

LUCA FAES

PERSONAL INFORMATION

- Date of and place of birth: [REDACTED]
- Nationality: Italian
- Affiliation: Department of Engineering, University of Palermo, Viale delle Scienze, Bldg 9, 90128 Palermo, Italy; Tel: [REDACTED] E-mail: luca.faes@unipa.it ; Personal website: [REDACTED]

EDUCATION

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

PROFESSIONAL EXPERIENCE

- 2003-2008: Postdoctoral Fellow at 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, Bruno Kessler Foundation (FBK), Trento, Italy
- from 2018: Associate Professor, Department of Engineering, University of Palermo, Italy
- 2007: Appointed Research Fellow, Dept. of Biomedical Engineering, State University of New York, Stony Brook, NY, USA
- 2010: Visiting Researcher, Dept. of Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA, USA
- 2013: Visiting Researcher, Dept. of Data Analysis, Faculty of Psychological and Pedagogical Sciences, Gent, Belgium
- 2015: Visiting Researcher, Dept. of Electronic Engineering, Federal University of Minas Gerais, Belo Horizonte, Brazil
- 2016: Visiting Researcher, Dept. of Physics, Boston University, Boston, MA, United States

ACADEMIC ACTIVITY

- 2016-2017: Member of the Doctorate Board in Cognitive and Brain Sciences, University of Trento, Italy
- From 2018: Member of the Doctorate Board in Information and Communication Technologies, Department of Engineering, University of Palermo, Italy
- From 2018: Vice coordinator and delegate for tutoring, Study Council of the Bachelor Degree in Biomedical Engineering, University of Palermo, Italy
- From 2018: Academic coordinator of the Erasmus Program for Student and Staff Mobility between the University of Palermo and the Universities of Jena, Angers, Thessaloniki, Novi Sad, Kyiv
- 1999-2005: Teaching assistant of General Physics II, faculty of Engineering, University of Trento, Italy
- 2002-2007: Teaching assistant of Signal and Image Processing, University of Trento, Italy
- From 2018: Tenured professor of “Sensors and Biomedical Devices”, graduation course on Biomedical Engineering, University of Palermo, Italy
- From 2019: Tenured professor of “Statistical Analysis of Biomedical Signals”, Master degree course on Biomedical Engineering, University of Palermo, Italy
- 2003-2017: Co-supervisor and tutor of 11 Master students and 1 PhD student, University of Trento, Italy
- From 2018: Supervisor of 36 bachelor students and 2 master students, University of Palermo, Italy
- From 2012: Co-supervisor/tutor of 8 PhD students visiting the Universities of Trento and Palermo, Italy
- 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

MEMBERSHIP OF SCIENTIFIC SOCIETIES

- From 2003: Italian Society of Chaos and Complexity, Member
- From 2007: IEEE Engineering in Medicine and Biology Society, Member
- From 2014: European Study Group on Cardiovascular Oscillations (ESGCO), Board Member
- From 2018: Italian National Bioengineering Group (GNB), Member
- From 2019: IEEE Senior Member

EDITORIAL ACTIVITY

- **Specialty Chief Editor** for the Section “Information Theory” of the journal *Frontiers in Network Physiology* (2021-present)
- **Editorial board member** for the journals: *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Associate Editor (2008-present); *Computational and Mathematical Methods in Medicine*, Associate Editor (2014-present); *International Scholarly Research Notices*, Associate Editor (2013-2017); *Frontiers in Computational Physiology and Medicine*, Editorial Board Member (2014-2017) and Review Editor (2018-present); *Frontiers in Autonomic Neuroscience*, Associate Editor (2019-present); *Physiological Measurement*, International Advisory Board Member (2016-present); *Entropy*, Editorial Board Member (2017-present) and Associate Editor (2019-present)
- **Member of the Technical Committee** on Biomedical Signal Processing of the IEEE Engineering in Medicine and Biology (EMB) Society (from 2015)
- **Guest Editor of special issues** in peer-reviewed journals: *Computational and Mathematical Methods in Medicine*, Special Issue “Methodological Advances in Brain Connectivity” (2012); *Philosophical Transactions of the Royal Society A*, Special Issue “Assessing Causality in Brain Dynamics and Cardiovascular Control” (2013); *Physiological Measurement*, Special Issue “8th Conference of the European Study Group on Cardiovascular Oscillations, ESGCO 2014” (2015); *Entropy*, Special Issue “Information Dynamics in Brain and Physiological Networks” (2018); *Entropy*, Special Issue “Assessing Complexity in Physiological Systems through Biomedical Signals Analysis” (2019); *Entropy*, Topical Collection "Feature Papers in Information Theory" (2020); *Biomedical Signal Processing and Control*, Special Issue “Biomedical signal processing and modelling for cardiovascular oscillations” (2020)
- **Program Committee member** of international conferences: *Annual International Conference of the IEEE Engineering in Medicine and Biology Society* (2008-2015); *MEDICON - Mediterranean Conference on Medical and Biological Engineering and Computing* (2010, 2016, 2019); *BIOSIGNALS - International Conference on bio-inspired systems and signal processing* (2014, 2015, 2016, 2017, 2018); *ESGCO - Conference of the European Study Group on Cardiovascular Oscillations* (2014, 2016, 2018, 2020), *ITISE - International Work-Conference on Time Series* (2014, 2015, 2016); *AMBN - Workshop on Advanced Methodologies for Bayesian Networks* (2015, 2017); *UKRCON - Ukraine Conference on Electrical and Computer Engineering* (2017); *MELECON–Mediterranean Electrotechnical Conference* (2020, Track chair)
- **Organization of Conferences:** *ESGCO 2014 – 8th Conference of the European Study Group on Cardiovascular Oscillations*, Fai della Paganella, May 25-28, Trento (Italy) – organizer and program Chair; *ESGCO 2020 – 11th Conference of the European Study Group on Cardiovascular Oscillations*, Pisa, Italy, 2020 – co-organizer
- **Organizer of invited sessions at conferences:** *33rd IEEE-EMBS Int. Conf.*, Boston, MA, USA (2011); *34th IEEE-EMBS Int. Conf.*, San Diego, CA, USA (2012); *35th IEEE-EMBS Int. Conf.*, Osaka, Japan (2013); *8th ESGCO Int. Conf.*, Trento, Italy, (2014); *36th IEEE-EMBS Int. Conf.*, Chicago, IL, USA (2014); *37th IEEE-EMBS Int. Conf.*, Milano, Italy (2015); *9th ESGCO Int. Conf.*, Lancaster, UK, (2016); *38th IEEE-EMBS Int. Conf.*, Orlando, FL, USA (2016); *39th IEEE-EMBS Int. Conf.*, Jeju, Korea, (2017); *40th IEEE-EMBS Int. Conf.*, Honolulu, HI, USA (2018); *10th ESGCO Int. Conf.*, Vienna, Austria, (2018)
- **Participation with oral presentation** in over 50 national and international conferences (in 24 occasions as invited speaker); chairman of Scientific Sessions at international Conferences – 25 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

SCIENTIFIC EVALUATOR ACTIVITY

- **Reviewer Activity:** Verified reviewer at Publons: <https://publons.com/researcher/1324469/luca-faes/> awarded as top reviewer for *Biology and Biochemistry* (2018, 2019) and in *Cross-Field* (2019); referee for over 35 journals (about 30 papers per year);
- **Grant reviewer activity:** evaluator of regional research program (Regione Emilia Romagna, Italy, 2012), postdoctoral fellow grant applications (Research Foundation – Flanders (FWO), Belgium, 2014-2015), research grant proposals (US National Science Foundation (NSF), 2017; Netherlands Organisation for

Scientific Research (NWO) Research Council, 2018; Swiss National Science Foundation, 2018; Leverhulme Trust, UK, 2020; Czech Science Foundation, Czech Republic, 2020)

- **Member of the examination board of PhD programs:** Biomedical Engineering, KU Leuven, Belgium (2015); Computer Science, University of Milan, Italy (2017); “Automatica, Bioingegneria e Ricerca Operativa”, University of Rome Sapienza, Italy (2017, 2020); Industrial Engineering, University of Trento, Italy (2019); Physics, University of Trento, Italy (2019), “Scienze e Ingegneria dell'Ambiente, delle Costruzioni e dell'Energia”, University of Calabria, Italy

FUNDING INFORMATION

- 2001: Autonomous Province of Trento, Commissione Ricerca Scientifica 2005 – "The combined role of visual attention and stochastic resonance on human perception"
- 2006: 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"
- 2007: Industrial grant, SIMM_PAC 2007 – "Sistema di monitoraggio multiparametrico per la gestione integrata di pazienti e soggetti ad alto rischio di malattia cardiovascolare"
- 2013: Special Program activated by the Autonomous Province of Trento, Italy – Healthcare Research Implementation Program (IRCS), Project Unit “Physiological and clinical data analysis”
- 2015: 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"
- 2015: 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”
- 2018: Strategic projects of the University of Trento – “Brain Network Dynamics - BRANDY”
- 2019: Progetti di ricerca di rilevante interesse nazionale – PRIN 2017, “Stochastic forecasting in complex systems”, Unit “Università di Palermo”
- 2020: Progetti Obiettivo di Piano Sanitario Nazionale, “Valutazione non invasiva dello stress lavoro-correlato per la prevenzione degli infortuni nelle strutture sanitarie della regione siciliana”
- 2021 MIUR, Piano Nazionale Ricerca 2015-2020, “Sensoristica intelligente, infrastrutture e modelli gestionali per la sicurezza di soggetti fragili – 4FRAILTY”

ACTIVE COLLABORATIONS

- Department of Technologies for Health, University of Milano, Italy (Alberto Porta)
- Department of Data Analysis, Faculty of Psychological and Pedagogical Sciences, University of Gent, Belgium (Daniele Marinazzo)
- Department of Physiology, Comenius University, Jessenius Faculty of Medicine, Martin, Slovakia (Michal Javorka)
- Centro E. Piaggio, Bioengineering and Robotics Research Center, Pisa, Italy (Gaetano Valenza)
- Department of Physics, University of Bari, Italy (Sebastiano Stramaglia)
- Department of Physics, Boston University, MA, USA (Plamen Ch. Ivanov)
- Institute of Innovative Research, Tokyo Institute of Technology, Tokyo, Japan (Ludovico Minati)
- Faculty of Sciences of the University of Porto, Portugal (Ana Paula Rocha)
- Department of Industrial Engineering, University of Trento, Italy (Giandomenico Nollo)
- Department of Electronic Engineering, Kyiv Polytechnic institute, Kyiv, Ukraine (Anton Popov)
- Department of Physics, University of Malaga (Pedro Bernaola-Galvan)
- Department of Power, Electronics and Telecommunications, University of Novi Sad, Serbia (Tatjana Loncar Turukalo)

PUBLICATIONS

- Total publications: **263** (7 book chapters, **122** articles in peer-reviewed indexed Journals, **83** articles in peer-reviewed indexed conference proceedings, **36** articles in other conference proceedings, **15** abstracts in indexed journals)
- Bibliometric indexes from Scopus Database: total citations received: **3731**; citing articles: **1977**; Hirsch Index: **h=35**
- Cumulative impact factor of published papers: **302** (font: Journal Citation Reports)

SELECTED PUBLICATIONS (last 5 years)

1. G Mijatovic, Y Antonacci, T Loncar-Turukalo, L Minati, **L Faes**, 'An information-theoretic framework to measure the dynamic interaction between neural spike trains', *IEEE Trans Biomed Eng.*, 2021, in press; arXiv preprint: 2012.08667
2. M Javorka, J Krohova, B Czippelova, Z Turianikova, N Mazgutova, R Wiszt, M Ciljakova, D Cernochova, R Pernice, A Busacca, **L Faes**, 'Respiratory sinus arrhythmia mechanisms in young obese subjects', *Front. Neurosci.*, 2020, 14:204; DOI: 10.3389/fnins.2020.00204
3. **L Faes**, M Gomez Extremera, R Pernice, P Carpena, G Nollo, A Porta, P Bernaola Galvàn, 'Comparison of methods for the assessment of nonlinearity in short-term heart rate variability under different physiopathological states', *Chaos*, 2019; 29:123114. DOI: 10.1063/1.5115506
4. TW Boonstra, **L Faes**, JN Kerkman, D Marinazzo, 'Information decomposition of multichannel EMG to map functional interactions in the distributed motor system', *Neuroimage*, 2019; 202:116093. DOI:10.1016/j.neuroimage.2019.116093
5. A Greco, **L Faes**, V Catambrone, R Barbieri, EP Scilingo, G Valenza, 'Lateralization of Directional Brain-Heart Information Transfer during Visual Emotional Elicitation', *Am. J. Physiol. Regul. Integr. Comp. Physiol.*, 2019; 317: R25-R38. DOI: 10.1152/ajpregu.00151.2018
6. M Valente, M Javorka, A Porta, V Bari, J Krohova, B Czippelova, Z Turianikova, G Nollo, **L Faes**, 'Univariate and multivariate conditional entropy measures for the characterization of short-term cardiovascular complexity under physiological stress', *Physiol. Meas.*, 2018; 39:014002; DOI: 10.1088/1361-6579/aa9a91
7. **L Faes**, S Stramaglia, G Nollo, D Marinazzo, 'Multiscale Granger causality', *Phys. Rev. E*, 2017; 96:042150 (7 pages). DOI: 10.1103/PhysRevE.96.042150
8. **L Faes**, A Porta, G Nollo, M Javorka, 'Information decomposition in multivariate systems: definitions, implementation and application to cardiovascular networks', *Entropy*, special issue on *Multivariate entropy measures and their applications*, 2017, 19(1), 5. DOI: 10.3390/e19010005
9. **L Faes**, A Porta, M Javorka, G Nollo, 'Efficient computation of multiscale entropy over short biomedical time series based on linear state-space models', *Complexity*, 2017; 2017:1768264 (13 pages). DOI: 10.1155/2017/1768264
10. **L Faes**, D Marinazzo, G Nollo, A Porta 'An information-theoretic framework to map the spatio-temporal dynamics of the scalp electroencephalogram', *IEEE Trans. Biomed. Eng.*, special issue on *Brain Connectivity*, 2016; 63(12):2488-2496. DOI: 10.1109/TBME.2016.2569823
11. **L Faes**, D Marinazzo, S Stramaglia, F Jurysta, A Porta, G Nollo, 'Predictability decomposition detects the impairment of brain-heart dynamical networks during sleep disorders and their recovery with treatment', *Phil. Trans. R. Soc. A*, special issue on *Uncovering brain-heart information through advanced signal and image processing*, 2016; 374:20150177. DOI: 10.1098/rsta.2015.0177
12. A Porta, **L Faes**, 'Wiener-Granger Causality in Network Physiology with Applications to Cardiovascular Control and Neuroscience', *Proceedings of the IEEE* 2016; 104(2): 282-309. DOI:10.1109/JPROC.2015.2476824
13. D Widjaja, A Montalto, E Vlemincx, D Marinazzo, S Van Huffel, **L Faes**, 'Cardiorespiratory information dynamics during mental arithmetic and sustained attention', *PLOS ONE* 2015; 10(6): e0129112 (14 pages). DOI:10.1371/journal.pone.0129112
14. **L Faes**, A Porta, G Nollo, 'Information decomposition in bivariate systems: theory and application to cardiorespiratory dynamics', *Entropy*, special issue on "Entropy and Cardiac Physics", 2015, DOI:17:277-303. 10.3390/e17010277
15. **L Faes**, D Marinazzo, F Jurysta, G Nollo, 'Linear and nonlinear brain-heart and brain-brain interactions during sleep', *Phys. Meas.* 2015; 36: 683-698. DOI:10.1088/0967-3334/36/4/683

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