Laura M. Ferrari

Assistant Professor

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2018	**PhD in Biorobotics** "Ultraconformable Temporary Tattoo Electrodes for Broad Electrophysiological Recordings". Final mark 100/100. CENTRE for MATERIAL INTERFACES (CMI) IIT@SSSA.
2014	**MsC Biomedical Engineering** "Design, fabrication and characterisation of an open-source inkjet printhead for biofabrication". Final mark 110/110. UNIVERSITY of PISA - School of Engineering.
2011	**BsC Biomedical Engineering** "Model of the distribution of 3-iodotironamina in a rat in vivo". Final mark 103/110. UNIVERSITY of PISA - School of Engineering.

Experience

May 2023→Now Assistant Professor   Scuola Superiore Sant'Anna, Biorobotics Institute. Italia.

Translation of innovative wearables and multimodal frameworks, with applications in neuroscience and prosthesis.

2022→2023 Starting Research Position   INRIA, STARS TEAM, France.

Generalisable Architecture through Multimodal sensing to tackle Emotion Recognition in realistic Scenarios.

2020→2022 Postdoctoral Researcher   UCA - INRIA, STARS TEAM, France.

Wearables and computer vision: Extraction of biomarkers for stress identification in neuroscience (e.g. autism).

2019→2020 Sr. Researcher   San Raffaele Hospital, Centre for adv. tech. in health and wellbeing, Italy.

Development and management of an industrial project for a novel smart ward platform through service design.

2018→2019 Research Fellow   CENTRE for MATERIAL INTERFACES (CMI) IIT@SSSA, Italy.

Inkjet printed conformable sensing based on conductive polymers for in vivo and in vitro recordings.

2017→2019 Scientific Advisor   Umana Medical Technologies, Malta.

"SmarterSkin" wireless device for the ECG monitoring based on tattoo technology.

2015	Jr. Engineer	ALMA MATER STUDIORUM Bologna - AFERETICA, Italy.

Apheretic therapies in the field of transplantation (lung) and plasmapheresis.

Awards

2015	ENGINEERING PROFESSIONAL QUALIFICATION - University of Pisa, School of Engineering, Italy.
2020/2022	GRANTS - PostDoc fellowship by UCA/Ville de Nice and NeuroMod call for PCB prototyping.

Professional Activities

EDITORIAL BOARD GUEST EDITOR IN A SPECIAL ISSUE. FRONTIERS IN COMPUTER SCIENCE : "RECOGNIZING THE STATE OF EMOTION, COGNITION AND ACTION FROM PHYSIOLOGICAL AND BEHAVIOURAL SIGNALS"

STUDENT CO-SUPERVISION

2020/2023	6 PHD STUDENTS (3) Wearables; (3) Multimodal Emotion Recognition.
	CO-SUPERVISOR E. Ismailova, F. Greco, F. Bremond, E. Guerci.
2021/2023	10. MASTER STUDENTS Biosignals signal processing and Multimodal deep learning.
	CO-SUPERVISION E. Ismailova and F. Bremond.

LECTURES

2022	CAPACITIVE COUPLING OF DRY CUTANEOUS ELECTRODES (3H). ITN Borges Winter Workshop.
	INKJET PRINTING FOR DIGITAL DESIGN AND FABRICATION OF FLEXIBLE ELECTRONICS DEVICES (3H). ITN Borges Winter Workshop.
2022	POLYMER SCIENCE (12H). ECOLE DES MINES DE SAINT-ÉTIENNE.
2018	TATTOO ELECTRODES BASIS FOR ELECTROPHYSIOLOGY (40h). ECOLE DES MINES DE SAINT-ÉTIENNE.
	PROCESSING AND MATERIALS FOR CONFORMABLE SENSING (5h). ECOLE DES MINES DE SAINT-ÉTIENNE.

WORKSHOP

2018	TATTOO ELECTRODES FOR BROAD ELECTROPHYSIOLOGY (8h).
	Workshop@Scuola Superiore Sant'Anna.

LAB PRACTICE

2017→2018	INKJET PRINTING (30h).

Communication

2021	WEAR AND REC BORGES EU project - European Researcher Night.
2017→2020	PRESS RELEASES
	traditional (general purpose magazine), institutional (TUGraz; EMSE; IIT) and online (IEEE Brain, Wired ita) Journals. TV and Radio Podcast.
2015→2018	PHD SCHOOL LOCAL EVENT (1 per year) for Broad Dissemination in the community.

Patents

1. P Cavallari, AA Trevisan, KA Trevisan, F Greco, <u>L. M. Ferrari</u>, V Varriale, Tattoo biosensor and health monitoring system", patent no: US/20190159731 A1, publication date: May 30, 2019.

# Peer-reviewed Publications   * equally contributed

1. H. Chaptoukaev, V. Strizhkova, M. PanarielloB. D'Alpaos, A. Reka, V. Manera, S. Thümmler, E. Ismailova, N. Evans, F. Bremond, M. Todisco, M. A. Zuluaga, <u>L. M. Ferrari,</u> StressID: a Multimodal Dataset for Stress Identification, accepted at Proceedings of the 37th Conference on Neural Information Processing Systems (NeurIPS), Datasets and Benchmarks Track.
2. H. Mousavi, <u>L. M Ferrari</u>, A. Whiteley, E. Ismailova, Kinetics and Physicochemical Characteristics of Electrodeposited PEDOT:PSS Thin Film Growth. Adv. Electron. Mater. 2023.
3. M. Galliani, <u>L. M. Ferrari</u>, G. Bouet, D. Eglin, E. Ismailova, Tailoring inkjet-printed PEDOT:PSS composition towards green, wearable devices fabrication, APL bioengineering 2023.
4. S. Chen, Y. Cho, K. Yu, <u>L. M. Ferrari</u> and F. Bremond. Recognizing the State of Emotion, Cognition and Action from Physiological and Behavioural Signals. Frontiers in Computer Science (2022).
5. M. Galliani*, <u>L. M. Ferrari*</u>, and Esma Ismailova. "Conformable Wearable Electrodes: From Fabrication to Electrophysiological Assessment." Journal of Visualized Experiments: Jove 185 (2022).
6. M. Galliani, <u>L M. Ferrari</u>, and Esma Ismailova. "Interdigitated Organic Sensor in Multimodal Facemask's Barrier Integrity and Wearer's Respiration Monitoring." Biosensors 12.5 (2022).
7. D. Agarwal, T. Agrawal, <u>L. M. Ferrari</u> and F. Bremond. "From Multimodal to Unimodal Attention in Transformers using Knowledge Distillation," 17th IEEE International Conference AVSS (2021).
8. <u>L. M. Ferrari</u>, G.A. Hanna, P. Volpe, E. Ismailova, F. Bremond and M. A. Zuluaga, One-class autoencoder approach for optimal electrode set-up identification in wearable EEG event monitoring, IEEE EMBC (2021).
9. <u>L. M. Ferrari</u>, U. Ismailov, F. Greco, E. Ismailova, Capacitive Coupling of Conducting Polymer Tattoo Electrodes with the Skin. Adv mater interf (2021).
10. <u>L. M. Ferrari*</u>, A. Bonisoli*, B. Rodriguez*, A. Cutrone, S. Micera, X. Navarro, F. Greco and J. Del Valle, All-polymer printed low-cost regenerative nerve cuff electrodes, Front. Bioeng. Biotechnol (2021).
11. Book chapter <u>L. M. Ferrari</u>, S. Taccola, J. Barsotti, V. Mattoli, F. Greco, Chapter 15, Organic Flexible Electronics: Fundamentals, Devices and Applications, Elsevier Science & Technology Books (2021).
12. Invited Review <u>L. M Ferrari</u>, K. Keller, B. Burtscher, F. Greco, Temporary tattoo as unconventional substrate for conformable and transferable electronics on skin and beyond. Multifunctional Mater. (2020).
13. <u>L. M. Ferrari</u>, U. Ismailov, J.M. Badier, F. Greco and E. Ismailova, Conducting polymer tattoo electrodes in clinical electro- and magneto-encephalography. npj Flex Electron (2020).
14. L. D. Garma*, <u>L. M. Ferrari*</u>, P. Scognamiglio, F. Greco, F. Santoro, Inkjet printed PEDOT:PSS multi electrodes array for low-cost in vitro electrophysiology, Lab Chip (2019).
15. <u>L. M. Ferrari*</u>, S. Sudha*, S. Tarantino, R. Esposti, F. Bolzoni, P. Cavallari, C. Cipriani, V. Mattoli, F. Greco, "Ultraconformable Temporary Tattoo Electrodes for Electrophysiology", Advanced Science (2018).
16. C. De Maria, <u>L. Ferrari</u>, F. Montemurro, F. Vozzi, I. Guerrazzi, T. Boland, G. Vozzi, Design and validation of an Open-Hardware Print-Head for Bioprinting application", Procedia Eng (2015).

Conferences

Event	Presenter	Presentation title
2023 FisMat - Milano	L. M. Ferrari	Conformable cutaneous tattoo electrodes, from the technology to the data
2021 AVSS - virtual conference	T. Agrawal	From Multimodal to Unimodal Attention in Transformers using Knowledge Distillation
2021 EMBC - virtual conference	L. M. Ferrari	One class autoencoder approach for optimal electrode set identification in wearable EEG event monitoring.
2019 Safety Pharmacology Society meeting, Barcelona.	L. D. Garma	A Cost-Effective Ecosystem for the Study of Electrogenic Cells.
2018 Materials - Bologna	L.M. Ferrari	EEG recording with temporary tattoo electrodes for clinical application.
2018 BioEl - Kirchberg	L. M. Ferrari	Temporary tattoo electrodes record brain activity.