SABATINA CRISCUOLO
Curriculum Vitae

SUMMARY

- **Nationality:** Italian

- Biomedical Engineer

- **Current position**: PhD Candidate in Information and Communication Technology for Health at University of Naples Federico II

- Affiliated with National Research Council - Institute of Intelligent Industrial Technologies and Systems for Advanced Manufacturing (STIIMA)

- **Institutional e-mail:**

ACADEMIC EXPERIENCE

Research activity   **18 Nov 2024 - ongoing**
National Research Council -STIIMA   Lecco, Italy

- Progetto del PdGP/GePro 2022-2024: "ID&A DIT.AD008.243 GAE P0001346"
- Prot. n. 436382
- Date : 18/11/2024 - 31/12/2024
- Tutor: Dr. Marco Sacco

Ph.D. student in *Information and Communication Technology for Health*   **Jan 2022 - ongoing**
University of Naples 'Federico II'

- Supported by the European Union - FSE-REACT-EU, PON Research and Innovation 2014-2020, DM 1061/2021 contract number DOT19X7NYL-2.

- Project : *Advanced artificial intelligence techniques and systems to support precision medicine.*
  Development of artificial intelligence algorithms and systems for the implementation of novel diagnostic and therapeutic strategies. The specific applications include electroencephalographic (EEG) analysis for neurodegenerative disease, type 1 diabetes and colorectal surgery.

- Supervisor: Prof. Egidio De Benedetto

- Thesis submission: December 2024

- Expected graduation: March 2025

Research activity   **Sep 2021 - ongoing**
Augmented Reality for Health Monitoring Laboratory (ARHeMLab)   Naples, Italy

Visiting PhD Student   **Mar 2023 - Sep 2023**
Applied Intelligence Research Centre (AIRC), Technological University Dublin (TUDublin)   Dublin,Ireland

- Variational autoencoder and eXplainability artificial intelligence for EEG artifact removal
- Supervisor: Dr. Luca Longo

RESEARCH COLLABORATION

CNR-STIIMA **Jul 2024 - ongoing**
National Research Council Lecco, Italy

Interdepartmental Research Centre on Management and Innovation **Sep 2021 - ongoing**
in Healthcare (CIRMIS), University of Naples "Federico II" Naples, Italy

Measurement Lab **Jan 2022 - ongoing**
University of Salento Lecce, Italy

The Institute for Signal and Information Processing **Oct 2023 - Jan 2024**
Temple University Philadelphia, USA

Applied Intelligence Research Centre (AIRC) **Mar 2023 - Sep 2023**
Technological University Dublin Dublin, Ireland

EDUCATION

Level II Master's degree - ECM12 **Sep 2023 - Feb 2024**
E-Campus University

- Level II Master ECM12 "Processi di apprendimento nelle materie scientifiche: matematica, scienze e fisica nelle scuole secondarie di primo e di secondo grado" proposes a training course designed to teach science subjects (mathematics, science, and physics) by combining disciplinary knowledge with didactic-methodological skills.

International PhD School "Italo Gorini" 2023 **Sep 2023**
Gruppo Misure Elettriche ed Elettroniche Firenze, Italy

- One-week course on measurement for the improvement of quality, reliability and safety in accordance with the United Nations Agenda 2030.

"Analyzing Neural Time Series" Summer School **Jun 2023**
Sincxpress Education Bucharest, Romania

- One-week course on advanced neural signals analysis in the time-frequency domain, focusing on spectral activity and synchronization of the brain, offering practical implementation using MATLAB.

International PhD School "Italo Gorini" 2022 **Sep 2022**
Gruppo Misure Elettriche ed Elettroniche Salerno, Italy

- One-week course on measurement in agri-food.

eXtended Reality Spring School 2022 **May 2022**
University of Naples 'Federico II' Naples, Italy

- One week course on eXtended Reality (XR) technology encompassing Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) for immersive user experiences, offering practical implementation using Unity.

MAKE Napoli | *Medtronic Master Advanced Knowledge Experience* **Nov 2021 - Jul 2021**
University of Naples 'Federico II' - Medtronic Italia S.p.A

- In collaboration with Medtronic Italia s.p.a, the master aimed the acquisition and development of project management skills in healthcare.
- *Project work* : taking care of elderly person suffering from incontinence thanks to *"Designed Against Miscomfort" (DAM device)* (https://docs.google.com/presentation/d/1De2LUl3Y0RNwvw0cIxpohdk5hi56Z49l/edit? usp=sharing&ouid=114403553490684844054&rtpof=true&sd=true). The work, conducted with a heterogeneous group of medical professionals, including biomedical engineers, management engineers, physiotherapists, has enabled us to be recognized as runners-up for the originality of the device and its potential feasibility in the near future.

Master's degree in *Biomedical Engineering - Bionic & Biorobotics* (LM-21)   2018 - 2021
University of Naples 'Federico II'

- Thesis: *A wearable, integrated AR-BCI system for robot-assisted rehabilitation in ADHD children therapy* discussed on 20/07/2021.
  Wearable Brain-Computer Interface system based on visually evoked potential integrated with Augmented Reality for robot-assisted rehabilitation therapies in children with attention deficit / hyperactivity disorder.
  Supervisor: Prof. Egidio De Benedetto, Co-supervisor: Eng. Luigi Duraccio
- Final grade : 110/110 cum laude

PF24 - Percorso Formativo da 24 CFU (MD 616/2017)   2020 - 2021
University of Naples 'Federico II'

- Anthropo-psycho-pedagogical disciplines and teaching methodologies and technologies.

Bachelor's degree in *Biomedical Engineering* (L-8)   2015 - 2018
University of Naples 'Federico II'

- Thesis : *Innovative methods of enzyme immobilization* discussed on 08/11/2018.
  Graphene nanocomposite hydrogel for the construction of bioelectric tissues, biosensors and delivery systems.
  Supervisor: Prof. Domenico Pirozzi
- Final grade : 108/110

Scientific High School Diploma   2010 - 2015
Lyceum Don Lorenzo Milani - Gragnano (NA)

- Final grade : 100/100

EXPERIENCES

Conference Organization

- *Operational Chair & Member of Scientific Program Committee in IEEE MetroXRAINE 2024*
  - ∗ Organizational support: revision process management, conference program development, support team coordinator
  - ∗ Co-proponent special session "Metrology and Machine Learning in Medical Applications" with Marisa Pesola and Fabrizio Lo Regio (University of Naples Federico II, Italy), and Esther Durá Martinez (Universitat de Valencia, Spain)
  - ∗ Oral session chair
  - ∗ Reviewer
  - ∗ More details: https://www.metroxraine.org/
- *IEEE Research and Technologies for Society and Industry 2024 (IEEE RTSI 2024)*
  - ∗ Co-proponent special session "Artificial Intelligence in Medical Applications" with Egidio De Benedetto (University of Naples Federico II, Italy), and Daniele Spoladore (STIIMA, National Research Council, Italy)
  - ∗ Oral session chair
  - ∗ Reviewer
  - ∗ More details: https://2024.ieee-rtsi.org/
- *Programme Committee World Conference on eXplainable Artificial Intelligence 2023 & 2024*
  - ∗ Reviewer
  - ∗ More details: https://xaiworldconference.com
- *Local Committee IEEE MetroXRAINE2022 & IEEE MetroXRAINE2023*
  - ∗ Organizational and technical support
  - ∗ Reviewer
  - ∗ More details: https://www.metroxraine.org/history

Journal Reviewer Experience **Ongoing**

- Measurement - Elsevier B.V.
- Frontiers in Aging Neuroscience - Frontiers Media SA
- Acta Imeko - International Measurement Confederation (IMEKO)
- IEEE Access - Institute of Electrical and Electronics Engineers Inc.
- Biocybernetics and Biomedical Engineering - Elsevier B.V.
- International Journal of Human-Computer Interaction - Taylor and Francis Ltd.
- APL Bioengineering - American Institute of Physics.

Master degree theses co-supervisor in Biomedical Engineering program **Ongoing**
University of Naples 'Federico II'

- Course: Sensors for Biomedical Applications
- Projects: Artificial Intelligence applications in healthcare domain and EEG analysis
- Number of co-supervised theses: 11

Academic Tutor **Oct 2023 - Jun 2024**
DIETI, University of Naples Federico II

- course "Calcolatori Elettronici I"
- course "Analisi Matematica I"

Internship activity **Jan 2021 - Jun 2021**
University of Naples 'Federico II' - Villa delle Ginestre S.p.A   Volla (NA), Italy

- Master's thesis internship at Villa delle Ginestre S.p.A (https://www.villadelleginestre.com/)
  Validated and evaluated therapeutic effectiveness of a system at the ARHeMLab, University of Naples 'Federico II'. Utilized Brain-Computer Interface, Augmented Reality, and humanoid robotic devices for ADHD patient rehabilitation.

PROJECTS

DHeal COM - HUB LIFESCIENCE DIGITAL HEALTH PROXIMITY MEDICINE **Jan 2024 - ongoing**
University of Naples Federico II

- WP5: Person-centred technology for treatment and management of health and functional conditions in community care settings
  * Digital health services to support pharmacological interventions: Artificial pancreas in type 1 diabetes and Influence of nutritional factors on blood glucose levels

NINFEA **Oct 2023 - ongoing**
University of Naples Federico II

- FRA-Finanziamento per la Ricerca di Ateneo 2023 initiative
- Corresponding Proponent: Roberto Peltrini
- The goal is to provide an artificial intelligence based analysis method in ICG angiography to perform real-time perfusion analysis in a selected region of interest

AI4PG **Oct 2021 - Oct 2023**
University of Naples Federico II

- FRA-Finanziamento per la Ricerca di Ateneo 2022 initiative
- Corresponding Proponent: Giovanni Annuzzi
- The goal is to provide an artificial intelligence system to investigate in patients with type 1 diabetes treated with artificial pancreas the relationships between nutritional factors, glycaemic response and prandial insulin requirements

- H index (Scopus, July 2024) : 5

- Most contributed Topics 2022-2024:

  - Electroencephalography signal, Artefacts, Complexity measures
  - Type 1 diabetes, Postprandial blood glucose prediction

- Scopus Author ID: 57419367000

- ORCID: 0000-0001-7189-1339

SCIENTIFIC PUBLICATIONS

International Journals with referees

1. **S. Criscuolo**, A. Apicella, R. Prevete, and L. Longo. "Interpreting the latent space of a Convolutional Variational Autoencoder for semi-automated eye blink artefact detection in EEG signals." Computer Standards & Interfaces (2025)
   https://doi.org/10.1016/j.csi.2024.103897

2. A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, and R. Schiavoni. "A Novel Metric for Alzheimer's Disease Detection Based on Brain Complexity Analysis via Multiscale Fuzzy Entropy." Bioengineering 11 (4), 324. (2024)
   https://doi.org/10.3390/bioengineering11040324

3. A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, J. Picone, and R. Schiavoni. "EEG complexity-based algorithm using Multiscale Fuzzy Entropy: Towards a detection of Alzheimer's disease." Measurement, 225, 114040. (2024)
   https://doi.org/10.1016/j.measurement.2023.114040

4. G. Annuzzi, A. Apicella, P. Arpaia, L. Bozzetto, **S. Criscuolo**, E. De Benedetto, M. Pesola, R. Prevete. "Exploring Nutritional Influence on Blood Glucose Forecasting for Type 1 Diabetes Using Explainable AI." IEEE Journal of Biomedical and Health Informatics. (2023)
   https://doi.org/10.1109/JBHI.2023.3348334

5. A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, and R. Schiavoni "Uncovering the Correlation between COVID-19 and Neurodegenerative Processes: Toward a New Approach Based on EEG Entropic Analysis". Bioengineering; 10(4):435. (2023)
   https://doi.org/10.3390/bioengineering10040435

6. G. Annuzzi, L. Bozzetto, A. Cataldo, **S. Criscuolo**, M. Pesola, "Predicting and monitoring blood glucose through nutritional factors in type 1 diabetes by artificial neural networks", Acta IMEKO. (2023)
   https://doi.org/10.21014/actaimeko.v12i2.1453

7. G. Annuzzi, A. Apicella, P. Arpaia, L. Bozzetto, **S. Criscuolo**, E. De Benedetto, M. Pesola, R. Prevete, and E. Vallefuoco, "Impact of nutritional factors in Blood Glucose Prediction in Type 1 Diabetes through Machine Learning", IEEE Access. (2023)
   https://doi.org/10.1109/ACCESS.2023.3244712

8. A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, R. Schiavoni, and S. Invitto, "A Method for Optimizing the Artifact Subspace Reconstruction Performance in Low-Density EEG", IEEE Sensors Journal.(2022).
   https://doi.org/10.1109/JSEN.2022.3208768

9. P. Arpaia, A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, and R. Schiavoni, "Assessment and scientific progresses in the analysis of olfactory evoked potentials", Bioengineering, 9(6), 252. (2022).
   https://doi.org/10.3390/bioengineering9060252

Submitted

- P. Arpaia, M. Cacciapuoti, A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, and R. Schiavoni, "Assessing the role of EEG preprocessing to enhance multiscale fuzzy entropy in Alzheimer's disease detection", IEEE Sensors Journal.
- P. Arpaia, M. Cacciapuoti, A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, and R. Schiavoni, "Improving Multiscale Fuzzy Entropy Robustness in EEG-based Alzheimer's Disease Detection via Amplitude Transformation", MDPI Sensors.

International conferences

1. P. Arpaia, M. Cacciapuoti, A. Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, and R. Schiavoni, "Comparison of EEG Pre-Processing Techniques for Complexity Measures in Alzheimer's Disease Detection", 2024 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering (MetroXRAINE).
   In proceeding

2. A. Annuzzi, P. Arpaia, L. Bozzetto, **S. Criscuolo**, and M. Pesola, "Explainable AI Assessment of Meal-Related Features Impact in Predicting Basal Insulin for Type I Diabetes", 2024 IEEE 8th Forum on Research and Technologies for Society and Industry Innovation (RTSI). *Oral presentation*.
   In proceeding

3. **S. Criscuolo**, S. Giugliano, A. Apicella, F. Donnarumma, F. Amato, A. Tedesco, and L. Longo, "Exploring the Latent Space of Person-Specific Convolutional Autoencoders for Eye-Blink Artefact Mitigation in EEG Signals", 2024 IEEE 8th Forum on Research and Technologies for Society and Industry Innovation (RTSI). *Oral presentation*.
   In proceeding

4. **S. Criscuolo**, A. Cataldo, E. De Benedetto, M. Pesola, and R. Schiavoni "Entropy and Coherence Features in EEG-based Classification for Alzheimer's Disease Detection", in 2024 IEEE International Instrumentation and Measurement Technology Conference (I2MTC). *Oral presentation*.
   https://doi.org/10.1109/I2MTC60896.2024.10560664

5. G. Annuzzi, A. Apicella, P. Arpaia, L. Bozzetto, **S. Criscuolo**, E. De Benedetto, M. Pesola, R. Prevete. (2024, March). "Influence of meal-related information on blood glucose prediction for type 1 diabetes through explainable artificial intelligence", in International Conference on Advanced Technologies & Treatments for Diabetes (ATTD 2024). *Contribution selected from 10% of the total contributions for oral presentation*.
   https://doi.org/10.1089/dia.2024.2525.abstract

6. G. Annuzzi, P. Arpaia, L. Bozzetto, **S. Criscuolo**, S. Giugliano, M. Pesola (2023, October). "Assessing the Features on Blood Glucose Level Prediction in Type 1 Diabetes Patients Through Explainable Artificial Intelligence", in 2023 IEEE International Conference on Metrology for Extended Reality, Artificial Intelligence and Neural Engineering (MetroXRAINE). *Oral presentation*.
   https://doi.org/10.1109/MetroXRAINE58569.2023.10405831

7. A.Cataldo, **S. Criscuolo**, E. De Benedetto, A. Masciullo, M. Pesola, R. Schiavoni (2023, October). "Entropy-Based EEG Measures for Revealing Altered Neural Dynamics in Alzheimer's Disease: A Preliminary Study", in 2023 IEEE International Conference on Metrology for Extended Reality, Artificial Intelligence and Neural Engineering (MetroXRAINE). *Poster*.
   https://doi.org/10.1109/MetroXRAINE58569.2023.10405779

8. P. Arpaia, **S. Criscuolo**, E. De Benedetto, N. Donato, and L. Duraccio, (2022, October). "Evaluation of the Effectiveness of a Wearable, AR-based BCI for Robot Control in ADHD Treatment", in 2022 IEEE International Conference on Metrology for Extended Reality, Artificial Intelligence and Neural Engineering (MetroXRAINE). *Poster*.
   https://doi.org/10.1109/MetroXRAINE54828.2022.9967655

9. P. Arpaia, **S. Criscuolo**, E. De Benedetto, N. Donato, and L. Duraccio, (2021, October). "A Wearable AR-based BCI for Robot Control in ADHD Treatment: Preliminary Evaluation of Adherence to

Therapy", in 2021 15th International Conference on Advanced Technologies, Systems and Services in Telecommunications (TELSIKS), Faculty of Electronic Engineering, University of Niš, Serbia. https://doi.org/10.1109/TELSIKS52058.2021.9606352

Conference Partecipation

1. 2024 IEEE International Conference on Metrology for extended reality, artificial intelligence and neural engineering (IEEE MetroXRAINE 2024), Oct 21-23, 2024, St.Albans, UK.

2. *Oral Presentation* at 2024 IEEE Research and Technologies for Society and Industry (RTSI), Sept 18-20, 2024, Lecco, Italy.

3. *Oral Presentation* at 2024 IEEE International Instrumentation and Measurement Technology Conference (I2MTC), May 20-23, 2024, Glasgow, Scotland.

4. *Oral Presentation* at International Conference on Advanced Technologies & Treatments for Diabetes (ATTD 2024), March 06-09, 2024, Florence, Italy.

5. *Oral Presentation* at 2023 IEEE International Conference on Metrology for extended reality, artificial intelligence and neural engineering (IEEE MetroXRAINE 2023), Oct. 25-27, 2023, Milan, Italy.

6. *Poster Presentation* at 2022 IEEE International Conference on Metrology for extended reality, artificial intelligence and neural engineering (IEEE MetroXRAINE 2022), Oct. 26-28, 2022, Rome, Italy.

Professional affiliations

IEEE Women in Engineering	from **Feb 2024**
IEEE Instrumentation and Measurement	from **Feb 2024**
GMEE - Gruppo Misure Elettriche ed Elettroniche	from **Jun 2023**
IEEE I&M society TC-06 - Emerging Technologies in Measurements	from **May 2023**
IEEE Young Professionals	from **Oct 2022**
IEEE Graduate Student Member	from **Oct 2022**

Awards

Best Project Award	**Sep 2022**
International PhD School "Italo Gorini" 2022	Salerno, Italy

Certificates

IOP Trusted Reviewer status	**Sep 2024**
IOP Publishing	
Peer Review Excellence online training graduate	**Feb 2024**
IOP Publishing	
Training Course in European Projects	**Dec 2023**
Intellera Consulting S.p.a.	
English CEFR Level: C1	**Aug 2023**
Educational Services and Testing (ESaT)	
Information Engineer Licence	**Sep 2022**
University of Naples 'Federico II'	

PERSONAL SKILLS

- **Languages**
  - Italian (Native Speaker)
  - English

- **Soft skills**
  - Teamworking/Interpersonal skills
  - Empathetic listening
  - Problem solving
  - Time management
  - Flexibility/Adaptability
  - Analysis
  - Prioritization and Follow-through
  - Reliable
  - Diligent

- **Technical skills**
  - Programming : C, Python
  - Softwares : MATLAB, Simulink, Cisco Packet Tracer, LabVIEW, Simul8, Unity (basic)
  - Operating system : Windows, Ubuntu (basic)
  - Others : LaTeX, Microsoft Office (Word, Excel, PowerPoint)

In compliance with the GDPR and the European Regulation n. 679/2016, I hereby authorize the use of personal details contained in this document.

Aware of the penal sanctions provided in art. 76 of D.P.R. n. 445 of December 28, 2000, for false statements and falsification of documents as indicated therein, and assuming full responsibility according to and for the purposes of the aforementioned D.P.R. n. 445/2000

Naples, November 28, 2024