

# How to create a startup during your PhD... and (almost) survive

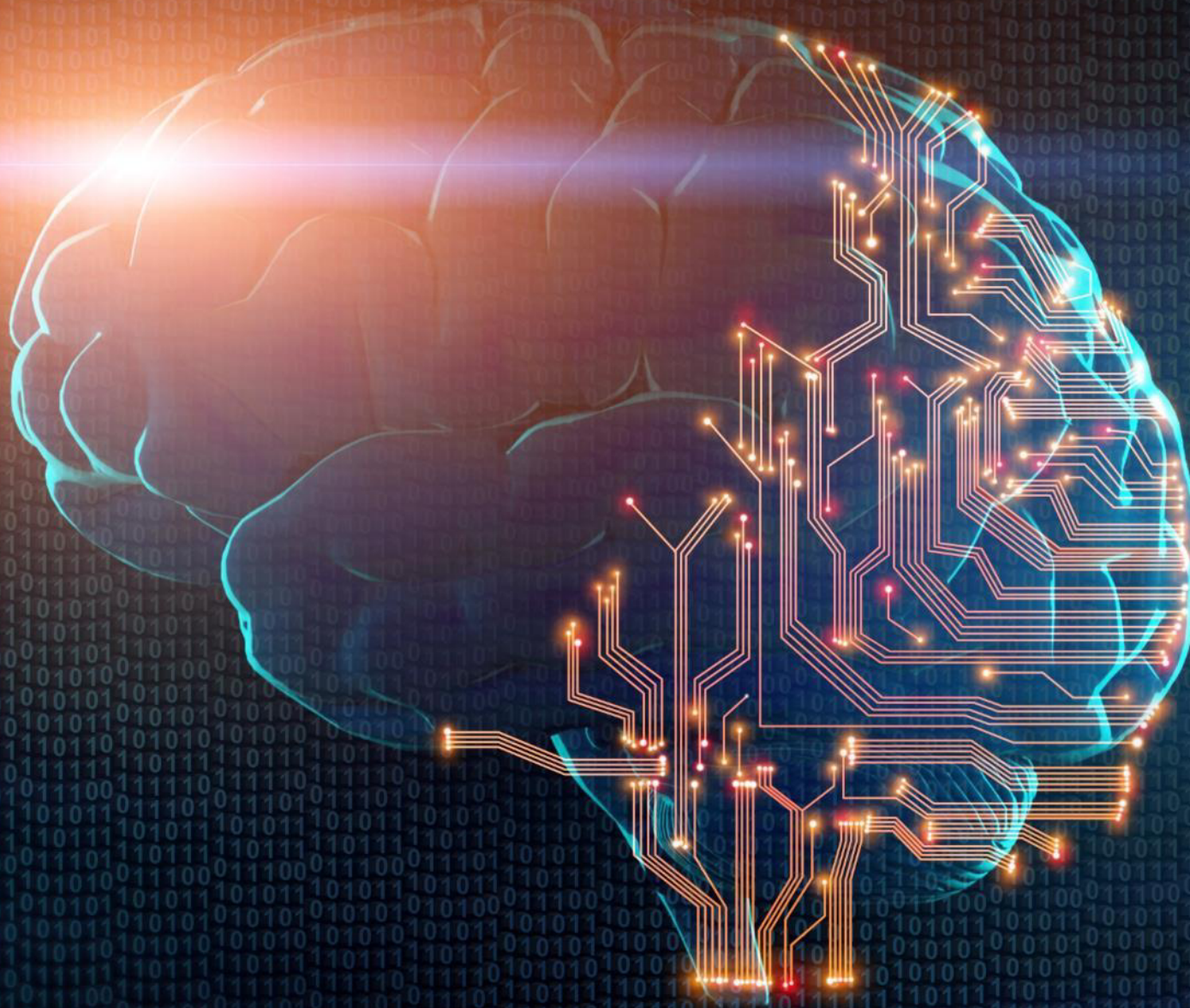
**André Mercanzini, PhD**

Aleva Neurotherapeutics SA

Adept Neuro SA

deepCDR Biologics AG

# The Dawn of the Era of Brain Therapy



The global health burden of neurological and mental health disorders can only be met with new technological approaches to therapy



# The world's billionaires are the main investors in neuroscience... and are building dominant companies



Neuralink has raised over 350MUSD

"Neuralink will solve a lot of brain-related diseases," said Musk, naming autism and schizophrenia as examples. Neuralink has the potential to treat neurological conditions such as Parkinson's and Alzheimer's.



"Mainframes became PCs and then smartphones. The \$1B genome became the \$1,000 genome. The brain and mind are next,"

Bryan Johnson

CEO and Founder of Kernel, raised over 100MUSD



WYSS CENTER



Hansjörg Wyss

200MUSD donation to the Wyss Center for Neuroengineering in Geneva, Switzerland



Paul G. Allen

1953-2018

Co-Founder of Microsoft



The Chinese Buddhist Billionaire  
Who Wants to Fix Your Brain

China's first internet titan is throwing billions at the mysteries of our gray matter

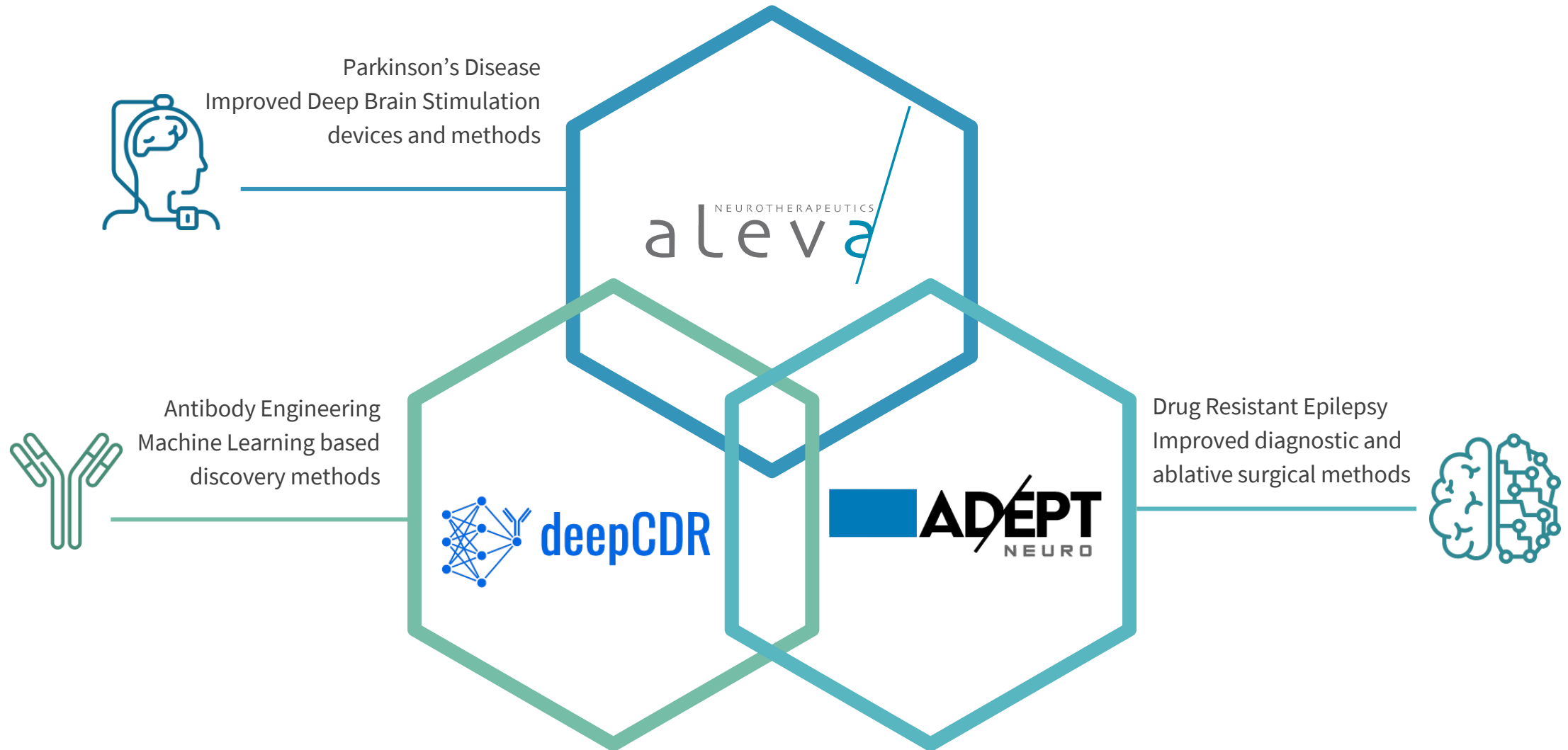
Caltech

Tianqiao and Chrissy Chen Institute for Neuroscience

Chen has set aside \$1 billion to fund research on neuroscience, including \$115 million to create the Tianqiao and Chrissy Chen Institute for Neuroscience at the California Institute of Technology (CalTech).

# A Tale of Three HealthTech Startups

The importance of Neuroscience and Neurology







# Aleva Neurotherapeutics

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*Corporate Presentation*

May 2023

 Degroof Petercam | Investment Banking

## Improving Patients' Lives

The first and only company in the world dedicated entirely to Deep Brain Stimulation

## Large and Growing Markets

Only 8% of Parkinson's patients are implanted, creating a \$6B underpenetrated market

## VC Funded to Drive Innovation

75M CHF in financing, one of the largest medical device raises in Switzerland



## Born at EPFL: A unique Physician and Engineer Collaboration

*A long standing professional and personal friendship*



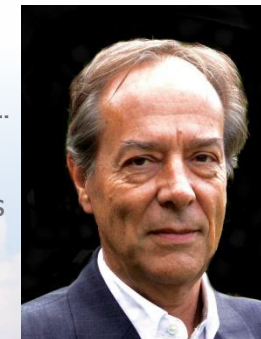
**André Mercanzini, PhD**  
**Founder and CSO**

BSc University of Toronto  
MS Stanford University  
PhD EPFL  
Serial Entrepreneur and Innovator with  
over 60 worldwide patents, and founder  
of four healthcare startups



**Prof Claudio Pollo, MD**  
**Founder and Neurosurgeon**

Functional Neurosurgery for Movement  
Disorders, Epilepsy and Psychiatric Disorders  
MD University of Geneva  
MEng EPFL  
Innovator and founder of several neuro  
startups



**Prof Philippe Renaud, PhD**  
**Founder and Technology Advisor**

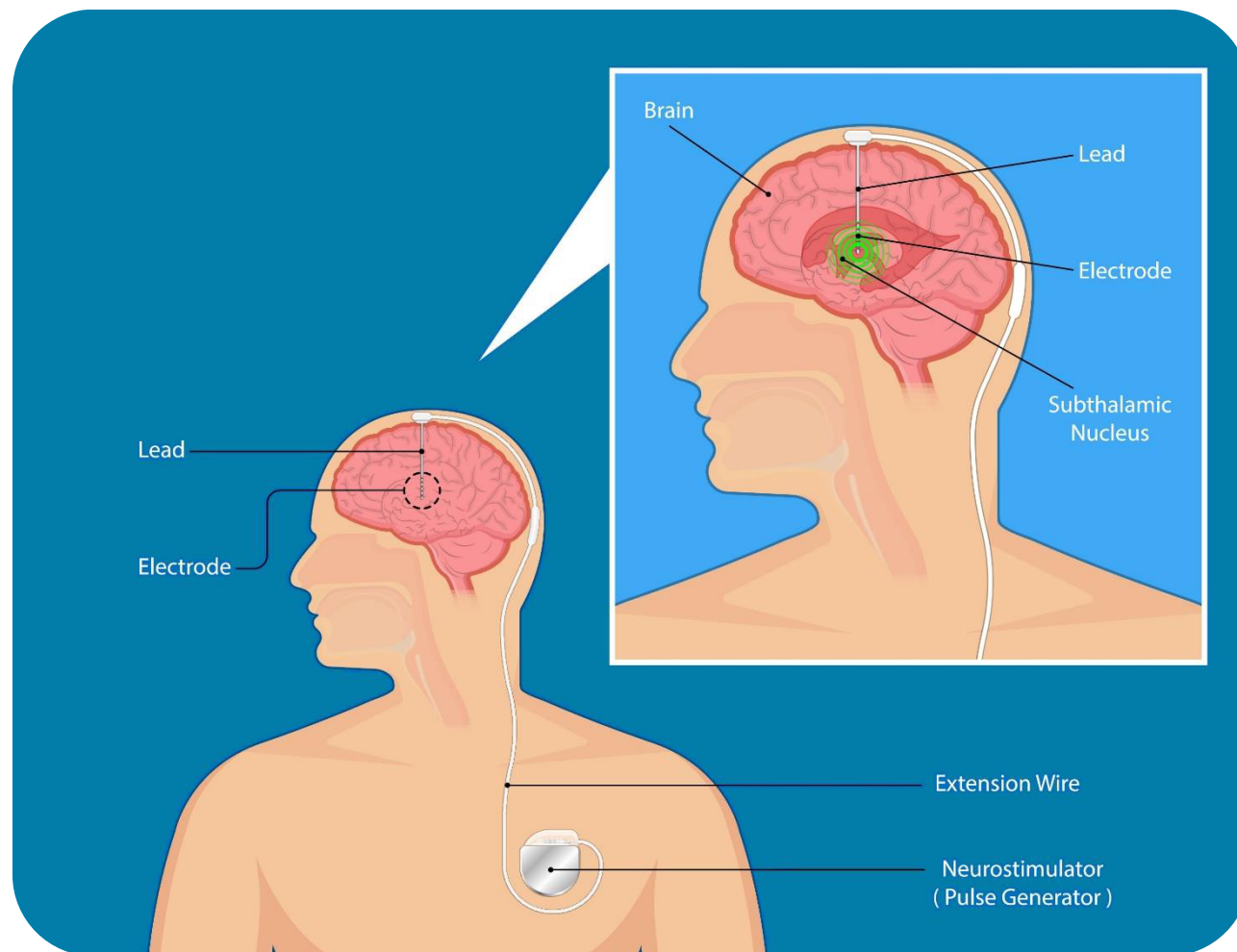
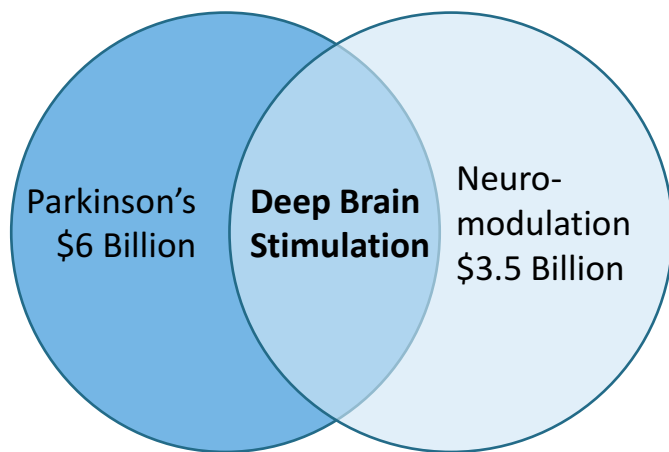
Director of Microsystems Laboratory at EPFL  
PhD Physics UNIL  
Post-Doc Berkeley  
Serial Innovator and founder of over 15  
spin-offs from his laboratory



# DBS: A Large Underpenetrated Market

## 2022 DBS Market

- Rapidly adopted therapy that has quickly grown to \$800 Million directly addressable market
- 15% CAGR including >4% growth in incidence of Parkinson's
- Compounding large Parkinson's and Neuromodulation markets provides additional product opportunities such as Epilepsy and Depression





# directSTIM Directional Deep Brain Stimulation System

## CE-Mark in 2020

- The only company in the world to have an active implantable device based on MEMS technology approved for sale

## Market entry in DACH Q2'2021

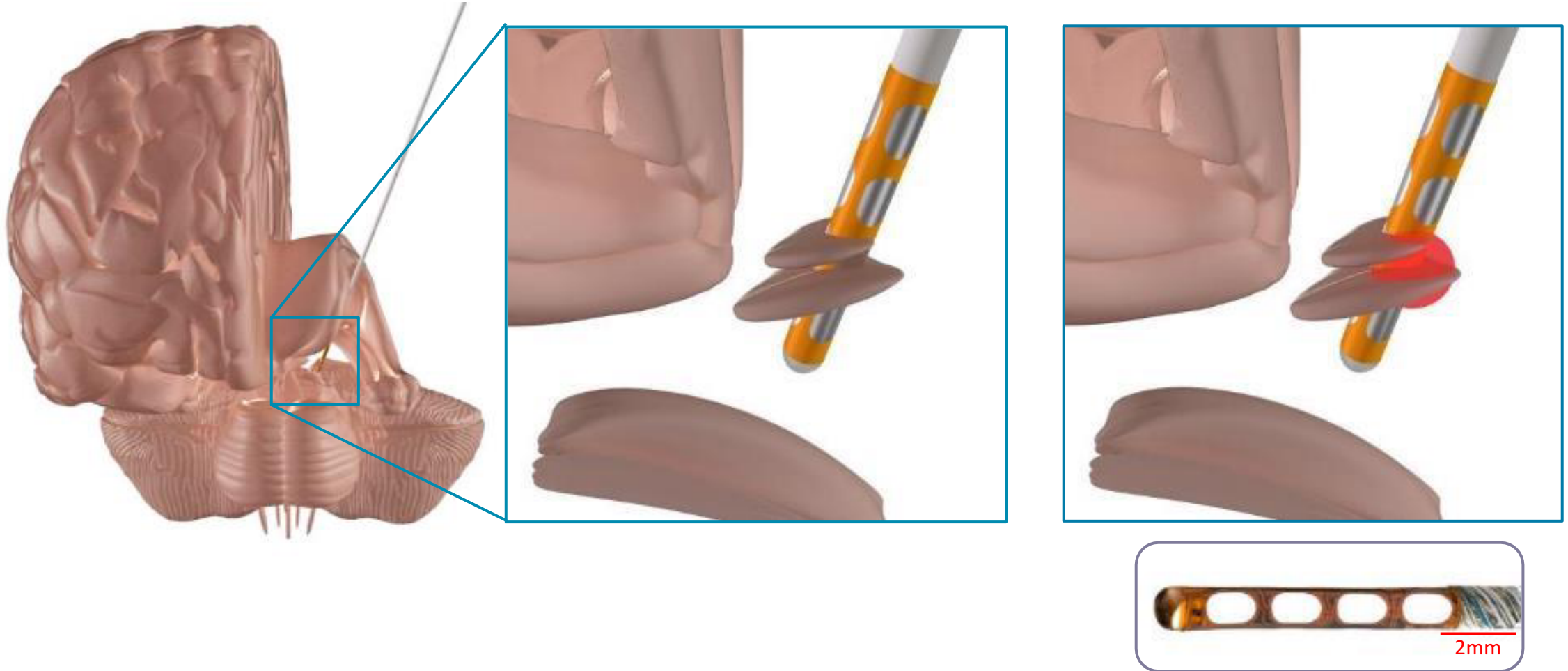
- Highest reimbursement codes possible in Germany and Switzerland
- **35% Premium pricing over Medtronic**

## FDA IDE Approval in Q1'2022

- Currently recruiting US sites for clinical study and preparing market entry

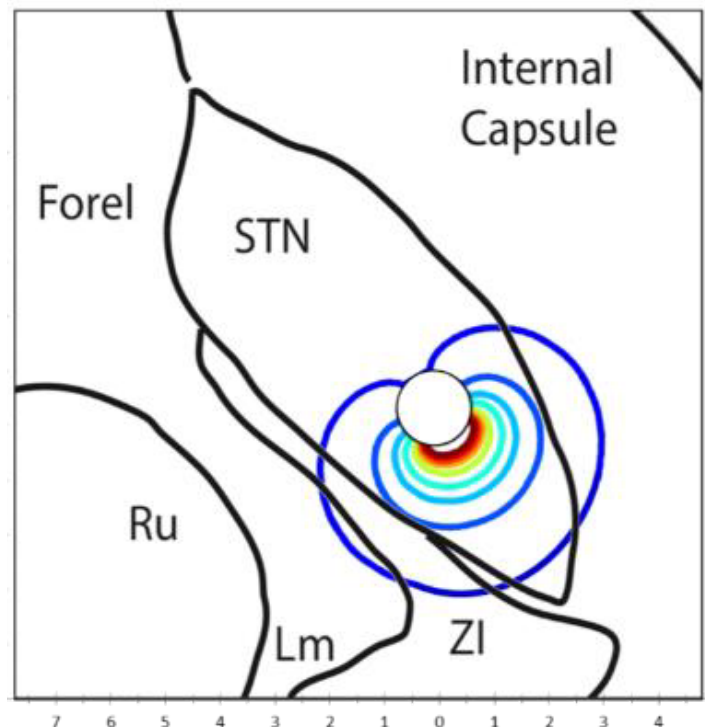


# Existing Technology to Next Generation Comparison

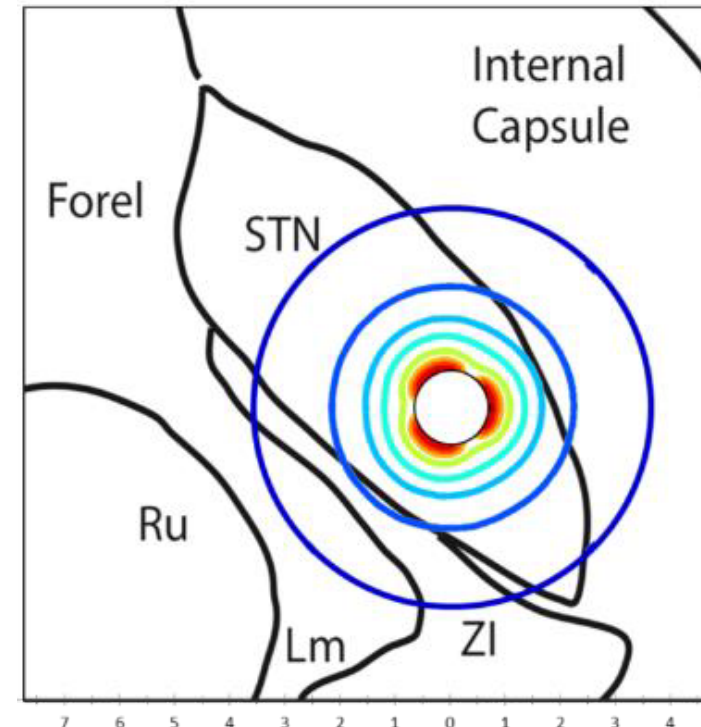




# Directional Stimulation Concept



**Postero-lateral stimulation at 1.8 mA**



**Omnidirectional stimulation at 3.0 mA**

# Aleva's path to market

## Born of an EPFL and CHUV Collaboration

- Years of development, government support, and Venture Capital
- Leading to the first introduction of Directional DBS

## The first use of MEMS Technology in the Brain

- High tech components designed and made in Switzerland
- Entirely based on EPFL Technology

## A New Global Leader in DBS

- Through Parkinson's Disease and a pipeline of secondary indications
- Financial independence achievable towards IPO with high margins





The background is a dark blue field with a glowing, particle-based brain silhouette in the center. The brain is composed of many small, bright blue and white dots. To the left of the brain, there is a solid blue rectangular block. The word 'ADEPT' is written in large, bold, black capital letters, with a diagonal slash through the 'D'. Below it, the word 'NEURO' is written in smaller, bold, brown capital letters. In the bottom right corner, there is a blue rectangular box containing white text. The overall aesthetic is futuristic and scientific.

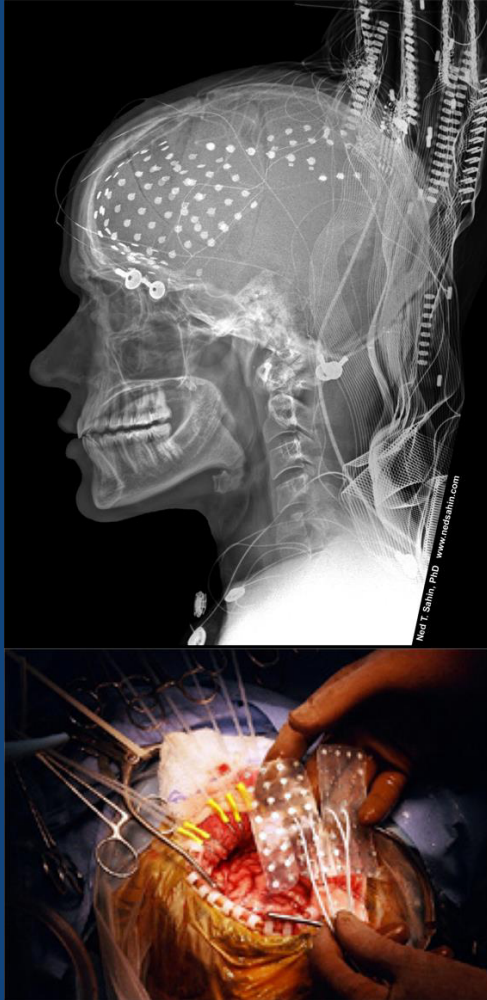
# ADEPT

## NEURO

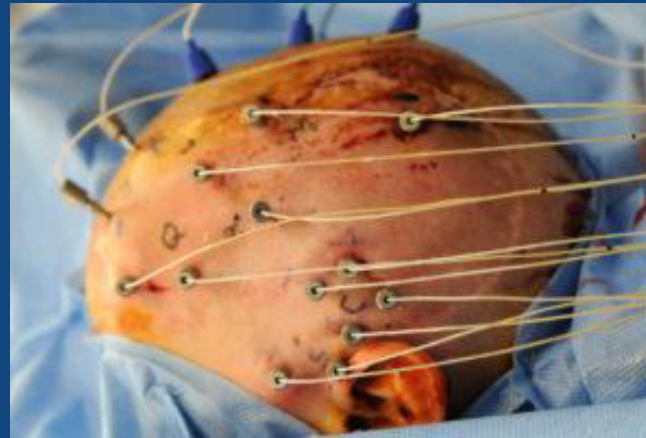
**Adept Neuro SA**  
EPFL Innovation Park,  
Building D  
1015 Lausanne  
Switzerland



# Current practices for EEG readout – ECOG and SEEG



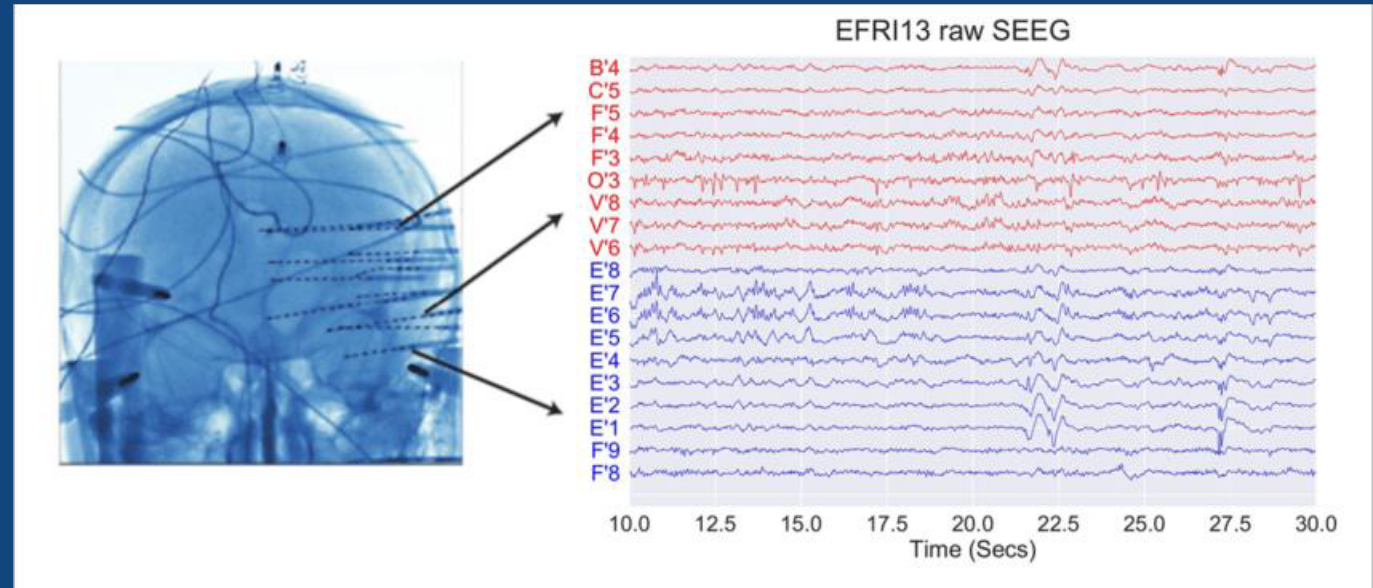
ECOG (ElectroCorticoGraphy)  
part of the skull is removed to apply  
electrodes onto the cortical surface  
(grids of electrodes)  
Higher risk of infection and hemorrhage  
Longer surgery time



SEEG (Stereo Electro EncephaloGraphy)  
small holes are drilled in the skull to implant thin depth electrodes  
Better intracranial signal detection  
However, sensitive to environment noise



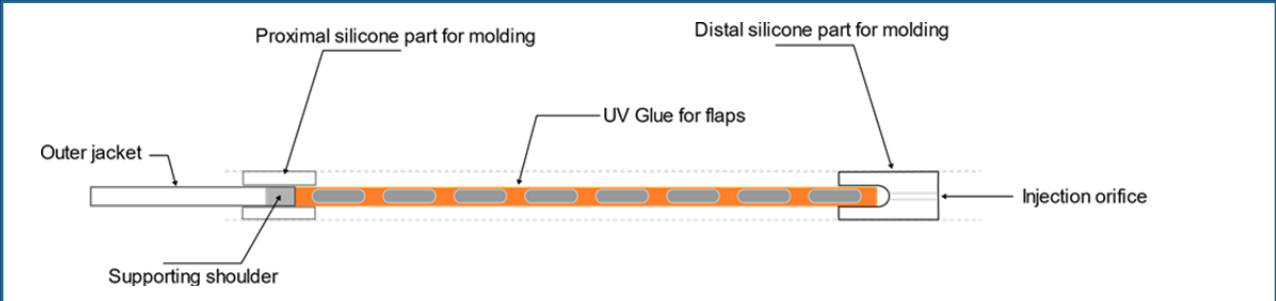
From 10-15 electrodes placed per hemisphere



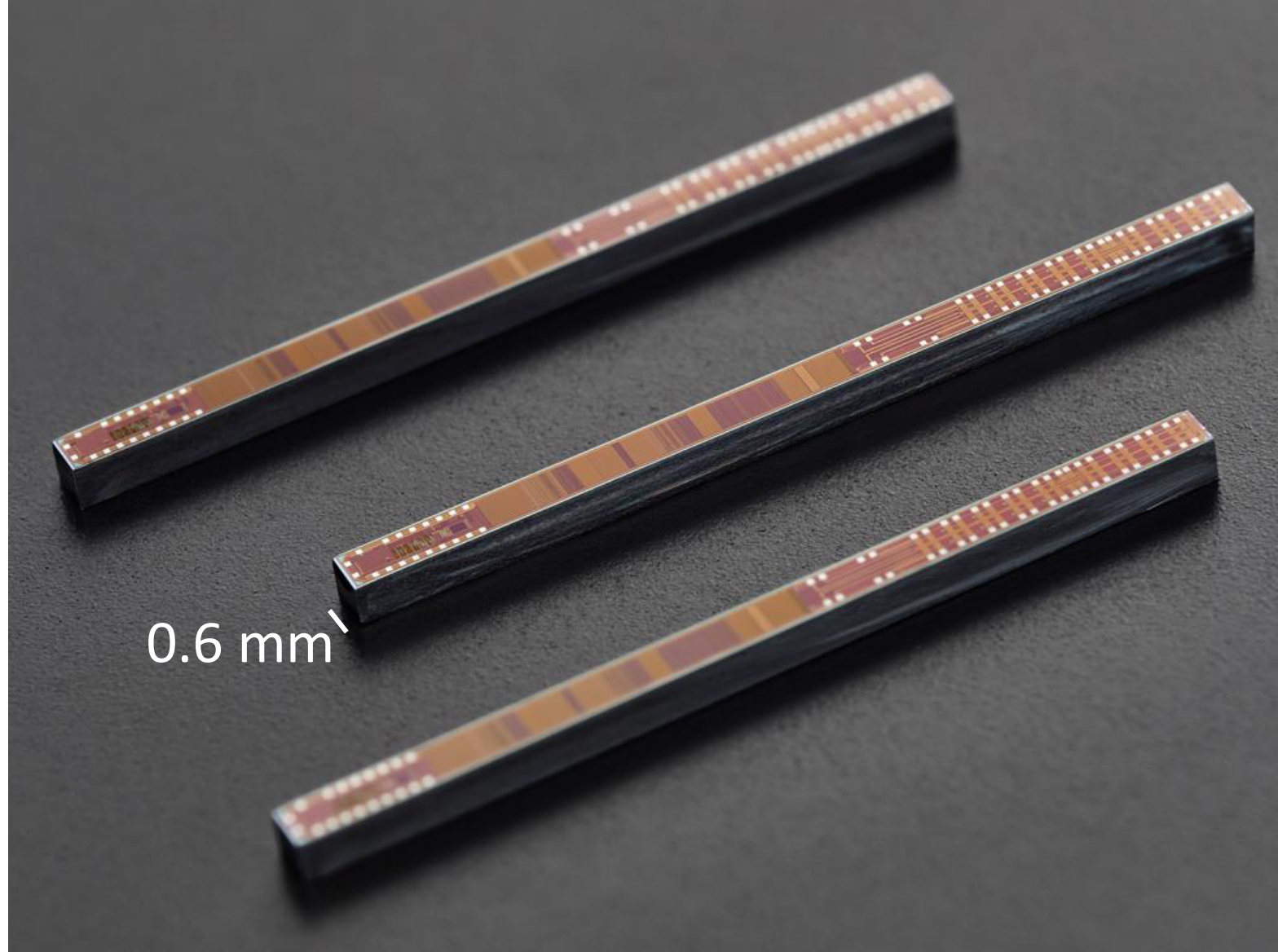


# 0.8mm diameter multi-contact SEEGs electrodes

- Prototype Manufacturing Order
- 1 Folding of 1st flap
- 2 MEMS Placement and Wire preparation
- 3 Bonding
- 4 Glob top application and curing
- 5 Slide support tube in place and Mount outer jacket over support tube
- 6 Rolling and insertion of 2nd flap
- 7 (Gluing of flaps)
- 8 Mount silicone tube for distal tip
- 9 Vertical injection
- 10 Molding (Curing)
- 11 De-Molding and Clearing
- Prototype Release



# Enter the era of ASIC enabled Brain implants



1<sup>st</sup> assembly and co-molding with an ASIC



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

**What is it like to follow an  
Entrepreneurial career...**



# Difficulties Along the Way

## Financing in Europe

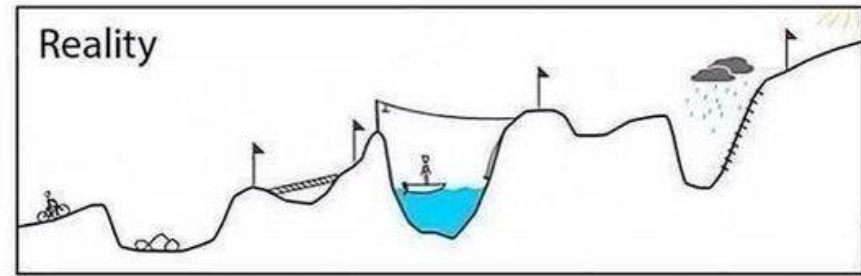
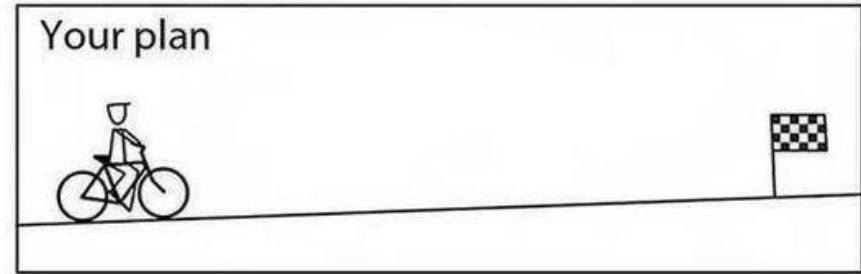
- Financing markets are not as extensive in the US. Access to capital is restrained, and large financing rounds are not typical.

## Failed Exit

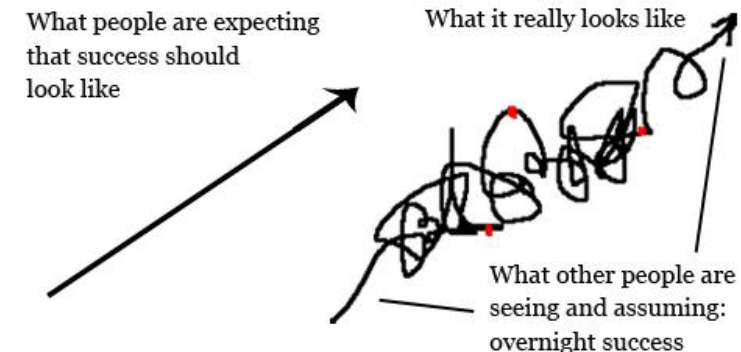
- Acquisition offer in 2014 with major strategic partner fell through. Difficult to regain investor confidence afterwards.

## Strategic Investor backed out

- In 2016 the C Round was led by an important strategic partner. In 2018 they backed out of an investment obligation which created 6 months of legal and financial problems.



## SUCCESS is Not a Straight Line



# Entrepreneurial Life

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- Get used to this:



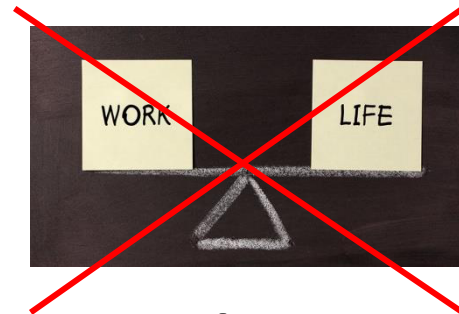
- Forget about this:



**Vacations**



**Friends**



**Balance**

# Entrepreneurial Attitude

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1. 'Start small, think big, move fast'
2. 'Fail early, and fail often'
3. 'More money is not the solution to your problems'





★ Technology    ★ Clinical    ★ Regulatory    ★ Reimbursement