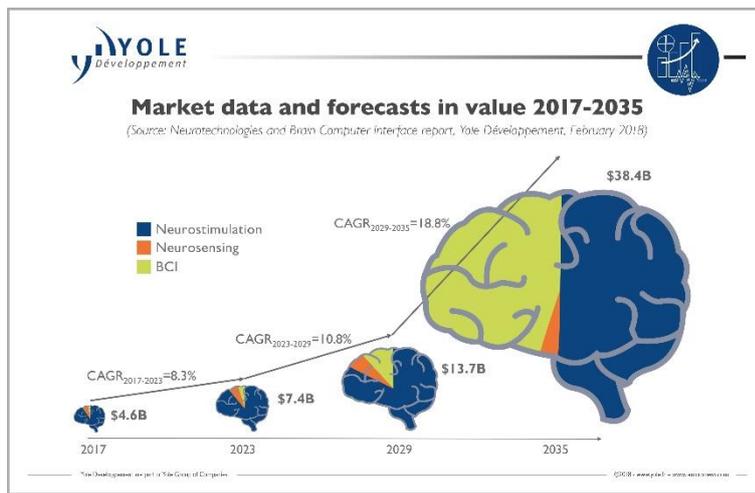




FOR IMMEDIATE RELEASE:

Neurotechnologies, a US\$4.6 billion market in 2017. What's next?

Extracted from: Neurotechnologies and Brain Computer Interface report, Yole Développement – Released in Feb. 2018



LYON, France – March 7, 2018:

Neurotechnologies market is expected to reach US\$7.4 billion in 2023, pointing out a 8.3% CAGR between 2017 and 2023, announces [Yole Développement \(Yole\)](#). A first inflexion point showing an increasing interest in neurotechnology was seen in patents around 2011. A second inflexion point happened in 2015 with an increase in funds raised by companies and academic funding such as the Brain Initiative in the

US¹. Then, according to Yole's analysts, a sharp inflexion point in the neurotechnology market is to be looked out for in the next 15 years... In its new report [Neurotechnologies & Brain Computer Interface](#), the market research and strategy consulting company, Yole explains that neurostimulation is today representing the major part of the market. Key players are therefore giant medical device companies such as Medtronic, Boston Scientific or Abbott (formerly Saint-Jude Medical) and take most of the market shares.

However the playground is not complete and **Dr. Marjorie Villien, Technology & Market Analyst at Yole** comments: "Market shares are slightly moving due to technology improvement in neurostimulation with smaller players bringing new technologies like Neuropace and its closed loop neurostimulator or ElectroCore for the treatment of headache using non-invasive vagus nerve stimulation. But implanted neurostimulators such as spinal cord stimulators for the treatment of pain or deep brain stimulators in the treatment of Parkinson's disease and epilepsy are still representing a large part of the products sold."

Comparatively, neurosensing market for diagnostics and research is a more mature market when considering EEG² in clinical applications. BCI³ is forecasted to have the strongest growth for the next decades. Research companies like Brain Products and g.tec are currently very

¹ US : United-States

² EEG : Electro- Encephalography

³ BCI : Brain Computer Interface

active to develop next generation of electrodes and systems to answer the strong demand for BCI applications.

Neurotechnologies & Brain Computer Interface report from Yole is a comprehensive analysis of the today's challenges linked to neurotechnologies, current and emerging applications. Under this new report, analysts offer a technical and economic segmentation of this field including neurosensing, neurostimulation and BCI. This report is a relevant overview of the competitive landscape with historic and new players and their respective technologies. Will neurotechnologies following the path of DNA sequencing? Will they open new business opportunities? Yole's analysts invites you to discover the mystery of our brain.

The dynamism of the neurosciences sector is also highlighted by a huge number of patent publications. Therefore neurosensing accounts for more than 16,000 published patents over a period of 75 years, 25% of whom in the last decade. Major patent assignees are both medical device companies Medtronic and Philips, recording the highest number of patents overall.

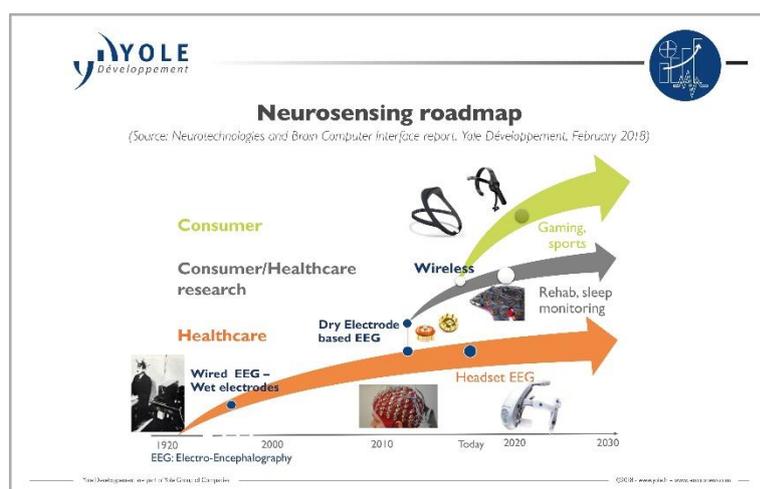
According to Knowmade, Yole's partner, this sector is showing two main waves in the time evolution of publications, following the market evolution:

- From 2002 to 2010: analysts identified a strong number of publications from the major medical device companies Medtronic and GE Healthcare.
- Then, started in 2011, they highlight a clear intensification of the number of published patents. *“During this period, we see several new comers, especially Chinese companies that published for the first time in this period”*, comments **Dr. Brice Sagot, Knowmade's COO & cofounder**. *“Several of these new comers are very active. As an example, the Chinese company CVTE is publishing more than 25 patents per year.”*

In collaboration with Yole, Knowmade proposes a significant IP analysis of this sector with detailed roadmaps of development and availability. Miniaturization and silicon technologies contribute to invasive probes manufacturing for local field potential measurement. Such technology trends are described in the neurotechnologies & BCI report with patent landscape and analysis in both sensing and stimulating devices highlighting the most active patent assignees and their involvement.

For a long time neurosciences were an exclusive domain of healthcare, and technologies associated were serving two main applications: neurostimulation and neurosensing.

In early 2000's the concept of BCI emerged with the strong objective to use brain and peripheral nerve information to the benefit of patients. More recently, BCI got the objective not only to serve the medical



sector, but to exploit brain signal for a broad range of applications in industrial, military and consumer fields. This has surely caught the attention of ambitious people like Elon Musk who founded Neuralink in this domain in 2017 or Bryan Johnson who invested US\$100 million in his company Kernel. In parallel, Web giants, with companies such as Google, Facebook and Microsoft are watching these new technologies

carefully. As an example, Facebook is strongly involved in project of “typing-by-brain” as a silent speech interface, while Microsoft is publishing patents on “mind control” that allow users to operate apps using their mind without gesture.

Conjunction of neurosciences, advanced microtechnologies and rapid adoption of wearables lead to the emergence of innovative start-up companies and number of initiatives supported by public or private organizations. In the last 3 to 4 years, a wave of fundraising reached a cumulative US\$300 million in BCI companies accompanied by national initiatives like the Obama’s Brain Initiative project supported by US government inspired by the success of the Human Genome Project.

“If we take the model of the DNA sequencing history, given that researches are going faster today thanks to computer science, it wouldn’t be surprising to see the discovery of a groundbreaking technology to record brain signals before 2030,” comments **Jérôme Mouly, Technology & Market Analyst at Yole...**

A full description of this report is available on [i-micronews.com/medtech reports section](http://i-micronews.com/medtech-reports-section).



ABOUT THE REPORT:

NEUROTECHNOLOGIES AND BRAIN COMPUTER INTERFACE

How are neurotechnologies unraveling the mystery of our brain and opening new business opportunities? – Produced by KnowMade & Yole Développement

Companies cited in the report:

Abbott, Ad-tech, Advanced Brain Monitoring, AdvaStim, AIST, Aleva Neurotherapeutics, Alphabet, Amazon, Ant Group, ArchiMed, Artinis Medical Systems, Atlas Neuroengineering, ATR, Beijing Pins Medical, BioSemi, Biotronik, Blackrock microsystems, Boston Scientific, Brain products, BrainCo, BrainCo, Brainscope, Brainsway, Cadwell, Cambridge Neurotech, Caputron, CAS Medical Systems... [Full list](#)

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- As a Technology & Market Analyst, **Dr. Marjorie Villien** is member of the Medical Technologies business unit at Yole Développement (Yole). She is a daily contributor to the development of these activities with a dedicated collection of market & technology reports as well as custom consulting projects. After spending two years at Harvard and prior Yole, Marjorie served as a research scientist at INSERM. Marjorie Villien is graduated from Grenoble INP and holds a PhD in physics & medical imaging

This report includes global trends in patent application identified by Knowmade but does not include an in-depth analysis of any patents. Knowmade is part of Yole Group of Companies, including Yole Développement, System Plus Consulting, PISEO and Blumorpho. More information on www.knowmade.com as well as on [LinkedIn](#).

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- **Dr. Brice Sagot** is COO and cofounder of Knowmade. He is leading the Biotechnology and Life Sciences department. He holds a PhD in molecular biology from the University of Nice Sophia-Antipolis, France.



ABOUT YOLE DEVELOPPEMENT

Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide covering MEMS and image sensors, Compound Semiconductors, RF Electronics, Solid-state lighting, Displays, software, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.

The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO and Knowmade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business. . For more information, visit www.yole.fr and follow Yole on [LinkedIn](#) and [Twitter](#).

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