**Docket #:** S22-511

# Tracheal Acoustic Monitoring to Detect Breath and Heart Sounds

Stanford researchers have developed an innovative wearable respiratory monitoring device that provides continuous, real-time detection of airflow obstruction during sedation, anesthesia, and recovery, which is an issue frequently missed by current monitoring technologies.

Respiratory obstruction is one of the most common and dangerous complications in procedural and perioperative care. Existing monitors, such as pulse oximetry and capnography, are either delayed or not routinely available outside the operating room. As a result, clinicians often rely on intermittent manual stethoscope checks, which cannot provide continuous or early detection of compromised breathing.

This wearable system overcomes these limitations by capturing high-fidelity tracheal breath sounds directly from the neck using a dual-microphone design embedded in a gel matrix. A machine-learning algorithm converts these signals into spectrograms and automatically identifies patterns such as obstruction, apnea, stridor, or irregular respiratory effort, triggering immediate clinical alerts. The device preserves clinician and patient mobility and integrates seamlessly with existing hospital telemetry or wireless displays.

By combining the sensitivity of a traditional precordial stethoscope with the convenience and intelligence of modern digital health systems, this technology establishes a new paradigm for continuous respiratory vigilance across operating rooms, recovery units, ICUs, dental sedation settings, and other environments where unrecognized airflow obstruction can lead to serious complications.

**Stage of Development**
Prototype

## Applications

- Continuous obstruction monitoring during sedation, anesthesia, and recovery
- Remote respiratory telemetry
- Sleep apnea screening and home respiratory tracking

## Advantages

- Detects airflow obstruction earlier than SpO? or capnography
- High signal-to-noise tracheal audio capture
- AI-based classification of abnormal breathing patterns
- Wireless, wearable, and motion robust
- Easily integrates with existing clinical monitors

## Patents

- Published Application: WO2024211825
- Published Application: 20260283501

## Innovators

- Matthew Muffly
- Chris Chafe
- Matthew Wright
- Steve Herron

## Licensing Contact


### Seth Rodgers

Licensing Manager, Life Sciences

Email