

LORENZO DI SILVERIO

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Biomedical Engineer with hands-on R&D experience developing wearable medical devices from concept to clinical evaluation. Background spanning mixed-signal PCB design, embedded systems, biosignal acquisition, mechanical prototyping, and hardware-software integration. Experienced across the complete product development lifecycle, from translating clinical needs into engineering requirements to prototype development, verification testing, human-subject evaluation, and data analysis.

Education

MSc in Biomedical Engineering University of Illinois Chicago (UIC)	05/2026
Thesis - Quantifying Tongue Agility: From Device Development to Precision Rehabilitation	
MSc in Biomedical Engineering Politecnico di Milano	Expected 10/2026
Thesis - Design of a Multimodal Intra-Oral Respirometer for Physiological Monitoring and Biofeedback	
BSc in Biomedical Engineering Università degli Studi "G. D'Annunzio"	07/2023
Thesis - Optimization of Process Parameters for the realization of an innovative EMG sensor using Aerosol Jet Printing	

Skills

- Mechanical Design & Prototyping:** CAD Modeling (SolidWorks, Fusion 360), Engineering Drawings, Design for Manufacturability (DFM), Design for Assembly (DFA), Materials Selection, Rapid Prototyping, 3D Printing, Thermoforming / Vacuum Forming
- Verification & Validation:** Process Validation (IQ/OQ/PQ), Root Cause Analysis & CAPA, Design Controls, Test Method Development, Technical Documentation, Risk Management (ISO 14971), Regulated Environments (ISO 13485 / FDA 21 CFR 820)
- Data Analysis & Modeling:** Python, MATLAB, Biosignal Processing, Statistical Analysis, Design of Experiments (DOE), Process Characterization & Optimization, Data-Driven Problem Solving
- Embedded Systems & Electronics:** Mixed-Signal PCB Design (Eagle, Fusion 360), Schematic Capture, PCB Layout, Analog & Digital Circuit Design, Analog Front-End & Signal Conditioning, Sensor System Integration, Firmware Development (C, C++), Microcontrollers, Communication Protocols (SPI, I2C, UART, BLE), Test Equipment Debug (Oscilloscope, Logic Analyzer, Multimeter), Surface Mount Soldering
- Clinical Research:** Cross-Disciplinary Communication, IRB-Compliant Protocols, Clinical Workflow Integration, On-Site Data Collection, Subject Interaction, Device Operations in Clinical Setting, Clinical Data Analysis

Working Experience

Graduate Research Assistant Wearable Technologies and Sensory Enhancement Laboratory @ UIC <i>Chicago, IL</i>	09/2024 - 05/2026
- Led the end-to-end engineering development of a wearable medical device for clinical rehabilitation applications - Designed and developed 5 flexible PCB iterations covering schematic capture, PCB layout, analog front-end design, microcontroller integration, sensor interfacing, and BLE wireless communication - Translated clinical input from rehabilitation researchers into engineering design requirements and design controls documentation - Redesigned the sensing PCB architecture, increasing the active sensing area by 11.23% while improving thermal dissipation and signal quality - Developed test methods, verification protocols, and work instructions supporting prototype fabrication, verification testing, and experimental validation - Designed device housing and thermoforming tooling in SolidWorks, applying DFM/DFA principles for manufacturable prototype development	
Clinical Research Collaborator Shirley Ryan AbilityLab <i>Chicago, IL</i>	09/2024 - 05/2026
- Collaborated with rehabilitation researchers and speech-language pathologists to translate clinical needs into engineering design requirements - Co-led IRB-approved clinical evaluations of a wearable medical device, including data collection on 6 neurologically impaired subjects - Developed Python and MATLAB analysis pipelines to process 21-subject biosignal datasets, applying statistical methods to evaluate rehabilitation outcomes - Conducted on-site data collection during rehabilitation sessions while ensuring proper device functionality and signal integrity	
Graduate Research Assistant WTSE @ UIC & DEIB @ Politecnico di Milano <i>Chicago, IL & Milan, ITALY</i>	12/2025 - 06/2026
- Designed and developed a multimodal wearable medical device integrating pressure, photoplethysmography, inertial sensing, and force sensing for continuous physiological monitoring - Designed and developed 2 custom PCBs integrating physiological sensors, analog front-end circuitry, microcontroller, haptic actuator, BLE communication, and wireless charging system - Designed and developed rigid and flexible miniaturized photoplethysmography sensors - Validated device performance on 10 subjects under static and dynamic conditions	
Graduate Teaching Assistant Wearables and Nearables Technology Laboratory @ UIC <i>Chicago, IL</i>	01/2025 - 12/2025
Mentored 95+ students from diverse disciplinary backgrounds through the development of 6 wearable devices and UIs	
Biomedical Engineer Intern Comec Innovative <i>Chieti, ITALY</i>	04/2023 - 07/2023
- R&D on Aerosol Jet Printing technology for flexible biomedical electronics in regulated manufacturing environment - Designed and developed a flexible sEMG electrode array for muscle activity monitoring in post-orthotic rehabilitation - Characterized and qualified printing process parameters for biocompatible substrates, improving repeatability and print quality	

Publications

- A. Scarpellini, **L. Di Silverio**, A. Carroll, L. R. Cherney, E. M. Babbitt, J. L. Patton, and H. Esmailbeigi, "**Tongue-Yoga: Precision Visual Feedback Rehabilitation Improves Tongue Agility**", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 2026.
- L. Di Silverio**, V. Bratland, A. Zhong, K. Coda, E. M. Babbitt, L. R. Cherney, Y. Dai, J. L. Patton, and H. Esmailbeigi, "**Tongue exploratory movements reveal disorder-specific impairment**", 2026. (Under Review)