College of Health and Human Services
Department of Occupational Therapy
WESTERN MICHIGAN UNIVERSITY

SAMMONS CENTER
FOR INNOVATION AND RESEARCH
IN OCCUPATION BASED TECHNOLOGY

Request for Proposals

The Sammons Center for Innovation and Research in Occupation Based Technology invites proposals for funding awards of up to $3000.00 for a product that will enable people to actively engage and participate in everyday occupation. These products can be devices, technology apps, teaching and learning technologies, and other innovative ideas. The Sammons Center WILL NOT fund personnel or indirect costs. The grant applicant may use funds from the award towards fees that directly support the innovation, such as consulting fees for the design of a product including mechanical, print, video, or computer based applications.

APPLICATION

Proposals are accepted throughout the year with no set deadlines. Fill out pages 1-9 and pay close attention to the comments to guide you through the application. Please submit your proposal to Dr. Holly Grieves, Co-Director, Sammons Center at holly.grieves@wmich.edu.

Michelle Suarez	PHD, OTR/L
Name(s) of Lead Innovator(s)	Credentials of Lead Innovator
Michelle.a.suarez@wmich.edu	269-366-6094
Email Address	Preferred Contact #

Grant Proposal:

A Novel Use for Wearable Technology:
Using Empatica Embrace to Measure Parent Stress during Structured Caregiving Experience

Michelle A. Suarez PhD, OTR/L

Professor, Occupational Therapy Department, WMU

Contact Info: Michelle.a.suarez@wmich.edu 269-366-6094

Table of Contents

Section A: Resume or CV of lead innovator and team members

(Attached)

Section B. Project Description

Background: Occupational therapists frequently work with children who have regulation challenges. This includes children who are neurodiverse (e.g. autism and ADHD) and those who have experienced trauma. Dysregulation results from brain and physiological processes that produce a sense of overwhelm panic, danger, or disconnection that manifests in behavior (Perry, 2009). Children who experience dysregulation can demonstrate aggression, verbal outbursts, defiance, and opposition. This constellation of behaviors can cause caregiver distress and impact family quality of life (Goemans et al., 2020). Caregiver distress is particularly concerning in families with dysregulated children as the caregiver's ability to co-regulate their child is key for functional gain for the family. It is impossible for a caregiver to co-regulate a child when their system is also in a sympathetic nervous system, fight or flight state (Leathers et al., 2019).

One of the targets of occupational therapy (OT) treatment is facilitating the parent's brain and physiological calm so that they can influence their child's regulatory state. To date, occupational therapists have measured outcomes in this population through parent report measures or behavioral observations. It had not been possible to measure changes in brain linked physiological states of parents. New technology makes physiological measurement of parent stress possible. However, to our knowledge, this has never been implemented in occupational therapy.

Novel Use of Physiological Monitoring Technology: Empatica is a non-invasive device that measures electrodermal activity (EDA), a measure of sympathetic nervous system function. The sympathetic nervous system is activated during stressful situations. Parents can wear this device on their wrist during interactions with their child and generate in the moment data related to the parent's level of stress. This device provides occupational therapists with the ability to measure a parent's stress before, during and after treatment. This has the potential to provide evidence for the positive internal physiological changes that may occur in a caregiver because of OT treatment.

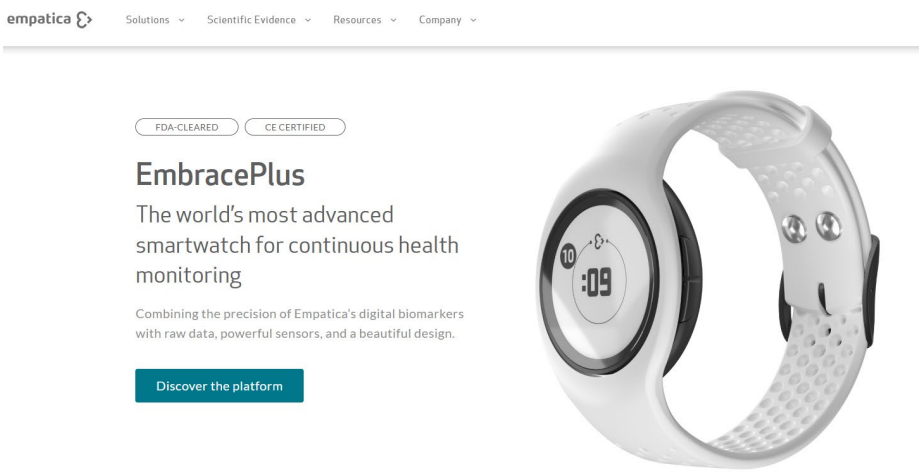
The goal of this Sammons Center proposal is to obtain and test Empatica Embrace for measuring caregiver stress during parent-child interaction. This is a novel use of this technology. Parents will fill out a Parent Stress Index (Abidin, 2012). Then, the parent and child will participate in a standardized play interaction developed by Booth & Jernberg (2010). Parents will be asked to rate their level of stress during this interaction on a Likert scale. Electrodermal activity will be compared to the Parent Stress Index and subjective parent Likert scale rating.

The immediate objective of this project is validation of the use of the Empatica Embrace during parent-child interaction to measure parent stress. Questions answered will include:

1. Are parents able to wear the wrist Empatica device during a parent-child play interaction?
2. Is EDA, measured with the Empatica, correlated with the parent's overall stress, measured with the Parent Stress Index?
3. Is EDA correlated with the parents' subjective rating of stress on a Likert scale?

The long-term objective of this line of research is novel utilization of a physiological monitoring device, like Empatica, to measure pre-to-post stress in individuals receiving OT treatment.

Section C. Pictorial Demonstration of Innovation



Section D. Line-Item Budget

Item:	Cost	Use/Justification
Empatica Embrace Watch and 3-year data subscription	$1620.00 (this is 25% academic discount off of regular price of $2160.00)	This will measure parent stress during parent-child interaction
Parent Stress Index Forms (25) forms	$144.00	Parent report measure of stress
Materials and supplies for standardized play interaction	$450	Standardized kits for the parent-child interaction will allow for fidelity in implementation
Total Costs:$ 2,214		

Section E. Implementation Plan:

The implementation plan will include partnership with a second researcher, who will look at the child's stress during parent child interaction. A total of 12 OTD students will participate in these two projects.

Stage	Outcome	Contributors
Stage I: Fall 2025: Grant development	Grant and research project development	Dr. Suarez and 6 OTD student researchers
Stage II: Fall 2025: Grant proposal Methodology refinement IRB application	Submit for grant funding Apply for IRB approval	Dr. Suarez and 6 OTD student researchers
Stage III: Spring 2026 Recruitment Technology training Data Collection	Recruitment, technology training, and beginning of data collection	Dr. Suarez and 6 OTD student researchers
Stage IV: Summer 2026 Recruitment Data Collection	Recruitment and data collection	Dr. Suarez and 6 OTD student researchers
Stage V: Fall 2026 Data Collection	Data collection	Dr. Suarez and 6 OTD student researchers

Section F. Evaluation Plan

The evaluation plan will be carried out with partner OT researcher (Dr. Trish Foster) and her 6 OTD students. The 12 OTD students will work together to validate the use of this technology. This project will analyze parent data.

Stage	Outcome	Outcome Evaluation Plan
Stage I: Spring 2027 - Data Analysis	Data analysis of Embrace EDA quantitative data Comparative analyses between physiological data and other subjective measures of parent stress	Dr. Suarez & Research Students
Stage II: Spring 2027 - Spring 2028	Dissemination (manuscript preparation; conference presentations) and next steps (additional funding for broader research)	Dr. Suarez & Research Students
Stage III: Spring 2028+	Implementation of Empatica Embrace for pre-post test before and after OT intervention	Dr. Suarez and the Resiliency Center

If your proposal is accepted, you will be required to provide an interim report (six months after funds are awarded) and final report (one year after funds are awarded). Please submit your proposal to Dr. Holly Grieves, Co-Director, Sammons Center at holly.grieves@wmich.edu.