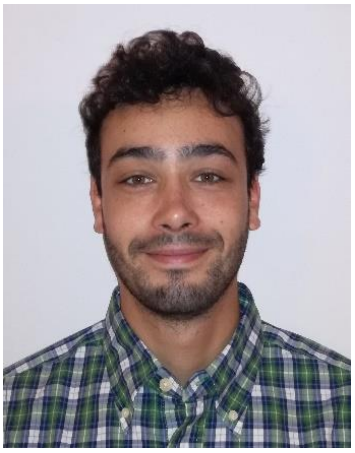

Muzzi Lorenzo

April 28th, 1993

Contacts

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Professional Profile

Biomedical engineer with an interdisciplinary background in neuroengineering and bioelectronics, specializing in the development of innovative "brain-on-a-chip" models and the analysis of complex data using cutting-edge technologies (e.g., microelectrode arrays, bioprinting). My experience, gained in both academic and clinical environments, has equipped me with a set of essential transferable skills, including:

- **Project Management:** Planning, execution, and coordination of complex projects, ensuring compliance with objectives, deadlines, and resource allocation.
- **Problem-Solving:** Analyzing and resolving challenges in dynamic, multidisciplinary environments.
- **Collaboration and Communication:** Strong ability to work in diverse teams and facilitate dialogue between professionals with different expertise.
- **Data Analysis and Programming:** Proficiency in software tools (Matlab, LabVIEW, C++, Java, JavaScript) for optimizing and interpreting large experimental datasets.

Work experience

Mar 2023 - present

Assistant Professor (RTD-a)
DINOGMI, University of Genoa, IT
Medical Genetic Unit, IRCCS Istituto Giannina Gaslini, Genoa, IT

Main activities

Design and development of 2D and 3D engineered neuronal networks derived from patient derived induced pluripotent stem cells; use of brain-on-a-chip model for the study of neurodevelopmental diseases; design and implementation of algorithms for the analysis of electrophysiological activity in neuronal networks coupled to MEA.

Nov 2021 – Mar 2023

Postdoctoral researcher
DINOGMI, University of Genoa, IT
Medical Genetic Unit, IRCCS Istituto Giannina Gaslini, Genoa, IT

Main activities

Development of advanced cellular models using genomic editing and patient-derived induced pluripotent stem cells for the study of genetic disease

Education

Nov 2018 – Nov 2021

PhD in Bioengineering and Bioelectronics, scholarship recipient
DIBRIS, University of Genoa, IT

Sep 2015 – Mar 2018

Master degree in Neuroengineering and neurotechnologies
University of Genoa, IT

Sep 2017 – Mar 2018

Erasmus at the Clinical Neurophysiology Group (CNPH)
University of Twente, NL

Sep 2012 – Sep 2015

BS in Biomedical Engineering
Polytechnic University of Milan, IT

Research experience

University of Genoa and Gaslini Hospital
MNESYS Project

Development of brain-on-a-chip models for the functional investigation of neurological diseases

- Development of optimized protocols for the generation of engineered 2D and 3D patient-derived neuronal networks
- Development of optimized protocols for the generation of mixed 2D and 3D patient-derived neuronal networks
- Use of high-density microelectrode arrays (HD-MEAs) for the detection of electrophysiological signals from neuronal networks
- Development of electrical/chemical stimulation protocols to assess neuronal network dynamics
- Development of algorithms for the analysis of electrophysiological data
- Development of algorithms to integrate omics data with electrophysiological analyses for the identification of potential biomarkers
- Implementation of a patient-specific brain-on-a-chip platform capable of recapitulating various physiological and pathological aspects

University of Genoa and Gaslini Hospital
Postdoctoral research area

Development of advanced cellular models using genomic editing and patient-derived pluripotent stem cells for the study of genetic diseases

P.I: F. Zara, P. Scudieri

- Generation of human-induced stem cells lines from patient
- Generation of patient-derived neuronal cultures
- Genome editing applied to neuronal cultures
- Integration with patch-clamp and high density micro-electrodes array systems
- Experienced 3D culture generation (organoids, 3D bioprint)
- Implementation of 3D cultures with electronic devices for functional test evaluation.

University of Genoa
PhD project

Development of engineered human-derived brain-on-a-chip models for electrophysiological recording

Supervisors: S. Martinoia, M. Frega.

- Experienced in culturing and maintaining human-induced stem cells (h-iPSCs)
- Optimized differentiation protocol for h-iPSCs
- Introduced new engineered protocols for brain organoids generation
- Designed electrophysiological experiments
- Mastered knowledge in micro-electrodes arrays (MEAs) technologies
- Measured and analyzed big electrophysiological data
- Collaborated with post-docs and external institution
- Correlator of students during their master thesis entitled:
  - "Caratterizzazione dell'attività elettrica di reti neuronali 2D e 3D derivate da cellule staminali pluripotenti indotte registrate con matrici di microelettrodi ad alta densità."
  - "Neuroni corticali umani derivati da cellule staminali pluripotenti indotte su matrici di microelettrodi: caratterizzazione dell'attività elettrosiologica di rete"
- Trainer of the 'neuroengineering and neurotechnolgies' course at University of Genoa (a.y. 2021).

University of Twente
Master thesis title

In-vitro model of the Penumbra: an optogenetic stimulation in closed loop might improve cell survival

Relators: J. Le Feber, S. Martinoia

- Experienced in culturing and maintaining primary neuronal cultures
- Learned viral transfection methodologies
- Mastered programming ability (LabView, Matlab, C++)
- Exercised in Immunofluorescent staining techniques for cell cultures

- Projected, developed and improved closed loop stimulation protocol for neuronal cultures
- Assembled electronic components for optogenitc stimulation
- Integrated hardware-software configuration
- Advanced microscope imaging techniques
- Evaluated statistical data analysis on electrophysiological data

Polytechnic University of Milan
Bachelor thesis title

Characterization of injectable gels for regeneration of adipose tissue

Relator: P. Petrini

- Earned basilar knowledge in general laboratory equipment
- Planned experiments workplan

Additional experience

26/01/20 – 30/01/20
Ponte di legno (BS), Italy
UNIMONT

3rd CellFit Training School "Meet the rising stars of emerging therapies" From 3D Bioprinting to Extracellular Vesicles isolation and encapsulation for delivery"

15/07/2019 – 19/07/2019
Utrecht University, NL

Summer school "Neural circuit Development and Plasticity"

3/12/2018-6/12/2018
Italian Institute of Technology (IIT), Genoa, Italy

5th Nikon@IIT Practical workshop on Advanced Microscopy.

Personal skill and competences

Languages

- Italian, native
- English B2 (IELTS Certificate)

Social

- Excellent ability to adapt in multicultural environments
- Excellent verbal communication skills, self-confidence, public speaking
- Excellent abitity to interact in multidisciplinary ambient
- Strong sense of collaboration
  Creative, with strong spirit of initiative

Organizational

- Excellent ability in managing group projects, prioritization and planning
- Strong attention to details
- Excellent problem solver with critical thinking

Great flexibility and ability to mediate problems

Technical

- Great ability in cell culturing (induced stem cells and primary cultures)
- Great command of the use of a cell culture laboratory
- Great skill in the use of micro-electrode arrays
- Excellent understanding of neuro-electrophysiological data
- Great knowledge in using 3D printers
- Experienced in handling biohazardous material

Experienced in creating custom script for big data analysis and signal processing

IT

- Proficient in LabView (associate developer certification), C++, Java, Javascript, Matlab.
- Excellent analysis and data processing skills

Personal Interest

- Classical guitar player (self-taught)
- Eleven years of experience in semi-professional soccer
- Amateur athlete in parkour (14 years), rugby, and trekking
- Passionate fisherman
- Travel enthusiast
- Hiking and nature exploration
- 3D printing enthusiast
- Interest in trading and financial markets

Dissemination

Pubblications

-Di Lisa, D., Muzzi, L., Lagazzo, A., Andolfi, A., Martinoia, S., & Pastorino, L. (2023). Long-term in vitro culture of 3D brain tissue model based on chitosan thermogel. Biofabrication, 16(1), 015011.

-Muzzi, L.; Di Lisa, D.; Falappa, M.; Pepe, S.; Maccione, A.; Pastorino, L.; Martinoia, S.; Frega, M. Human-Derived Cortical Neurospheroids Coupled to Passive, High-Density and 3D MEAs: A Valid Platform for Functional Tests. Bioengineering 2023, 10, 449.

- Di Lisa, D., Muzzi, L., Pepe, S., Dellacasa, E., Frega, M., Fassio, A., ... & Pastorino, L. (2022). On the way back from 3D to 2D: Chitosan promotes adhesion and development of neuronal networks onto culture supports. Carbohydrate Polymers, 297, 120049.

- Muzzi, L., et al. "Rapid generation of functional engineered 3D human neuronal assemblies: network dynamics evaluated by micro-electrodes arrays." Journal of neural engineering 18.6 (2021): 066030.

-Muzzi, Lorenzo, et al. "Human derived cortical excitatory neurospheroids showed spontaneous activity on micro electrodes array." 2021 10th International IEEE/EMBS Conference on Neural Engineering (NER). IEEE, 2021.

- Monteiro, S. P., Voogd, E., Muzzi, L., De Vecchis, G., Mossink, B., Levers, M., ... & Frega, M. (2021). Neuroprotective effect of hypoxic preconditioning and neuronal activation in a in vitro human model of the ischemic penumbra. Journal of neural engineering, 18(3), 036016.

- Di Lisa, D., Dellacasa, E., Muzzi, L., Lagazzo, A., Frega, M., Martinoia, S., & Pastorino, L. (2020, June). Thermosensitive hydrogels for the encapsulation of primary and human derived neuronal cells. GNB2020, June 9th-11th 2021, Trieste, Italy

- Martinoia, S., Andolfi, A., Muzzi, L., Pisano, M., Spanu, A., & Raiteri, R. (2020, December). Neuro-electronic devices and nanotools to interact with neuronal networks. In 2020 IEEE International Electron Devices Meeting (IEDM) (pp. 14-1). IEEE.

- Arnaldi, P., Carosio, F., Di Lisa, D., Muzzi, L., Monticelli, O., & Pastorino, L. (2020). Assembly of chitosan-graphite oxide nanoplatelets core shell microparticles for advanced 3D scaffolds supporting neuronal networks growth. Colloids and Surfaces B: Biointerfaces, 196, 111295

- Muzzi, L., Martinoia, S., & Frega, M. (2019, January). Brain-on-a-Chip: A Human 3D Model for Clinical Application. In pHealth (pp. 274-279).

- Muzzi, L., Hassink, G., Levers, M., Jansman, M., Frega, M., Hofmeijer, J., ... & le Feber, J. (2019). Mild stimulation improves neuronal survival in an in vitro model of the ischemic penumbra. Journal of neural engineering, 17(1), 016001.

-Muzzi Lorenzo, Hassink Gerco Cornelis, Le Feber Joost. "In-vitro model of the Penumbra: closed-loop optogenetic stimulation to improve cell survival." Frontiers in Cellular Neuroscience, N#00046, DOI=10.3389/conf.fncel.2018.38.00046

Conferences

- FENS Forum 2024

Location: Wien, Austria. Date: 25-29 June 2024. Poster presentation entitled "From neuronal progenitor cells to neuronal networks: in-vitro model for neurodevelopmental disease characterized by proteomics and HD-MEA "

- VIII Congress of the National Group of Bioengineering (GNB2023)

Location: Padua, Italy. Date: 21-23 June 2023. Oral presentation entitled: "Innovation in neuronal cell culture: from adhesion to maturation, chitosan promotes developing nervous system"

- 3rd In-Vitro 2D & 3D Neuronal Networks Summit (MxW Summit 2023)
Location: Zurich, Switzerland. Date: 15-17 May 2023. Poster presentation entitled:
"Characterizing mixed neuronal network derived from control individuals: in-vitro model for neurodevelopmental disease."

- **6th world congress of the Tissue Engineering and Regenerative Medicine International Society (TERMIS2021)**
Location: Virtual. Date: 15-19 November 2021. Poster presentation entitled "*Thermogelling biomimetic hydrogel supporting 3D neuronal networks"*

- **International Society for Stem Cell Research (ISSCR) Annual Meeting 2021**.
Location: Virtual. Date: 21-26 June. Poster presentation entitled "*Preliminar analysis of engineered functionally active human derived cortical neurospheroids for drug screening and precision medicine*" and contribution to the poster entitled "*A thermosensitive chitosan hydrogel-based 3d in vitro human neuronal culture model*"

-**10th International IEEE EMBS Conference on Neural Engineering (NER2021).**
Location: Virtual. Date: 4-6 May 2021. Poster presentation entitled "*Human derived cortical excitatory neurospheroids showed spontaneous activity on micro electrodes array*"

-**pHealth 2019**.
Location: Genoa, Italy. Date: 10-12 June 2019. Oral presentation of the work: "*Brain-on-a-chip: a human 3D model for clinical application*", published in the conference book: pHealth 2019 proceedings of the 16th International Conference on Wearable Micro and Nano Technologies for Personalized Health

-**MEA Meeting 2018,**
Location: Reutlingen, Germany. Date: 4-6 June 2018.
Oral talk from the title "*In-vitro model of the Penumbra: closed-loop optogenetic stimulation to improve cell survival*." Authors: Muzzi L., Hassink G., Le Feber J.