

# INVESTMENT DIGEST

**NeuroTech Industry Overview 2021 / Q2** 

## **Table of Contents**

Investments in NeuroTech Industry	3
Leading Companies by Amount and Stage of Funding	7
Investment Landscape at a Glance	12
NeuroTech Industry Landscape / 2021 (Mind Maps)	14
50 Leading Companies in NeuroTech Sector	19
Top-10 NeuroTech Companies by Total Investments in Q2 2021	21
50 Leading Investors in NeuroTech Sector	24
NeuroTech Industry Market Timeline	30
Conclusions	31
NeuroTech Publicly Traded Companies	33
NeuroTech Market Capitalization	34
Top-10 NeuroTech Publicly Traded Companies	36
Main NeuroTech IPOs in 2020-Q2 2021	38
Conclusions/Key Takeaways	43
About NeuroTech Analytics	48
Disclaimer	55

## **NeuroTech Investment Digest at a Glance**

This Investment Digest is summarizing key players and observations in the private equity and venture capital ecosystem, focusing on the NeuroTech industry. Here we have summarized information about key industry trends, more than 1200 promising NeuroTech companies, 50 leading investors in this sector, and more than 90 NeuroTech-focused publicly traded corporations, outlining major investment rounds and relevant R&D trends illustrating the industry traction and readiness of institutional investors (big pharma/biotech) to potentially acquire most successful NeuroTech startups.

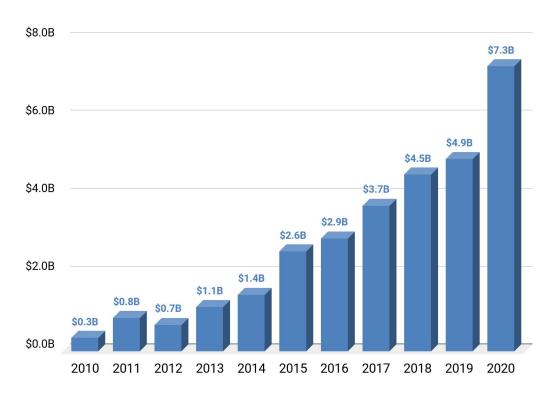
Covid pandemic facilitated biotech capital market development in general, although NeuroTech market cap of publicly traded companies stagnated in the previous year.

3 NeuroTech companies made IPO in Q4 2020, whereas more than a hundred received private equity funding.

NeuroTech is now regularly embraced as a major topic of interest for panel discussions and entire conference series by top-tier finance and business media brands including The Economist, Financial Times and Bloomberg.

As the technology continues to evolve, meeting the needs of the developing market will require dynamic approaches in understanding and delivering the types of goods and services demanded.

# **Investments in NeuroTech Industry**



# Total early stage investments into NeuroTech Industry by 2021: \$7.3B

**NeuroTech Industry** is one of the most promising and prospective sectors of modern biotech in particular and exponential markets in general.

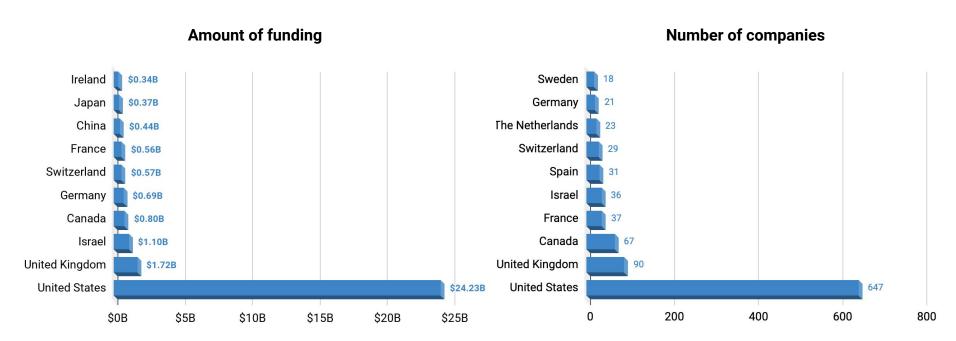
Corporations, investors and other agents who will be able to utilize this growth and development will gain essential competitive advantages in their struggle for new markets, audiences, funding, and technologies.

That competition is presented by the amounts of investments in new biotech companies. During the last 10 years, amount of investments in NeuroTech companies increased in 21 times from \$331 million to \$7.3 billion.

**Overall investments** in the NeuroTech companies amounts to \$33.2 billion.

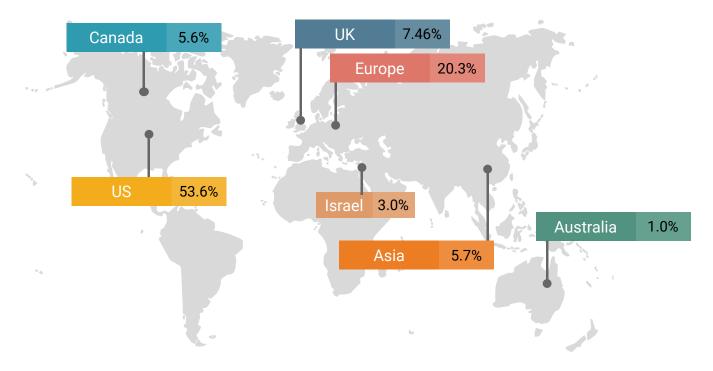
Current report is based on the data of 1200 companies, 100 public and 50 leading investors.

## **Top-10 Countries in NeuroTech Sector in 2021**

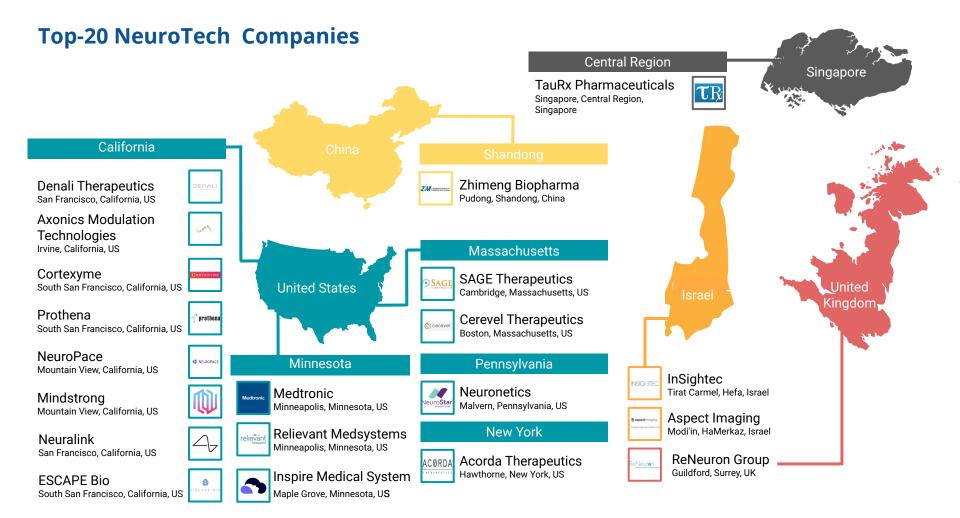


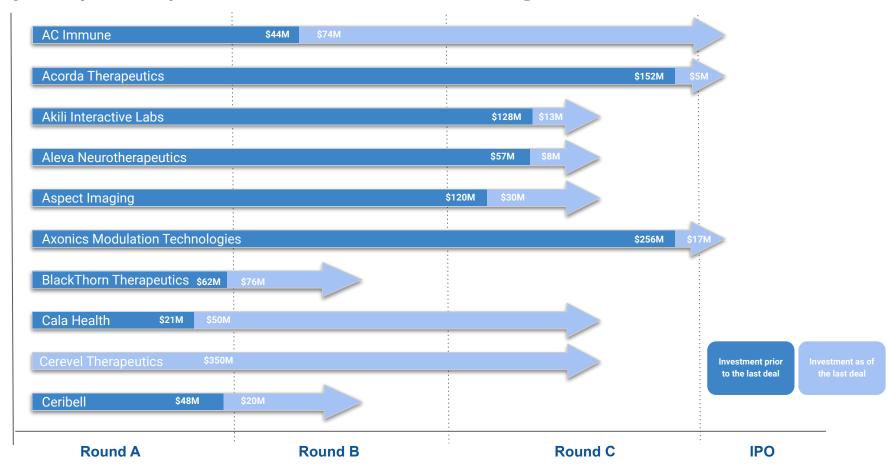
The United States firmly leads in NeuroTech Industry as shown by such quantitative indicators as total amount of investments and number of companies operating in the sector. 647 US-based companies have raised more than \$24 billion total funding by the beginning of 2021. Equally as well-known for its strong biomedical community as the US, United Kingdom is the second most invested country with \$1.7B total investments. Other countries with intense focus in NeuroTech Industry include Canada, Israel, Germany, Switzerland, France, and others. Europe is the most active region in the sector.

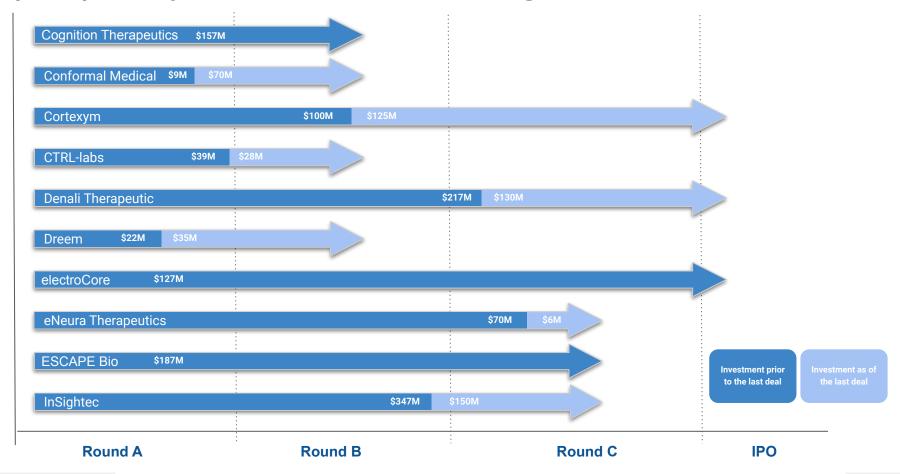
## **1200 NeuroTech Companies: Regional Proportion**

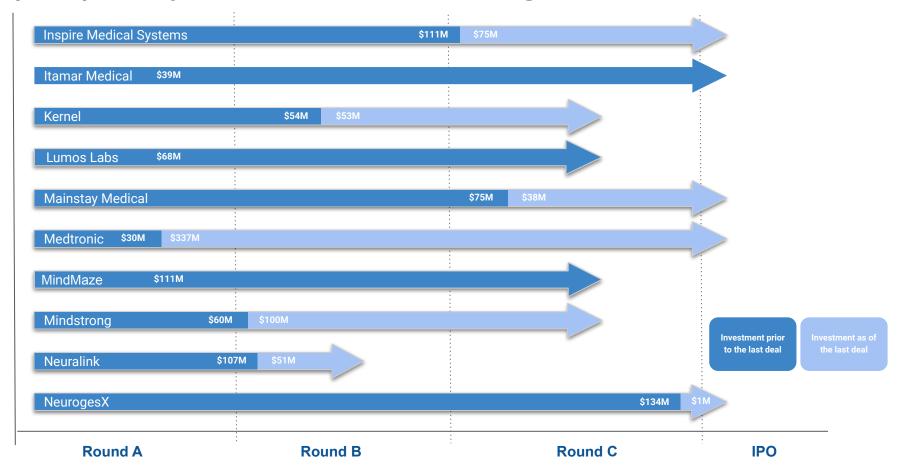


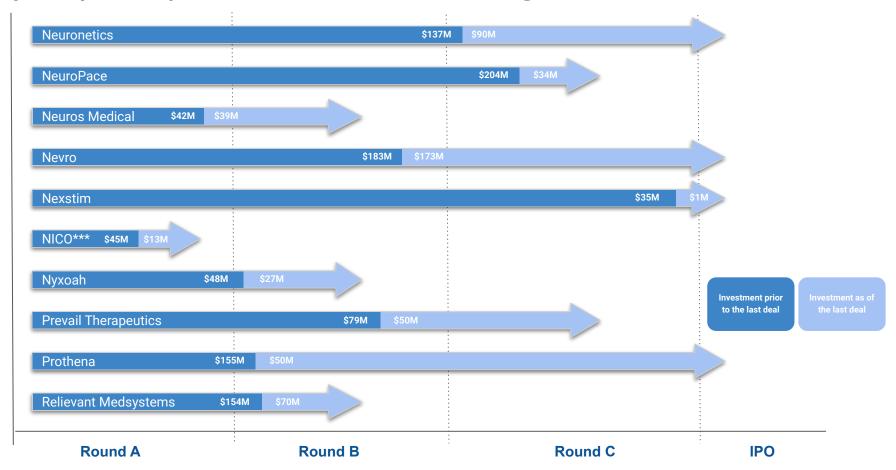
The US is still firmly in the lead in terms of its proportion of NeuroTech companies. With Canada and European countries, they hold 87% of the whole market. Another big part of the market, 8.7%, belongs to Asia. However, Asia-Pacific region has begun to aggressively increase its activity in NeuroTech Industry. Now, the most active asian country is Israel with 36 active companies. With Singapore and China, this 3 countries are the leaders of the APAC market.

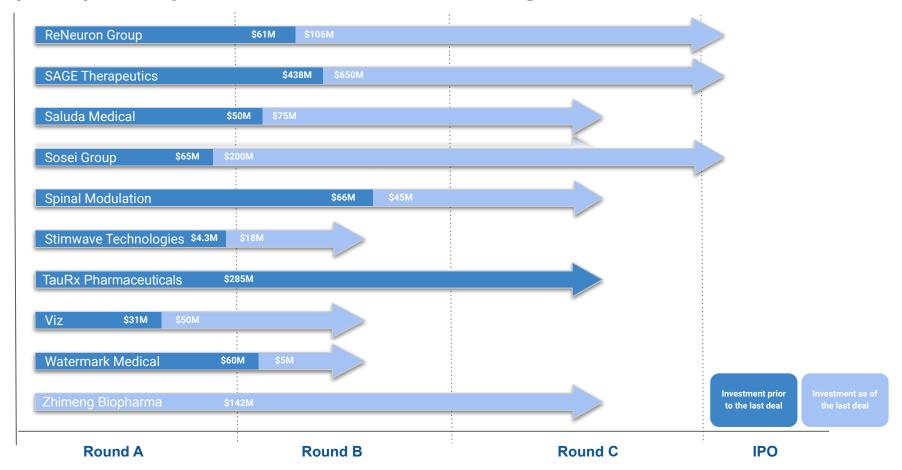












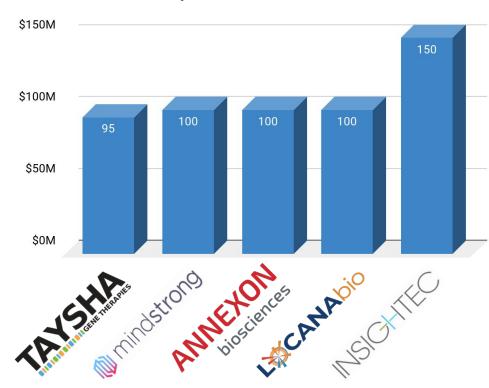
## **Investment Landscape at a Glance**

As of beginning of 2021, total investments into the NeuroTech companies globally had crossed the \$30.7 billion mark, of which \$13.2B were raised in 2020 and 2021.

Some of the major deals included:

- InSightec \$150M earmarked for supporting research to evaluate focused ultrasound for treating essential tremors (Series F round);
- Locanabio \$100M earmarked for treatments aimed at degenerative diseases (Series B round);
- Annexon Biosciences \$100M earmarked to advance broad pipeline of classical complement therapeutics (Series D round);
- Mindstrong \$100M to scale its virtual mental healthcare and digital symptom measurement offering (Series C Round);
- Taysha Gene Therapies \$95M to bolster its initial clinical studies (Series B Round).

## **Top-5 Investment deals**

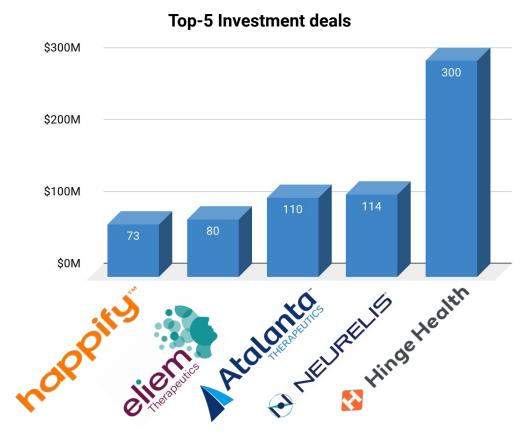


## **Top Investment Deals in Q1 2021**

During the first 3 month of 2021, new announced investments into the NeuroTech companies globally had reached the \$1.24 billion mark.

Some of the major deals included:

- Hinge Health \$300M (Series D round);
- Neurelis \$114M earmarked to commercialize its lead orphan drug product, VALTOCO® (diazepam nasal spray), and to continue the development and expansion of its neuroscience pipeline (Series D round);
- Atalanta Therapeutics \$110M earmarked to pioneer RNAi therapeutics for neurodegenerative diseases (Series A round);
- Eliem Therapeutics \$80M earmarked to progress multiple clinical stage assets targeting neuronal excitability disorders (Series A round);
- Happify \$73M to advance and expand Digital Health Platform (Series D Round).



# **NeuroTech Landscape Overview 2021 Sector Classification**



## NeuroPharmacology



## **Brain-computer interfaces**



## **Cognitive Assessment & Enhancing**



#### **NeuroModulation**



## NeuroMonitoring / Imaging

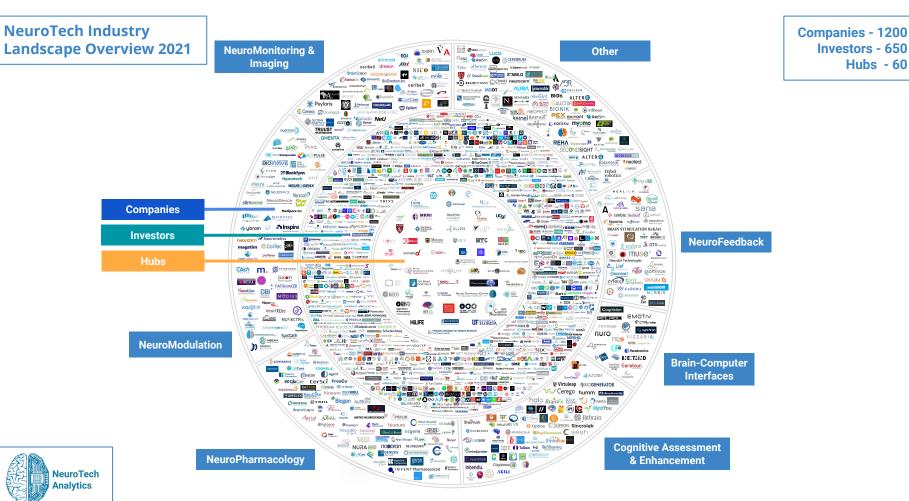


## **NeuroFeedback**



#### Other





Investors - 650

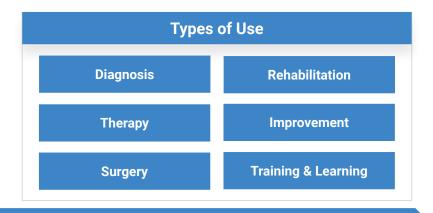
Hubs - 60





# **NeuroTech Industry Framework**





Markets				
Healthcare	Education			
Wellness	Lifestyle Computing			
Sport	Military			

Opportunities & Concerns					
Enhancement vs. therapy	Safety				
Cognitive Liberty	Hype & False Claims				
Human Identity	Distributive Justice & Access				

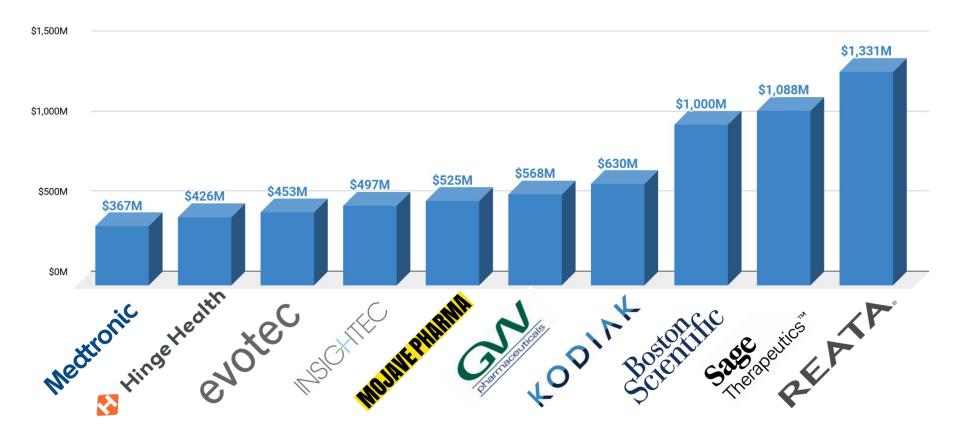
# **50 Leading Companies in NeuroTech Sector**

1	AC Immune	14	CTRL-labs			
2	Acorda Therapeutics	15	Denali Therapeutics			
3	Akili Interactive Labs	16	Dreem			
4	Aleva Neurotherapeutics	17	electroCore			
5	Aspect Imaging	18	eNeura Therapeutics			
6	Axonics Modulation Technologies	19 ESCAPE Bio				
7	BlackThorn Therapeutics	20 InSightec				
8	Cala Health	21	Inspire Medical Systems			
9	Cerevel Therapeutics	22	Itamar Medical			
10	Ceribell	23	Kernel			
11	Cognition Therapeutics	24	Lumos Labs			
12	Conformal Medical	25	Mainstay Medical			
13	Cortexyme					

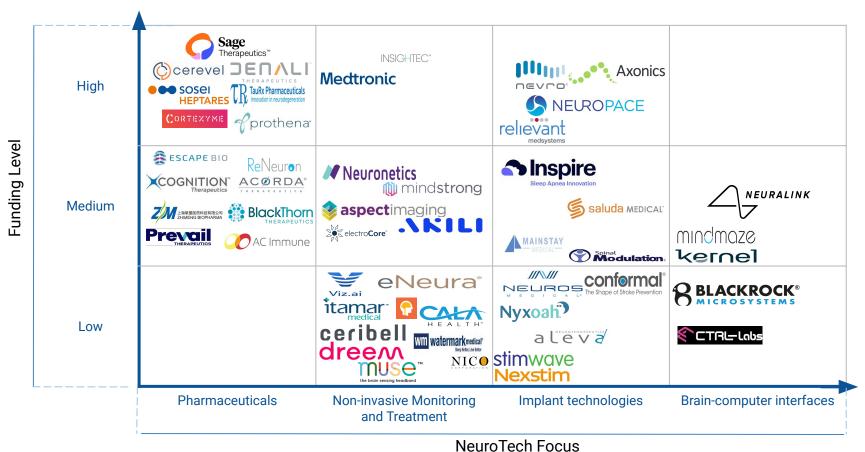
# **50 Leading Companies in NeuroTech Sector**

26	Medtronic	39	Prothena			
27	MindMaze	40	Relievant Medsystems			
28	Mindstrong	41 ReNeuron Group				
29	Neuralink	42 SAGE Therapeutics				
30	NeurogesX	43 Saluda Medical				
31	Neuronetics	44 Sosei Group				
32	NeuroPace	45 Spinal Modulation				
33	Neuros Medical	46	Stimwave Technologies			
34	Nevro	47	TauRx Pharmaceuticals			
35	Nexstim	48	Viz			
36	NICO	49	Watermark Medical			
37	Nyxoah	50	Zhimeng Biopharma			
38	Prevail Therapeutics					

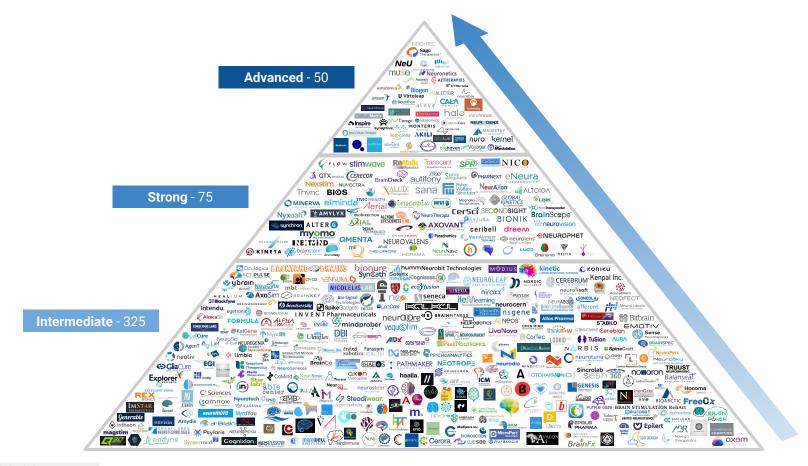
# **Top-10 NeuroTech Companies by Total Investments in 2021**



# **Comparison of Top NeuroTech Companies**



# **NeuroTech Landscape Overview 2021 Company Benchmarking**



# **Comparison of Top NeuroTech Companies**

NeuroTech Focus

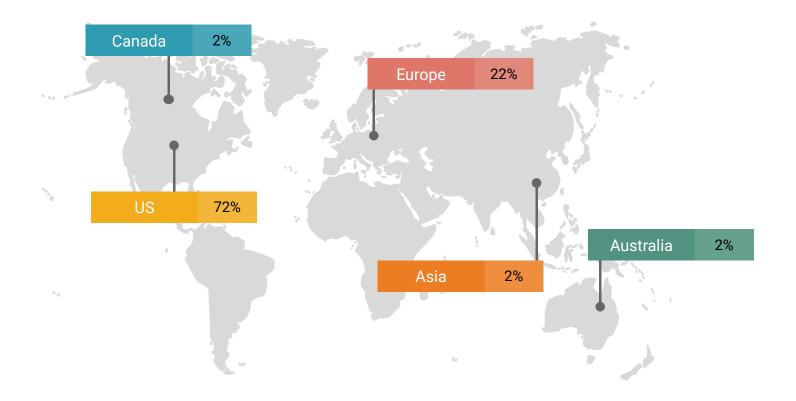
**Brain-computer** NEURALINK mindmaze P BLACKROCK® interfaces kernel € CTRL—Labs ◆ Inspire relievant NEUROS conformal **S** NEUROPACE Implant technologies Saluda MEDICAL Nexstim Axonics UEALO. Nyxoah? a Leva stimwaye dreem sapectimaging the broin sensing beadband the broin sensing beadband eNeura<sup>®</sup> Non-invasive Monitoring Medtronic electro**Core** ✓ Neuronetics and Treatment INSIGHTEC\* NICO ceribell watermarkmedical tamar medical HEALTH Cereve TR TauRx Pharmaceuticals Therapeutics" ReNeuron CORTEXYMI **Pharmaceuticals** ACØRDA® ZM 上海华州区市村技有限公司 ZHIMENG BIOPHARMA **₽**prothena COGNITION' AC Immune Prevail 🕦 BlackThorn Lab Development/Preclinical **Clinical Trials** Pre-Production or Trials Commercialized

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Aging Analytics Agency

# **50 Leading Investors in NeuroTech Sector**



# **Top-50 Investors: Regional Proportion**



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# **50 Leading Investors in NeuroTech Sector**

1	Alexandria Venture Investments	14	Forbion Capital Partners		
2	ARCH Venture Partners	15	Foresite Capital		
3	BioScience Managers Limited	16	Foundation for Technological Innovation (FIT)		
4	Boston Scientific	17 Fountain Healthcare Partners			
5	Bpifrance	18	GE Capital		
6	Capricorn Partners	19	General Catalyst		
7	Cormorant Asset Management	20	GEOC		
8	Dolby Family Ventures	21	Gilde Healthcare		
9	Domain Associates	22	Greatbatch		
10	EASME - EU Executive Agency for SMEs	23	GV		
11	EcoR1 Capital	24	Innovation Works		
12	F-Prime Capital	25	InterWest Partners		
13	Flagship Pioneering				

# **50 Leading Investors in NeuroTech Sector**

Johnson & Johnson
Khosla Ventures
Kleiner Perkins
Life Sciences Partners
Lundbeckfonden Ventures
Lux Capital
Mayo Clinic
Medtronic
MPM Capital
New Enterprise Associates
OrbiMed
OUP (Osage University Partners)
Pfizer

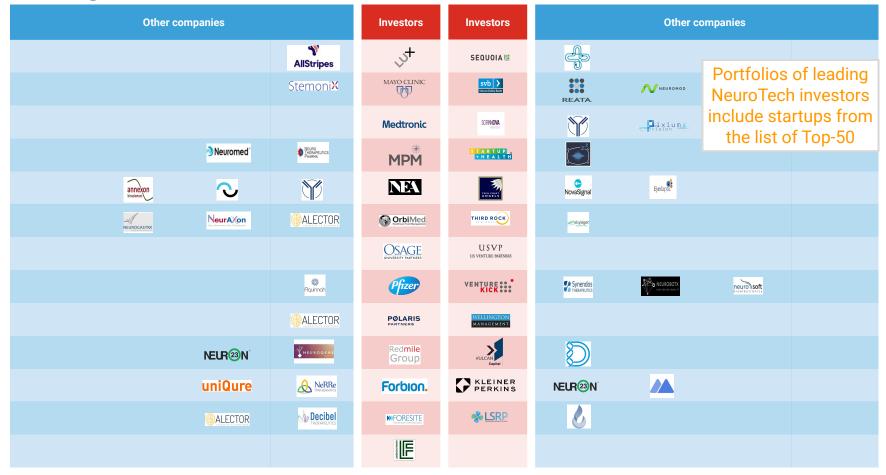
Polaris Partners
Redmile Group
Sequoia Capital
Silicon Valley Bank
Sofinnova Partners
StartUp Health
Tech Coast Angels
Third Rock Ventures
U.S. Venture Partners (USVP)
Venture Kick
Vulcan Capital
Wellington Management

# **50 Leading Investors NeuroTech (Part 1)**

Other companies	Investors	Investors	Other companies				
FREQUENCY THERAPOUTICS	श्रीके HEROPHILUS	A LEXA N D R.I.A. VENTURE INVESTMENTS	FIT rectation part instantion lectrologics	BIOSCIENCES		D (6.1)	61 1:
	Magnolia NeuroSciences	ARCH VARYONS VARYONS	FOUNTAIN HEALDHCARE PARTMERS	8	NEUROMOD	Portfolios NeuroTech	of leading n investors
		BioScience Managers	GE Capital	SONITUS MEDICAL		include startups from the list of Top-50	
	TVA   medical	Scientific Advancing science for Me*	GENERAL (G) CATALYST	BIOM Personal Blanks			. тор ос
Santen	ixiumu	bp <mark>ifrance</mark>	GEOC GO CAPITAL & ECC				
	<b>STAR</b> MEDICAL	Capricorn VENTURE PARTNERS	HEALTH CARE	•,	<b>BIOM</b> Personal Bionics		
	NEUROGENE		<b>Greatbatch</b> Medical	intelect'			
HEROPHILUS	NeuroTherapia	DOLBY FAMILY VENTURES	G/	ALECTOR	TAYSHA		
	RVO° REVISION OPTICS	DOMAIN ASSOCIATES	innovation works	^∕ ∧POLLO			
<u>NeuroDevice</u>	neuroste er	EASME	INTERWEST PARTNERS	LABRYS BIOLOUICS	RVO REVISION OPTICS	Cardi Mind	
WNEUROGENE	nurîx	EcoR1	J-48	S S			
imagen	NEURO THERAPEUTICS PHARMA	F/PRIME CAPITAL PARTNERS	khosla ventures	FLOW	neurotrack		
Quanterix	CODÍAK	Flagship Pioneering					

Deep Pharma Intelligence

# **50 Leading Investors NeuroTech (Part 2)**



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## **NeuroTech Industry Market Timeline**

Fundamental science development

- Major scientific discoveries supporting further NeuroTech industry development were made.
- However, only few market players believed in NeuroTechnologies.

Early tech approaches

- Many pilot projects failed due to the lack of scientific validation and immaturity of the technologies, creating a lot of criticism towards the whole industry.
- Since then the race for the acquisition of the NeuroTech startups began.
- Testing of the technology began.

Startup development

- Capitalization of the industry was continuously growing.
- Many bets of early investors appeared to be justified.
- Large investors, as well as financial institution, started to express interest in the longevity industry.

Early boom

- Hype over
- NeuroTech industry is growing.
- Competition for the most successful NeuroTech companies increased drastically.
- Most developed NeuroTech startups are becoming mature companies, large institutional investors are being attracted to the industry, full-fledged industry infrastructure is being developed.

Transition from quantity to quality

- Intensive cooperation of NeuroTech companies with corporations, banks, and governments begins.
- Competition among advanced NeuroTech companies booms.

**Before** 2000-2010 2010-2016 2016-2019 2020-2021

## **Conclusions**

## I. Why NeuroTech has not boomed in mass market yet.

Despite the fact that impressively much has been accomplished in neuroscience over the last several years (including a recent presentation by Neuralink), neurotech companies have been struggling to enter the mass market due to a general lack of awareness of the products or expensive R&D costs. Moreover, markets have been slow to accept the new technology and many neurotech startups are only now making their products available for customers and making modest revenue.

### II. COVID-19 impact

A wider audience became hooked to neurotech during the pandemic. The COVID-19 pandemic brought additional attention to mental health issues. The pandemic highlighted mental health challenges, allowing various startups to grow and address them. Thus, once more COVID-19 became an accelerator for the industry to show wider audience the importance of its products and research.

## III. Investors are changing the approach to funding the neurotech companies

Citing the number of deals and the volume of investment, venture capital funds have preferred biotech approaches over medical devices. The degree of invasiveness of a therapeutic treatment have been the crucial factor making investors be wary to innovative approaches. However, early-stage investors, whose investments are associated with critical investment risks, consider neurotech products, notably medical devices, to be less invasive than some of the new cell therapies coming down the road. Moreover, some of them believe that cell-based therapies for neurological diseases and disorders are not effective for now, and as a result, there's a "significant opportunity" for neurological companies to grow in the next few years.

## IV. The Neurotech industry will go way up

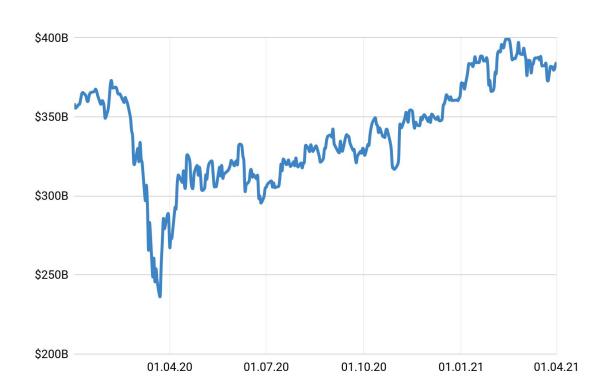
It is beneficial for investors, as it accelerates their access to biomedical technology and life extension. It is of great benefit to humanity, creating the products and services that will transport us all to new era of a long, comfortable and productive lives. It is the most ethical way of conducting business, it is the way to generate enormous profits, bringing closer yourself to the most advanced longevity technologies, and delivering more health to humanity.

# **NeuroTech Publicly Traded Companies**



# **NeuroTech Publicly Traded Companies**

### Cumulative capitalization dynamics, 2020 - 2021

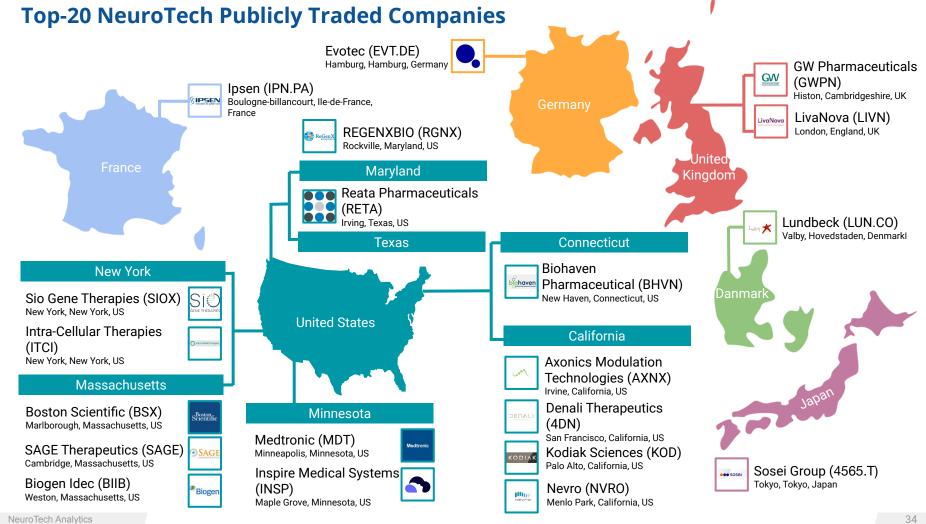


The coronavirus pandemic had a striking effect on publicly traded NeuroTech companies and caused the declining of the industry by 25%. Despite that, NeuroTech firms have recovered by the end of 2021. The majority of the market is represented by old mature healthcare companies which own different divisions with neuroscience as one of them.

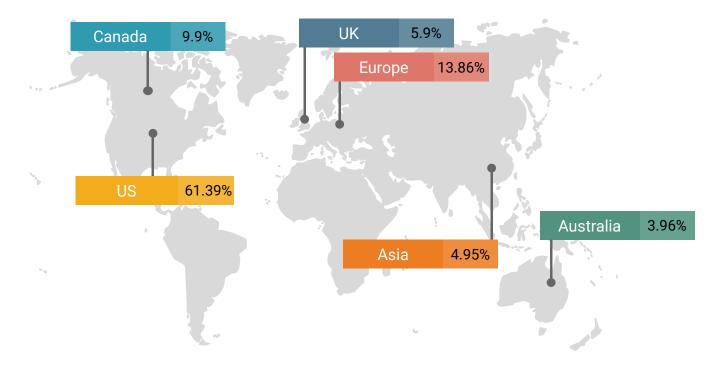
The biggest companies by market capitalization are Medtronic, Boston Scientific, Lundbeck, Biogen, Denali, TerrAscend.

Despite the dominance of the mature players, there are 5 young companies which closed IPO successfully in 2021: Annexon Biosciences, Annovis Bio, Taysha Gene Therapies, Clene Nanomedicine, Synaptogenix.

Technologically, publicly traded NeuroTech companies are similar to other companies in the sector (which reached series B or C funding rounds), which means that their market capitalization growth can be an approximation of the dynamics of the whole sector.



# **90 Public Companies: Regional Proportion**



The distribution of public companies is almost equal to general distribution of NeuroTech companies. Most of the companies located in North America or Europe and the most popular stock exchange is NASDAQ. Nevertheless, there is an increasing visible trend for NeuroTech companies in Asia. Among the biggest Asian NeuroTech companies are Sosei Group (\$66M) and SanBio (\$28M).

# Top-10 Public Companies Involved in the NeuroTech Industry by Market Capitalization in 2021



The chart represents the top 10 public companies operating in the NeuroTech sector. Most of the companies belong to the healthcare industry with departments or subsidiaries which specialized in NeuroTechnologies. Most of the top-tier companies have a large experience in transforming a medical system and innovating new medical solutions. Most of the companies develop innovative pharmaceuticals for people suffering from CNS disorders. However, there are gene therapy providers as well as suppliers of implants.

## **NeuroTech Market Capitalization**

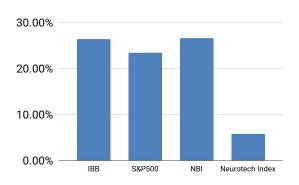
Despite the effect of current crisis, most of the experts expect significant growth of the global NeuroTech industry. The market volume has currently reached \$10.3 billion in 2020 and is looking to achieve \$15.1 billion in 2026 with 8% CAGR. This growth is driven by the resulting implementation.

NeuroTech public companies' market capitalization growth was slowed in 2020-Q2 2021 and fully corresponds to the state of the whole market (represented as S&P500 index) but not (IBB and NBI), although AI in pharma stock market segment is more volatile compared to them (as measured by standard deviation).

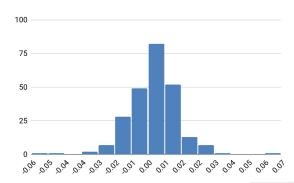
Interestingly, distribution of the returns of the NeuroTech stock market segment is left-skewed and means that rare extraordinary negative events, that occured in 2020-Q2 2021, played a large role in the dynamics of the market capitalization of the segment. Further calculations on the table displayed strong correlation of the NeuroTech market to whole market dynamics in comparison with Healthcare indices, that are proved by pharma corporations during the covid pandemic.

Index	Correlation with Indices	Average daily return in 2020	Average daily volatility in 2020	Skewness	Curtosis
NeuroTech Index	-	0.04%	2.09%	-0.48	0.16
IBB	72%	0.09%	2.03%	-0.009	-0.27
S&P500	91%	0.09%	1.99%	-0.38	-0.3
NBI	72%	0.10%	2.05%	-0.005	-0.27

#### Market capitalization growth



#### NeuroTech stock returns histogram



## **NeuroTech IPOs in 2020**

Despite the crisis, all new public companies announced successful closing of the IPO. Their stocks present high volatility with little growth by the end of the year, although net income of all corporations remains negative. All IPOs took place in the USA and 4 of 5 were made in the second half of 2020. All companies have beta smaller than 1 (although positive) which means that Al in pharma stock prices move in accordance with general market movements, yet the degree of these movements is lower (although volatility as measured by standard deviation can be relatively high)

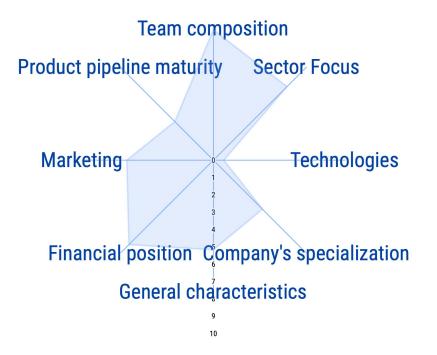
#### Capitalization change in 2020, \$B



Company	Ticker	Country	Funding Amount, M\$	Investment s in 2020 (M\$)	Number of Investors	IPO Date	Capitalizati on (M\$)	ROA	ROE	Current Ratio	Enterprise Value (M)	Net income (M)
Annexon Biosciences	ANNX	USA	504.8	350.8	17	24.08.2020	942.93	-17.81%	-18.42%	30.50	591.67	-63.41
Annovis Bio	ANVS	USA	21	12	6	28.01.2020	194.18	-67.27%	-72.43%	14.04	186.3	-5.462
Taysha Gene Therapies	TSHA	USA	282.4	282.4	13	24.09.2020	774.08	n/a	n/a	0.1	762.91	n/a
Clene Nanomedicine	CLNN	USA	120.9	71	3	30.12.2020	780.39	-30.4%	-456.75	5.4	718.89	-19.28

#### **Annovis Bio**





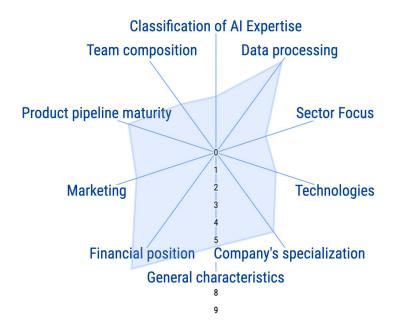
Annovis Bio is a company that discovers new medicines to treat neurodegenerative diseases. Their approach bases on inhibiting the neurotoxic proteins that kill nerve cells and improving the information transmission between neurons.



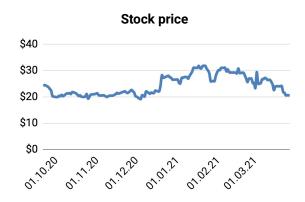
Ticker	Mean daily Volatility of daily returns		Growth after IPO	Capitalization (M\$)	
ANVS	0.007	0.09	299%	194.18	

# **Taysha Gene Therapies**





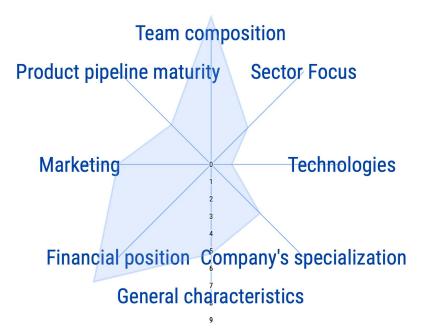
Taysha Gene Therapies discoveries and develops new ways to treat rare and frequent diseases of the central nervous system (CNS) by gene editing. They also develop next-generation technologies to improve AAV-based gene therapies.



Ticker	Mean daily return	Volatility of daily returns		Capitalization (M\$)
TSHA	-0.0001	0.04	-15%	774.08

#### **Annexon Biosciences**





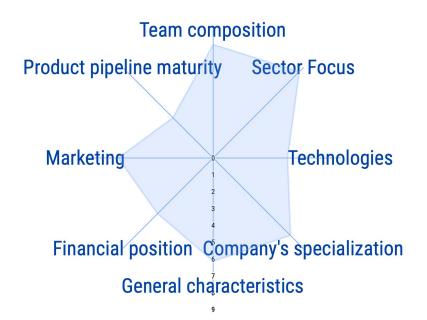
Annexon Biosciences develops new biologics (especially antibodies) for the treatment of autoimmune and neurodegenerative diseases. The range of focus diseases includes Guillain-Barre syndrome, Huntington's disease, Amyotrophic lateral sclerosis, and others.

Stock price						
\$40						
\$30	hal	M	-M n	May		
\$20	A A C	<b>~~</b>	<b>+</b> 01			
\$10						
\$0	01.09.20	01.11.20	01.01.21	01.03.21		
	01.09.20	01.11.20	01.01.21	01.03.21		

Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (M\$)
ANNX	0.003	0.05	39%	942.93

## **Clene Nanomedicine**





Clene Nanomedicine is a clinical-stage biopharmaceutical company that focuses on the development of unique therapeutics for neurodegenerative diseases. The company innovated a novel nanotechnology drug platform for the development of a new class of orally-administered neurotherapeutic drugs.



Ticker	Mean daily Volatility of daily returns		Growth after IPO	Capitalization (M\$)	
CLNN	0.01	0.12	54%	780.39	

# **Key Takeaways**



# Major Observations for 2020-Q2 2021: Key Business Takeaways

- 1. The investment in NeuroTech is relatively small in comparison with other areas of medicine and biotech, but today there is a tendency to a growing number of neurological disorders, so the development of NeuroTechnologies becomes an important part of our future life. The industry has witnessed an inflow of considerable investment estimated at \$6,1 billion. The overall investments in NeuroTech companies amount to \$33.2 billion. Interest in the NeuroTech industry is steadily growing. Among all sectors in the industry, Neuropharmacology companies tend to have more funding.
- 2. In the regional proportion, the USA is an absolute leader in the industry. With 53,6 % share of the total number of companies, the USA is far ahead of Europe, the second-biggest market with 20,3%. Only 5,7% belongs to Asian companies, but their NeuroTech sector has been strongly increasing during last years.
- 3. Despite the small number of companies, China and India are increasing total investments and size of the companies.
- 4. Despite the fact that impressively much has been accomplished in neuroscience over the last several years (including a recent presentation by Neuralink), only exceptional startups based on novel high-promise applications have been able to enter the mass market due to a general lack of awareness of the products or expensive R&D costs.
- 5. COVID-19 pandemics had a negative impact on the industry, especially on public companies, in 2020. Despite it, NeuroTech companies had recovered for the end of the year.
- 6. The first months of 2021 have shown a great interest in funding NeuroTech industry. YTD funding of NeuroTech companies has already reached \$ 2.4 billion.

## Major Observations for 2020-Q2 2021: **Key Financial and Investment Takeaways**

- 1. Despite the COVID19 pandemics, **the global NeuroTech industry** got the highest number of investments ever. During 2020 we have observed **\$6.1 bln** of investments, which is **62% more** than in 2019.
- United States is an absolute leader by total raised fundings by NeuroTech companies. During last 30 years, \$22.56 bln were invested in 649 US-backed startups and corporations.
- 3. Over 315 NeuroTech companies, funded in 2020, more than 80 closed large-sum late-stage venture capital rounds (B, C, and D). We expect some of them to go public in 2021-2022.
- 4. 2020 was marked by 5 successful IPOs in the NeuroTech sector: Annexon Biosciences, Annovis Bio, Taysha Gene Therapies, Clene Nanomedicine, Synaptogenix.
- 5. Despite the global funding boom in private investments, public NeuroTech companies received a serious blow at their stock indicators with a 25% loss of capitalization, from which they recovered only at the end of the year.
- 6. In 2021 among the most successful fundings appeared Hinge Health (\$300M), Neurelis (\$114M), Atalanta Therapeutics (\$110M).
- 7. At present, VC funds categorize NeuroTech companies according to seed, series A, series B, etc.; the stage of a company's development moving forward will become less important while TRL levels and the level of the technology accordingly to other tangible metrics will become much more important, because they will provide data-driven analysis allowing to perform certain mathematical calculations of how valuable a portfolio company is.

## **Key Technology Takeaways**

- The huge leaps in the scientific understanding of the brain and the human genome, as well as advances in computer technology, have led to the recent acceleration of NeuroTech development and the establishment of a direct channel of communication between the brain and the machine.
- 2. Healthcare and research have long been the only applications of NeuroTechnologies, with the main focus on neurodegenerative diseases, psychiatric disorders, brain tumors and injuries. Today, however, there are plenty of non-invasive brain-computer interface devices and various forms of brain stimulation, such as Vagus nerve stimulation, available directly to consumers. This has opened up opportunities for improved health and wellness, entertainment, productivity, physical and cognitive enhancement, and education.
- 3. Advances in high-performance computing, data analysis, and algorithmic approaches allow researchers to attempt to reconstruct the brain and create its digital copy. This will enable in silico experiments, improved experimental methods, testing and generating new hypotheses and theories.

## **Obstacles That Still Remain**

- Current scientific understanding of how the brain actually works is still limited which complicates the process of integrating devices within the greater nervous system in effective and reproducible ways.
- Neuroscience has to move away from small-scale collaborations towards large teams that bring together the huge range of competences and financial resources in order to fully achieve its potential to make fundamental contributions to medicine and our understanding of the brain.
- Direct-to-consumer NeuroTechnologies face multiple challenges including safety risks, data protection, transparency, and lack of ergonomics.
- 4. NeuroTechnological innovation should be balanced with an appropriate international set of governance principles developed through a multi-disciplinary consultative process involving government officials, companies, non-governmental organizations, scientists, ethicists, and legal and governance scholars. National and local governments can adapt provisions from such international principles in developing their own regulations.

## NeuroTech in the Global Context

United States has launched BRAIN Initiative in 2013 with a goal to accelerate the development and application of innovative technologies and to construct a dynamic picture of brain function that integrates neuronal and circuit activity over time and space. Another important research initiative in the US is Allen Institute for Brain Science. Its signature achievements include successful execution of the Allen Mouse Brain Atlas as well as transcriptional atlases for the adult and developing human brain.

Started in 2013 as one of the three European FET (Future and Emerging Technology) Flagship projects, Human Brain Project has originally been focused on simulations and modeling of the brains of mice and humans, based on a detailed neurobiological knowledge of the different parts of the brain. The six different platforms for neuroinformatics, simulation, high performance computing, medical informatics, neuromorphic engineering and robotics are a major resource for the research community.

Japan's Brain Mapping by Integrated NeuroTechnologies for Disease Studies (Brain/MINDS) program started in 2014. One of the major achievements of the Brain/ MINDS project is a gene mapping project using in situ hybridization. Research groups have also produced an array of new tools and techniques for visualizing brain tissue and activity.

In March 2016, Chinese National People's has approved 15-year China Brain Project. The central body of the project is the study of the neural basis of cognitive functions. With sustained government investment, together with new mechanisms in funding and team organization, China Brain Project is believed to produce results that will complement those achieved by the US Brain Initiative, the European Union's HBP and Japan's Brain/ MIND project.

Israel Brain Technologies (IBT), started in 2011, is a non-profit initiative whose mission is to accelerate the commercialization of Israel's brain-related innovation and establish Israel as a leading international brain technology hub. IBT organizes one of the leading international brain technology conferences, which is attended by leaders from academia and industry worldwide.

## **About NeuroTech Analytics**

**NeuroTech Analytics** in a broad sense is the whole scope of technologies, directly or indirectly related to the brain and various aspects of consciousness, thought, and higher-order activities in the brain. NeuroTech as complex of technologies and industry sectors is based on neuroscience and IT.

**NeuroTech can be structured and subdivided** in different ways, namely based on:

- Technology;
- Application;
- Market segment;
- R&D processes.



**Analysis of market structure and key players** can be essentially extended by a broader view representing the picture of general market and technology trends, some of which are already robust and clear, whereas others will be observable only in the near future.

#### Exoskeletons

Mind-reading tech / Brain hacking

**Brainternet** 

Convergence of NeuroTech, VR and AR

Biochips and brain implants

Al in NeuroTech

SleepTech

Convergence of NeuroTech and Pharma

NeuroTech for productivity

Global NeuroTech race

Uneven development of different NeuroTech subsectors

High level of science and tech expertise required to enter the market

High level of fraud and bubbles

Long operational cycle

Constant emergence of new NeuroTech subsectors

High volatility due to low volumes

Geographic disproportions

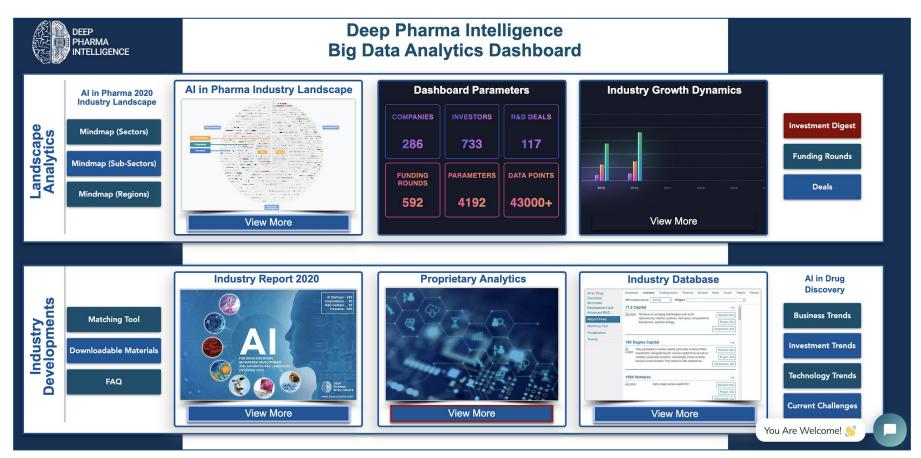
Exponential growth of the NeuroTech industry in general, superior to

the growth of exponential technologies as a whole Convergence with other exponential technologies

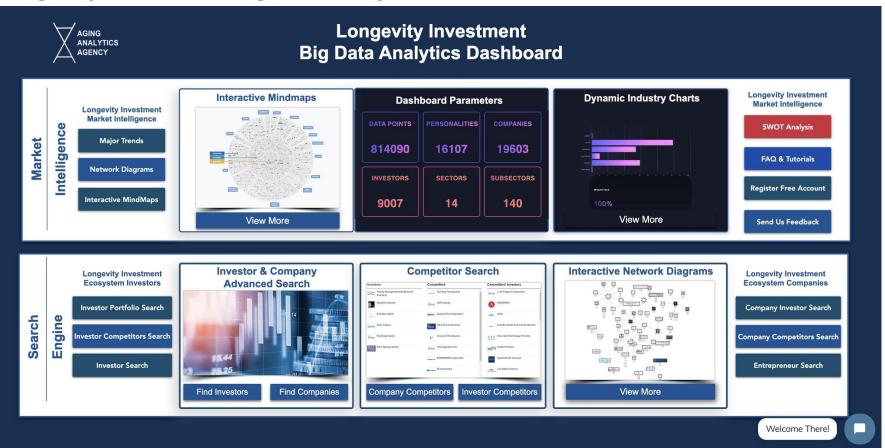
## NeuroTech COMPANIES COMPARATIVE AND COMPETITIVE ANALYSIS

Business metrics	Size and growth	Funding	Investors	Value chain stages	
business metrics	Investment readiness levels	Sales indicators	Level of monopolization	M&A activity	
Technology	Technology readiness levels	Technologies diversification	Scientific validation	Level of novelty	
metrics	Level of uniqueness	Research team	R&D cooperation with other agents	R&D process features	
Maylest matrice	Market infrastructure	Specialized investors presence	Each of NeuroTech companies can be characterized by several met are a combination of business, technology and science indicators. that are characterized by high levels of each type of metric are		
Market metrics	Region	Volatility and bubbles probability	prospects are high in 2 types of metrics are labeled as intermediate may have or	logy. Companies which development and as are labeled as strong. Companies which one dimension of strength or may not have n of the positive prospects of a company.	

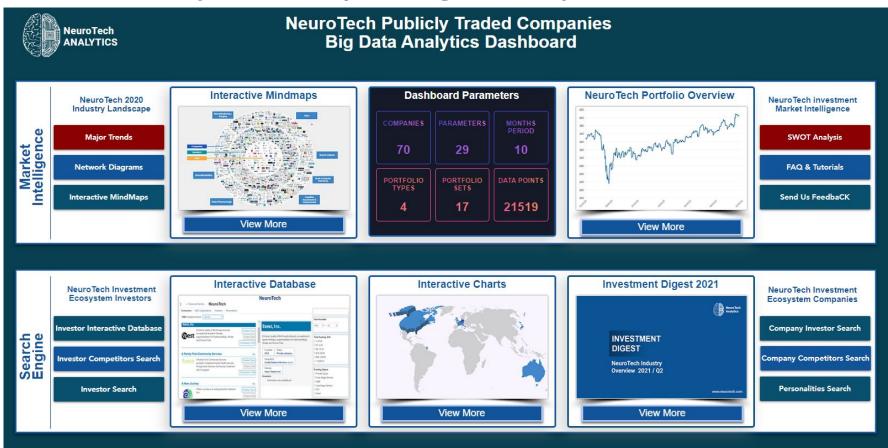
# **Artificial Intelligence in Pharma Big Data Analytics Dashboard**



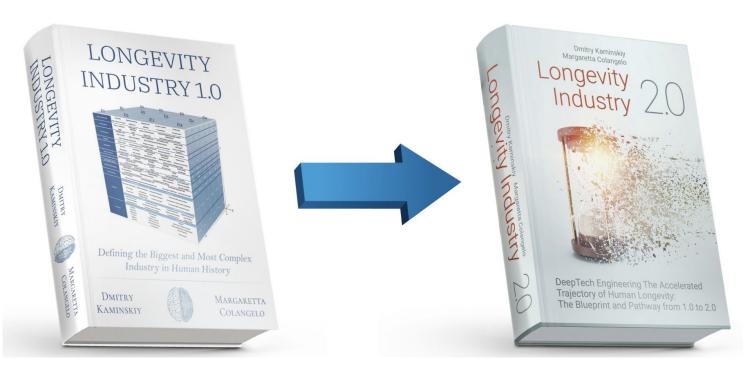
## **Longevity Investment Big Data Analytics Dashboard**



# **NeuroTech Publicly Traded Companies Big Data Analytics Dashboard**



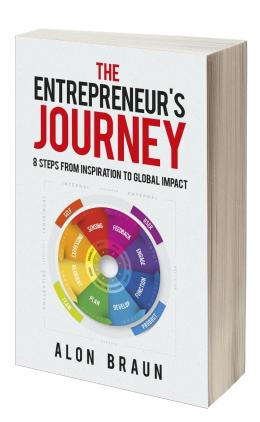
# www.longevity-book.com



Longevity Industry 1.0
Defining the Biggest and Most
Complex Industry in Human History

## **Longevity Industry 2.0**

DeepTech Engineering The Accelerated Trajectory of Human Longevity The Blueprint and Pathway from 1.0 to 2.0



In this book, Alon Braun covers the main stages of the business journey, the decisions to be taken on the threshold of each one, the difficulties particular to each stage, and the techniques for negotiating them.

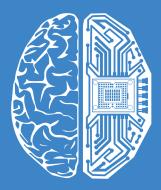
The author stresses the necessity to express the ideas to oneself and then the outside world once an idea takes hold. The book aligns the psychology and productivity of starting out entrepreneurs and founders whose company is up and running. The book helps to identify and overcome blind spots at each step.

Alon Braun applies his own expertise in guiding companies on how to grow from an initial idea to profitability and achieve their goals quickly in both the public and the private sectors.

"My aim is to help you make an impact on the world by showing you how to commercialise your ideas or inspiration and grow a successful business"

Alon Braun





Link to the Report: www.neurotech.com/investment-digest

E-mail: info@neurotech.com Website: www.neurotech.com

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