Starlab Neuroscience

Starlab Neuroelectrics Home System

Javier Acedo

Neuroscience Research Engineer & Project Manager

Starlab Living Science

NE neuroelectrics®

Starlab – a brief introduction

A private R&D company based in Barcelona (since 2000)

Transforming **Science** into **Technologies**

Developing new products and services with profound and **positive social impact**

Starlab®
Neuroscience

spin-off

product line

NE
neuroelectrics®

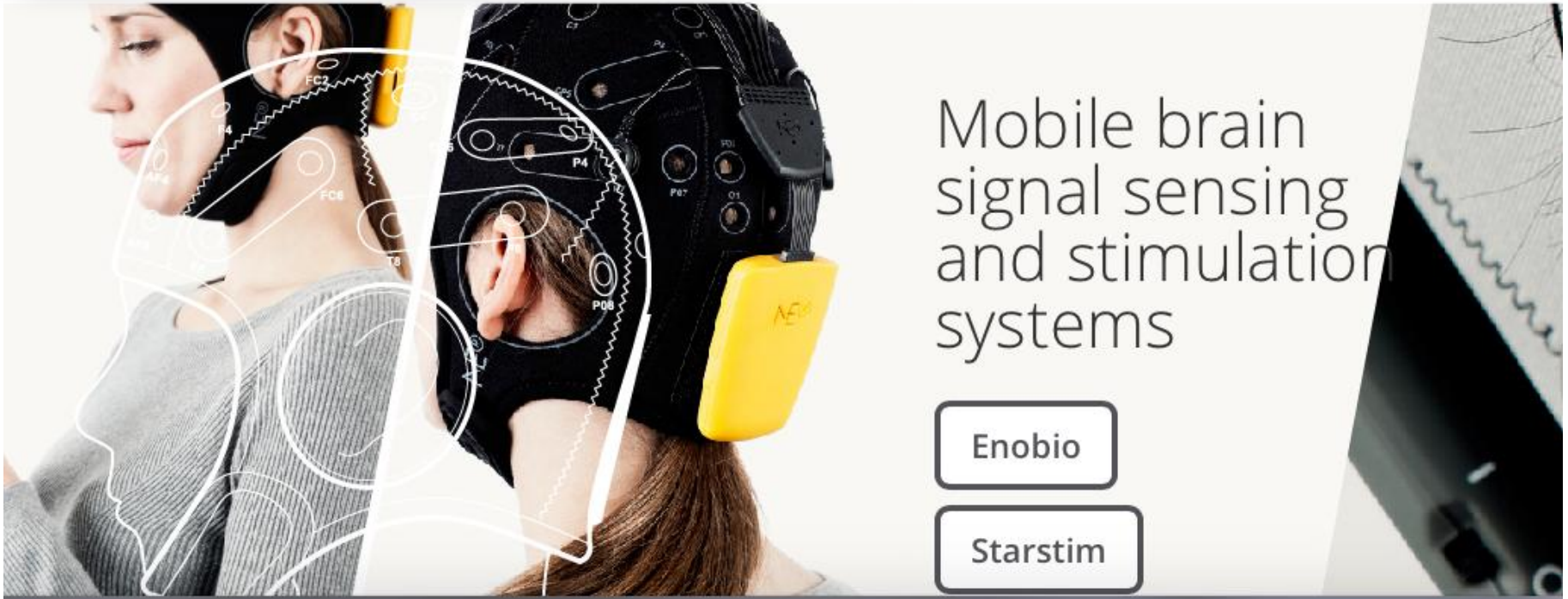
Neuroscience
Business Unit

Hardware

Consulting Services
Funded research

A new paradigm to monitor and stimulate the brain

NE
neuroelectrics ®

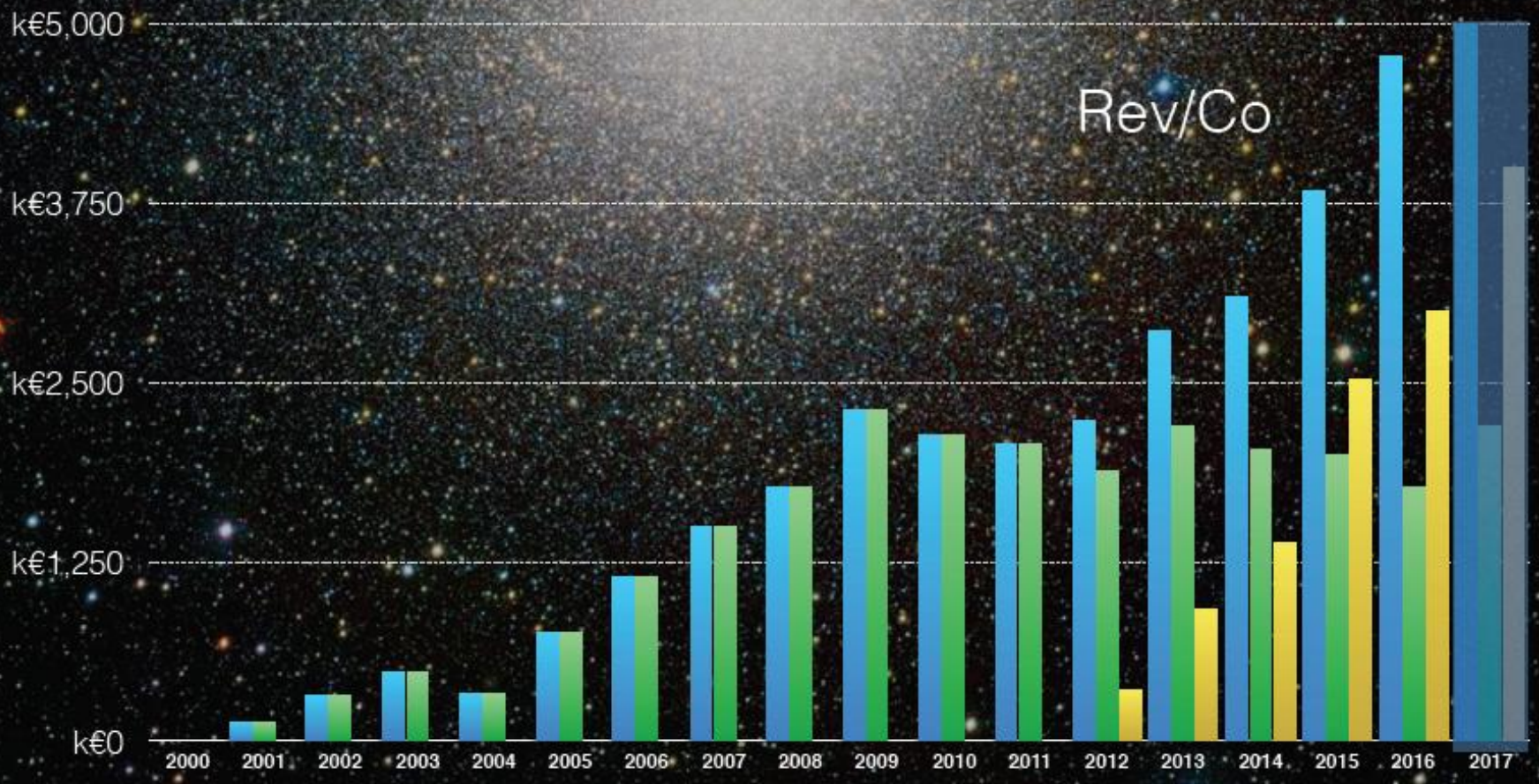


Mobile brain signal sensing and stimulation systems

Enobio

Starstim

Revenues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Digital Brain Health

DIGITAL HEALTH

THE MICHAEL J. FOX FOUNDATION FOR PARKINSON'S RESEARCH

Comunitats RIS3CAT
Research and Innovation Strategies for Smart Specialisation

biomarker discovery

NE neuroelectrics®

Starlab®

STIPED

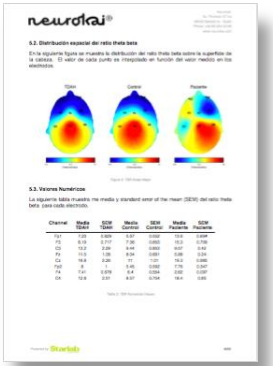
brain stimulation

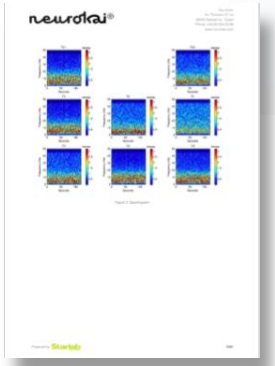
hiVE
HYPER INTERACTION VIABILITY EXPERIMENTS

Studying Consciousness in the electrical brain
luminous

Digital Brain Health

Turn-key and custom solutions for the development of neurophysiological biomarkers.





Biomarkers – Parkinson's

	HC vs PD
CR (Acc) N = 41	94 %
CR (Acc) N = 82	93 %
CR (Acc) N = 118*	94 %

N = 41, 82, 118

CR = Classification Rate

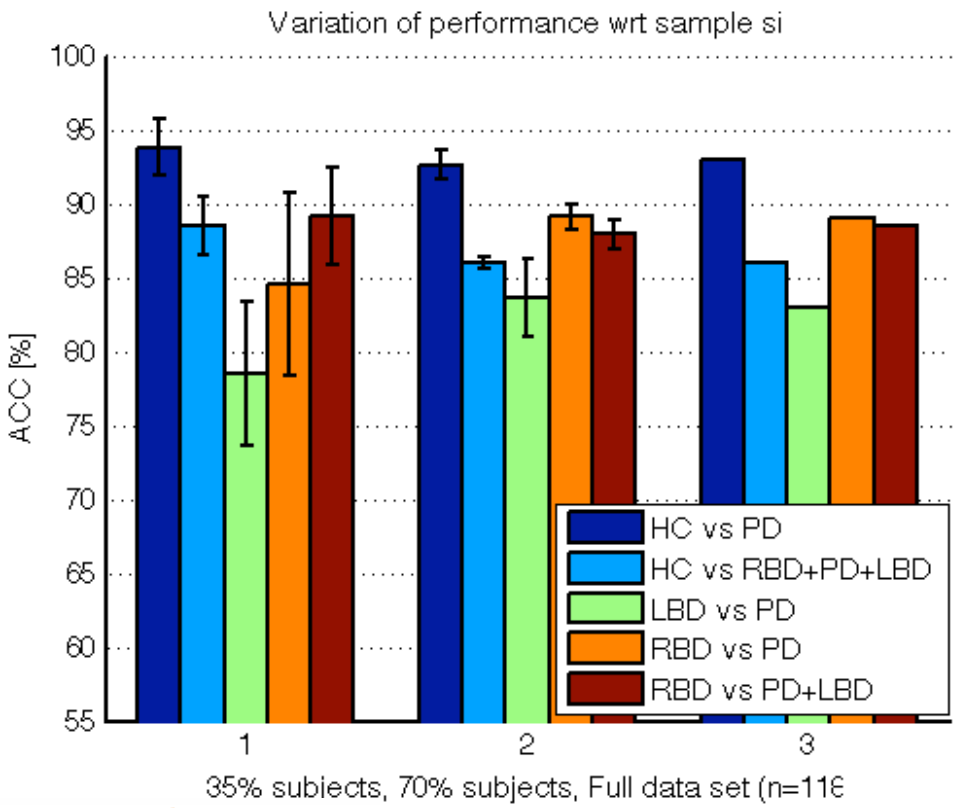
Acc = Accuracy

HC = Healthy Control

PD = Parkinson's Disease

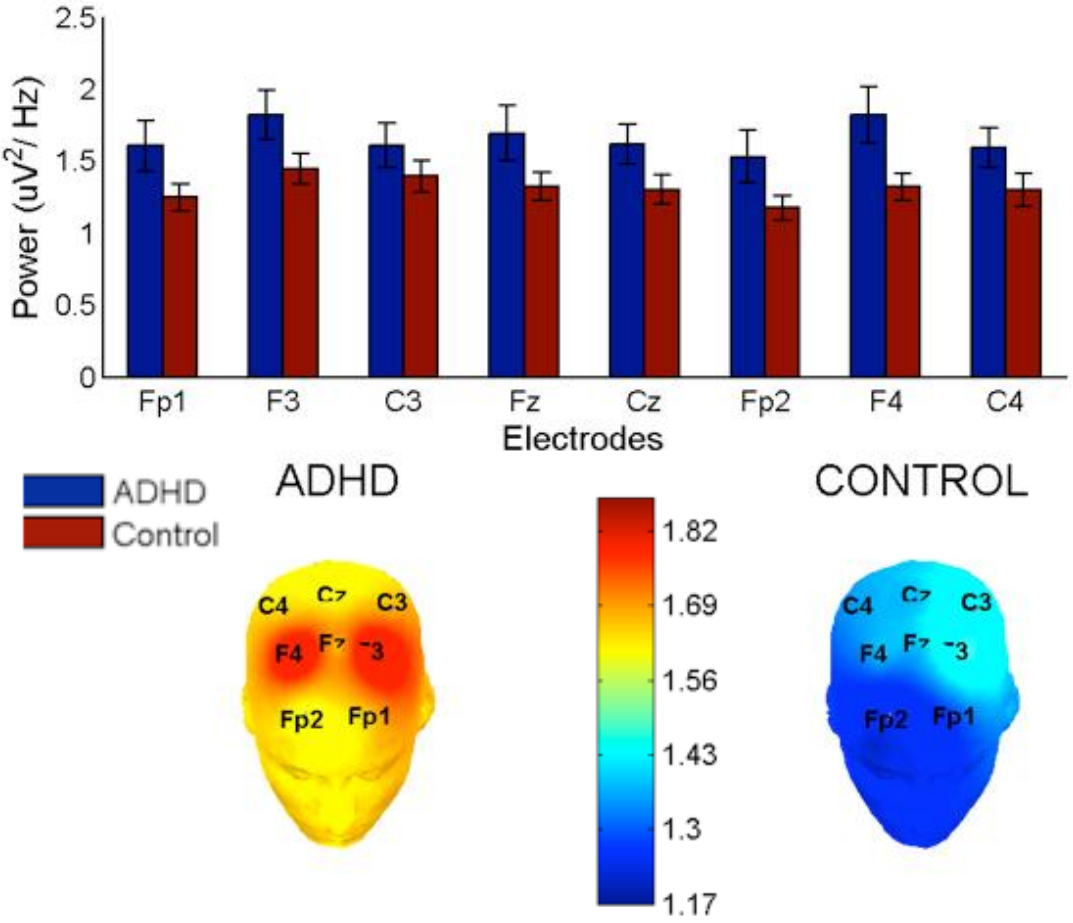
LBD = Dementia with Lewy Bodies

RBD = REM Behaviour Disorder



THE MICHAEL J. FOX FOUNDATION
FOR PARKINSON'S RESEARCH

Biomarkers – ADHD



- alpha band is shifted towards the theta band (all channels, EC)
- significant differences $p<0.05$ in theta at Fp2, and Cz, and in beta at C3
- significant asymmetries in theta at Cs ($p<0.0001$), and Fs ($p<0.01$)

Absolute Power in Beta Band

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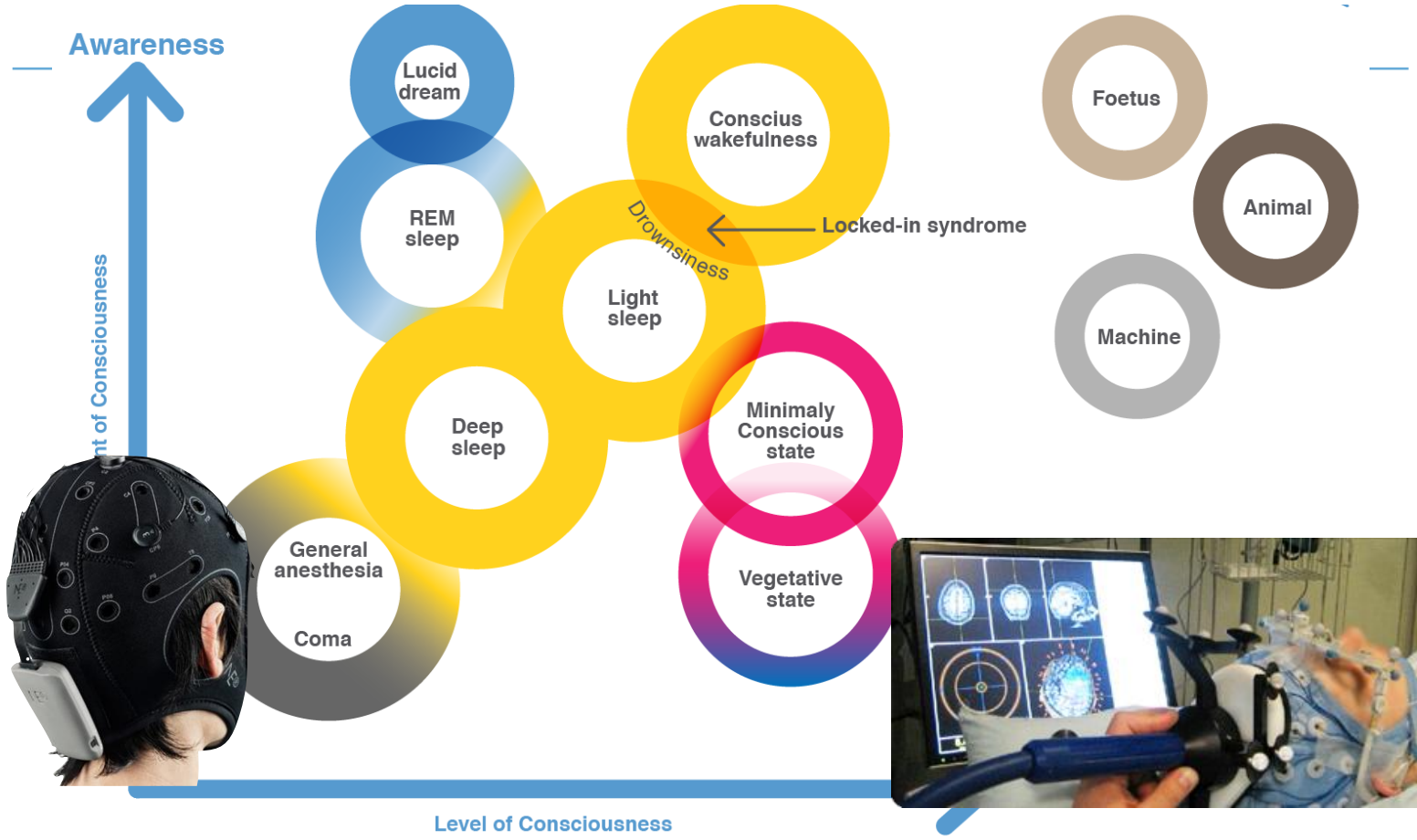
Biomarkers – Consciousness

luminous



Starlab Neuroscience

MAGIC product concept

Neuromodulation

Alteration of the brain activity through targeted delivery stimulus

Visual as in Neurofeedback or BCI

Electromagnetic as tCS

Neuromodulation

Alteration of the brain activity through targeted delivery stimulus

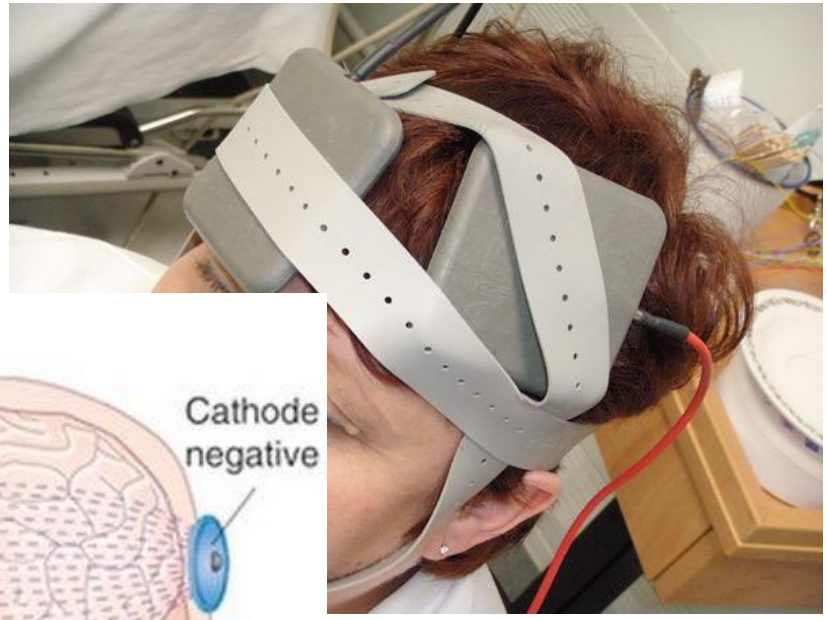
Visual as in Neurofeedback or BCI

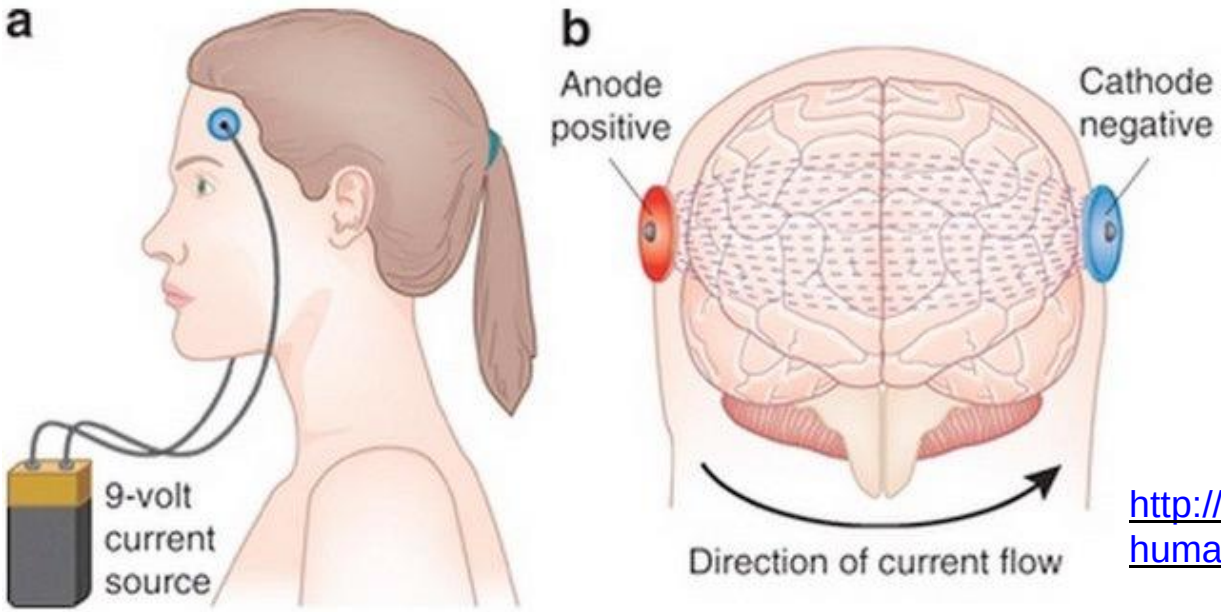
In BCI or Neuofeedback therapies brain-waves are transformed in gaming commands - this has a neuromodulatory effect

Transcranial Current Stimulation

Non-invasive neuro-stimulation uses low amplitude current delivered directly to the surface of the scalp via electrodes.

Small currents (~1mA) are passed directly through the scalp to modulate activity. Firing rates of the neurons increase when the current is applied in the direction of the axons and decreases if the current is reversed.



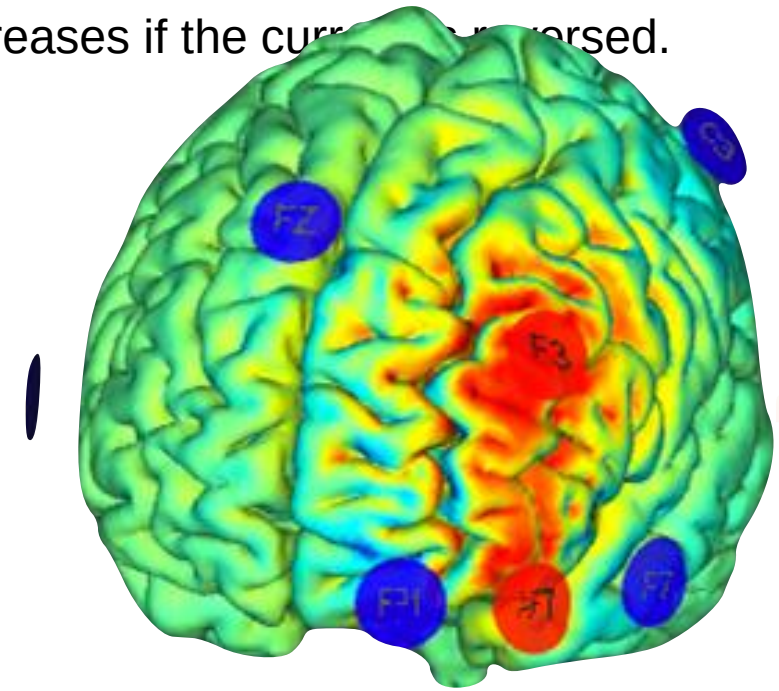


http://chem11.proboards.com/thread/2332/human-experiment-vi

Transcranial Current Stimulation - modern approach

Non-invasive neuro-stimulation uses low amplitude current delivered directly to the surface of the scalp via electrodes.

Small currents (~1mA) are passed directly through the scalp to modulate activity. Firing rates of the neurons increase when the current is applied in the direction of the axons and decreases if the cur[illegible]rsed.



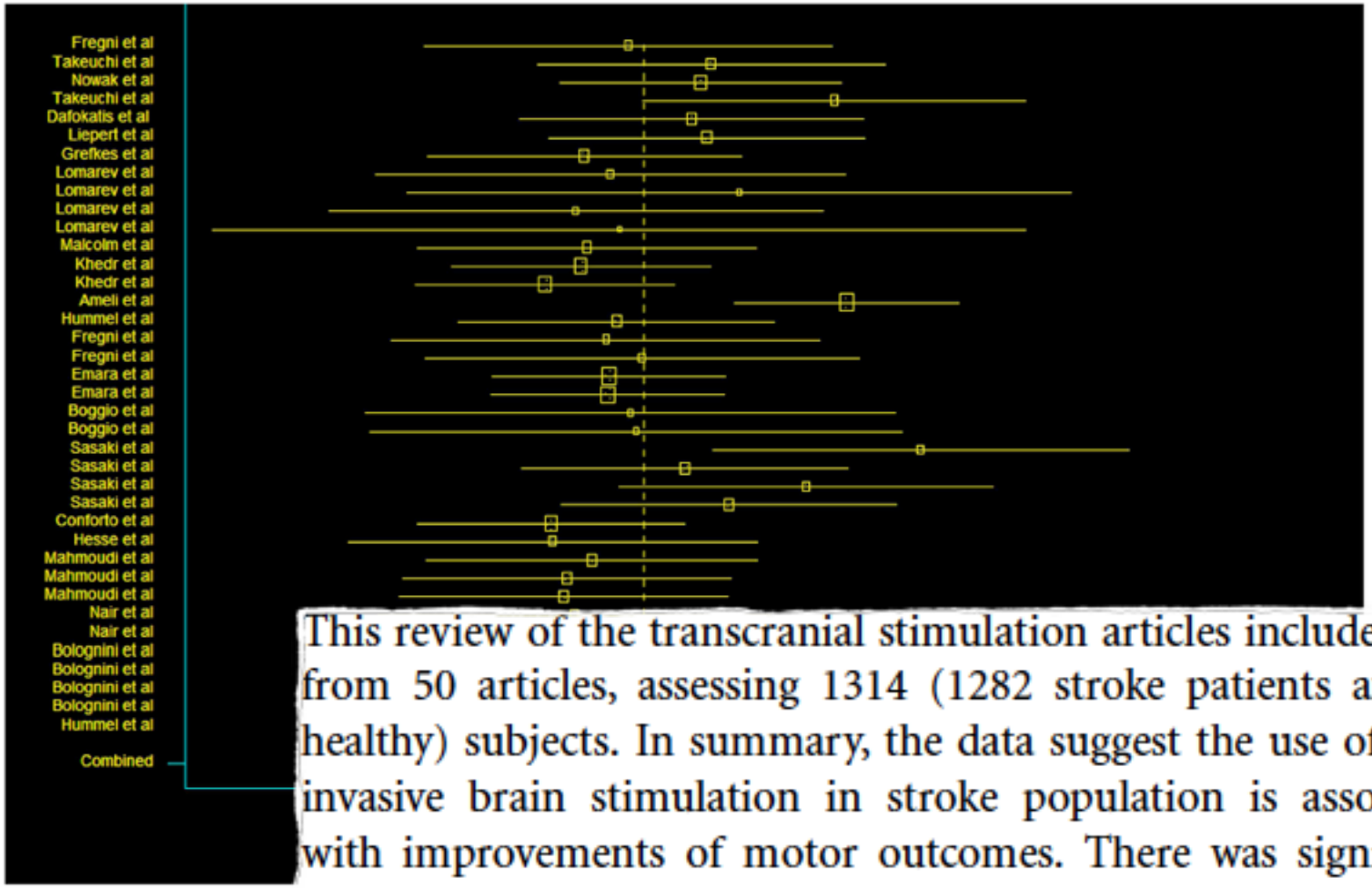
NIBS
NON-INVASIVE BRAIN STIMULATION

Transcranial Current Stimulation - indications

- **Stroke rehabilitation**
- **Neuropathic chronic pain**
- Major depression
- Enhancement
- Addiction

Stroke rehabilitation

Adeyemo et al 2012 F. Psychiatry

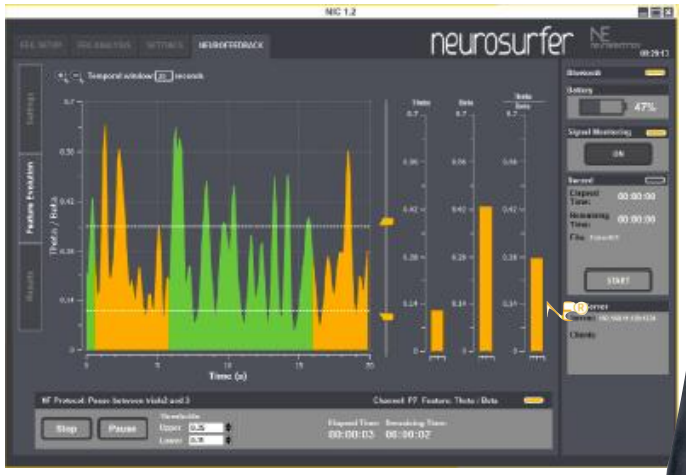


This review of the transcranial stimulation articles includes data from 50 articles, assessing 1314 (1282 stroke patients and 32 healthy) subjects. In summary, the data suggest the use of non-invasive brain stimulation in stroke population is associated with improvements of motor outcomes. There was significant heterogeneity of patient population characteristics, intervention parameters, and selected assessments.

Neuromodulation

Neurofeedback/BCI for Therapy, and Brain Health

neurosurfer NE®



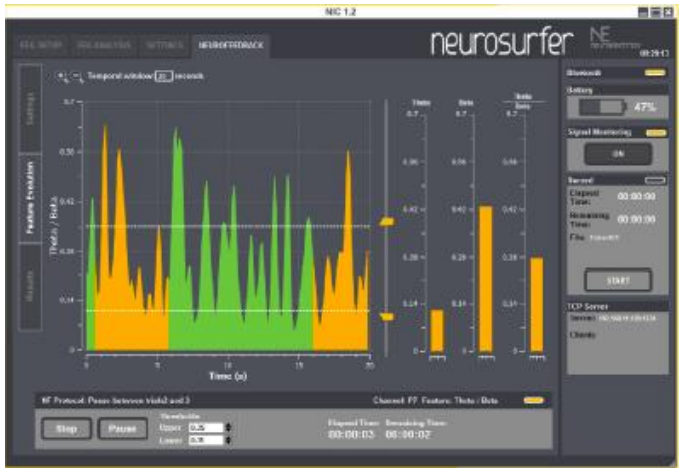
2D, 3D

Neuromodulation

Neurofeedback/BCI + tCS

neurosurfer

starstim NE®
HOME RESEARCH KIT



2D, 3D

Beth Israel Deaconess Medical Center

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

UCSF

INSTITUT GUTTMANN

Starlab Neuroscience

Customer Collaboration

Starlab Living Science

NE neuroelectrics®

Stroke rehabilitation at Burke Rehabilitation Centre

Brain Stimulation tCS for Therapy, and Brain Health

@starlabdf2

Neuropathic Pain treatment tCS + VR/AR

INSTITUT GUTTMANN

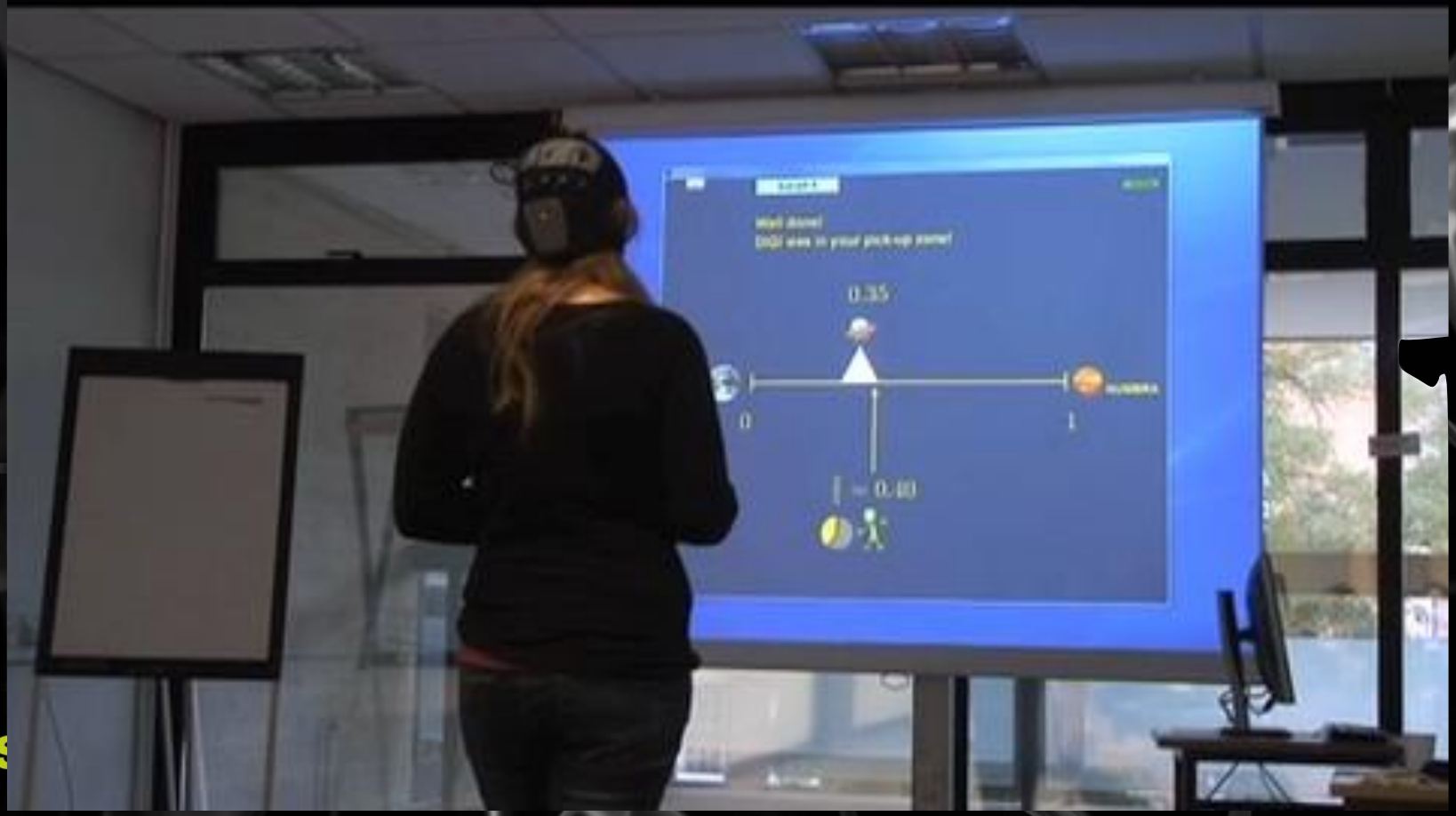
Brain Training

UCSF

AKILI™

Dyscalculia treatment with tCS

UNIVERSITY OF OXFORD




Thank you for
your attention!
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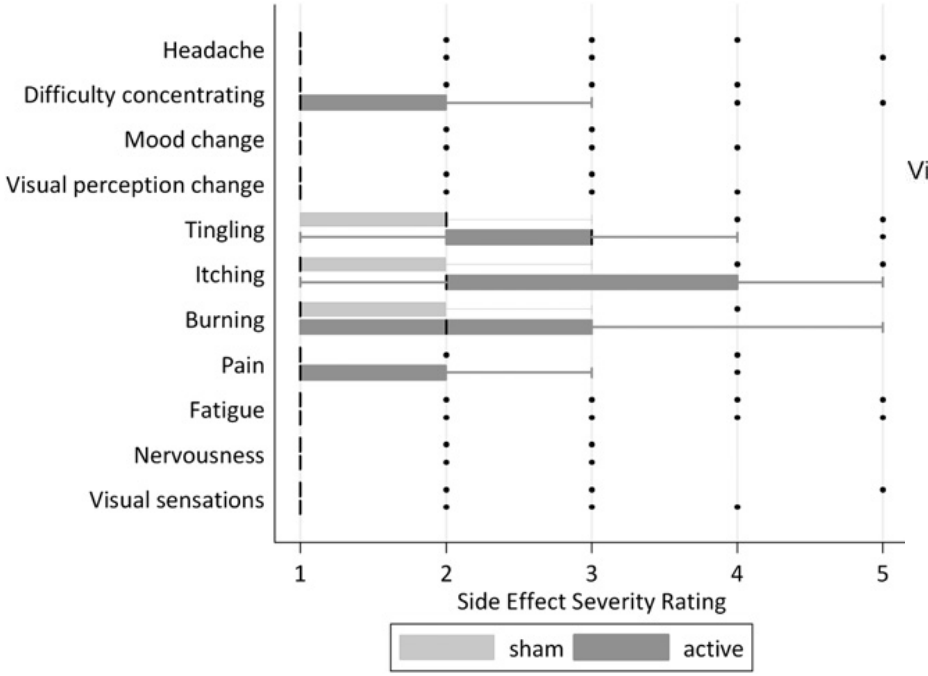
Starlab
Living Science

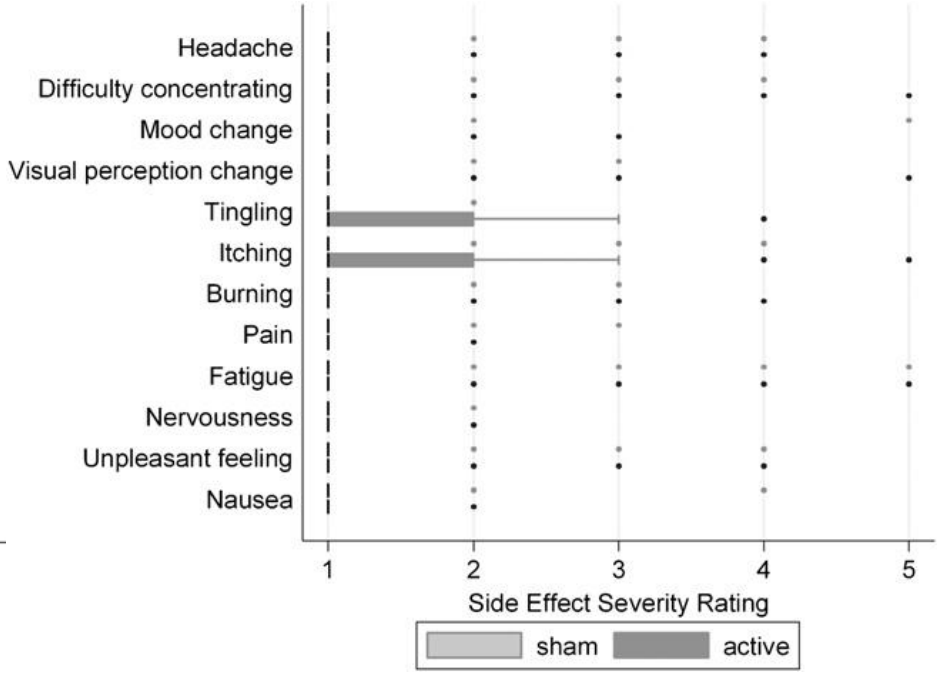
Safety aspects

Kessler et al 2012 Brain Stimulation

137 subjects



during



after

Results

No serious adverse effects occurred. Side effects most commonly reported were tingling (76%), itching (68%), burning (54%), and pain (25%). Side effect severity was mild, with fewer than 2% of responses indicating a severity $>$ 3 on all questions except tingling (15%), itching (20%), burning (7%), pain (5%), and fatigue (3%) during stimulation. Rates of sensory side effects were statistically significantly higher in active stimulation sessions compared with sham sessions. No other stimulation parameters had a statistically significant impact on side effect occurrence.

Safety aspects

TDCS has been tested in thousands of subjects world- wide with no evidence of toxic effects to date. In addition to the hundreds of studies exploring tDCS effects in diverse contexts, some studies have focused specifically on safety."

[Clinical research with transcranial direct current stimulation (tDCS): Challenges and future directions

Andre Russowsky Brunoni,a Michael A. Nitsche,b Nadia Bolognini,c,d Marom Bikson,e Tim Wagner,f Lotfi Merabet,g Dylan J. Edwards,h Antoni Valero-Cabre,i Alexander Rotenberg,j Alvaro Pascual-Leone,k Roberta Ferrucci,l Alberto Priori,l Paulo Sergio Boggio,m Felipe Fregni]