University of Pittsburgh

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Featured Inventor: Greg J. Siegle, PhD

Emotion Prosthetics: Purrr
Take Control of Your Stress in the Moment

Value Proposition

Those that often experience high levels of stress and are not satisfied with existing strategies for stress management need an effective solution to keep stress under control. Purrr is a consumer wearable controlled by a mobile app that provides real-time monitoring and active, on command control of stress to the desired level. Unlike emerging wearables that only either monitor or blindly electrically stimulate often without real-time effects and underlying science, Purrr combines monitoring and safe vibrational stimulation in a single solution working exactly when needed and supported by validated science.

Market Opportunity

About 39 million Americans suffer from severe chronic stress (SCS), which negatively impacts their physical and emotional health, work performance, and personal relationships.

The prevalence of SCS in the U.S. is increasing at a rate exceeding 10% per year. SCS costs U.S. employers approximately $81 billion each year in lost productivity, missed work hours, and health care costs. Busy professional women may represent a promising entry market for this technology.

Competitive Landscape

Current strategies often fail to adequately address SCS as they either require continuous commitment, or have significant adverse side effects that deter use. Some emerging competing consumer technologies track stress while others use stimulation to affect stress, but none of them can do both functions and in real-time.

IP Landscape

A provisional patent was filed in April 2016.

Technology

Purrr uses scientifically validated techniques to measure the body's stress response including galvanic skin response (GSR), to measure sympathetic tone or arousal level, and heart rate variability (HRV), to measure parasympathetic tone or how well the user manages emotions. The wearable adapts to the user's body and discovers its unique baseline.

Our proprietary calibration software derives a unique 'stress index' for each user from these measurements. Purrr's sensors detect when the user's stress response increases above a limit they set, or when they have a lower level of arousal than they have selected. Users can select for the app to either alert them of changes in stress with a quick vibration or users can choose to automatically send gentle, inaudible vibrations to their sternum which regulate parasympathetic and sympathetic tone, helping them to better adapt to stressful or low-arousal situations.

Stage of Development

We have developed a multiple generations of functional prototypes (both hardware and software) and have submitted a protocol for IRB approval to perform a large study in human subjects, which will be completed by Q4 of 2016.

Funding

In March 2016 the project received $3k from the NSF-supported First Gear program; it was awarded $5k by the same program during its final competition. The project was awarded $25k in September 2016 from the CTSI-sponsored PInCh competition, and is competing for the Wells competition in October 2016.

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FEATURED INVENTORS:

Greg J. Siegle

Dr. Siegle directs the Program in Cognitive Affective Neuroscience (PICAN) at the University of Pittsburgh School of Medicine, where he is an Associate Professor of Psychiatry and Psychology. His research examines neural mechanisms of emotional and cognitive information processing in mood and anxiety disorders, how this information can be used to predict response to treatment and to guide novel treatment development. He works to translate cognitive and emotional neuroscience for use in the real world. Dr. Siegle has over 115 publications, and has been continuously funded by NIH and foundation awards for over 15 years.

Education

Undergraduate:

1987-1991 Brown University, Providence, RI Sc.B. with honors magna cum laude (1991)

Graduate:

1992-1993 Northwestern University, Evanston IL Graduate courses

1994-1996 San Diego State University M.S. (1996)

1993-1999 San Diego State University / University of California, San Diego Joint Doctoral Program

Doctor of Philosophy (1999)

1998-1999 Clarke Institute of Psychiatry, Toronto, ON

Clinical Internship

Post Graduate:

1999-2001 Western Psychiatric Institute and Clinic, University of Pittsburgh Medical School, Pittsburgh, PA

NIH Postdoctoral Fellow

Selected Publications

1. Siegle, G. J.+, Price, R. B.+, Jones, N. P., Ghinassi, F., & Thase, M. E. (2014). You gotta work at it: Pupillary indices of task focus are prognostic for response to a neurocognitive intervention for depression. Clinical Psychological Science. + These authors contributed equally. 2(4) 455-471.

2. Siegle, G.J., Thompson, W. K., Collier, A., Berman, S. R., Feldmiller, J., Thase, M. E., & Friedman, E. S. (2012). Towards clinically useful neuroimaging in depression treatment: Prognostic utility of subgenual cingulate activity for determining depression outcome in Cognitive Therapy across studies, scanners, and patient characteristics. Archives of General Psychiatry, 69(9), 913-924. NIHMSID 524641.

3. DeRubeis, R.J., Siegle, G. J., Hollon, S., (2008). Cognitive therapy versus medications for depression: treatment outcomes and neural mechanisms. Nature Neuroscience: Reviews, 9, 788-796. PMID: 18784657.

4. Siegle, G.J., Ghinassi, F., Thase, M.E. (2007). Neurobehavioral therapies in the 21st century: Summary of an emerging field and an extended example of Cognitive Control Training for depression. Cognitive Therapy and Research, 31, 235-262.

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