



## Noninvasive Biological Stress Sensing Device

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### Inventors

#### Jeffrey La Belle

Assistant Professor  
School of Biological and  
Health Systems Engineering  
Arizona State University

#### Jorge Tenerio

Undergraduate Researcher  
Department of Biomedical  
Engineering  
Arizona State University

#### Kevin Uchimura

Undergraduate Researcher  
Department of Biomedical  
Engineering  
Arizona State University

#### Benjamin Cantrill

Graduate Research Assistant  
School of Biological and  
Health Systems Engineering  
Arizona State University

### Intellectual Property

#### Status:

*Patent Pending*

### Contact

*Yash Vaishnav, PhD, MBA*

Vice President

Business Development, Life  
Sciences

Arizona Technology  
Enterprises, LLC (AzTE)

P: 480.884.1648

F: 847.971.2871

[YASH@AZTE.COM](mailto:YASH@AZTE.COM)

[HEALTHSCIENCES@AZTE.COM](mailto:HEALTHSCIENCES@AZTE.COM)

### Invention Description

It has long been recognized that chronic stress is detrimental to overall health and plays a significant role in many diseases. Unfortunately, stress is difficult to quantify, and devices that can measure stress do not provide output in a manner that is relevant to the user. Moreover, these current devices rely on measurements of a single parameter. What is needed is a comprehensive device that can take measurements of multiple parameters to give a more complete determination of stress, and subsequently health.

Researchers at Arizona State University have developed a novel noninvasive biological stress sensing device which utilizes measurements of multiple parameters including heart rate variability (HRV), biological impedance analysis (BIA), surface and core temperatures, muscle twitch, and respiratory rate. All of these parameters are indicators of some level of stress, and taken together, can provide for a more accurate and quantitative analysis of total body stress levels. This device provides simple and meaningful outputs to quantify stress and inform the user when intervention is recommended.

Because multiple parameters are measured simultaneously and the results are output in a simple and easy-to-understand manner, this device could allow for continuous real-time monitoring of stress and provide a better understanding and awareness of the general health of the user.

### Potential Applications

- Monitoring of multiple parameters of stress for:
  - Predicting increased risk for diabetic autonomic neuropathy, hypertension, myocardial infarction, future heart failure, all cause mortality, etc.
  - Critical care transport – assessing patient's medical condition during transport
  - 1<sup>st</sup> Responder use – assessing patient's initial medical condition and immediate medical needs
  - Fire Fighters/Military use – monitoring of user's health to ensure proper personal safety, alertness and efficacy while on duty

### Benefits and Advantages

- Ease of use – single portable device
- More comprehensive analysis – via real-time, continuous, multi-parameter measurements
- Intuitive output
- Noninvasive