2026 START Program
CFP Brief

THEME: **04.** **Advanced Sensors for Health**

SUB-THEME: **4.2.** **Non-invasive wearable sensors for measuring blood flow**

Context/ Overview

Blood flow is a fundamental cardiovascular signal that is not well captured using traditional photoplethysmography (PPG). Along with electrocardiography (ECG), PPG and blood flow provide unique viewpoints about the cardiovascular cycle. ECG is related to electrical impulse activity of the heart, PPG is related to the vascular expansion, and blood flow is related to the movement of blood within the mechanical constraints of the vasculature system. While research has shown how each of these physiological Biomarkers can provide a wealth of insights including unique timing and morphology information related to cardiovascular health, blood flow has not reached the hands of consumers.

Problem Statement

Blood flow is a key cardiovascular metric, yet has not been exploited for consumer health, fitness, or wellbeing. Despite the proven connection to health fundamentals, it remains underutilized by consumer wearables. Technologies sensitive to blood flow such as (but not limited to) ultrasonics, optics, and radio frequency require significant development for adoption into consumer devices. There is a need to determine the most feasible approaches for wearable blood flow and to show the impact of this new Biomarker in the area of health interpretation. Opportunities remain open to explore this avenue of research to advance blood flow sensors, and develop algorithms that provide unique physiological measures that guide wellness.

Objectives & Scope

This project will investigate novel sensors for blood flow measurements. New, high-impact Biomarkers relevant to consumer health, fitness, or wellbeing and enabled by blood flow data are desired. This will be achieved by demonstrating optimization of the technology for Samsung form factors, assessment using limited user studies, design of a wireless and wearable devices, and integration of new data streams into the wider Samsung health ecosystem.

Specific Topics & Focus Areas

1. Novel non-invasive sensing hardware for blood flow
2. Strategies for decoupling blood flow measurements from confounding factors
3. Algorithms that utilize blood flow data to derive health metrics
4. Trials to establish relationships with conventional medical measurements and disease

※ The topics are not limited to the above examples and the participants are encouraged to propose other original ideas.

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