

neuroFit

Movement indicates health.

**neuroFit** can scan, predict, and enhance brain health, using eye movements.

## **PROBLEM: Many users need to measure brain health ...**



**Individuals** need sensitive metrics to enable biofeedback.



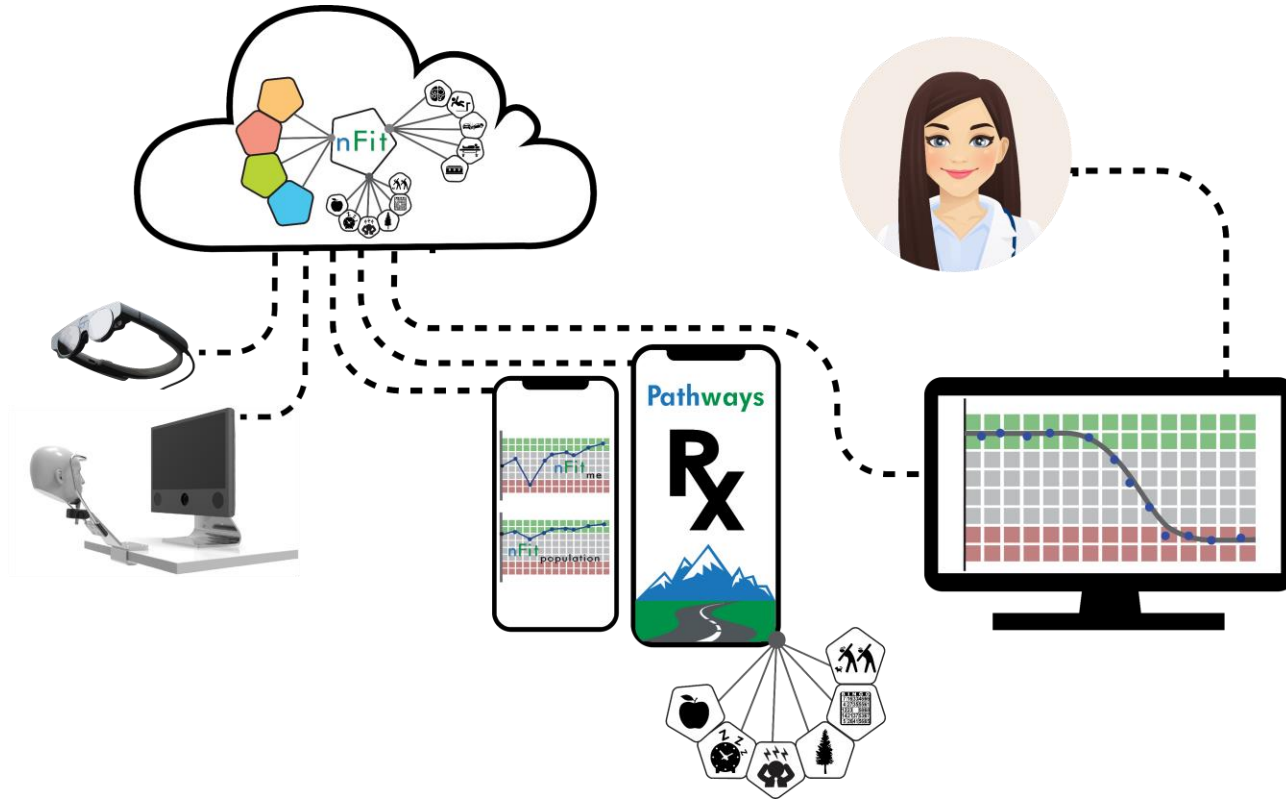
**Governments and health systems** need better solutions to monitor neurological decline.



**Pharma** needs better tools to assess drug effectiveness.

... yet there is no **modern technology available.**

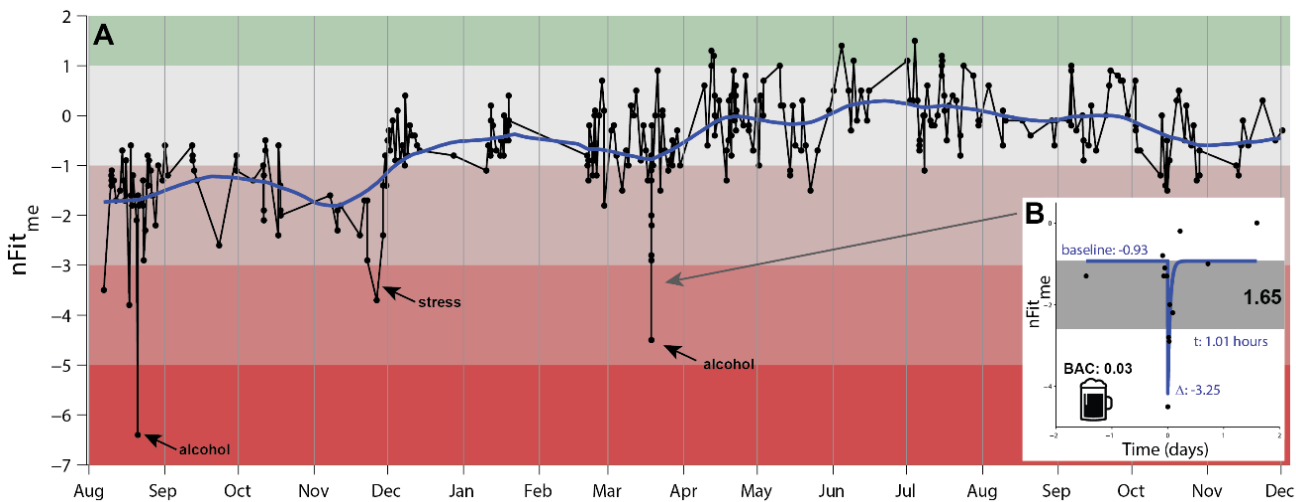
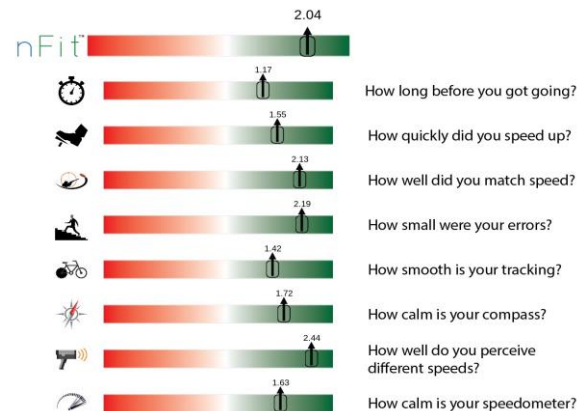
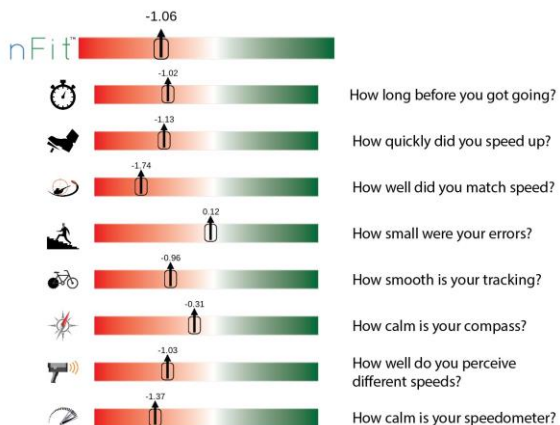
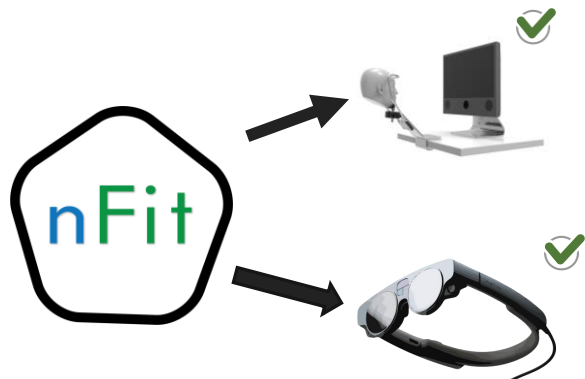
# SOLUTION: Oculometric Biomarkers.



neuroFit can make rapid, low-cost measurements of brain health, replacing legacy assessments.

# Use cases

Our technology can measure the full spectrum of brain health, from highly impaired to optimal, at the state and etiological levels.



nFit can quantify the long-term effects of lifestyle changes or therapeutic interventions.

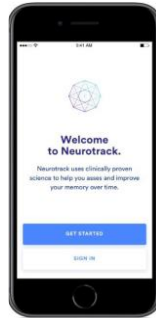
# Why Now?

## Desktop



- Traditional clinical form factor
- ~50 cm viewing distance
- Cost and logistical downsides

## Phone / tablet



- Low-cost, commodity
- Generic tracking (e.g., AR Kit)
- Low-precision 3D signals

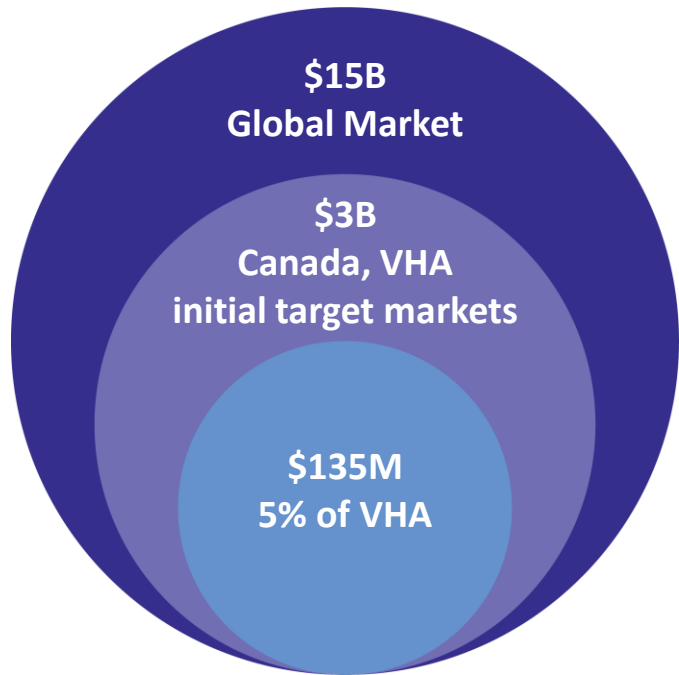
## Headset



- Eye-to-camera distance: 3 cm
- Intermediate cost
- Specialized sensors, APIs
- ML2: **260 g**, Pico: 470 g, MQP: **722 g**

**Vision based biomarkers** may be the best functional neurophysiological measure. **Headsets (Apple Vision, ML2 Q322, Meta Quest Pro Q422) enable** medical-grade eyetracking and scalability.

# Brain Health Markets: **Dementia** + **High Performance**



## **Total Addressable Market**

50M people are living with dementia today  
150M people will be living with dementia by 2050

## **Serviceable Addressable Market**

**Veterans Healthcare Administration (9M)**  
Canadian Departments of Health (38M)

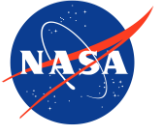
## **Serviceable Obtainable Market (Y5)**

**Veterans Healthcare Administration pilot (9M x 5%)**  
**Military ORGs (SBIR Phase III, 1K users)**  
**SaaS model (\$300/user/year)**

Assuming a SaaS subscription model (\$300/user/year), the revenue potential of our SaaS approach combines B2B channels such as businesses with innovative health plans, corporate wellness, high-performing populations, sports, and VA.

# Our journey

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## Where we are today:

- neuroFit ONE deployed to VA Palo Alto, Air Force Research Lab, UC Berkeley
- Proof-of-concept for several disease indications including MCIExperienced team and research ecosystem
- National Institute on Aging SBIR Phase I
- US Army SBIR Phase I
- Strong IP portfolio (in-house SW, 3 NASA patents, 1 trademark)
- Proof points and traction in influential markets
- Sales of high-sensitivity neuroFit ONE (\$140K)

## Where we'll be:



- SaaS model (\$300 / user / year)
- VA WRIISC pilot project
- Stanford/VA Alzheimer's Center pilot project
- US Army Phase II / Phase III
- App development for Magic Leap 2, Meta Quest Pro
- Analytics environment for nFit data
- VA Rural Health
- Three or more high-performance military customers
  - AFRL, US Army , Australia's DSTG
- Partner, prototype, iterate



# Team

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- Dorion Liston, PhD, Neurosciences, UC San Diego**
- **CEO**, expertise in oculomotor mechanisms, software
  - Inventor of NASA IP, oculometric device



- Rami Ersheid, BS, IE, Pomona College**
- **CPO**, expertise in eye-tracking, hardware
  - Founded IT company



- Dmitriy Orlov, MBA, GWU**
- **Industrial Designer**, founded an ID firm
  - product development, industrial engineering



- Maheen Adamson, PhD, Neuroscience, Stanford**
- Advisory board, WRIISC-WOMEN director
  - Veterans Affairs Palo Alto Healthcare System



- Quinn Kennedy, PhD, Cognitive Aging, Stanford**
- **Director of Aging Research**
  - Former Faculty, Naval Postgraduate School



- Leda Kourita, MD, U Siena; EMBA, UC Berkeley**
- **Chief Business Officer**
  - NHS pediatrician, practiced in London for 8 years



- Ali Ismael, PhD, ECE, U Missouri, Columbia**
- **System Architect**, expertise in enterprise software
  - Cisco, eBay, PayPal, Google, and Uber



- Gerald Friedland, PhD, Computer Science**
- ML models of aging and dementia
  - Faculty, UC Berkeley

# Contact

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**Dorion Liston, Ph.D.**  
Founder, CEO  
dliston@neurofit.tech  
415.992.1745



[dliston@neurofit.tech](mailto:dliston@neurofit.tech)



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# SaaS Business Model

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SaaS model for nFit app (\$300 / user / year), we assume 30% growth per year. The global AD diagnostics market was valued at \$3.0 B in 2019 and is projected to reach \$5.23B by 2027 at a CAGR of 10%. High-end performers (professionals, sports, military) are another potential customer base that can be reached via B2B2C channel partners.



For one example, if we were to plan to initiate a pilot with VA Healthcare System and launch our solution in about 0.1% of their 9 million members (9000 members), with a yearly subscription of \$300 per participant that would yield a revenue of \$2.7 million in year one. If we assume growth of at least 30% per year with a maximum of 50% as reported by other SaaS companies, we can assume an initial **serviceable obtainable market (SOM)** of over about **\$11 million** by year five.

Credit Suisse. Livongo Health: A Compelling Digital Health Growth Story, Initiate with an Outperform Rating. Equity Research: Credit Suisse; 2020.

# EVIDENCE BASE

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## **TBI**

Liston, D. B., et al. (2017). "Oculometric Assessment of Sensorimotor Impairment Associated with TBI." *Optom Vis Sci* 94(1): 51-59.  
Wagner CM (2017) Oculometric Screening for Traumatic Brain Injury in Veterans. In: Department of Operations Research. Monterey, CA: Naval Postgraduate School.

## **High Performance**

Liston DB, Stone LS (2014) Oculometric assessment of dynamic visual processing. *J Vis* 14:12.  
Stone, L. S. and D. B. Liston (2014). Development of Oculometrics for Operational Based Vision Assessment. Wright-Patterson AFB, OH, USAF School of Aerospace Medicine Ophthalmology Branch (USAFSAM/FECO).  
Liston D, Chen R, Li L, Kennedy Q, Adamson M. (2018). Visual Tracking: An Indicator of Health and Performance. SABR Analytics, March 9-1, Phoenix, AZ, Society for Baseball Research.  
Chen, R., Stone, L. S., & Li, L. (2021). Visuomotor predictors of batting performance in baseball players. *J Vis*, 21(3), 3.

## **Acute Impairment**

Tyson T, Feick N, Cravalho P, Flynn-Evans E, Stone L (2018) Increased dependence on saccades for ocular tracking with low-dose alcohol. *Society for Neuroscience Abstracts*: 399.320.  
Stone LS, Tyson TL, Cravalho PF, Feick NH, Flynn-Evans EE (2019) Distinct pattern of oculomotor impairment associated with acute sleep loss and circadian misalignment. *The Journal of physiology* 597:4643-4660.

## **Hepatic Encephalopathy**

Wong, K., et al. (2018). Oculometric Assessment of Dynamic Visual Processing in Patients with Cirrhosis: A Potential Diagnostic Tool for Minimal Hepatic Encephalopathy. *Digestive Disease Week*. Washington, D.C. 1568.  
Wong K, Liston D, Papademetriou S, Yeoh A, Haywood SR, Goel A, Kwo PY, Okafor PN (2018) Oculometric Assessment of Dynamic Visual Processing in Patients with Cirrhosis: A Potential Diagnostic Tool for Minimal Hepatic Encephalopathy. In: *Digestive Disease Week*. Washington, D.C.

## **Obesity and Inflammation**

Yeoh, A., et al. (2018). Visual Processing Impairments Detected by Oculometric Assessment Provide Evidence of Obesity-Related Neurological Dysfunction. *American College of Gastroenterology*. Philadelphia, PA.  
Yeoh A, Wong K, Smart J, Liston D, Papademetriou, Azagury D, Okafor PN (2020) The Relationship Between Visual Processing Impairments Before and After Bariatric Surgery. In: *Digestive Disease Week*. Chicago, IL.

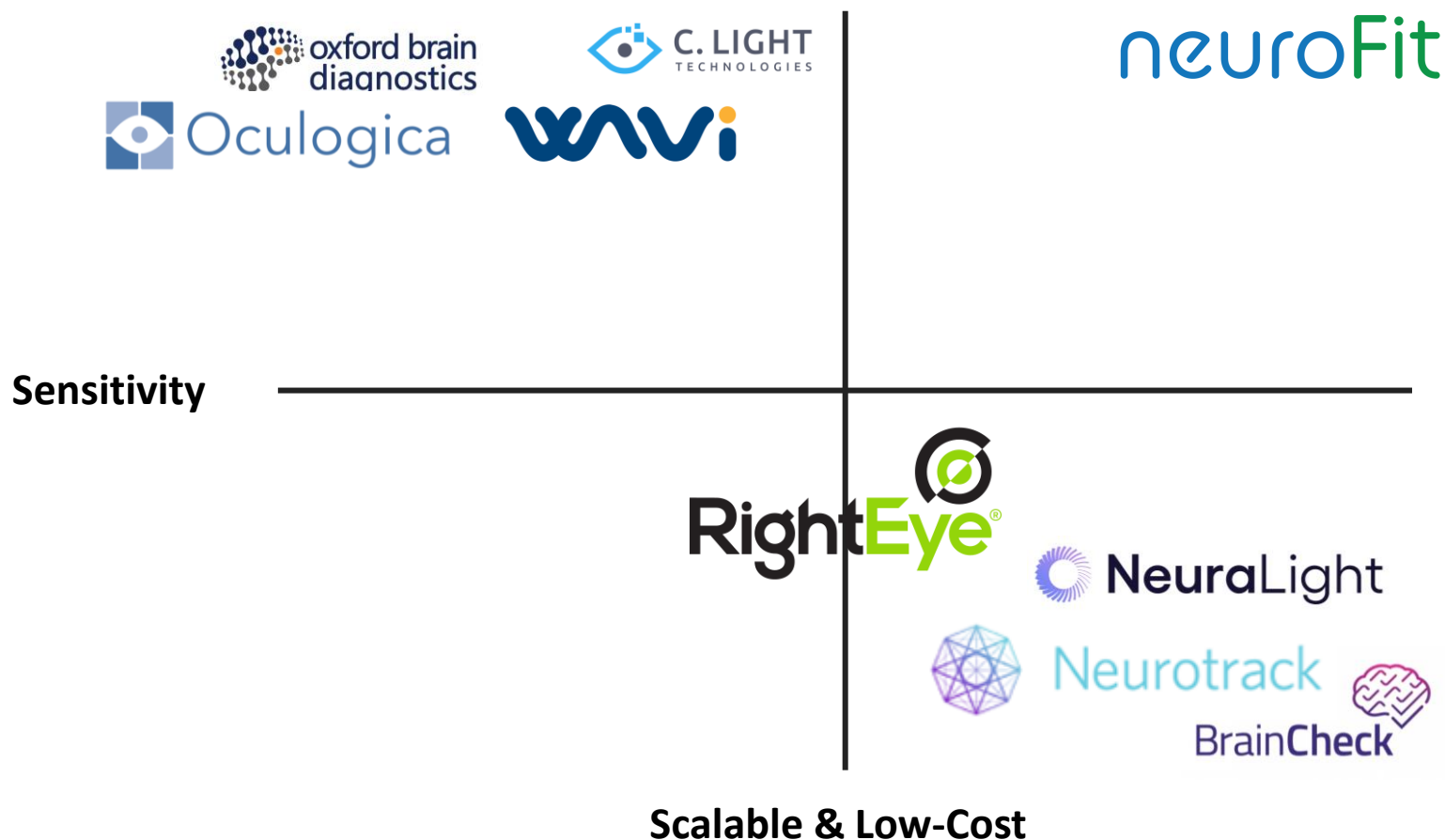
## **Parkinson's**

Chen, J., et al. (2017). "Visual tracking abnormalities in hemisphere-asymmetric Parkinson's disease." *Society for Neuroscience Abstracts* 80: 102-114.

## **Multiple Sclerosis**

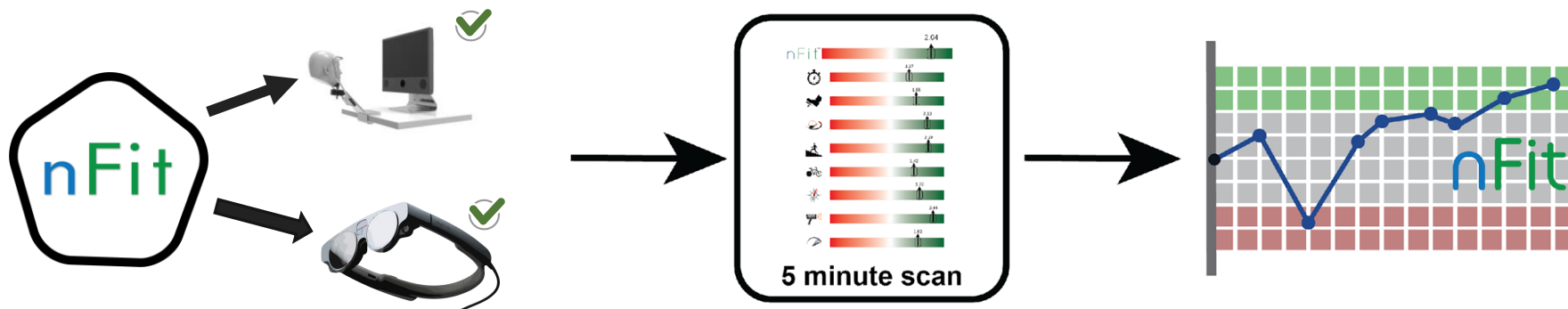
Rempe, T., Dastgheyb, N., Miner, A., Palomino, M., Kinkel, R., Liston, D., & Graves, J. S. (2021). Quantification of smooth pursuit dysfunction in multiple sclerosis. *Mult Scler Relat Disord*, 54, 103073.

# Platform Tech, Attractive to Pharma



- Traditional technologies (MRI, EEG, ophthalmoscopy) can be sensitive at high cost.
- Cost and scalability favors oculometric approaches; sensitivity levels differ.

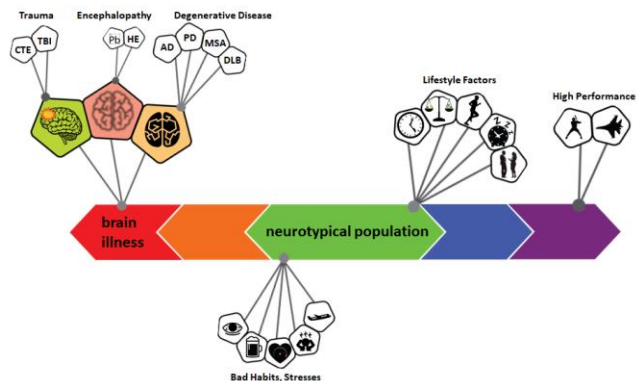
# Differentiation + Competitive Advantage



We have a **medical-grade** device and a highly-scalable **software-only** approach. Thus, neuroFit offers both a medical and a consumer solution .

nFit is **sensitive above the control range** (e.g., professional athletes). Thus, neuroFit can be used as a biomarker throughout the lifespan.

Our technology is sensitive to several etiologies of dementia (e.g., proteinopathy, toxicity, trauma). neuroFit's approach and nFit can provide a general-purpose brain health biomarker.



Etiologies	
Alzheimer's disease (AD)	✓
Frontotemporal degeneration (FTD)	✓
Parkinson's disease (PD)	✓
Lewy body disease (DLB)	✓
Hepatic encephalopathy (HE)	✓
Traumatic brain injury (TBI, CTE)	✓
Vascular disease (VD)	✓
Substance use disorder (SUD)	✓