

40 Hz Light Enhancement Study

Team 19: **Noah Abrha, Anton Homenuik, Eden Gideon, Jed Lartey, Medua Nwokolo**

Technical Advisor: **Andrey Vyshedskiy (ImagiRation, LLC & BU MET)**

Cognitive impairment affects over 16 million people in the US. The current gold standards of treatment for most cognition impairing conditions are prescribed psychostimulants. These medications come with multiple side effects and leave room for misuse leading to addiction and pose other health risks. An alternative non-intrusive, safe, and accessible method of improving cognitive performance can contribute to solving this problem. The brain produces electrical activities, known as gamma waves, which are essential for processing and connecting information. Light delivered at 40 flashes per second has been shown to restart the natural 40Hz gamma rhythm of the brain. These gamma waves are associated with memory and cognition, which are affected as a result of cognitive impairments. We ran a study using 40 Hz light stimuli administered through an iPad pro. The participants consisted of a group of college students with conditions affecting their cognition or in a state of fatigue to closely resemble individuals with cognitive disabilities. Subjects were made to take a 10 question arithmetic long addition test with 40 Hz light constantly on or off to determine the effect of light on their performance. Our findings showed a jump in performance from the first trial to the second when light was administered. However, this was attributed to the effect of practice and not a consequence of the 40 Hz light. Although, there has been an overall trend of improvement across subjects, the results thus far show no statistical significance in the effect of 40 Hz light on cognition.

