

BIOS

Creating standards for commercialisation

Emil Hewage, Co-Founder & CEO

Workshop 3: Standards for Neurotechnologies and
Brain-Machine Interfacing

TU Graz , 16th September, 2019

info@BIOS.health

BIOS | Creating standards for commercialisation

- Neurotechnology – need for platform technologies
- Our journey at BIOS
- Standards are Key enablers for future neurotechnology companies

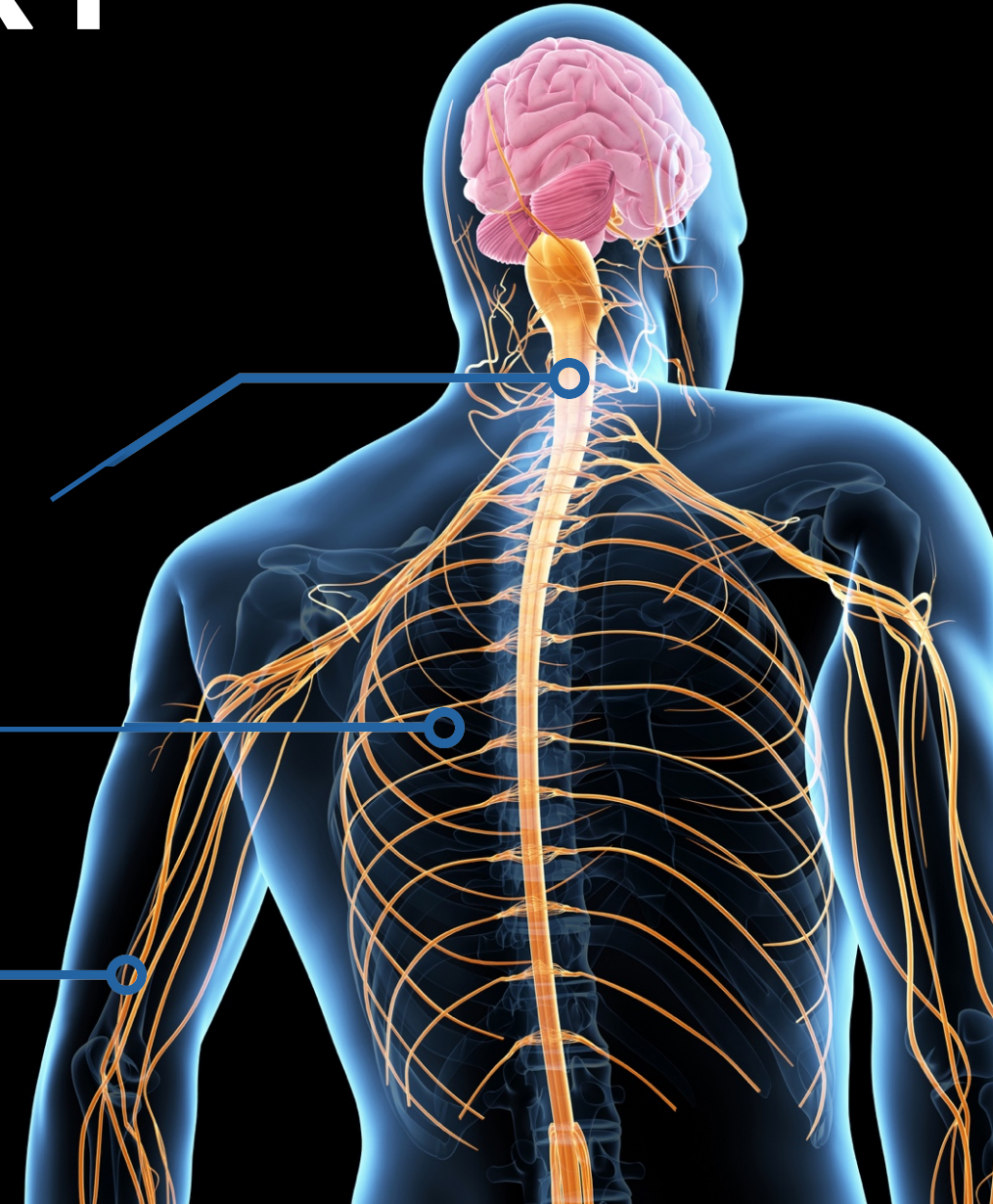


NEURAL IS THE NEXT FRONTIER

SPINE - 1000 MB/S

ORGAN - 4 MB/S

LIMB - <1 MB/S



A black and white photograph showing an elderly woman on the right side of the frame, looking down towards a baby on the left. The woman has wrinkled skin and is wearing a patterned garment. The baby is lying down, looking up at the woman. The background is blurred.

<... FOR LIFELONG HEALTH ...>

REDUCED PAIN
REDUCED COST

INCREASED EMPOWERMENT &
BETTER HEALTH

BIOS | New generation of neural technologies

J Neural Eng. 2014 Jun;11(3):036011. doi: 10.1088/1741-2560/11/3/036011. Epub 2014 May 8.

Blood pressure control with selective vagal nerve stimulation and minimal side effects.

Plachta DT¹, Gierthmuehlen M, Cota O, Espinosa N, Boeser F, Herrera TC, Stieglitz T, Zentner J.

TWO PEOPLE WITH PARALYSIS WALK AGAIN USING AN IMPLANTED DEVICE

'It was like watching fireworks, but from the inside'

Vagus nerve stimulation inhibits cytokine production and attenuates disease severity in rheumatoid arthritis

Frieda A. Koopman, Sangeeta S. Chavan, Sanda Miljko, Simeon Grazio, Sekib Sokolovic, P. Richard Schuurman, Ashesh D. Mehta, Yaakov A. Levine, Michael Faltys, Ralph Zitnik, Kevin J. Tracey, and Paul P. Tak

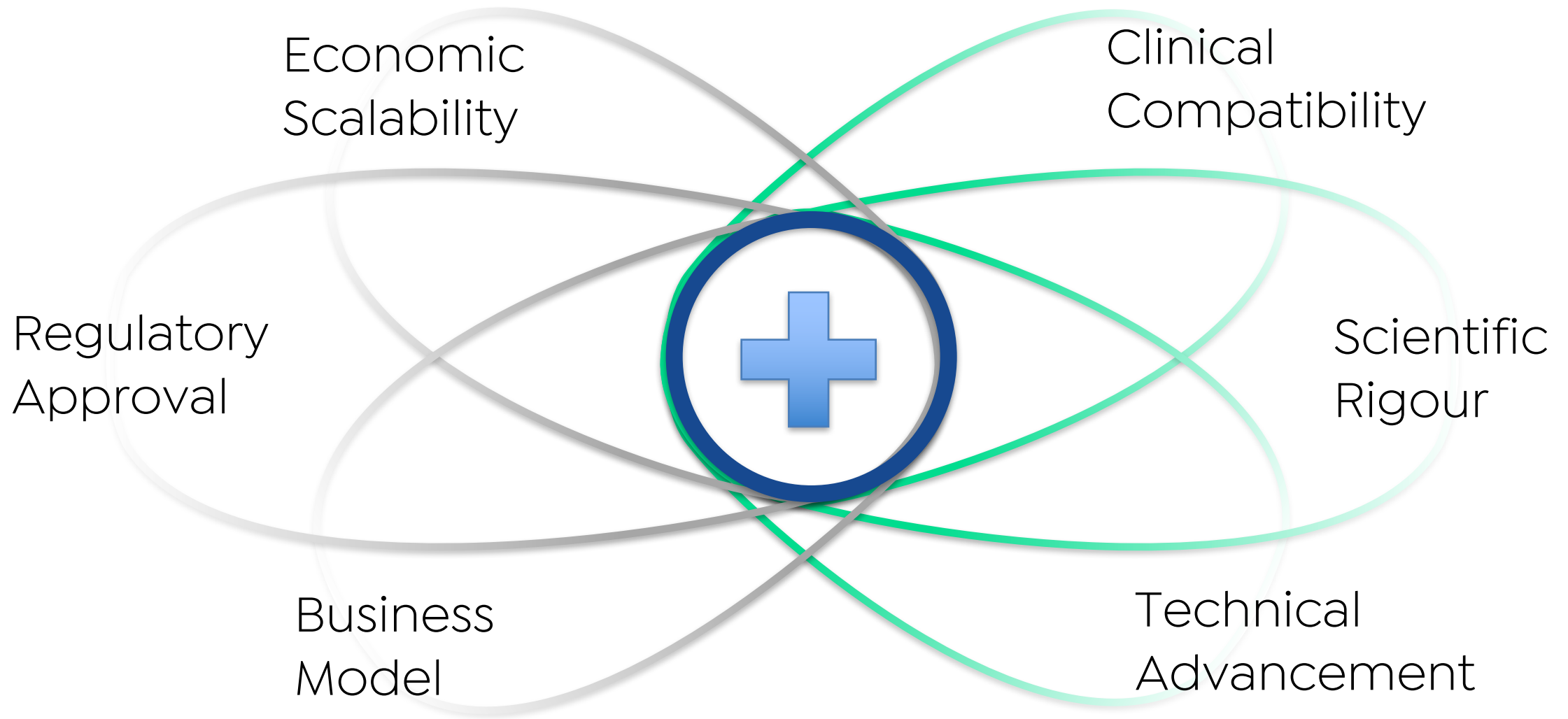
PNAS July 19, 2016 113 (29) 8284-8289; published ahead of print July 5, 2016

<https://doi.org/10.1073/pnas.1605635113>

Experimental nerve-stimulation therapy partially revives man in long-term vegetative state—but experts urge caution

By **Michael Price** | Sep. 25, 2017 , 12:00 PM

Science

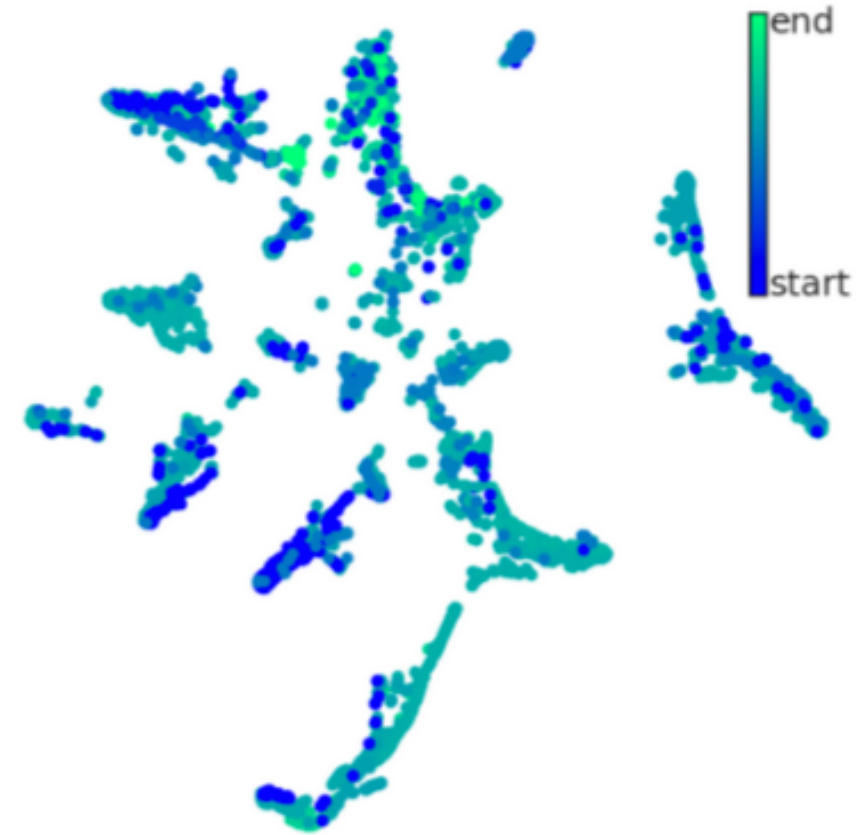


COMMERCIAL

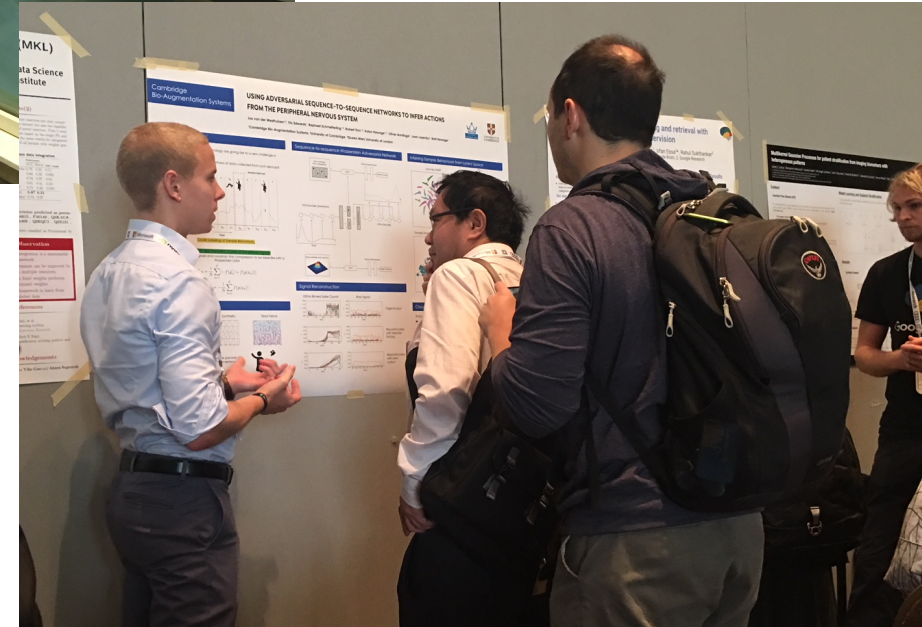
TECHNICAL

BIOS | Fundamental challenges for neurotech

1. A stable & high-fidelity neural connection
2. Discovery of neural biomarkers for multiple diseases
3. An ability to deliver this to people & clinics in a safe & cost effective way



BIOS | Where we started

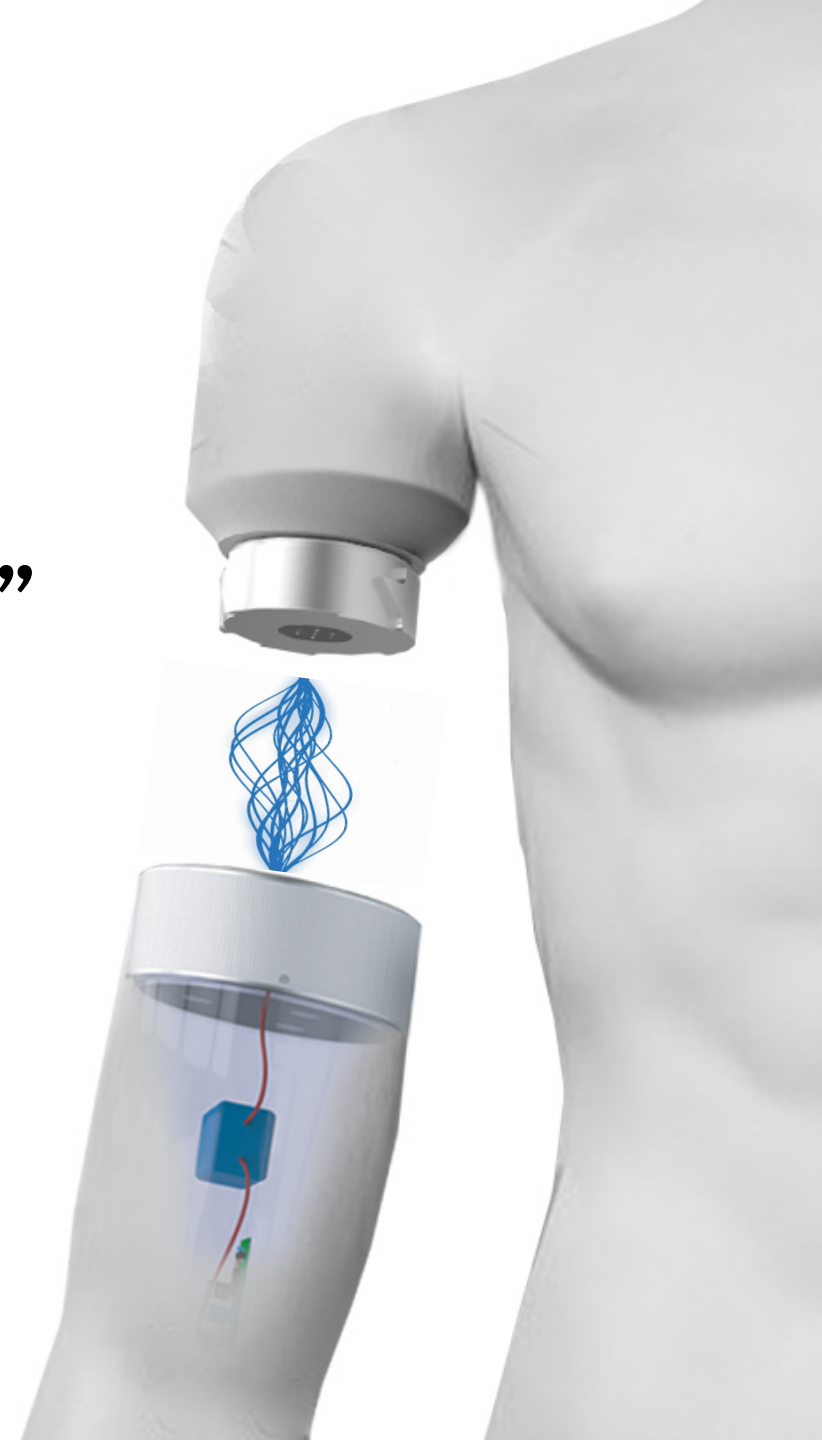


BIOS | Early clinical impact – PID

“USB PORT FOR THE BODY”

PLUG & PLAY

OPEN STANDARD



BIOS | Key facts

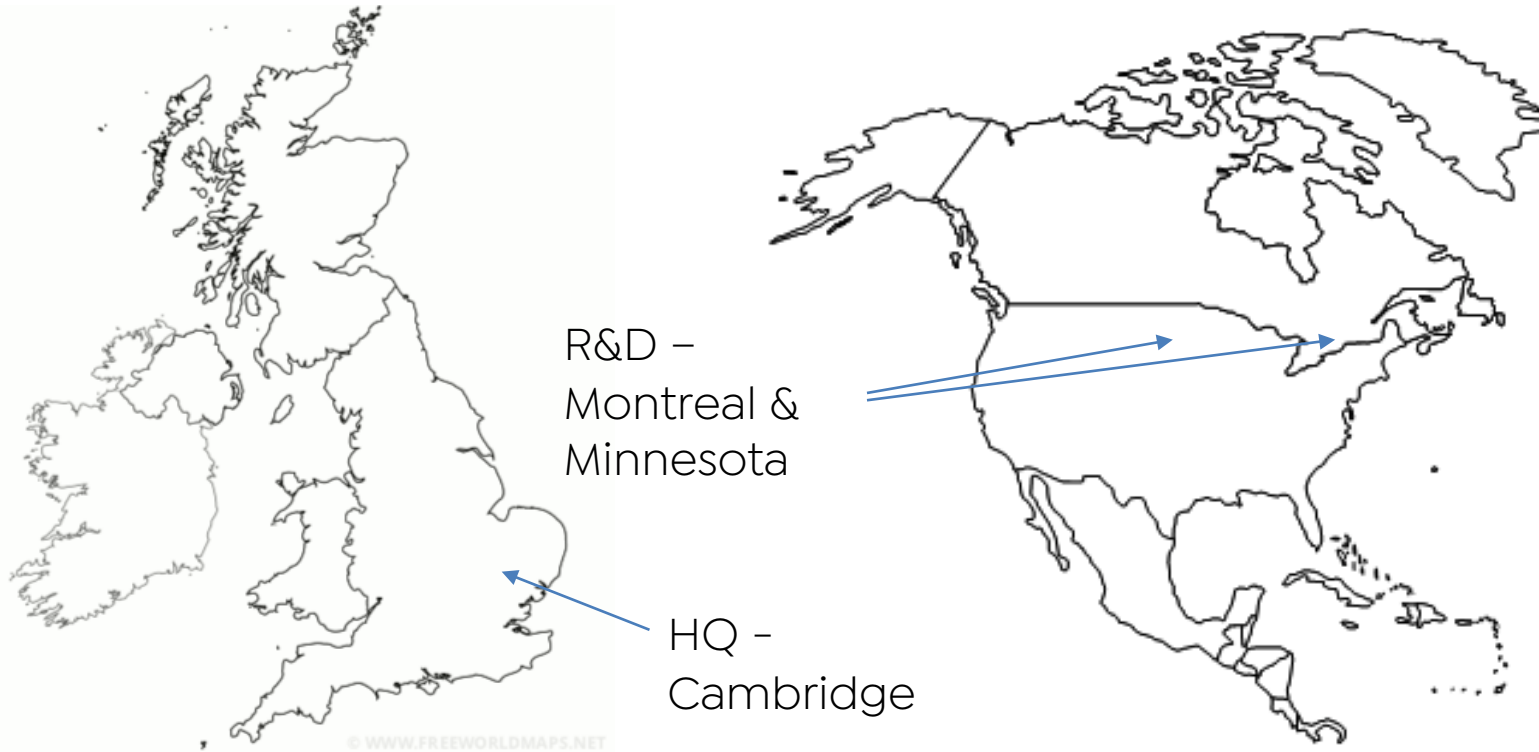


Imperial College
London

Innovate UK



ANDIAMO



real



Founded: **2014**

Team size: **35+**

BIOS | UK talent advantage: high concentration of neuro talent



28

Full-Time

13

Part Time

6k+

Clinical Procedures*

10+

First of kind Medical Devices*

300+

Peer-reviewed papers*

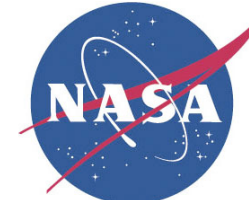
*denotes combined achievements prior to joining BIOS

@BIOShealth

PREVIOUS COMPANIES:

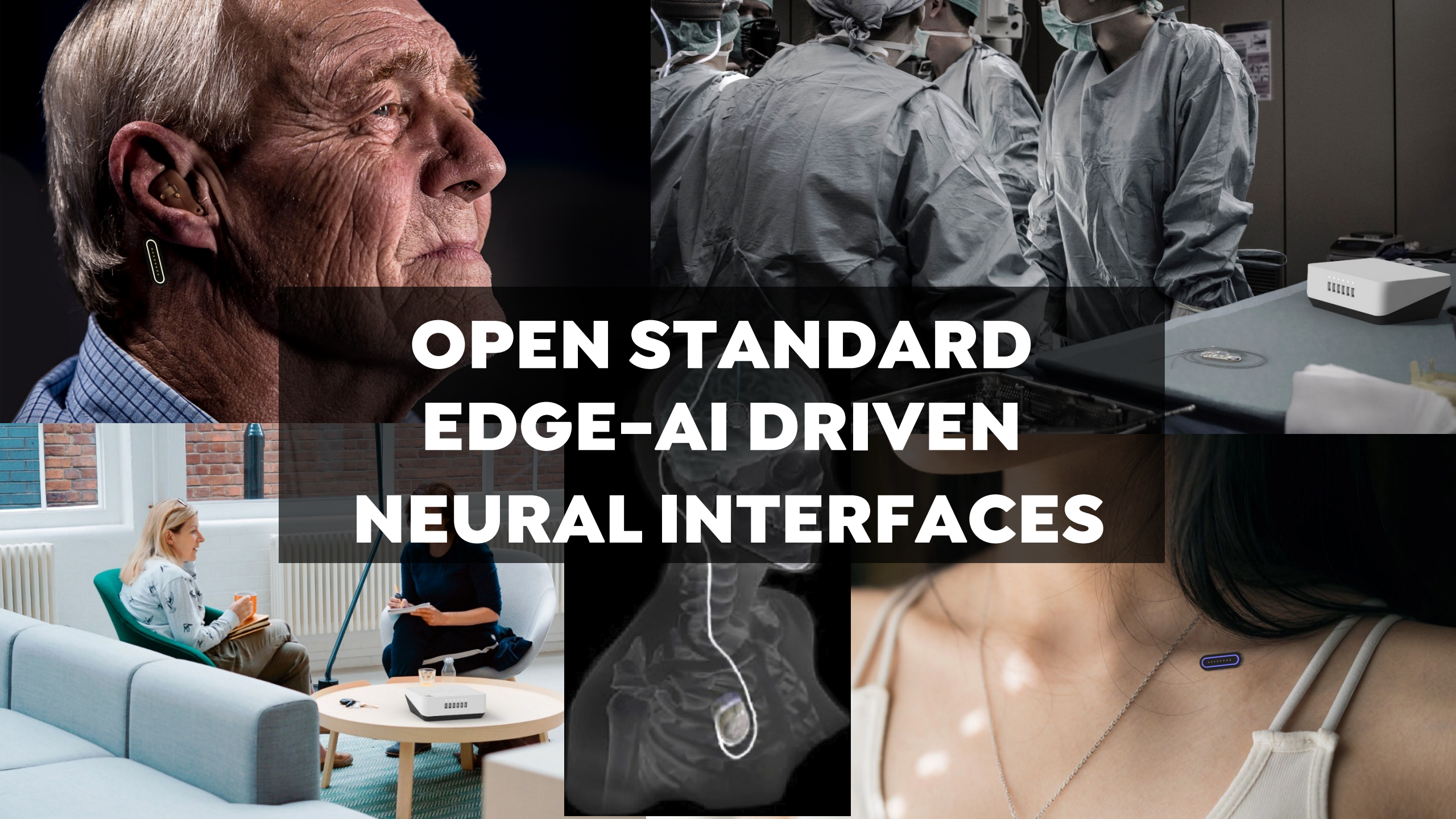


SIEMENS



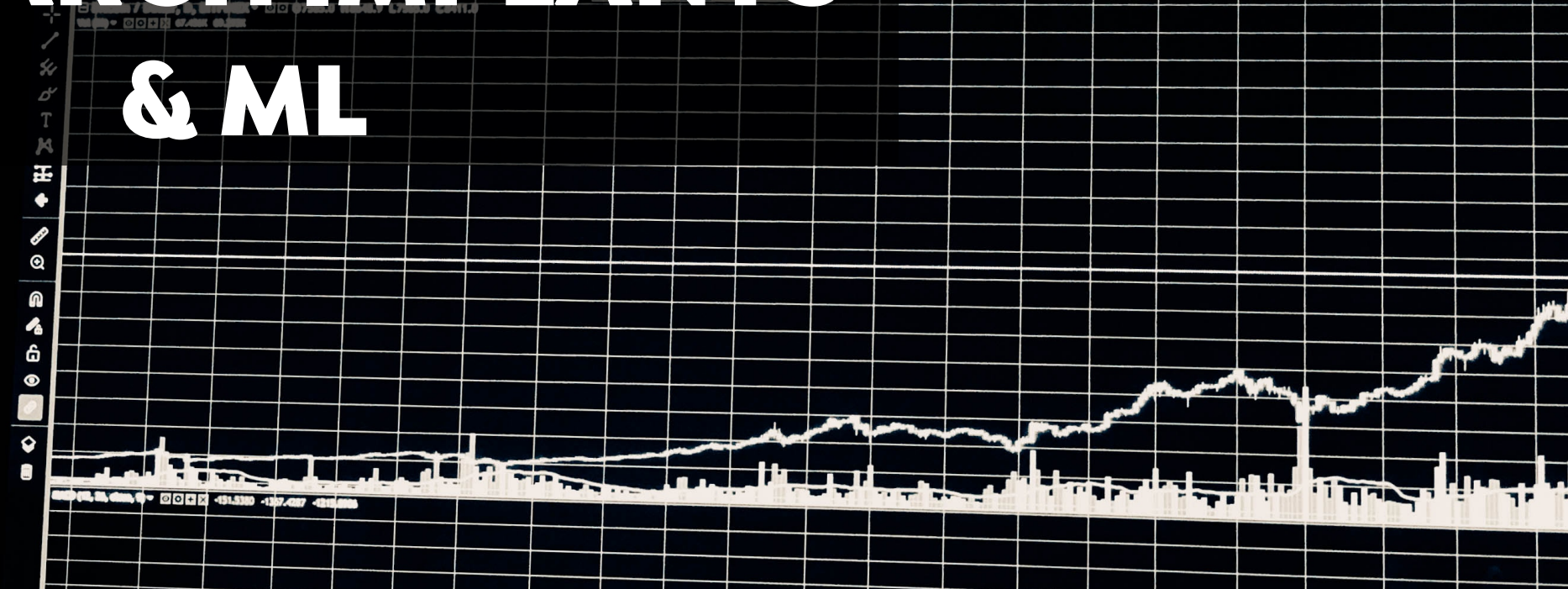
TOSHIBA
Leading Innovation >>>






OPEN STANDARD EDGE-AI DRIVEN NEURAL INTERFACES

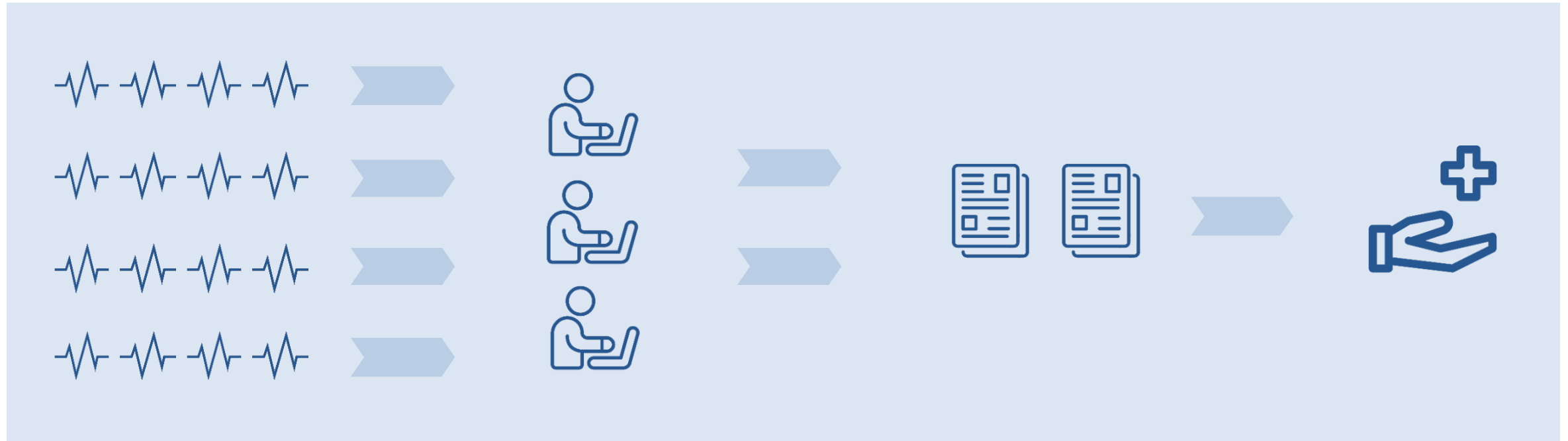
DISCOVER & DEPLOY NEW TREATMENTS USING ADVANCED RESEARCH IMPLANTS & ML



A laptop is shown in a blurred office setting, displaying a web dashboard. The dashboard has a dark blue sidebar with a user profile and a main content area with several data cards and a line chart. The text 'OUTCOME MEASURES POWER CLINICAL & PATIENT OPERATING SYSTEMS' is overlaid in a large, white, bold font on a dark background.

OUTCOME MEASURES POWER CLINICAL & PATIENT OPERATING SYSTEMS

BIOS | The data challenge: new approaches to discovery



**LONG TERM &
LARGE SCALE
NEURAL
DISCOVERY**

**DISTRIBUTED,
ML ENABLED,
NEURAL DATA
STUDIES**

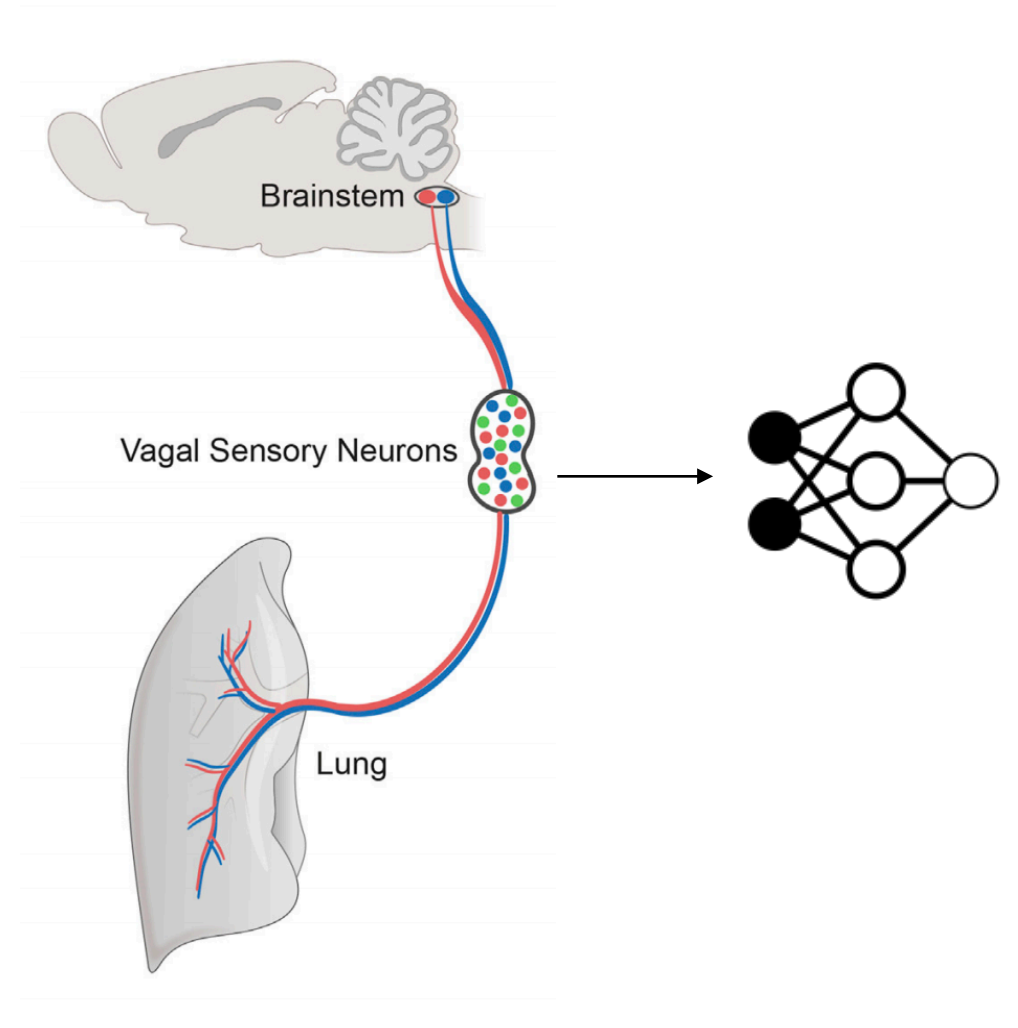
**BENCHMARKED
METHODS,
LEVERAGING
NEURAL
BIOMARKERS**

**EARLY CLINICAL
IMPACT**

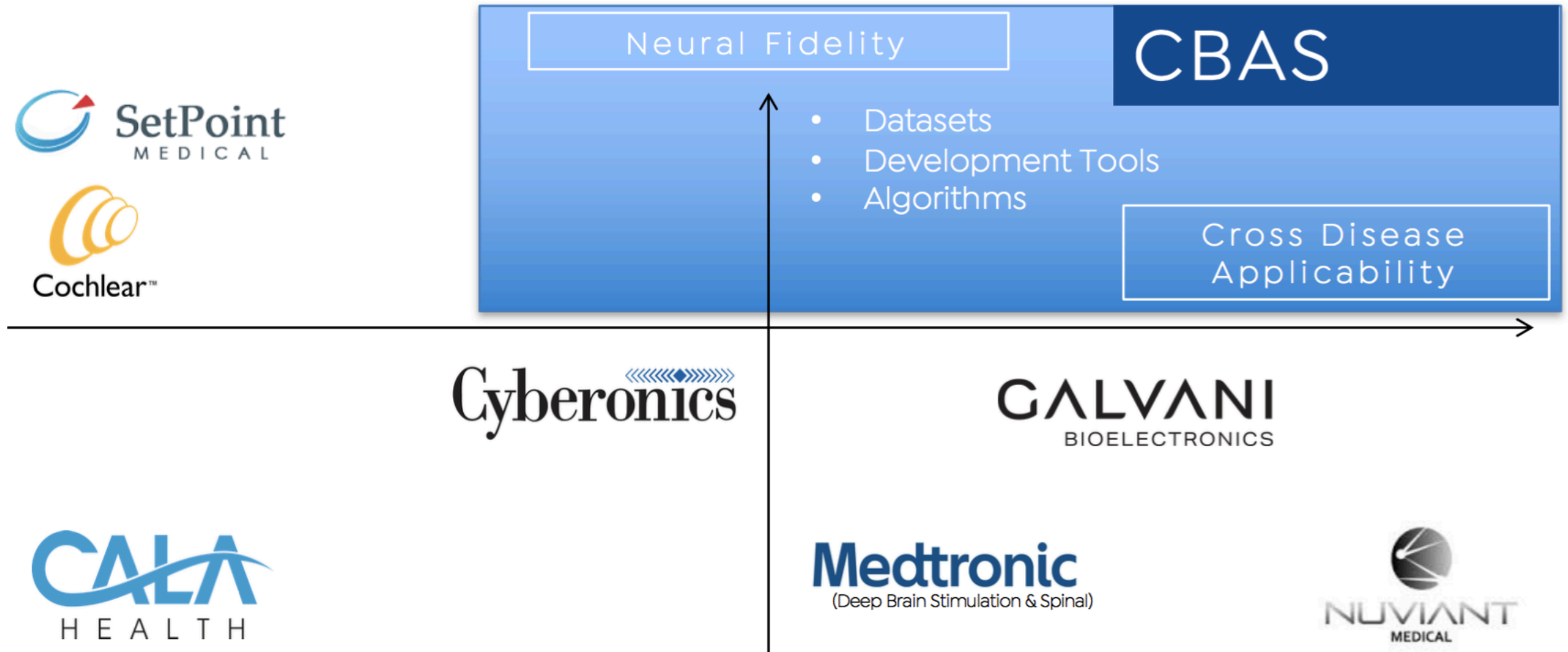
**OPEN
TRANSLATION
PLATFORMS**

Neural Biomarkers for Respiration

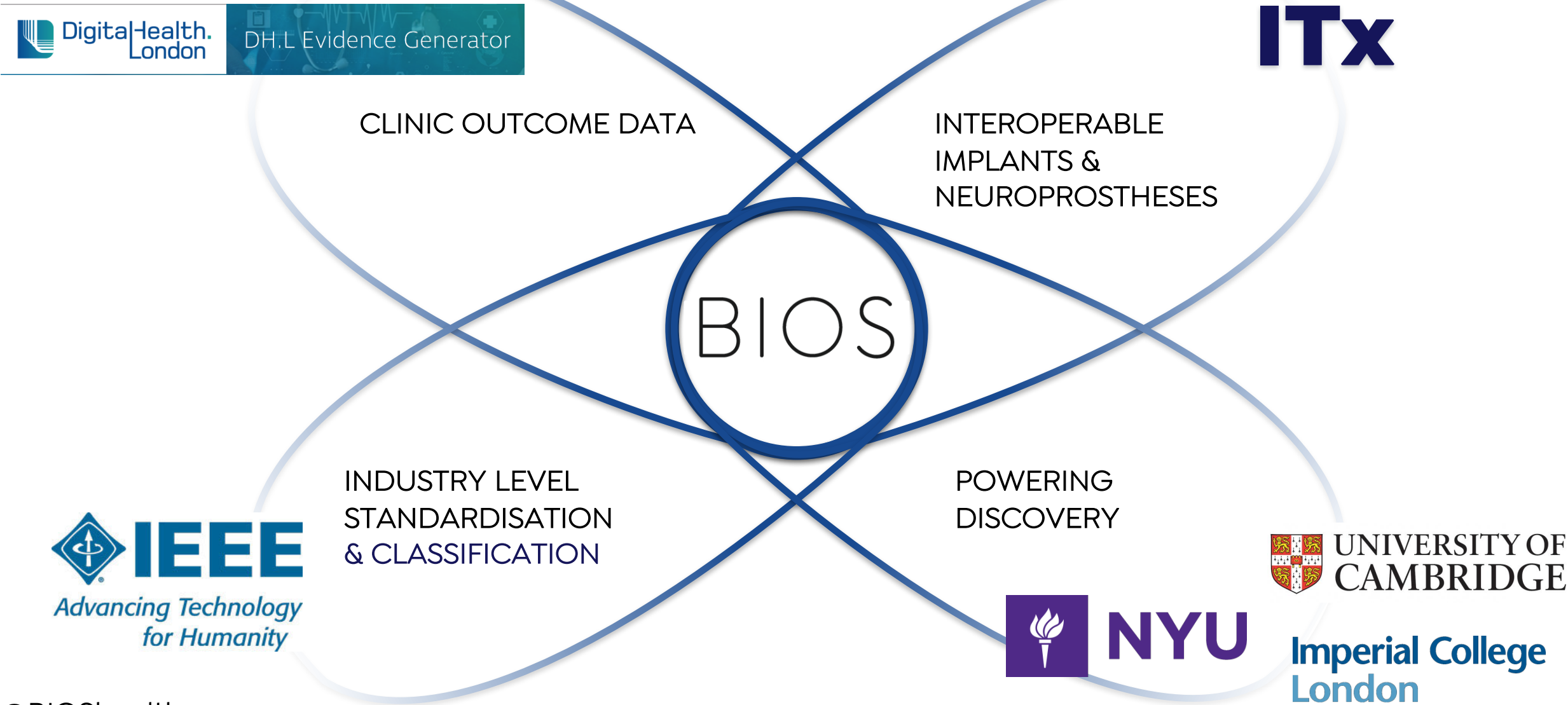
- Identify activity of vagus nerve modulating respiration
- Neural Biomarker-like encoding via ML:
 - Output independent of time shifts and highly tolerant to time scaling
 - Prioritisation of poignant signal features
- Subject-to-subject repeatability
- Robust to implantation procedure
- Invariant to electrode types



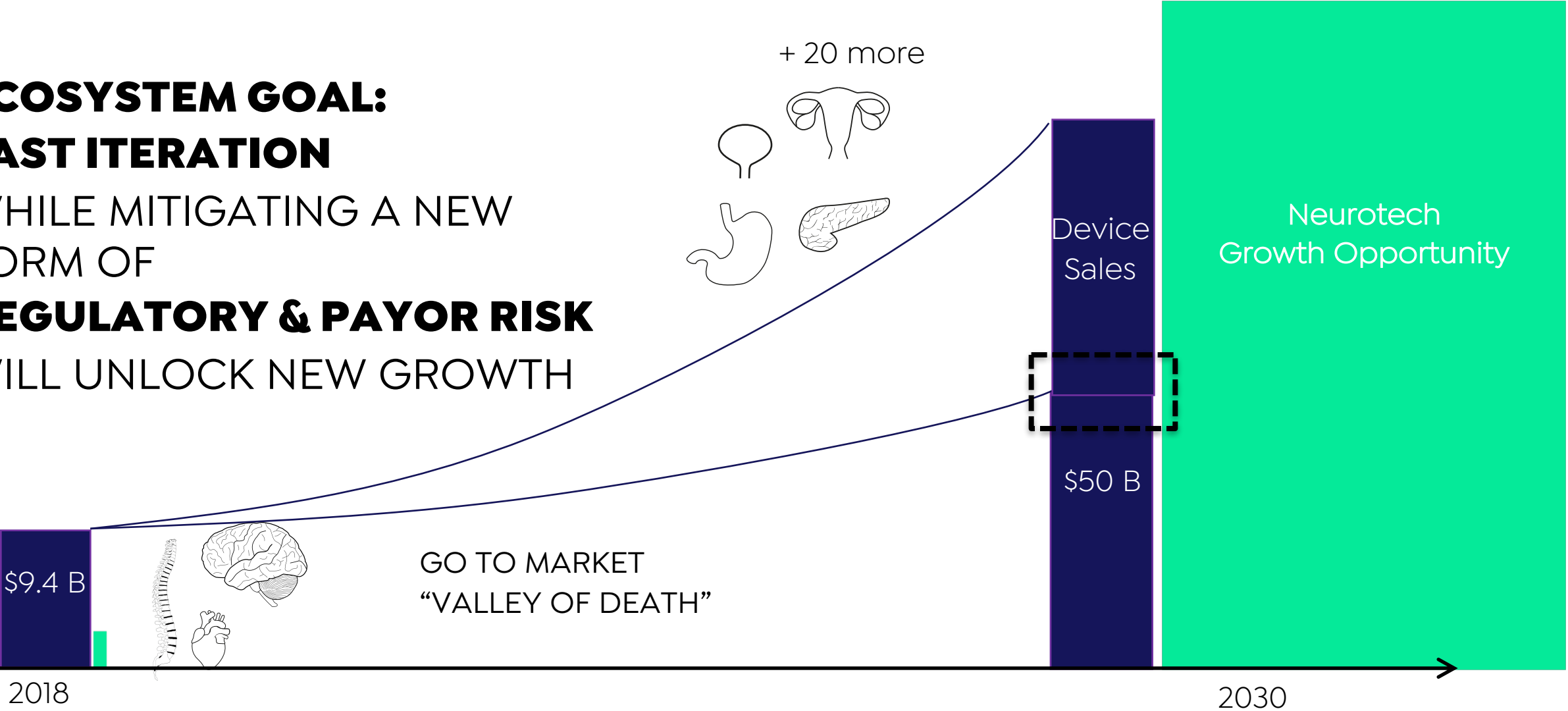
BIOS | Enabling faster delivery of clinical applications



BIOS | Facilitating standards for the neurotech ecosystem



ECOSYSTEM GOAL:
FAST ITERATION
WHILE MITIGATING A NEW
FORM OF
REGULATORY & PAYOR RISK
WILL UNLOCK NEW GROWTH



BIOS | Creating standards for commercialisation

Neurotechnology – need for platform technologies

Standards are Key enablers for:

- future neurotechnology companies
- Better, more accessible products



BIOS

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