

MONA SAFARI

Product R&D Technologist

Embedded Systems • Sensor Development • Soft Robotics • Haptics • Physical Prototyping
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PROFILE

Product R&D Technologist working across embedded systems, sensor development, electronics, and physical prototyping. Hands-on experience developing electrochemical sensing hardware from analog front-end and multilayer PCB design through embedded firmware, signal acquisition, wireless connectivity, testing, and validation. Background in soft robotics, haptics, tangible interaction, and human-technology interaction, with a focus on functional R&D prototypes that integrate hardware, firmware, and physical systems.

TECHNICAL SKILLS

Embedded Systems & Firmware: STM32 • ESP32 • Embedded C/C++ • Python • Hardware-firmware integration • Visual Studio Code • PlatformIO • Arduino IDE • STM32CubeIDE • STM32CubeProgrammer

PCB & Electronics: KiCad • Schematic capture • Multilayer PCB design • Analog circuit design • Board bring-up • Hardware debugging • TIA circuits • Potentiostat circuits

Signal Acquisition: Electrochemical measurement systems • ADC integration • Analog filtering • Signal conditioning • Low-current measurement • Reference/bias circuits

Sensors & Validation: Electrochemical sensors • Biosensor electronics • Sensor integration • Calibration • Bench testing • Validation • Data acquisition • Data analysis

Interfaces & Connectivity: SPI • USB • BLE • Wi-Fi • Serial communication • IoT-connected sensing systems

Prototyping & Fabrication: Electronic prototyping (breadboard & perfboard) • Bench-top prototyping • Soft Robotics • Haptics and Soft sensors • 3D printing • CNC • Laser cutting • Fusion 360 • Rhinoceros • Blender

WORK EXPERIENCE

Product Designer — Sensor & Embedded Systems R&D

2025-2026

nBiomachines | Burlington, Ontario

“nBiomachines, builds the intelligence layer for biomanufacturing and biosensors”

- Designed and developed electronics for an electrochemical amperometric sensing system, spanning analog front-end architecture, PCB implementation, embedded acquisition, and system validation.
- Designed multilayer PCB prototypes integrating low-current analog measurement, signal conditioning, ADC acquisition, embedded processing, power/reference circuitry, and communication interfaces.
- Developed and validated analog front-end circuitry including transimpedance amplification, buffering, filtering, voltage/reference generation, and ADC interface conditioning.
- Integrated high-resolution ADC acquisition with STM32 and ESP32 platforms and developed firmware for sensor measurement, calibration workflows, diagnostics, device configuration, and data reporting.
- Implemented USB, BLE, and Wi-Fi communication for connected sensor operation and real-time data acquisition.
- Built bench-validation workflows using programmable sources, dummy-cell/resistive models, and real electrochemical electrodes; analyzed accuracy, drift, baseline behavior, and channel response.
- Developed and tested multi-channel sensor architectures, debugged hardware/firmware/system issues, and prepared final prototypes, firmware, validation tools, and documentation for technical handoff.

EDUCATION & ACADEMIC EXPERIENCE

MDes — Digital Futures (Emerging Technologies & Human–Technology Interaction focus)

2022–2024

OCAD University | Toronto, Ontario

Thesis: Symbiont: Soft Robotic Objects for Tactile Interpersonal Communication

BDes — Industrial Design

2012–2017

Tabriz University | Iran

Thesis: Designing an Interactive Hydroponic Kit for Children: Applying Behavioral Design Principles

Research Assistant

2022–2024

Social Body Lab — Focused on Wearable & Human–Technology Interaction

- Explored embodied interactions and developed soft robotic and haptic interaction prototypes for tactile interpersonal communication.
- Integrated electronics, physical fabrication, interaction design, and iterative research-through-design methods into functional experimental systems.

Teaching Assistant — Regenerative Design • Computation & AI • Game Design

2022–2024

Member — Artificial Intelligence Advisory Committee

2023–2024

OCAD University | Toronto, Ontario

- Contributed to university-level discussion & academic planning around AI policy, emerging tech, and responsible use.

Technology Associate

2025–2026

Network for Applied Technology (NAT) — University of Alberta

- Emerging-technology programs, hackathons, workshops, and community initiatives focused on innovation and collaboration.

SELECTED R&D PROJECT

Symbiont — Tactile Interpersonal Communication

Master Thesis — Soft Robotics / Haptics / Affective Tactile Interaction

- Designed a pair of biomimetic soft robotic objects for nonverbal tactile communication across distance or shared space.
- Developed responsive physical behaviors using soft form, embedded interaction, soft sensing/actuation, and haptic feedback including pulses, vibration, and crawling motion.
- Research focused on soft robotics, affective touch, embodied communication, biomimetics, and tangible human–technology interaction.

AWARDS & RECOGNITION

Iron A' Design Award — Industrial Design, 2026 | Symbiont — Tactile Interpersonal Communication

NeurAlberta Tech — BCI Beats, 2023 | 2nd place | Brain–Computer Interface Application, University of Alberta / Alberta Health Services

DeAuto Moving Space, 2023 | 1st place | Rebuild the City with Autonomous Mobility — Autodesk, San Francisco

SELECTED PUBLICATIONS

SYMBIONT: Designing Bioinspired Objects for Tactile Interpersonal Communication — ACM DIS 2025, Madeira, Portugal • DOI: 10.1145/3715668.3735614

SOFT OBJECTS: Prototyping for Tactile Interpersonal Communication — ACM DIS 2025, Madeira, Portugal • DOI: 10.1145/3715336.3735440

HiPalm: Wearable Device for Affective Tactile Interpersonal Communication — ACM TEI 2024, Bordeaux, France • DOI: 10.1145/3689050.3705974