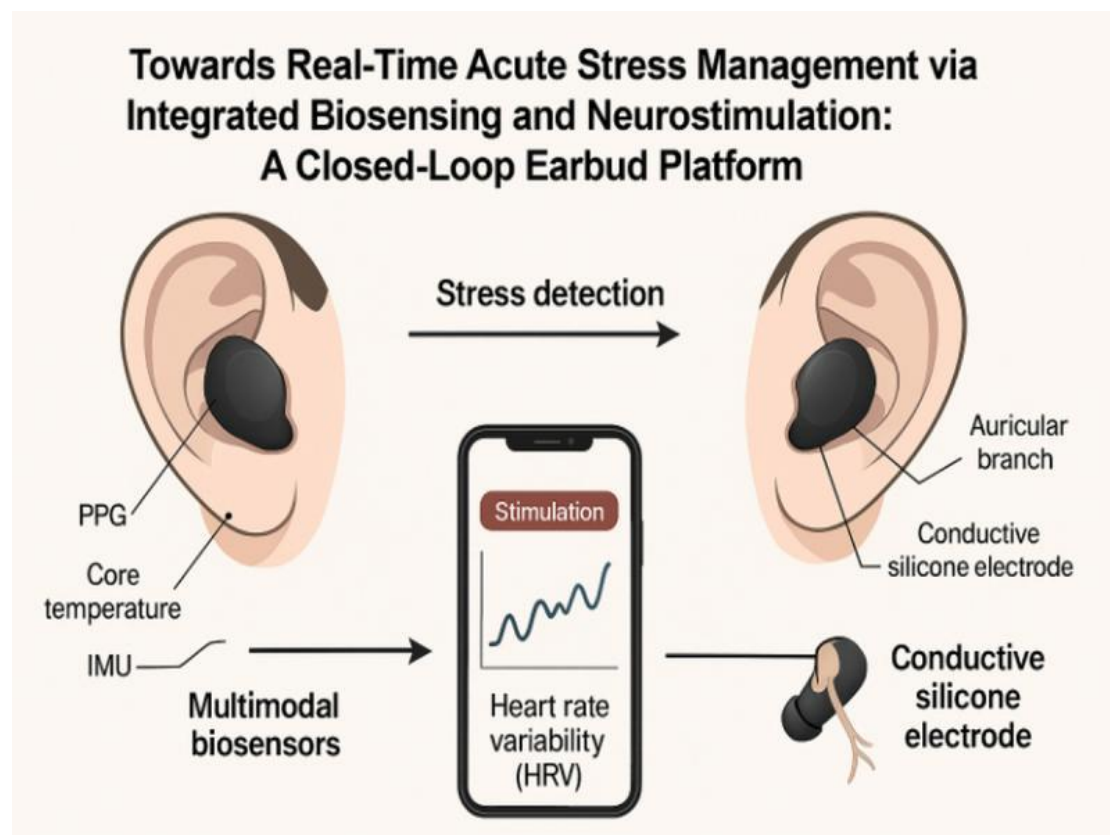


Well Being Digital (2026-04-28)

Samsung collaborates with Well Being Digital (WBD101) to address mental wellness using hearables



Addressing mental wellness through PPG stress sensing (HRV) and taVNS intervention

Wearables are for awareness, hearables come with intervention.

Acute stress affects almost everyone. It shows up in moments like high pressure meetings, public speaking, or tense daily interactions-and over time it can take a real toll on both mental and physical wellness. The challenge is that stress often builds quietly in the body before we consciously realize what's happening. Most wearables today-like watches or rings-are excellent at tracking stress signals such as heart rate (HR) and heart rate variability (HRV) but they only raise awareness after the fact and don't do anything to help in the moment.



- Samsung delivers taVNS earbuds with WBD101 PPG (HR, HRV) sensing for real time intervention

This Samsung research demonstrates a new approach to real time stress management by integrating non-invasive transcutaneous auricular vagus nerve stimulation (taVNS) with continuous PPG sensing from Well Being Digital (WBD101) into a single wearable earbud designed for outpatient use. Unlike the wrist or hand, the ear contains dense branches of the vagus nerve that directly connect to the body's autonomic stress regulation pathways, making it a uniquely effective site for neuromodulation.

taVNS delivers mild electrical stimulation through the outer ear to engage these calming neural circuits, while integrated photoplethysmography (PPG) continuously measures cardiovascular signals such as heart rate variability that reflect acute stress levels. By combining PPG based stress detection with targeted taVNS delivery, the earbud enables adaptive, context aware intervention-stimulating only when elevated stress is detected rather than applying stimulation continuously or relying on manual activation. This work successfully demonstrates that continuous physiological monitoring and responsive neuromodulation can be integrated into a single, everyday wearable platform, marking a shift from stress awareness to real time intervention.

- WBD101 supports Samsung with the heavy lifting including system architecture miniaturization, implementing algorithms and productization

Well Being Digital (WBD101) contributed applied stress science and digital wellbeing expertise to this Samsung led research, helping align physiological stress signals with real world use cases and adaptive intervention logic. Its involvement supported the translation of closed loop stress detection and neuromodulation from laboratory research into a practical, outpatient ready wearable platform designed for everyday stress management.



"We managed to implement this complicated design into a small form-factor with our patented multiple wavelength PPG OpticalFusion™ and continuous in-ear temperature sensing, we used the AFE44i30 and TMP117 both from Texas Instruments to achieve the high accuracy required." said Wallace Wong, Co-Founder and CTO of WBD101 <https://www.linkedin.com/in/wallace-wong-4157531/>,

"Additionally two processors were used including the SBS3000 core from Beken Corp which provided real-time signal acquisition and control, onboard DAC waveform generation with a synchronization error of less than 1.1 ms between sensors, as well as the BES2700L from Bestechnic which provided the low-latency real-time data transmission to smartphone".

● Mental wellness a global issue affecting 1 billion people and US\$1 trillion loss in productivity

"With mental wellness widely recognized as a growing global health crisis, with sharp increases in white collar knowledge based workforces in Singapore, the U.S., Japan, China, and Hong Kong, over 1 billion people globally are living with a mental health disorder, and economic losses exceeding US\$1 trillion annually in lost productivity." said Kow Ping, Co-Founder of WBD101, <https://www.linkedin.com/in/kowping/>, "We are elated to see the positive trial results of this multi-party collaboration that also include the Department of Neurological Surgery at UCSF and the Department of Psychology at Yale University which used a combination of our ActivHearts™ PPG (HR, HRV) and taVNS to address this worldwide health issue".

● Photoplethysmography PPG (HR, HRV) increasingly used in real world application for stress detection

Increasingly, academics and clinicians are turning to heart rate variability (HRV) as an objective, physiological marker of stress, complementing-and in many cases advancing beyond-traditional questionnaire-based assessments. WBD101's in ear stress and HRV sensing algorithms have been previously trialed in academic research at The Chinese University of Hong Kong and have since been deployed in commercial products including



the Hera Leto M8 and Anker Liberty 4, both of which monitor stress through HRV.

● PPG Market leader WBD101 has ready solutions for stress detection and intervention

With the destigmatization on mental wellness, real productivity losses now costing organizations billions, growing consumer adoption of earbuds versus watches/rings, and the validation of WBD101's sensing algorithms in both research and real-world products-point to a clear opportunity of using hearables to offer a more natural and scalable path toward meaningful mental wellness intervention.

Samsung Scientific Publication located here:

<https://ieeexplore.ieee.org/document/11431950>

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About Well Being Digital (WBD101)

Founded in 2012, WBD101 is a Hong Kong based company whose first patents are dated back to 2008, incubated by the Hong Kong Science and Technology Parks Corporation (HKSTP), it has offices in HKSTP, Shenzhen and Singapore to provide very timely support to B2B customers during their product designs, testing and production stages. WBD101 provides Optical Designs (OpticalFusion™) and Health-Sensing Algorithm (ActivHearts™ and Mogo™) to earbuds and smartwatch brands looking to add PPG vital sensing for hearables and wearables, it also co-develops Bluetooth SDK with brands to enable optimized Bluetooth IC resources. WBD101's technology has been licensed by several consumer earbud brands and many others in the Fitness/HealthTech/MedTech space.



Over the years, WBD101 won numerous international awards including the Best Wearable Mobile Tech Awards at the Mobile World Congress 2016, Special & Gold Awards at the 43rd Geneva Inventions Conventions, 2016 WITSA Global ICT Award, the inaugural HK City I&T Grand Challenge Innovation Award in 2022 and the 2025 EE Innovation R&D Award (Most Promising Product). Visit <http://www.wbd101.net>

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