

Lead R&D Engineer: Embedded Hardware & Biomedical Systems

Company: Corvita Biomedical Inc.

Location: Greater Toronto Area, Ontario, Canada

Position Type: Full-Time, Permanent

Experience Level: Entry-Level

Start Date: Immediate

About Corvita Biomedical

Corvita Biomedical Inc. is a mission-driven medical device startup transforming neonatal and perinatal healthcare globally. We are developing the next generation of smart neonatal life support systems, including the ARK Incubator, to democratize access to critical care for premature infants worldwide. By combining cutting-edge embedded systems, sensor technologies, and clinical innovation, we address vital gaps in neonatal care across Canada and in under-resourced global settings.

The Opportunity

We are seeking an exceptional Lead R&D Engineer: Embedded Hardware & Biomedical Systems to take full ownership of our hardware and embedded system R&D. In this role, you will lead the end-to-end development of life-critical medical devices, architecting power and PCB systems, writing mission-critical firmware, integrating biosensors, and generating complete manufacturing-ready technical documentation.

Working at the intersection of electrical engineering, embedded software, and biosignal acquisition, you will serve as the technical authority ensuring our technologies transition seamlessly from concept and prototype to high-volume manufacturing.

Key Responsibilities

Innovation & Product Development

- Develop and optimize signal processing algorithms for bio-signals in neonatal populations
- Develop non-abrasive sensor-to-skin connection systems that prevent motion artifacts and over-temperature saturation while maintaining optimal signal acquisition
- Create adaptive filtering and noise reduction algorithms to handle motion artifacts and environmental interference common in NICU settings

- Drive the integration of electrical, mechanical, and biomedical subsystems into comprehensive incubator solutions
- Research and implement novel biosignal acquisition methods that enhance comfort while maintaining clinical-grade accuracy

Embedded Systems & Firmware Architecture

- System Architecture: Architect, design, and implement complete embedded systems and real-time firmware for life-support medical devices using C/C++.
- Microcontroller & RTOS Integration: Lead firmware development on STM32 and ARM Cortex microcontroller platforms utilizing Real-Time Operating Systems (FreeRTOS, ThreadX, or similar).
- Peripherals & Drivers: Develop Hardware Abstraction Layers (HAL), Board Support Packages (BSP), and drivers for communication protocols including I2C, SPI, UART, USB, and CAN.
- System Reliability: Implement fail-safe watchdog mechanisms, diagnostic routines, and built-in self-test (BIST) capabilities for uninterrupted operation.

Biomedical Sensors & Signal Processing

- Biosensor Development: Lead the engineering and integration of non-invasive carbon dioxide monitoring, vital sign monitoring, and bio-sensors for neonatal care.
- Signal Optimization: Create adaptive filtering, noise reduction, and signal processing algorithms (MATLAB/Simulink/C++) to eliminate motion artifacts and environmental interference in NICU settings.
- Sensor-to-Skin Connections: Develop non-abrasive connection systems designed for delicate neonatal skin to maintain clinical accuracy while preventing saturation or artifacts.

Regulatory, Quality & Documentation

- Medical Device Documentation: Generate complete, manufacturing-ready technical documentation, including Design History Files (DHF), Verification & Validation (V&V) reports, and interface control documents.
- Regulatory Compliance: Ensure all hardware and firmware processes strictly comply with medical device standards, including IEC 62304 (Software Lifecycle), IEC 60601 (Electrical Safety), ISO 13485 (QMS), and ISO 14971 (Risk Management).
- Risk & Verification: Conduct Failure Mode and Effects Analysis (FMEA), hazard analysis, and maintain full traceability between requirements, design, and testing for Health Canada, FDA, and CE submissions.

Technical Leadership

- Ownership of hardware and embedded projects from concept, prototyping, and testing through commercialization.
- Mentor co-op students and junior team members, establishing engineering best practices and development workflows.

Required Qualifications

Education

- Bachelor's or Master's degree in Electrical Engineering, Biomedical Engineering, Computer Engineering, Systems Engineering, or a related discipline.

Technical Expertise

- 5+ years of hands-on experience in embedded firmware development (C/C++) and real-time systems (RTOS).
- Proven track record of PCB hardware design (Altium Designer preferred) covering power electronics, analog/digital circuits, and EMI/EMC mitigation.
- Experience designing Battery Management Systems (BMS) and low-power/redundant power architectures.
- Proficiency in signal processing, algorithm development, and simulation tools (MATLAB/Simulink, Python).
- Extensive experience with STM32/ARM microcontrollers, protocol busses (I2C, SPI, UART, CAN), and debugging tools (oscilloscopes, logic analyzers, JTAG).

Domain Knowledge & Regulatory

- Demonstrated experience with medical device software and safety standards (IEC 62304, IEC 60601, ISO 13485, ISO 14971).
- Proven ability to prepare DFM documentation and interface with contract manufacturers to bring products to market.
- Solid understanding of biosignal acquisition, sensor integration, and noise filtering.

Professional Skills

- Strong technical leadership and project management abilities in a fast-paced environment.
- Methodical approach to root-cause debugging, verification, and risk management in safety-critical systems.
- Excellent technical writing capabilities for regulatory submissions and manufacturing specifications.

Preferred Qualifications

- Prior leadership or R&D ownership experience within a medical device startup or high-reliability hardware industry.
- Experience with cloud/IoT protocols, cybersecurity for medical devices (ISO/IEC 81001-5-1), or wireless integration.
- Knowledge of machine learning frameworks applied to biosignal analysis.



What We Offer

- **Impact & Purpose:** Direct technical leadership over life-saving incubator systems protecting the world's most vulnerable patients.
- **Growth & Leadership:** Complete autonomy over embedded hardware architecture, leading to Principal or Director-level growth paths as the engineering team expands.
- **Comprehensive Package:** Competitive compensation, equity opportunities, and full health/dental benefits.

Join Our Mission

Every year, 15 million babies are born prematurely worldwide, and inadequate incubation technology contributes to millions of preventable deaths and disabilities. At Corvita Biomedical, we're engineering the solution through intelligent embedded systems that monitor, adapt, and respond in real-time to save lives. Your expertise in embedded systems engineering will be the foundation of medical devices that give premature infants their best chance at a healthy life. This is more than writing code – it's architecting systems that will run continuously for years, protecting the most vulnerable patients on the planet.

How to Apply

Please submit the following to hello@corvita biomedical.com:

- Resume/CV
- Cover letter

Application Deadline: Applications reviewed on a rolling basis until position is filled

Corvita Biomedical Inc. is an equal opportunity employer committed to building a diverse and inclusive team. We welcome applications from all qualified candidates, including those from underrepresented groups in STEM. We are committed to providing accommodation for people with disabilities throughout the recruitment process.

Why Choose Corvita?

Join a team where your work directly translates into saved lives. Unlike traditional embedded roles focused on consumer products or industrial applications, at Corvita your code will run in life-support systems protecting premature infants 24/7. This is your opportunity to apply advanced embedded systems engineering to solve one of healthcare's most critical challenges while working in a dynamic startup environment where your technical decisions shape the future of neonatal care technology.