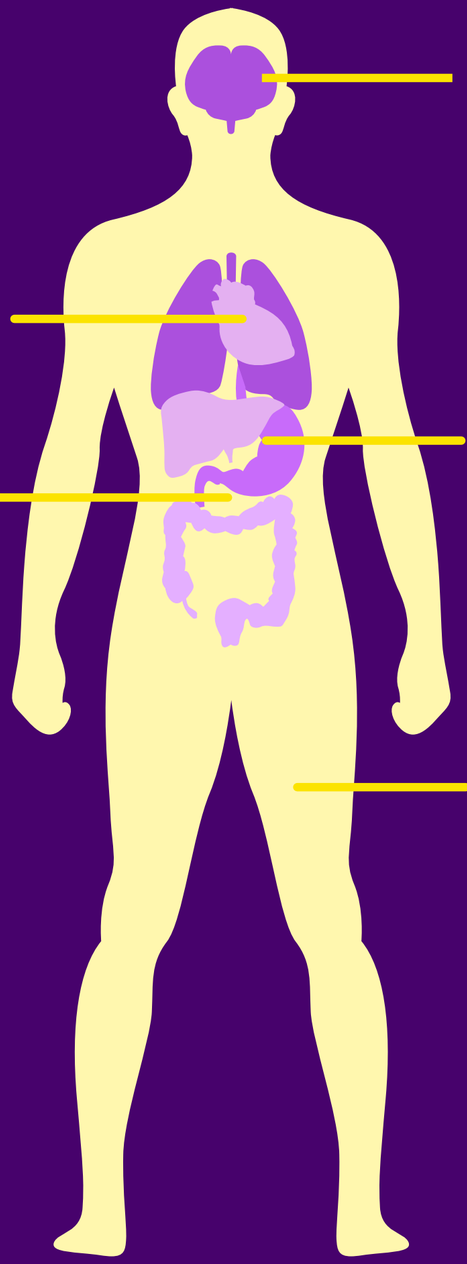
# SOUND ASLEEP

Improving sleep to optimize aging

# THE NIGHTMARE OF POOR SLEEP



stroke
memory loss
trouble focusing
poor mental health
hallucinations
paranoia

heart disease
high blood pressure

obesity
poor digestion

kidney failure
diabetes
hormone imbalances
infertility

joint pain
muscle weakness
poor immunity
cancer

Medic G, Wille M, Hemels ME. Short- and long-term health consequences of sleep disruption. Nat Sci Sleep. 2017;9:151-161
https://doi.org/10.2147/NSS.S134864

# DEEP SLEEP, DEEPLY IMPORTANT

# 66%

**decrease in time spent in slow wave sleep**

in people ages 51-85 compared to 18-23

## SLOW WAVE SLEEP IS RESPONSIBLE FOR

### Declarative memory

forming new memories

### Spatial navigation

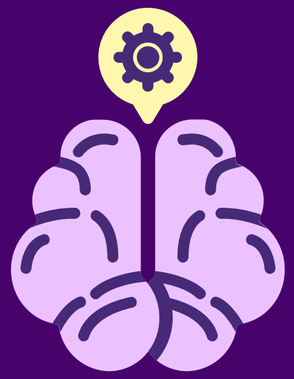
key to independence

### Memory consolidation

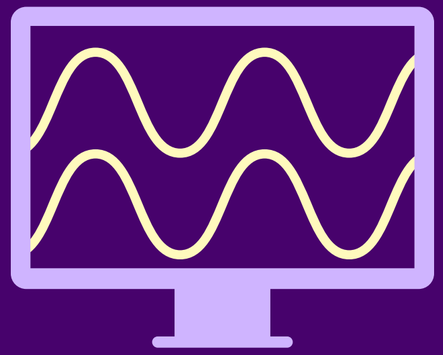
retaining long-term memories

Varga, A. W., Ducca, E. L., Kishi, A., Fischer, E., Parekh, A., Koushyk, V., Yau, P. L., Gumb, T., Leibert, D. P., Wohlleber, M. E., Burschtin, O. E., Convit, A., Rapoport, D. M., Osorio, R. S., & Ayappa, I. (2016). Effects of aging on slow-wave sleep dynamics and human spatial navigational memory consolidation. Neurobiology of aging, 42, 142–149. https://doi.org/10.1016/j.neurobiolaging.2016.03.008

# NOT JUST TRACKING, BUT TRANSFORMING



Device detects the user's brain waves and other physiological metrics during sleep



Software analyzes data to detect slow wave sleep in real time

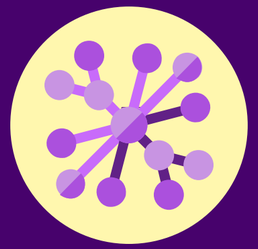
Speakers transmit specific sound frequencies to amplify and prolong slow waves

**BETTER SLEEP!**

# DREAMING BIGGER: THE COMPETITORS ARE ...

**Sensors without stimulation**

Cogionics, Sleep Profiler



**Rigid headbands that put users off**

Dreem

**Only collecting EEG data**

Most current systems

Markov, K., Elgendi, M. & Menon, C. EEG-based headset sleep wearable devices. npj Biosensing 1, 12 (2024). https://doi.org/10.1038/s44328-024-00013-y
Mohamed, M., Mohamed, N., & Kim, J. G. (2023). Advancements in Wearable EEG Technology for Improved Home-Based Sleep Monitoring and Assessment: A Review. Biosensors, 13(12), 1019. https://doi.org/10.3390/bios13121019

# FROM SLEEP SCIENCE TO SOLUTIONS... WE ARE SEEKING

01

## Hardware engineering

to build the signal processing and transmission system

02

## Software engineering

to build the EEG processing software and user-facing application

# WHY PICK THIS PROJECT?

## Develop a variety of skills

Code in R and/or Python for signal processing, build with Raspberry Pis or Arduinos, manage power sources, and more!

## Over $50,000 in funding already secured

Access to whatever materials and software needed

## Good opportunity to work with an interdisciplinary team

Medical students, business students, physicians, engineers, etc.

# SLEEP SMARTER, LIVE BETTER