

# Fetal Oximetry Measurement via Maternal Transabdominal Spectroscopy

Tech ID: 32531 / UC Case 2021-615-0

## ABSTRACT

Researchers at the University of California, Davis have developed a non-invasive, near-infrared, spectroscopy technique that measures fetal oxygen saturation via the maternal abdomen.

## FULL DESCRIPTION

Measuring fetal oxygen levels is critical for the health and safety of the expectant mother and fetus – both in utero and during delivery. Medical professionals analyze oxygen levels to help determine – as just one example - the potential need for delivery by caesarean section. There are several common methods for estimating fetal oxygen levels. However, many are either inaccurate or derived only indirectly from other data, such as the fetal heart rate. Some existing methods are also physically intrusive or require prohibitively expensive equipment. Thus, lower cost, more accurate, fetal oximeters would significantly improve the ability to assess fetal health in a wider range of clinical settings.

Researchers at the University of California Davis have developed a non-intrusive method of measuring fetal oxygen saturation in real-time via spectroscopy sensing of the maternal abdomen. Time-domain, near-infrared, spectroscopy is implemented using an optical interferometer device with two wavelength-swept laser sources. A frequency-modulated, continuous-wave, (FMCW) technique focuses a laser light wave on the abdomen – the reflection of which interferes with the light from the device's reference arm. The wavelength pattern can then be processed using machine learning algorithms. By using two laser wavelengths, absolute concentrations of both oxygenated and deoxygenated hemoglobin can be extracted – thus measuring oxygen saturation for both the mother and fetus. This method calculates real-time fetal oxygen levels more accurately and consistently than existing techniques, allowing for immediate medical determinations during labor. It is also a lower cost and more easily deployed solution than the diagnostic techniques used currently.

## APPLICATIONS

- ▶ Real-time measurement of fetal oxygen saturation
- ▶ Can be used in both delivery room and other settings

## FEATURES/BENEFITS

- ▶ Inexpensive sensors allow for low-cost implementation in more diverse clinical settings
- ▶ Results can be processed in real-time
- ▶ Non-invasive procedure
- ▶ Measuring the oxygen concentration directly provides more accurate results than alternative methods

## PATENT STATUS

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

fetal pulse oximetry, fetal oximetry, transabdominal fetal oximetry, spectroscopy, machine learning

### CATEGORIZED AS

- ▶ **Imaging**
  - ▶ Medical
- ▶ **Medical**
  - ▶ Devices
  - ▶ Diagnostics
  - ▶ Imaging
  - ▶ Screening
- ▶ **Sensors & Instrumentation**
  - ▶ Medical

### RELATED CASES

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240023846	01/25/2024	2021-615

2021-615-0

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Two-Photon Miniscope with Elliptical Point-Spread-Function and Temporal Focusing Scheme
- ▶ TransPPG-Sep: Fetal Signal Separation using Physically and Physiologically Compliant Synthetic Data
- ▶ Accurate, Non-Invasive Fetal Arterial Oxygen Saturation and Blood Ph Measurement via Diffuse Optics
- ▶ Method and System for Signal Separation in Wearable Sensors with Limited Data (with Applications to Transabdominal Fetal Oximetry)
- ▶ Systems, Methods, and Media for Determining Fetal Photoplethysmography Information from Non-Invasively Obtained Mixed Photoplethysmography Signals
- ▶ Metasurface, Metalens, and Metalens Array with Controllable Angular Field-of-View

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