

Keeping Labor Safe LLC

## The Fetal Reserve Index- Monica Novii Pod Integration- Fall 2023 Field Session

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### The Need:

Childbirth should be a time of great joy, but it can also be perilous. Electronic fetal monitoring (EFM) has been used for >50 years to predict and prevent compromised babies who can have neurodevelopmental delays including cerebral palsy. Unfortunately, EFM has performed poorly – missing as much as 50% of problematic cases. As a result, medical liability costs around labor have reached \$40 Billion per year in the USA. Outcomes have been worse in minority populations. We have developed a very disruptive technology called the Fetal Reserve Index (FRI) to provide improved and earlier assessment of clinical risk to prevent damage rather than react to it. We need to move the FRI into a deployable platform for clinical introduction, refinement, and world-wide implementation. We need help to create the app for clinical implementation.

### Company Background:

Keeping Labor Safe, LLC (KLS), is a start-up medical technology company, developing technology and software that will make labor and delivery (L&D) and immediate postpartum care (L&D/PC) safer for mother and newborn infant. Our team is primarily comprised of medical professionals who have spent our careers working in maternity hospitals in Detroit, Chicago, Augusta, Dayton, Ohio, Philadelphia and New York City where we have seen firsthand the need to make childbirth safer for all parties involved. We have developed the Fetal Reserve Index (FRI) to identify distressed fetuses earlier in the course of developing compromise and to allow for earlier intervention to help produce better medical outcomes for mother, fetus, and baby. We have multiple papers and patents and have developed the computer algorithm to “read” the tracing and produce a quantitative score.

### The Project: Integration of the Monica Novii Pod

With this project we are looking for the Bluetooth transfer of the EFM Data from the Monica Novii Pod/Patch combination into the KLS FRI Web Application. Our goal here is to turn the Fetal Reserve Index into a working wireless Electronic Fetal Monitor (EFM). Currently the Novii System has 3 components the Patch, Pod and an Interface. The Novii Patch and Pod monitor, and measure 4 times per second the Maternal Heart Rate, Fetal Heart Rate and Uterine Activity; then the Pod sends this data via Bluetooth to the Novii Interface. We would like to replace the Novii Interface with our custom-built FRI Algorithm Web Application (ideally this task will be completed with another project during the Fall 2023 semester) that will be residing on a Windows laptop, Android or iOS Tablet. A successful result will be to get the integration on one of the 3 previously mentioned operating systems, preferably Windows. When completed this will help reduce the hardware and machinery in the labor and delivery rooms thereby giving the doctors and attending nurses more room to work.

- **Monica Novii Pod**



- **Application Requirements:**

- Connect the Novii Pod (small blue squares in the picture) via Bluetooth to the FRI Web Application
- Have the FRI Web Application directly score the data as it is delivered via the Bluetooth connection
- And Dynamically update FRI Score as data is received.
- HIPAA compliant

**Technologies and Desired Skills:**

- Bluetooth Input/Output v2.1 + EDR, Class 1.5
- Bluetooth Protocol Modified Series 50
- Python (Python Flask, Micro framework)
- WebSocket
- REST API
- JavaScript, TypeScript
- HTML/CSS
- Others as appropriate
- C++
- Cloud Architecture

**Preferred Team Size:** 4-5 Students

**Preferred Work Location:** Remote

- Meeting regularly via Zoom

**Intellectual Property:** All intellectual property developed as part of this project will be owned by Keeping Labor Safe, LLC.

**NDA:** Signed NDA will be required.