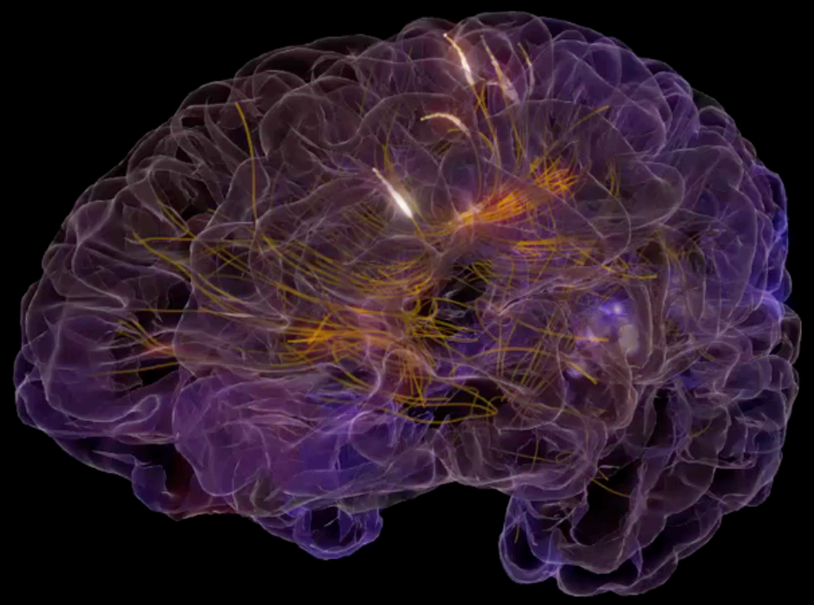
Video Games meet Neuroscience

The Vision of the Future of Brain Optimization



Adam Gazzaley, MD PhD

Professor - Neurology, Physiology and Psychiatry
Director- Gazzaley Lab, Neuroscape Lab
Neuroscience Imaging Center
University of California, San Francisco

Flexibility
Coordination
Strength
Balance
Speed
Endurance
Power

Current Approach

- Poor assessments
- Poor targeting
- Non-personalized
- Unimodal
- Open Loop

This is just not good enough

targeted

personalized

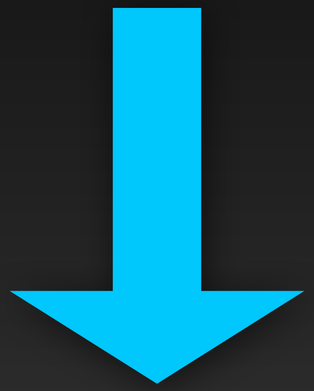
multimodal

closed-loop

Technology

htc
oculus
MAGIC LEAP
FUEL
STEM
PreGlove
Gear VR
Omni

Experience



Brain Plasticity

Closed Loop System

Video Games

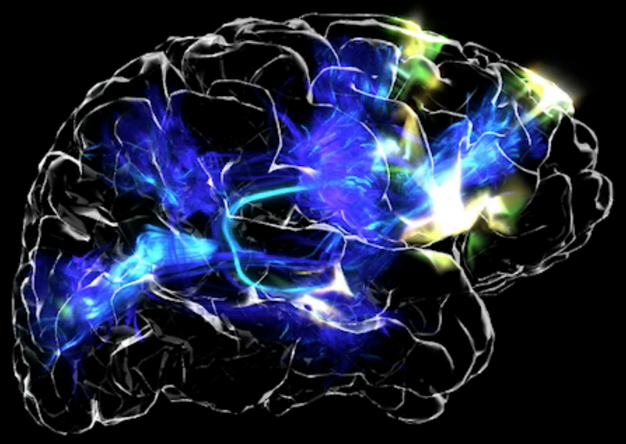
Performance

Motion Capture

Physiology

Closed-Loop System

Augmented / Virtual Reality



Environment

Neuroracer

Multitasking Performance
0%
-20%
-40%
-60%
-80%
-100%
Multi-tasking Index
20s
30s
40s
50s
60s
70s
1 month later
Decades of Life
Training

nature
THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE
Video gaming enhances cognitive skills that decline with age PAGE 97
GAME CHANGER
HIGH SCORE
38,642
HISTORY OF SCIENCE
GETTING THE DRIFT
First rumblings of plate-tectonic theory
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LIKE NIGHT AND DAY
Ecosystem effects of asymmetric warming
PAGES 39 & 88
NATURE.COM/NATURE
5 September 2013

Move to the Real World

AKILI
interactive labs

Akili Interactive Labs

Co-founder and Chief Science Advisor

Patent-pending: “Enhancing Cognition in the Presence of Distraction and/or Interruption”

Neuroscape Lab

Bridging the Gap Between Technology and Neuroscience

Neuroscapelab.com

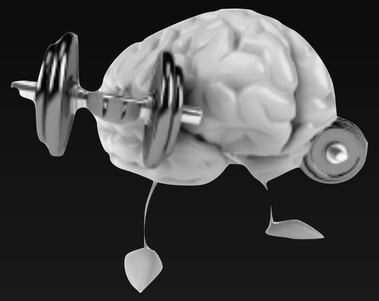
Google TV

New Technology

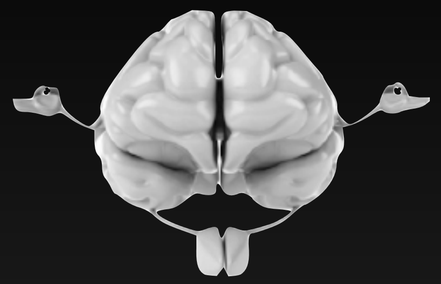
Virtual Reality

Motion Capture

New Games...

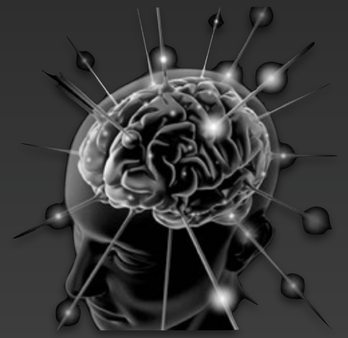


Meditrain



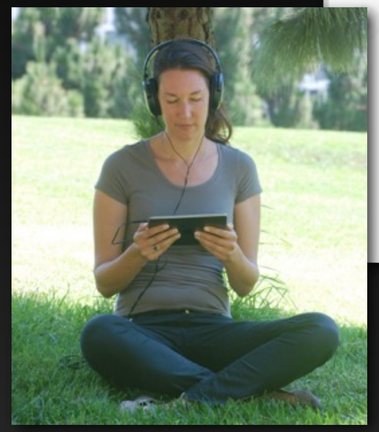
Body-Brain Trainer

Rhythmicity



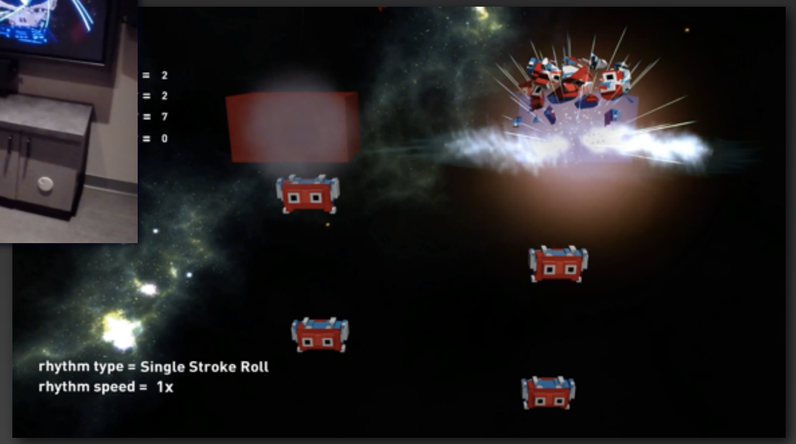
Virtual Attention

Meditrain



Body-Brain Trainer

Rhythmicity

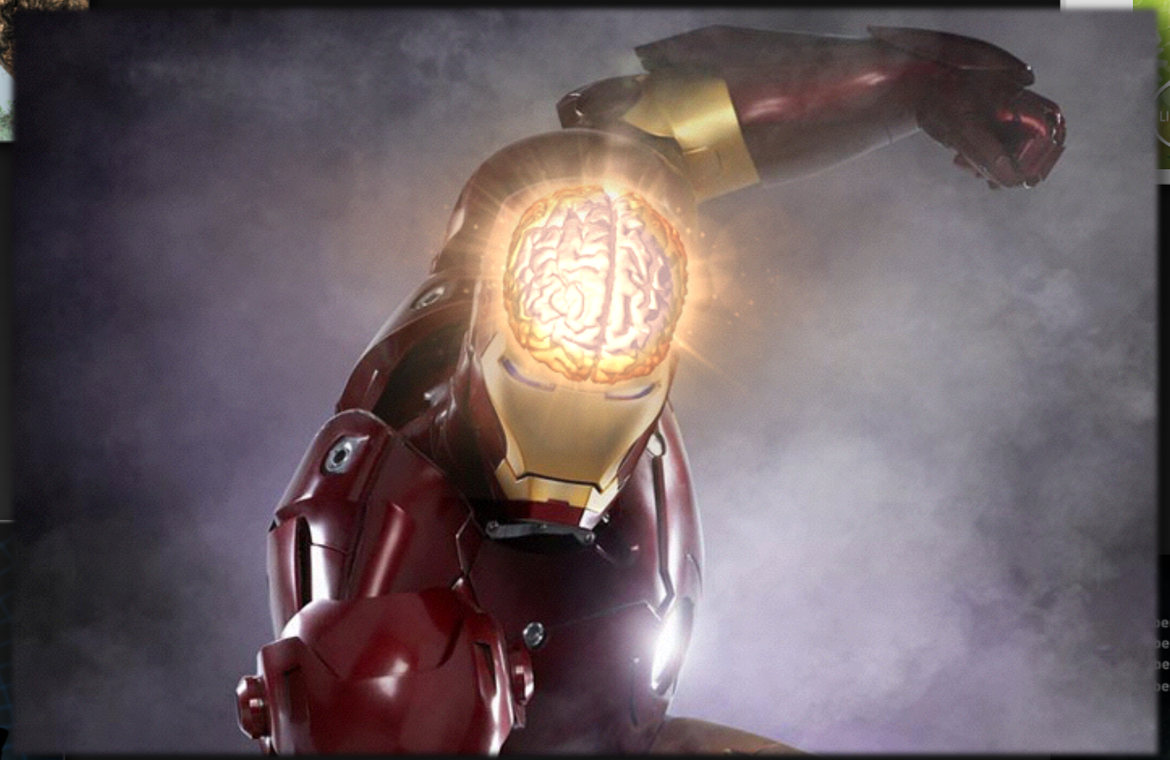


Virtual Attention

Neuro Crossfit

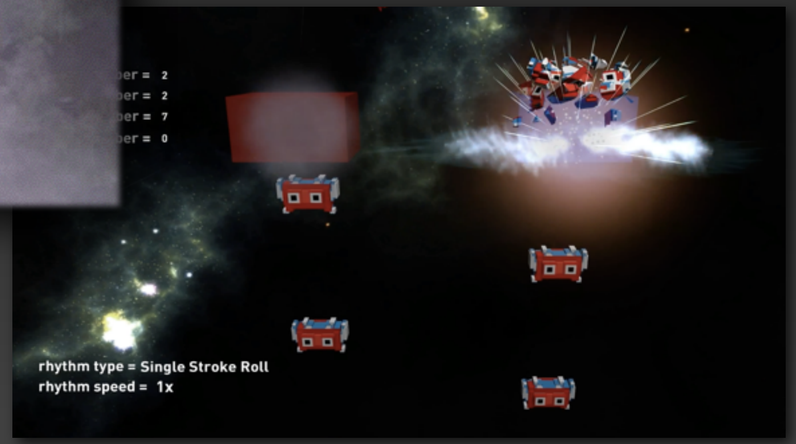
Meditrain

Body-Brain Trainer



Rhythmicity

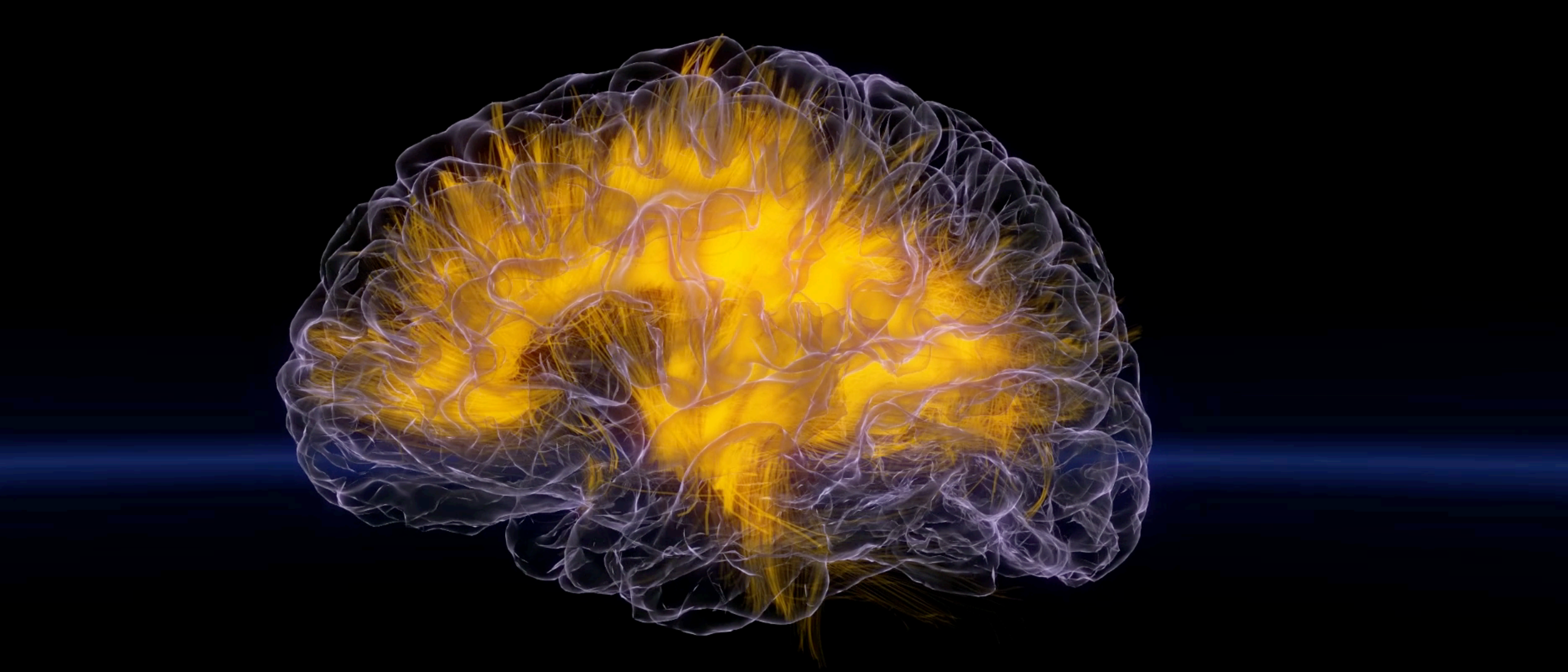
Virtual Attention



Enhance the Effects

Neuromodulation

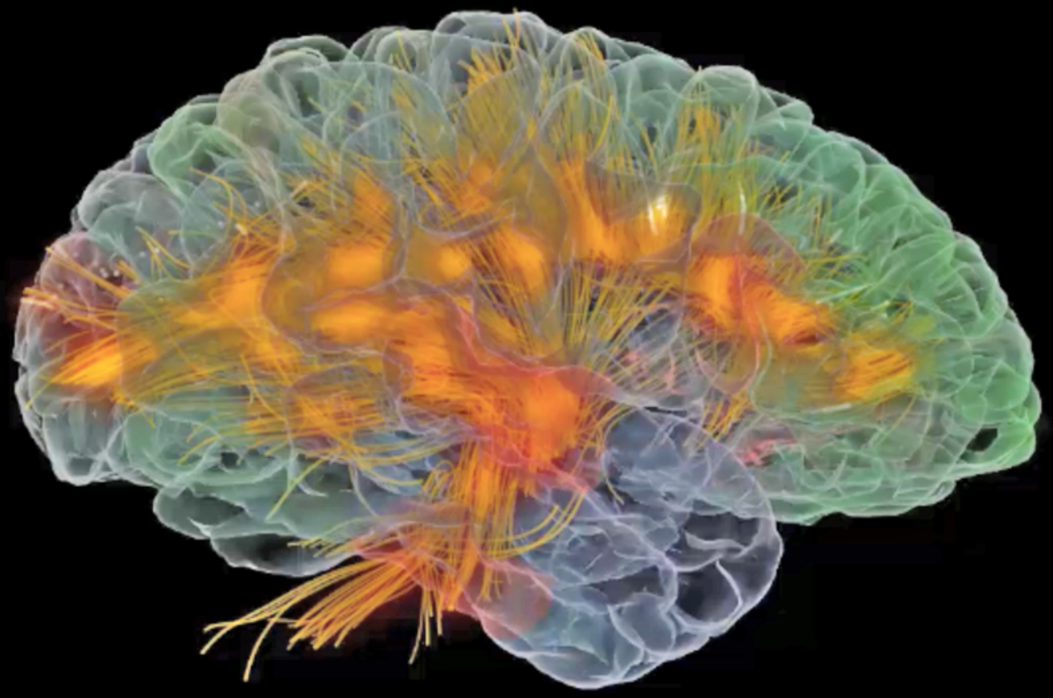
Neurofeedback



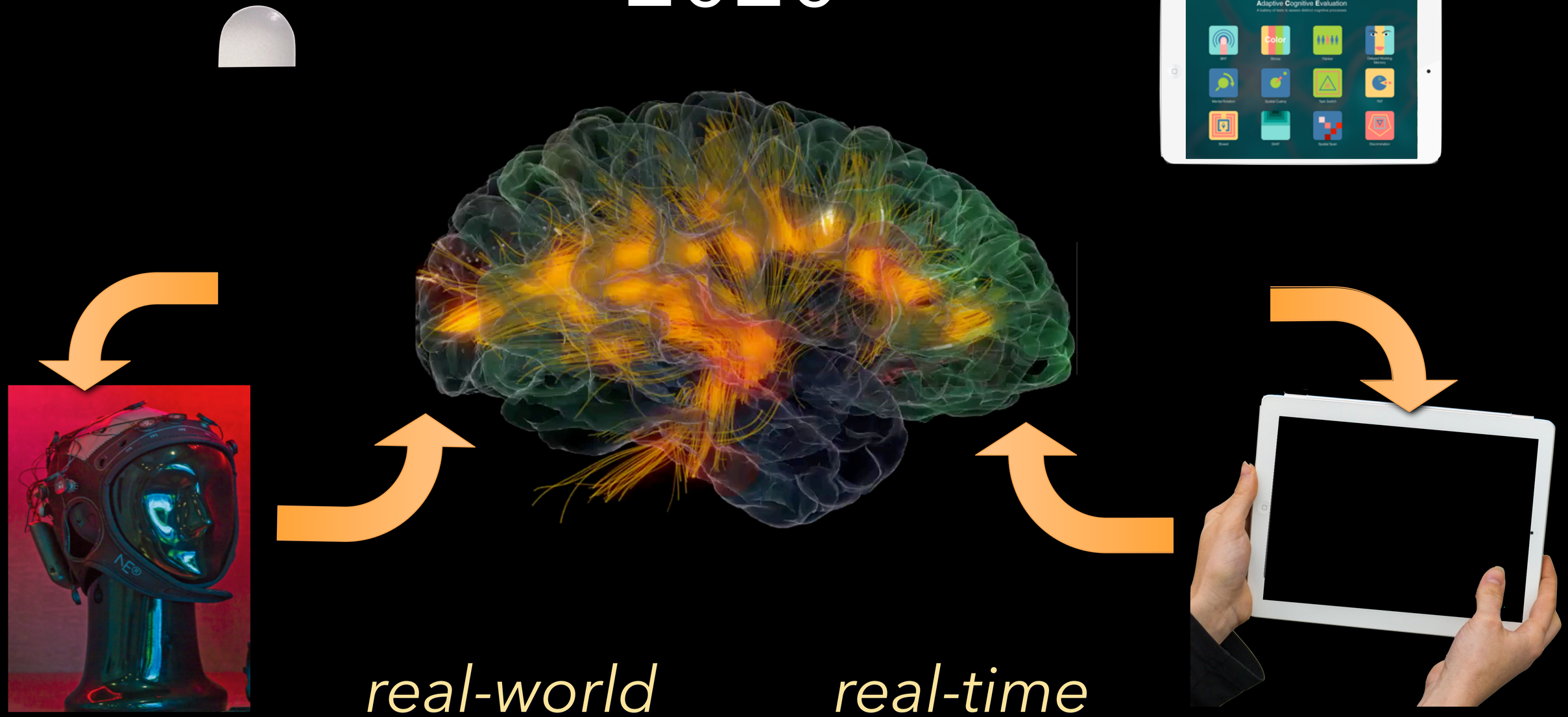
GlassBrain

HandSonic

2020



2020



real-world *real-time*

targeted / personalized / multimodal / closed-loop

Over the Next 10 Years ...

Addiction

Parkinson's Disease

Anxiety Disorder

Schizophrenia

Alzheimer's Disease

Multiple Sclerosis

Depression

Education

Wellness

Autism

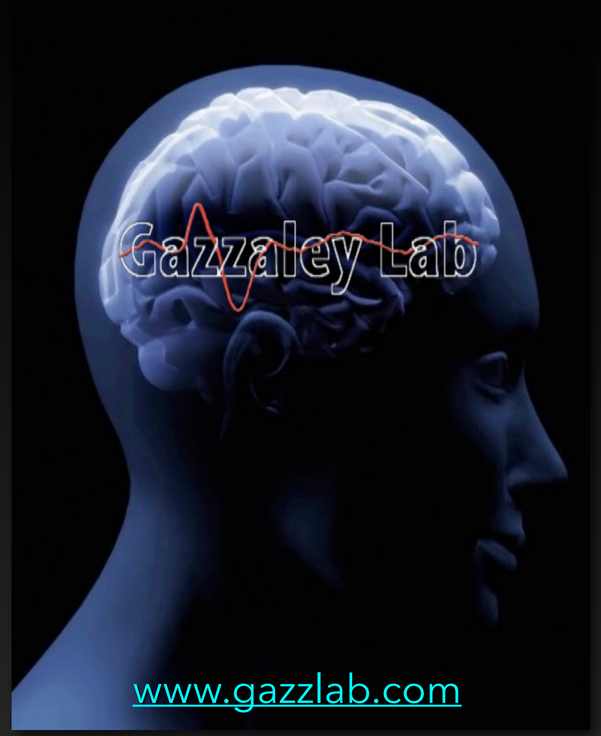
Attention Deficit Disorder

Traumatic Brain Injury

Post Traumatic Stress Disorder

Thanks for your attention

Current Team



Faculty

- Ted Zanto
- Jyoti Mishra
- Peter Wais
- Joaquin Anguera
- Melina Uncapher

Fellows

- David Ziegler
- Morgan Hough
- WanYu Hsu
- Gabe Aranovich

Associates

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- Sasha Skinner
- Sierra Niblett
- Caleb Banks
- Caleb Khan
- Jo Fung
- AJ Simon

Collaborators

- Pat Arean
- Ezequiel Morsella
- Christian Thompson
- Elysa Marco

Neuroscape Lab

Neuroscapelab.com

Game Development

- Roger Anguera

- Matt Omernick
- Dmitri Ellingson
- Eric Johnson
- Noah Fahlstein
- Matt Whitman
- Mike Gonzales
- Ty Clark
- Zynga.org

GlassBrain

- Tim Mullen
- Christian Kothe
- Oleg Konigs
- John Fesenko

Financial Support

- National Institute on Aging
- National Institute of Mental Health
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- Robert Wood Johnson Foundation
- Zynga.org Foundation
- Center 17 Foundation
- Sandler Foundation
- UCSF CTSI
- Posit Science
- Pfizer / Eisai
- Tim Ferriss
- William Getty
- Tully and Elise Friedman
- Sara and Evan Williams Foundation
- Ray and Dagmar Dolby Family Fund
- Ellison Medical Foundation
- James Gates Family Foundation
- Rose Family Foundation
- Feldman Family Foundation
- Grammy Foundation
- Biggelsworth Foundation
- Laney and Pasha Thornton
- Richard Lounsbery Foundation

Industry Partners

- Apple
- Sony
- Zynga
- NVIDIA
- Neuroelectrics
- Akili Interactive
- Basis
- Empatica
- Cognionics
- Syntrogi
- High Fidelity
- Brain Vision