 'Statistical approaches to identify pairwise and high-order brain functional connectivity signatures on a single-subject basis', *Life*, **2023**; 13,2075. DOI: 10.3390/life13102075
7. Y Antonacci, C Barà, A Zaccaro, F Ferri, R Pernice, **L Faes**, 'Time-varying information measures: an adaptive estimation of information storage with application to brain-heart interactions', *Front. Netw. Physiol.*, **2023**; 3, 1242505. DOI: 10.3389/fnetp.2023.1242505
8. C Barà, A Zaccaro, Y Antonacci, M Dalla Riva, A Busacca, F Ferri, **L Faes**, R Pernice, 'Local and global measures of information storage for the assessment of heartbeat-evoked cortical responses', *Biomed. Sig. Proc. Control*, **2023**; 86,105315. DOI: 10.1016/j.bspc.2023.105315
9. A Porta, F Gelpi, V Bari, B Cairo, B De Maria, D Tonon, G Rossato, **L Faes**, 'Concomitant evaluation of cardiovascular and cerebrovascular controls via Geweke spectral causality to assess the propensity to postural syncope', *Med. Biol. Eng. Comput.*, **2023**. DOI: 10.1007/s11517-023-02885-0

10. M Platisa, NN Radovanovic, R Pernice, C Barà, SU Pavlovic, **L Faes**, 'Information-theoretic analysis of cardio-respiratory interactions in heart failure patients: effects of arrhythmias and cardiac resynchronization therapy', *Entropy*, **2023**, 25:1072. DOI: 10.3390/e25071072
11. M Paoli, Y Antonacci, A Albi, **L Faes**, A Haase, 'Granger Causality Analysis of Transient Calcium Dynamics in the Honey Bee Antennal Lobe Network', *Insects*, **2023**, 14(6): 539. DOI: 10.3390/insects14060539
12. S Valenti, G Volpes, A Parisi, D Peri, J Lee, **L Faes**, A Busacca, R Pernice, 'Wearable multisensor ring-shaped probe assessing stress and blood oxygenation: design and preliminary measurements', *Biosensors*, **2023**, 13:460. DOI: 10.3390/bios13040460
13. A Porta, V Bari, F Gelpi, B Cairo, B De Maria, D Tonon, G Rossato, **L Faes**, 'On the different ability of cross-sample entropy and k-nearest-neighbor cross-predictability in assessing cardiorespiratory and cerebrovascular dynamic interactions', *Entropy*, **2023**; 25:299. DOI: 10.3390/e25040599
14. G Chiarion, L Sparacino, Y Antonacci, **L Faes**, L Mesin, 'Connectivity analysis in EEG data: a tutorial review of the state of the art and emerging trends', *Bioengineering*, **2023**, 10:372; DOI: 10.3390/bioengineering10030372
15. J Cernanova Krohova, B Czipelova, Z Turianikova, R Pernice, A Busacca, **L Faes**, M Javorka, 'Input for baroreflex analysis: which blood pressure signal should be used?', *J. Physiol. Pharmacol.*, **2023**; 73(5):587-595. DOI: 10.26402/jpp.2022.5.02
16. C Barà, L Sparacino, R Pernice, Y Antonacci, A Porta, D Kugiumtzis, **L Faes**, 'Comparison of discretization strategies for the model-free information-theoretic assessment of short-term physiological interactions', *Chaos*, **2023**; 33:033127. DOI: 10.1063/5.0140641
17. T Scagliarini, D Nuzzi, Y Antonacci, **L Faes**, FE Rosas, D Marinazzo, S Stramaglia, 'Gradients of O-information: low-order descriptors of high-order dependencies', *Physical Review Research*, **2023**; 5:013025; DOI: 10.1103/PhysRevResearch.5.013025
18. G Volpes, C Barà, A Busacca, S Stivala, M Javorka, **L Faes**, R Pernice, 'Feasibility of Ultra-Short Term Analysis of Heart Rate and Systolic Arterial Pressure Variability at Rest and During Stress via Time-domain and Entropy-based Measures', *Sensors*, **2022**, 22:9149; DOI: 10.3390/s22239149
19. **L Faes**, G Mijatovic, Y Antonacci, R Pernice, C Barà, L Sparacino, M Sammartino, A Porta, D Marinazzo, S Stramaglia, 'A new framework for the time- and frequency-domain assessment of high-order interactions in networks of random processes', *IEEE Transactions on Signal Processing*, **2022**; 70: 5766-5777; DOI: 10.1109/TSP.2022.3221892
20. H Lee, H Chung, H Ko, R Pernice, A Parisi, A Busacca, **L Faes**, J Lee, 'Adaptive scheduling of acceleration and gyroscope for motion artifact cancellation in photoplethysmography', *Computer Methods and Programs in Biomedicine*, **2022**; 226:107126; DOI: 10.1016/j.cmpb.2022.107126
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