Curriculum Vitae

Emma Colamarino

Research Fellow

Personal Information

Place and date of birth

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Emma Colamarino

Work experiences

Aug. 2020- to date
Research Fellow
Project *Innovative **algorithms** for the processing and **classification** of **biosignals** in supporting of **rehabilitation protocols** for sensorimotor functions*
Department of Computer, Control, and Management Engineering
Sapienza University of Rome, Italy

Jan. 2019- Jul. 2020
Research Fellow
Project *Technologies for **neuromotor rehabilitation** based on hybrid **Brain-Computer Interfaces***
Department of Computer, Control, and Management Engineering
Sapienza University of Rome, Italy

Dic. 2018
Research Collaborator
Project *PROMO- The Promoter 2.0: a progressive modular BCI-based training system to support upper limb motor recovery after stroke*
Fondazione Santa Lucia, Rome, Italy

Nov. 2015- to date
Research Collaborator with the team of the Neuroelectrical Imaging and Brain-Computer Interface Laboratory, IRCCS Fondazione Santa Lucia, Rome, Italy

Oct. 2014 – Oct. 2015
Research Fellow
Project *National survey of the application of the requirements on the validation of processes and procedures (plasma freezing procedure validated at blood transfusion centres)*
Blood Regional Centre, Ivrea (Turin), Italy

2014
Research Collaborator
Data capture of surface myoelectric signals pre and post marathon from trained runners
Event: RUN for SCIENCE 2014
Department of Neurological and Movement Sciences, University of Verona, Italy

2013 - 2014
Trainee at OT Bioelettronica SRL Turin, Italy
Study in the field of surface electromyography (6 months)

2011
Intern at the Department of Basic and Applied Sciences for Engineering, Sapienza University of Rome, Italy. Study in the field of the tensegral model (3 months)

Education and Training

Feb. 2019
PhD Degree in **Bioengineering (Doctor Europaeus** Degree**)**
Sapienza, University of Rome
Final Grade: **with honours**
Thesis: Implementing physiologically-based approaches to improve Brain-Computer Interfaces usability in post-stroke motor rehabilitation
Supervisor: Prof. Febo Cincotti. Co-supervisor: Dr. Donatella Mattia

Jul. 2018-Oct.2018	Visiting PhD Student (Advisor: Prof. Dario Farina) Department of Bioengineering Imperial College London (London, United Kingdom)
Sept. 2017	School & Symposium on Advanced Neurorehabilitation, Baiona (Spain) Organizers: Imperial College London, Department of Bioengineering Spanish National Research Council, Neural Rehabilitation Group. Cajal Institute
Sept. 2016	XXXV Annual School of Bioengineering La Bioingegneria per il benessere e l'invecchiamento attivo, Bressanone (Italy) Organizer: Università degli Studi di Padova, Department of Information Engineering
Nov. 2015- Oct. 2018	Research Doctorate in Automatica, Bioengineering and Operations Research (cycle XXXI) Department of Computer, Control, and Management Engineering Sapienza University of Rome, Rome, Italy
Oct. 2014	Passed the Government Exam and licensed as Industrial Engineer, and enrolled as a member of the Professional Association of Engineers of Bari (Italy)
Oct. 2011-Mar. 2014	Master's Degree in **Biomedical Engineering** Sapienza, University of Rome Final Grade: **110**/110 **with honours** Experimental Thesis: Bipolar and concentric electrodes in comparison. Cross-talk in surface myoelectric signals. Advisor: Prof. Febo Cincotti
2013	Postgraduate in Health and Safety Manager Sapienza, University of Rome
Oct. 2008- Nov. 2011	Bachelor's Degree in **Clinical Engineering** Sapienza, University of Rome Final Grade: **110**/110 **with honours** Experimental Thesis: Evaluation of tensegral models for biological structures of human body. Advisor: Prof. Adriano Alippi
Sep. 2003 – Jul. 2008	Senior high school specializing in scientific studies Liceo "Leonardo da Vinci" in Noci (BA) Final Grade: 100/100

Research and Academic activity

The **research activity** focuses on the development of methods to support motor function rehabilitation protocols.
Interest fields: Neurorehabilitation, Brain-computer interface, EEG and EMG signal processing, machine learning

Peer Reviewer of Research Proposal and Scientific Papers for Journals as IEEE Access, IEEE Transactions, Biomedical Physics & Engineering Express, Journal of Neural Engineering, Measurement Science and Technology

Teaching activity (lessons, seminars and practice exercises)
Advanced Biomedical Data Analysis (prof. Febo Cincotti), Master's Degree in Biomedical Engineering, Sapienza
Neuroengineering (prof. Febo Cincotti), Master's Degree in Artificial Intelligence and Robotics, Sapienza
Member of the examination board of *Advanced Biomedical Data Analysis*.

Co-supervision of 13 MD theses in Biomedical Engineering, 1 MD thesis in Management Engineering, 1 MD thesis in Artificial Intelligence and Robotics

Papers

E. Colamarino, F. Pichiorri, J. Toppi, D. Mattia, F. Cincotti
Automatic Selection of Control Features for Electroencephalography-Based Brain-Computer Interface Assisted Motor Rehabilitation: The GUIDER Algorithm, Brain Topography, 2022, DOI: 10.1007/s10548-021-00883-9

E. Colamarino, V. de Seta, M. Masciullo, F. Cincotti, D. Mattia, F. Pichiorri, J. Toppi
Corticomuscular and Intermuscular Coupling in Simple Hand Movements to Enable a Hybrid Brain-Computer Interface, International Journal of Neural Systems, vol. 31, no. 11, 2021, DOI: 10.1142/S0129065721500520.

E. Colamarino, F. Pichiorri, M. Masciullo, F. Tamburella, I. Pisotta, G. Scivoletto et al.
BCI-assisted Motor Imagery training to promote functional recovery in cervical Spinal Cord Injury patients: preliminary data
Abstract Book of the 8th International BCI Meeting (2021), pag. 44

V. de Seta, **E. Colamarino**, F. Pichiorri, J. Toppi, M. Masciullo, F. Cincotti, D. Mattia
Hand movements classification for a hybrid rehabilitative BCI: study on corticomuscular and intermuscular coherence
Abstract Book of the 8th International BCI Meeting (2021), pag. 56

F. Pichiorri, V. de Seta, **E. Colamarino**, J. Toppi, F. Cincotti, D. Mattia
Movement-Related Cortical Potential during post-stroke motor recovery: preliminary study for a novel hybrid BCI paradigm
Abstract Book of the 8th International BCI Meeting (2021), pag. 43

E. Colamarino, F. Pichiorri, J. Toppi, V. de Seta, M. Masciullo, D. Mattia, F. Cincotti
Inter-muscular coherence features to classify upper limb simple tasks.
10th International IEEE/EMBS Conference on Neural Engineering (NER 2021).
DOI: 10.1109/NER49283.2021.9441150

V. de Seta, J. Toppi, F. Pichiorri, M. Masciullo, **E. Colamarino**, D. Mattia, F. Cincotti
Towards a hybrid EEG-EMG feature for the classification of upper limb movements: comparison of different processing pipelines
10th International IEEE/EMBS Conference on Neural Engineering (NER 2021)
DOI: 10.1109/NER49283.2021.9441390

D. Mattia, F. Pichiorri, **E. Colamarino**, M. Masciullo, G. Morone, J. Toppi et al., *The Promotoer, a brain-computer interface-assisted intervention to promote upper limb functional motor recovery after stroke: a study protocol for a randomized controlled trial to test early and long-term efficacy and to identify determinants of response*, BMC Neurology. 2020; 20:254

E. Colamarino, T. Colombo, F. Pichiorri, D. Mattia, L. Palagi, F. Cincotti
SWLDA offers a valuable trade-off between interpretability and accuracy for rehabilitative BCIs. Proceedings of the 8th Graz Brain-Computer Interface Conference (2019), pag. 285-290. DOI: 10.3217/978-3-85125-682-6-52

E. Colamarino, S. Muceli, J. Ibáñez, N. Mrachacz-Kersting, D. Mattia, F. Cincotti, D. Farina
Adaptive learning in the detection of Movement Related Cortical Potentials improves usability of associative Brain-Computer Interfaces
41th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2019) – pag. 3079–3082 DOI: 10.1109/EMBC.2019.8856580

E. Colamarino, F. Pichiorri, D. Mattia, F. Cincotti
Bipolar filters improve usability of Brain-Computer Interface technology in post-stroke motor rehabilitation. Converging Clinical and Engineering Research on Neurorehabilitation III. ICNR 2018 Biosystems & Biorobotics, vol 21. Springer. DOI: 10.1007/978-3-030-01845-0_183
(Oral Presentation)

F. Pichiorri, **E. Colamarino**, F. Cincotti, D. Mattia
An All-in-One BCI-Supported Motor Imagery Training Station: Validation in a Real Clinical Setting with Chronic Stroke Patients
Converging Clinical and Engineering Research on Neurorehabilitation III. ICNR 2018 Biosystems & Biorobotics, vol 21. Springer. DOI: 10.1007/978-3-030-01845-0_177
(Oral Presentation)

F. Pichiorri, **E. Colamarino**, F. Cincotti, D. Mattia
Brain-computer interface technology for upper limb rehabilitation after stroke: a translational effort. Meeting Abstract of the 4th Congress of the European Academy of Neurology, 2018. European Journal of Neurology, Vol. 25, Supp 2, pag. 50.

E. Colamarino, F. Pichiorri, D. Mattia, F. Cincotti
Semiautomatic physiologically-driven feature selection improves the usability of a brain computer interface system in post-stroke motor rehabilitation. Abstract Book of the 7th International BCI Meeting: "BCIs: not getting lost in Translation" (2018), pag. 96-97

E. Colamarino, F. Pichiorri, D. Mattia, F. Cincotti
Spatial filters selection towards a rehabilitation BCI. Proceedings of the 7th Graz Brain-Computer Interface Conference (2017), pag. 92-96. DOI: 10.3217/978-3-85125-533-1-18

E. Colamarino, F. Pichiorri, F. Schettini, M. Martinoia, D. Mattia, F. Cincotti
GUIDER: a GUI for semiautomatic, physiologically driven EEG feature selection for a rehabilitation BCI. Proceedings of the 7th Graz Brain-Computer Interface Conference (2017), pag. 97-101. DOI: 10.3217/978-3-85125-533-1-19

E. Colamarino, F. Pichiorri, D. Mattia, F. Cincotti
Neurophysiological constraints of control parameters for a brain computer interface system to support post-stroke motor rehabilitation.
Proceedings of the School & Symposium on Advanced Neurorehabilitation 2017
(Oral Presentation)

F. Pichiorri, **E. Colamarino**, D. Mattia, F. Cincotti
The Promotoer: a successful story of translational research in BCI for motor rehabilitation
Proceedings of the 7th Graz Brain-Computer Interface Conference (2017), pag. 410-413
DOI: 10.3217/978-3-85125-533-1-75
(Oral Presentation)

E. Colamarino, E. Merlo, G. Boccia, J. Toppi, D. Mattia, F. Cincotti
Concentric-ring electrodes reduce crosstalk in surface EMG
Proceedings of the 5th Conference of the National Group of Bioengineering, 2016

F. Schettini, M. Martinoia, F. Pichiorri, **E. Colamarino**, D. Mattia, F. Cincotti
Automatic features selection in BCI-supported motor imagery practice for stroke rehabilitation
Proceedings of the 5th Conference of the National Group of Bioengineering, 2016

G. Boccia, D. Dardanello, V. Rosso, **E. Colamarino**, C. Tarperi, F. Schena, A. Rainoldi
Neuromuscular fatigue on locomotor and non-locomotor muscles induced by half marathon run, VI SISMES Conference, Research and Training applied to motor and sport science, 2014

Awards and recognitions

2021 — **Grant** (as Principal Investigator) for 1-year project **Avvio alla Ricerca** (AR22117A8B38D947) titled “MoRe MuSyC: Post-stroke Motor Recovery Muscle Synergy quality Capture” received by Sapienza University of Rome

2020 — **Grant** (as Principal Investigator) for 1-year project **Avvio alla Ricerca** (AR220172B9222800) titled “PHYDBEC: Physiology-evidence based indices to describe movement in Box and Block test execution” received by Sapienza University of Rome

2019 — Mention as Subject **Expert** in **Advanced Biomedical Data Analysis**, **Biomedical Signal Processing, Neuroengineering**, received by the Department of Computer, Control, and Management Engineering, Sapienza University of Rome, Rome, Italy

2018 — **Grant** (as Principal Investigator) for 1-year project **Avvio alla Ricerca** (AR11816436CA41E5) titled “Synergies-based real-time monitoring to improve post-stroke rehabilitation” received by Sapienza University of Rome

2018 — **Student Award** to attend the 7th International **BCI Meeting** “BCIs: Not Getting Lost in Translation (21-25 May 2018, Asilomar Conference Center in Pacific Grove, California, (USA), financed by the National Institutes of Health and the National Science Foundation with the support of IEEE and OpenBCI

2017 — **Mobility Projects** Call for Research Doctorates: **Grant** for the **project** titled “Motor Recovery supported by **hybrid Brain-Computer Interface** and complex network theory” received by Sapienza University of Rome

2017 — **Grant** (as Principal Investigator) for 1-year project **Avvio alla Ricerca** (AR11715C823D7492) titled “Multimodal classification of upper limb movements during post-stroke rehabilitation” received by Sapienza University of Rome

2014 — **Special Mention for her** career, **unanimously** awarded by the Biomedical Engineering’s Degree Board on 21 March 2014, for her **brilliant curriculum**

Skill and competence

Languages — **Italian** - Native Speaker
English - Level B1 (certificated by Cambridge Esol, May 2005)
German - Level A2 (certificated by Goethe Institut, June 2007)

Information Technology — Proficiency in **Matlab®** (experienced in the use of Signal Processing and Statistics and Machine Learning Toolbox), OriginPro8®
Fundamentals of **Python** and **Dev C++®**
Good knowledge of **BCI2000** system and **EEGLAB**
Good knowledge of statistical analysis software **STATISTICA, SPSS**
Excellent knowledge of the **Windows®, Linux, MC-OS** operating system
Excellent use of **Microsoft Office®** and Internet, certificate **ECDL** (November 2006)

Organizational and social — Management and coordination of small **team** activities.
Good **communication skills**. Ability to manage time giving due priority to the different activities. **Proactive problem solving**.
Calm and determination. Predisposition to living changes and new experiences with interest and enthusiasm.

I hereby authorize you to use my personal details contained in this document (Regolamento UE 2016/679)

Rome, March 2022