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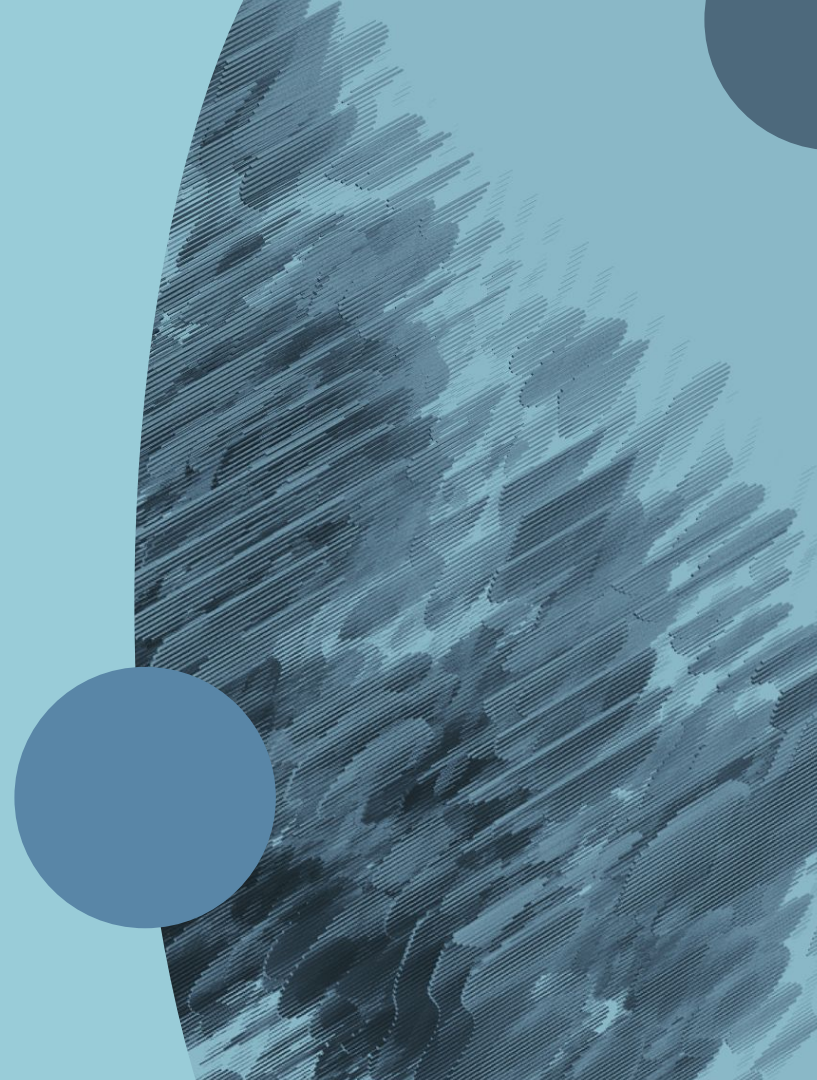
LAKE STAR

(w)C Walden Catalyst

The European Deep Tech Report

2023 Edition

January 2023



In January 2021, we predicted a pivotal year for European Deep Tech. Was it?

Massive breakthroughs are accelerating on several fronts

In our 2021 report, we highlighted the huge potential for Deep Tech in Europe. Indeed, European Deep Tech had its best year with over $22B in funding, and billion dollar exits.

Since then we also saw huge breakthroughs in key segments like quantum computing (with the first 100+ qubit processor and near error-free quantum computing in silicon-based devices being proven), nuclear fusion (almost tripling the record for the amount of energy produced), space tech (Starlink providing internet coverage to Ukraine, James Webb Space Telescope, new missions to the moon), generative AI (Dall-E moving to commercial uses, Stable Diffusion text to image generative AI launch, ChatGPT reaching 1M users in 5 days) and much more.

We are still only scratching the surface

In 2021, we also pointed out the still largely unlocked potential in Europe's leading academic institutions and the need for closer collaboration between the different actors in the ecosystem to support Europe's most promising Deep Tech startups.

A number of key questions which remain open form the centre of this year report:

- How is Deep Tech evolving? What is the state of European Deep Tech?
- Which are the emerging areas in Deep Tech?
- How can we accelerate European Deep Tech further?
- Can we unlock the potential in academia & scientific research?

Previous edition

Recap on the first edition here

Source: Dealroom.co.

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LAKE STAR

European, multi-stage venture capital firm

Lakestar invests with a long term view across all stages from seed to growth. We care about Europe. We understand its regulations and politics. We speak the languages and appreciate its cultures. Yet we have a global mindset and like to build bridges between continents, through our deep relationships in many different ecosystems.

Lakestar's Deep Tech team focuses on novel scientific and engineering breakthroughs that are making their way into companies and products for the first time. We live on the bleeding edge and are constantly looking for contrarian views on how the world is going to change for the better.

Terra Quantum · isar aerospace · soul machines · QM ware · constellr · ALEPH ALPHA

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Global venture capital firm dedicated to Deep Tech investments

Walden Catalyst Ventures is helping early-stage companies in the U.S., Europe, and Israel build the next generation of category-defining businesses in Deep Tech. We back the bold and the daring—trailblazers who are changing the world and making life better for all of us.

Walden Catalyst invests in innovators and entrepreneurs passionate about disruptive technologies and committed to excellence. For startups, this translates into unparalleled access to operational expertise, global reach, and a network of industry captains eager to help build and scale the companies of the future.

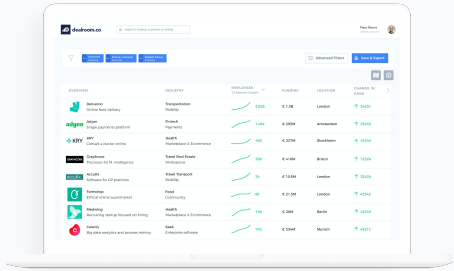
INGONYAMA · Peptone · Opaque systems · AI21labs · VOLTRON DATA · ARTERA

dealroom.co

Global startup & venture capital intelligence platform

Dealroom.co is the foremost data provider on startup, early-stage and growth company ecosystems in Europe and around the globe.

Founded in Amsterdam in 2013, we now work with many of the world's most prominent investors, entrepreneurs and government organizations to provide transparency, analysis and insights on venture capital activity.



Key takeaways.

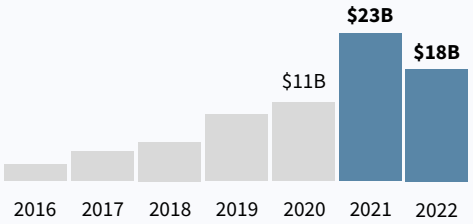
Deep Tech in Europe has grown strongly and has shown resilience in recent market turmoil.

European Deep Tech startups raised $17.7B in 2022, 22% less than 2021 total, but still +60% on 2020.

Looking at Q3 & Q4 2022, Deep Tech was the 2nd best performing segment behind only Energy year on year.

LPs in Europe see Deep Tech as the 2nd most promising segment in venture capital.

VC investment in European Deep Tech startups

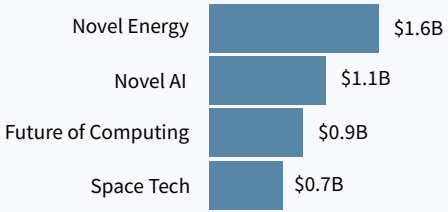


Key emerging areas in Deep Tech have changed.

By its own nature, Deep Tech is constantly evolving. Some segments mature to the scaling and mainstream phases, while new ones emerge to push the boundaries of what is possible.

Four core emerging segments of Novel AI, Future of Computing, Novel Energy and Space Tech raised $4.4B in 2022, their highest total ever and double that of 2020.

VC investment in core emerging Deep Tech segments in Europe (2022)



Requirements to accelerate European Deep Tech.

Europe has great technical talent and research to lead in Deep Tech. Many European Deep Tech successes have their roots in academia, spinout processes and unrealised potential of European universities can still be unlocked.

Other key enablers to unlock the growth of Deep Tech in Europe include bridging the gap in funding between early-stage dedicated Deep Tech investors and generalist funds, and increasing diversity and inclusion.

- Unlocking potential of academic spinouts
- Bridging the gap between early stage dedicated Deep Tech investors and generalist funds
- Gender inclusion is still in the early innings

Source: Dealroom.co.

1 | Understanding Deep Tech

Deep Tech, a definition.

Deep Tech is fundamentally new science and engineering.

Deep Tech companies apply a novel scientific or engineering breakthrough for the first time in the form of a product.

This means there is technical risk in getting the idea to actually work.

Deep Tech starts with an extended R&D phase and involves a higher share of technical staff compared to conventional ventures. Deep Tech also often involves the development of hardware and/or IP which are more capital and time intensive.

Once technical risk is overcome, there is additional risk in proving market demand for that product. If market demand is proven, Deep Tech startups have stronger defensibility from competition thanks to technology barriers, instead of having to rely on network effects and market lock-up.

What's Deep Tech today is not necessarily Deep Tech tomorrow. Once the technology or product is no longer novel and as the company scales, what was once Deep Tech becomes regular tech.

Examples of today's key Deep Tech domains*.

Novel AI

Generative AI
AI-first biology
Privacy-preserving AI
Explainable AI
AI acceleration
Autonomous systems
General purpose AI

Future of Computing

Quantum computing
Silicon photonics
AR/VR/MR
Neuromorphic & advanced AI chips
Decentralized & distributed computing
Brain-computer interfaces
Ambient Computing

Novel Energy

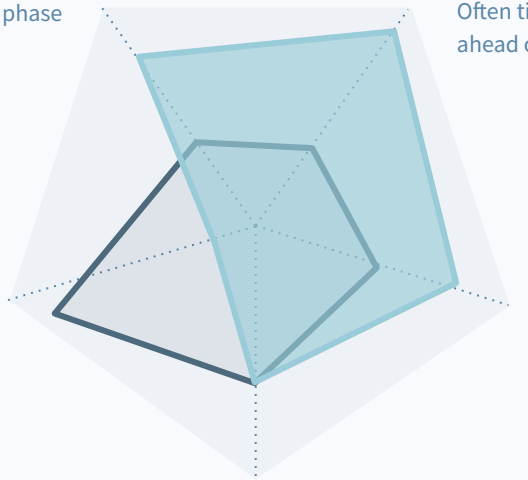
Nuclear fusion
Next-gen battery chemistries
Large-scale storage
Green hydrogen
Supercapacitors
Waste heat recovery

Space Tech

Reusable and next-gen rockets
Satellites for communication
& earth observation
In-space transportation
In-space manufacturing
Debris removal

Source: Dealroom.co *The segments indicated are not meant to be exhaustive but serve as an example of key areas of focus chosen. Other interesting Deep Tech segments not in these 4 areas include for instance: Synthetic biology, Advanced materials , Robotics, Transportation, FoodTech & Agritech, Cybersecurity. Biotech is excluded by our definition of Deep Tech, except for some segments like AI-first biology.

Deep Tech startups have very different characteristics and risk-profiles from traditional startups.



Development times
Often go to market within months of starting
Long initial development phase

Capex intensity
Quick go-to-market with basic MVP
Often times heavy capex ahead of revenues and PMF

Competition risk
Network effect and market dominance as main edge
Strong tech edge

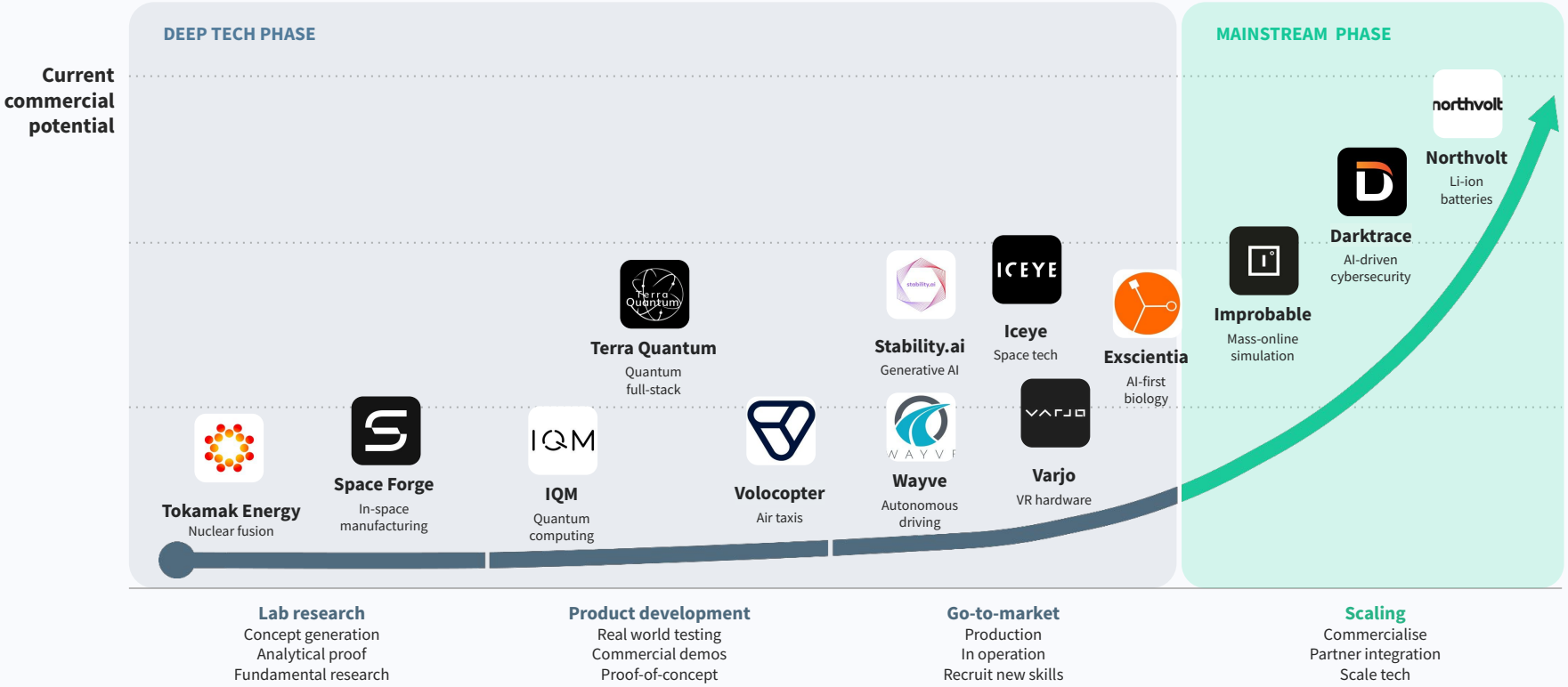
Technology risk
Existing proven technologies
Breakthrough/novel tech

Market risk
Existing market demand, but also existing alternatives
Often no comparable product in market

Deep Tech Regular Tech

Source: Dealroom.co.

Once successful, many Deep Tech startups outgrow their Deep Tech roots as they scale and go mainstream.



Why Deep Tech is exciting.

Almost anything used in today's world had its roots in Deep Tech at a certain point, from electricity to the telephone and the Internet, to cars and planes.

By bringing new technologies to life, Deep Tech in fact creates new markets and enables economic and societal growth, while solving the world's biggest problems.

Deep Tech is instrumental to tackle today's biggest challenges, from climate change and food security to intractable disease.

Why Deep Tech is exciting for investors:

Deep Tech startups can often target applications in multiple markets and unlike traditional startups have a stronger moat towards competition thanks to technology edge and IP portfolio. Deep Tech startups can also generate higher ROI thanks to lower initial valuations and high attractiveness as acquisition targets.

This is also recognized by LPs in Europe, who see Deep Tech as the 2nd most promising segment in venture capital, behind only Planet Positive*.

> ***As investors in Deep Tech, we are looking for the next Marie Curie or Max Planck, scientists and entrepreneurs taking disruptive technologies out of the lab and turning them into commercial products.***

"Distributed at global scale, these technologies eventually make their way into everyone's life, and have the potential to solve some of the many challenges humanity is facing."

Nicolas Autret
Partner, **Walden Catalyst Ventures**

Source: Dealroom.co. *The State of European Tech 2021 by Atomico, Chapter 2.2

2 | The State of European Deep Tech

European Deep Tech startups raised $17.7B in 2022, 22% less than 2021 total, but still 60% more than in 2020.

Venture capital investment in European Deep Tech startups

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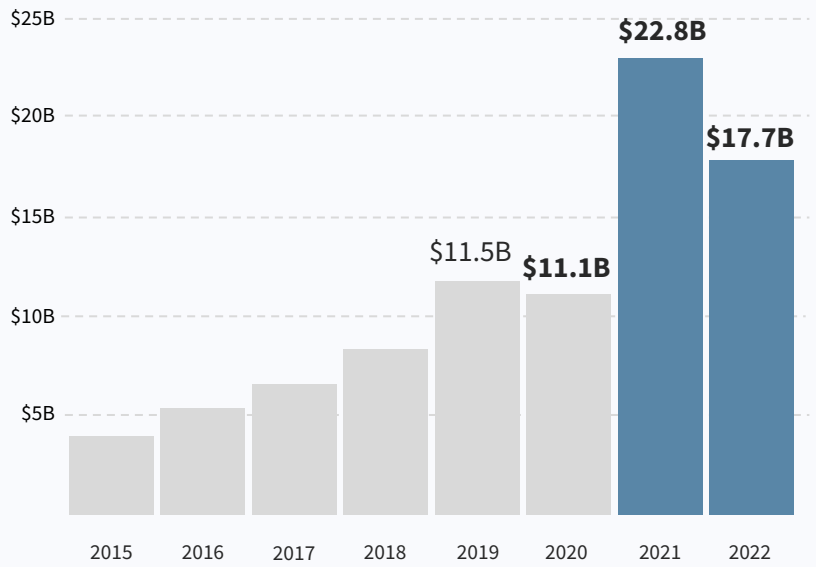

Selected Deep Tech rounds in 2022

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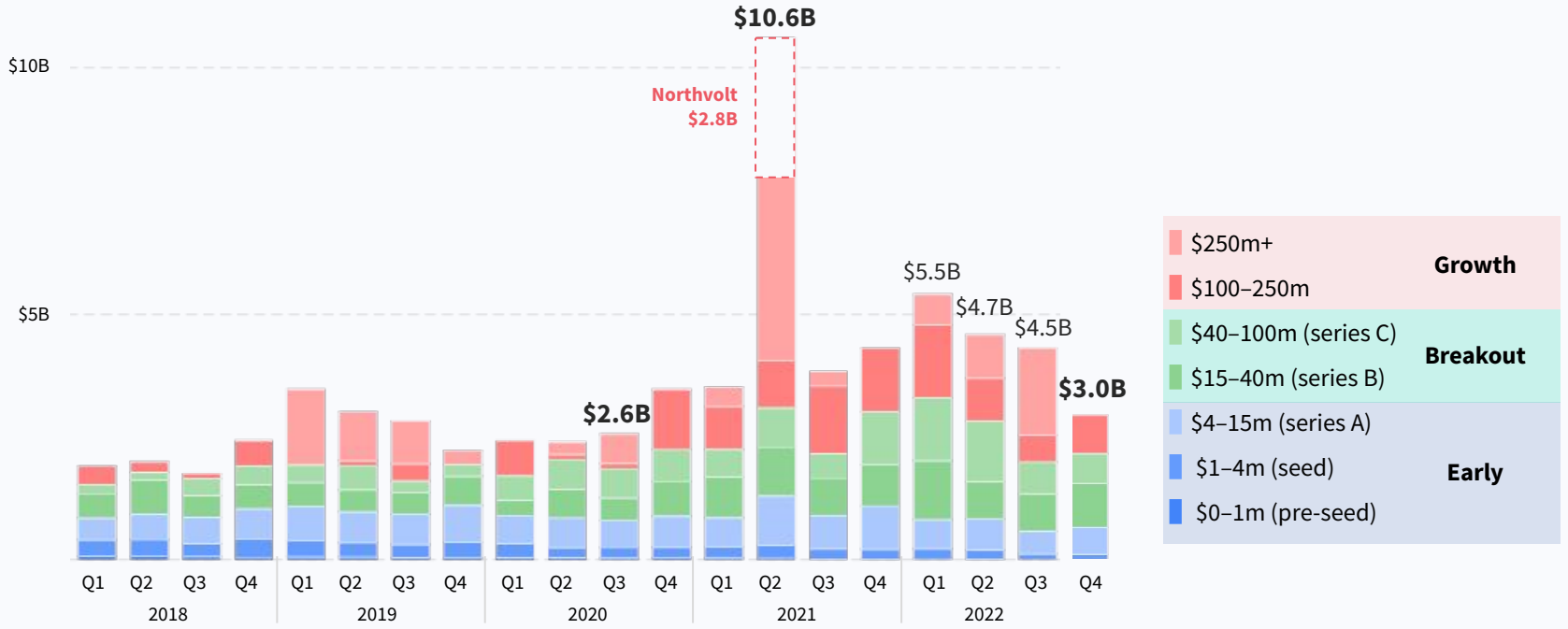
Startup	Funding round	Focus
climeworks	$600M Series F	Direct air carbon capture and storage
EXOTEC	$335M Series D	Industrial robotics
newcleo	€300M Early VC	Nuclear fission
IQM	€128M Series A	Quantum computing
ICEYE	$136M Series D	Earth observation satellites
stability.ai	$101M Series A	Generative AI

Source: Dealroom.co.

Q4 2022 showed a slowdown compared to the beginning of the year, but the level of funding is still higher than pre-2021 averages.

Venture capital investment in European Deep Tech startups, by quarter » view online



Source: Dealroom.co. Due to report lag, the last 12 months are systematically under reporting especially on early-stage rounds.

We appear to be in the early stages of a rotation into new technologies that solves major world problems, away from momentum bets.

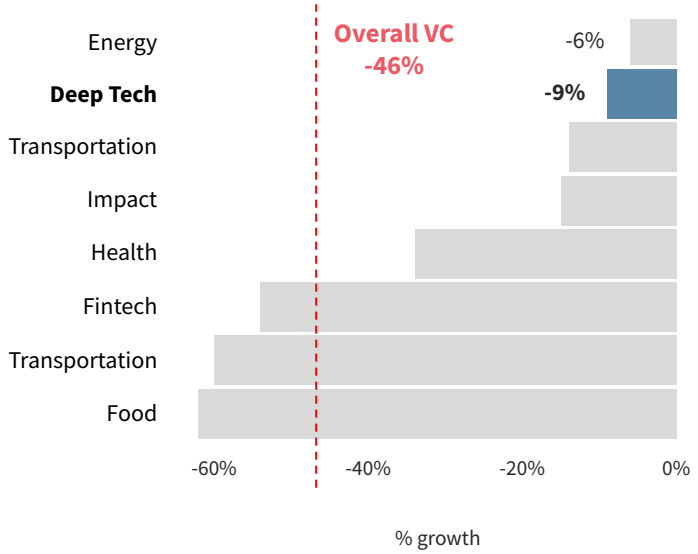
The VC market entered a new market phase in 2022, with a significant slowdown compared to the heights of 2021.

The downturn started from the public market in January with interest hikes, and has seen a transition happen in public markets from growth stocks (tech companies) to value stocks (industrials, energy). The tech-heavy Nasdaq lost 33.1% 2022.

This shockwave has entered the private market, with a slowdown in VC activity, especially at late stages. Due to lag in adjustments, pre-commitments and reporting lag this impact has become clearly visible only in Q3 & Q4, with a 46% slowdown with respect to 2021 levels.

Energy and Deep Tech held up the best in Q3 and Q4 2022.

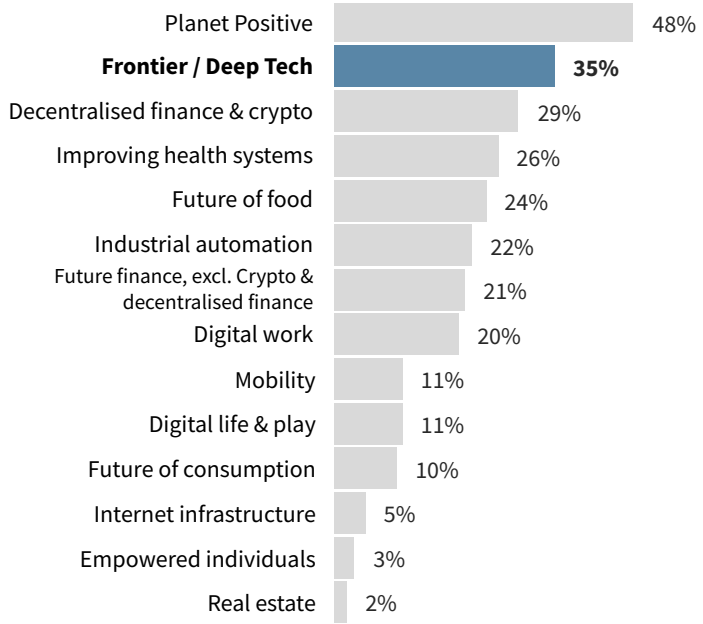
European VC investment growth by industry Q3 & Q4, 2022 vs 2021



Source: Dealroom.co.

LPs in Europe see Deep Tech as the 2nd most promising segment in venture capital, behind only to Planet Positive.

Most promising themes for VC investments in Europe for LPs*



*The State of European Tech 2021 by Atomico, Chapter 2.2

> ***Europe has a clear role to play as a leader in Deep Tech, and the future of fundamental research and innovation.***

"At the frontier of innovation, Deep Tech's disruptive technologies - such as AI, Space, Quantum, Hardware, and Cybersecurity - have population-level impact potential.

"Europe is already home to huge numbers of highly-skilled scientists and researchers. The EIF is now supporting an emergent community of Deep Tech VCs, to bring their smart money and know-how to this underserved segment.

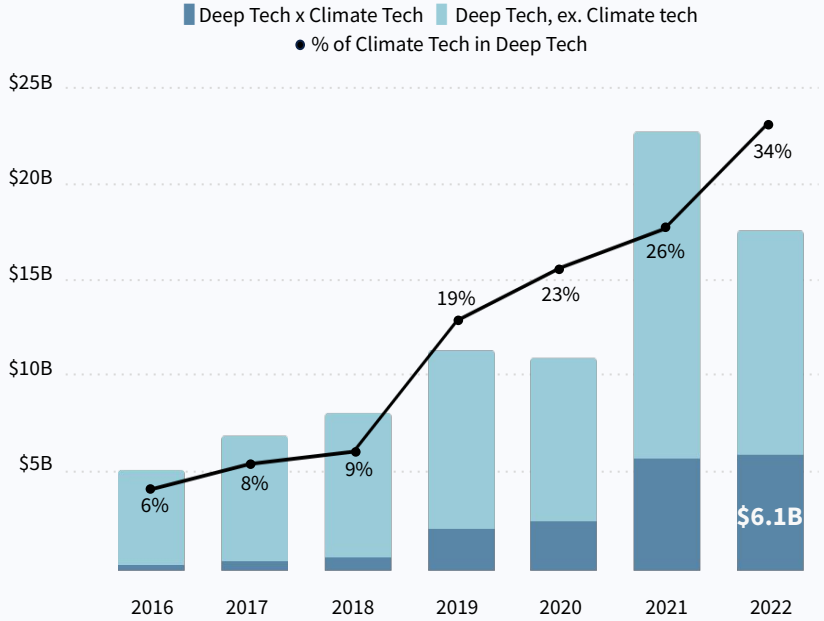
"The Deep Tech breakthroughs of the next decade will shape our societies well into the next century. It is therefore essential for Europe to lead from the front in shaping these revolutionary technologies and their real-world applications."

David Dana
Head of VC investments - Disruptive Tech & Innovation at **European Investment Fund** (**EIF**)

Deep x Climate Tech startups raised $6.1B in 2022 in Europe. Climate Tech makes up a growing proportion of Deep Tech funding, up from 6% in 2016 to 34% in 2022.

Software alone will not solve our climate crisis. There is no way to transition to net zero without hardware breakthroughs.

VC investment in European Deep Tech x Climate Tech startups



Notable Deep Tech x Climate Tech rounds in Europe in 2022

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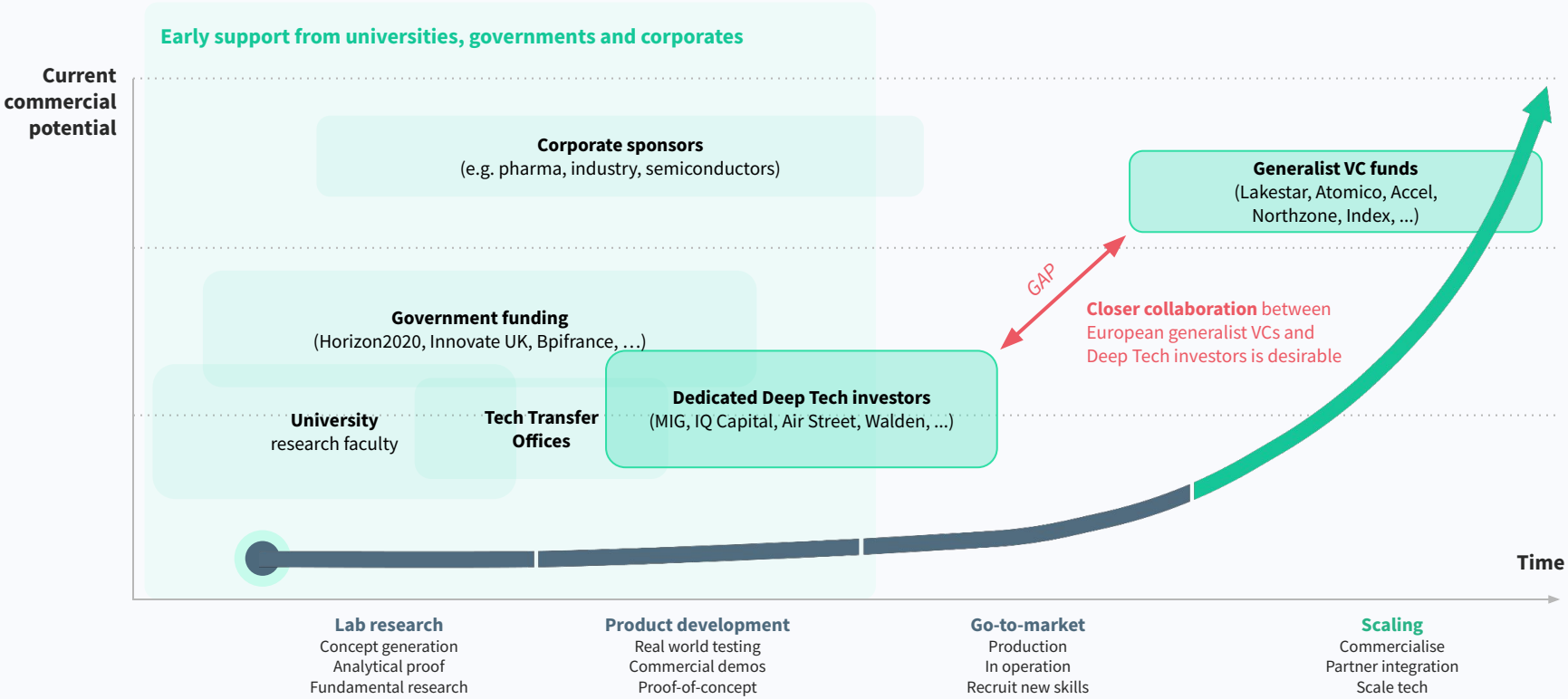
Startup	Funding round	Focus
northvolt	$1.1B Convertible	EV battery manufacturing
climeworks	$600M Late VC	Direct air carbon capture and storage
VOLOCOPTER	$352M Series E	Electric urban air mobility (eVTOL)
newcleo	€300M Early VC	Nuclear fission
H2green steel	€260M Series B	CO2-free steel manufacturing
carbon clean	$150M Series C	Industrial carbon capture and storage

Source: Dealroom.co.

Deep Tech startups are supported by multiple stakeholders involved in de-risking at each stage, but some gaps still exist.



Source: Dealroom.co based on discussion with Stephen Nundy from Lakestar and others. Stages based on Technology Readiness Levels used by governments.

Most Dedicated Deep Tech investors in Europe focus on early stage. They don't have the firepower to lead at Series B+.

The Math

Average Deep Tech Series B = €30M[1].

~Lead investor commitment = €15M.

€15M x 20 fund investments = €300M.

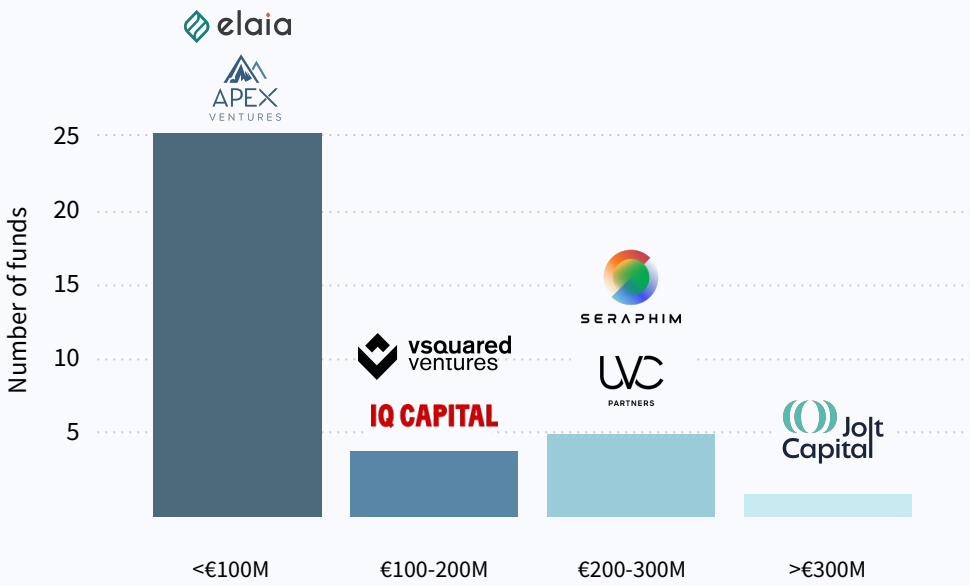
97% of dedicated European Deep Tech investors have fund sizes below €300M.

∴ Dedicated Deep Tech funds in Europe largely cannot lead Series B+.

50+ Dedicated Deep Tech investors in Europe»

List

Fund size distribution of European Dedicated Deep Tech investors*



Source: Dealroom.co.
1) Dealroom analysis on Deep Tech round size 2021-2022
*Funds used in the analysis can be seen at this link

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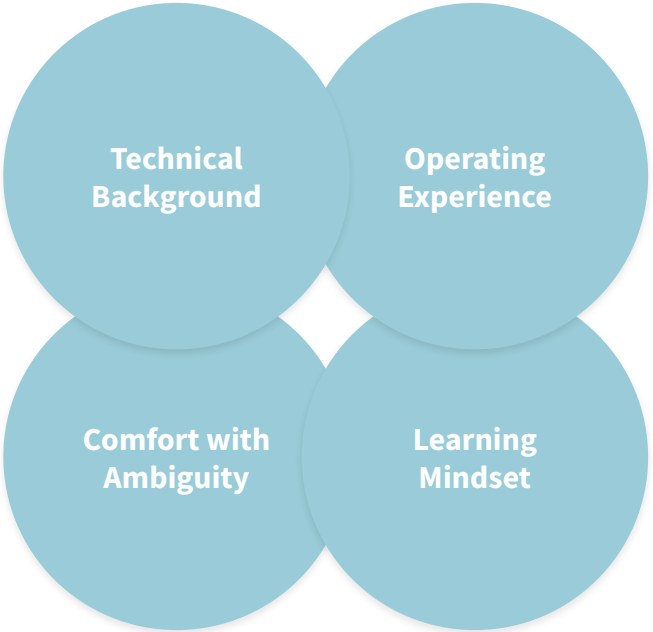
Dedicated Deep Tech investors in Europe are mostly focused on seed stage. European generalists enter in Series A, as well as in Series B+ with corporates and US & Asia investors.

Source: Dealroom.co. Based on number of rounds and amount invested in 2021-2022. Investors are shown only at the most common entry stage point. Global investors investing in Europe based Deep Tech startups.

Generalist funds are creating Deep Tech focused teams to bridge the gap in scaling Deep Tech startups.

Key attributes to look for in a Deep Tech investor:



> ***To properly invest in Deep Tech you must build a dedicated team.***

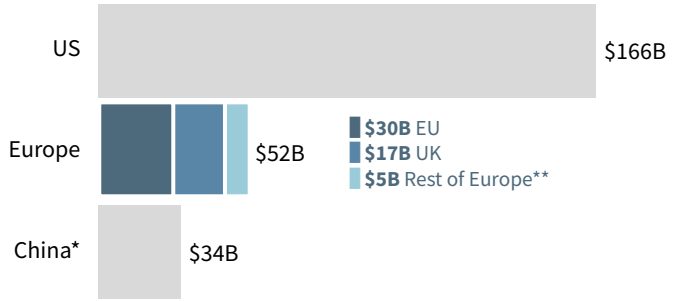
"The approach and process used to invest in Deep Tech is often quite different from traditional SaaS investing. It requires a unique investor skillset, a specialized bottoms-up investment strategy and the ability to operate independently."

Steven Jacobs
Venture Partner (Deep Tech) & Chief Product Officer at **Lakestar**

Europe lags far behind the US in terms of Deep Tech investment, and China is ahead of the whole of the EU.*

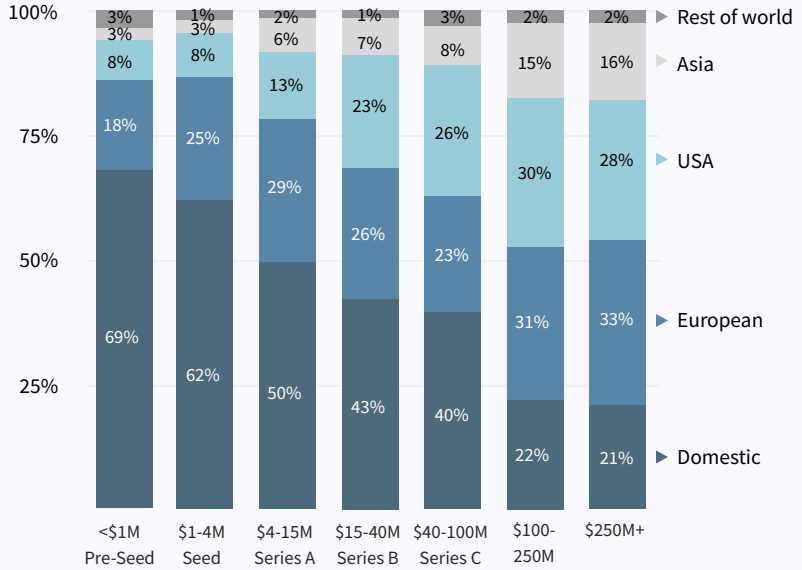
Deep Tech is key for European sovereignty and security.
More is needed if Europe wants to be the third pole and have control over critical technologies and enablers.

Global VC investment in Deep Tech by startup HQ (2020-2022)



The share of funding coming from US and Asia for European Deep Tech increases to nearly 50% at late stage.

VC investment in European Deep Tech by source of funds (2020-2022)



Source: Dealroom.co. *China VC investment are not fully representative due to limited visibility in sensible deep tech areas and the strong role played by government in the sector.
**Albania, Belarus, Bosnia and Herzegovina, Kosovo, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, San Marino, Serbia, Switzerland, Ukraine.

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There is strong public support for Deep Tech in Europe.

EU programs

EIC Fund
(European Innovation Council Fund)

EIC provided more than 1.5k grants totalling over $1.3B in support of European Deep Tech startups since 2016.

EIF
(European Investment Fund)

EIF is the main LP in most European Deep Tech funds, providing nearly 40% of the capital allocation.

EIT InnoEnergy

EIT InnoEnergy is one of the most active investors in Energy in Europe.

JEDI

"The European DARPA" aims to hand €50m and €100m in annual challenge grants.

Domestic programs*

Germany

Germany is planning a €30B fund to support technology-oriented startups and facilitate start-up spin-offs from academia and lab access for start-ups.

SPRIND

German Federal Agency for Disruptive Innovation.

France

France committed €2.3B in funding to the "Industrial and Deep Tech Start-Ups" strategy.

Bpifrance

Bpifrance participated in over 160 rounds totalling $3B for Deep Tech since 2016.

Advanced Research and Invention Agency (ARIA)

Pending launch of Advanced Research & Invention Agency (ARIA) with £800 million to support new areas of research and technology.

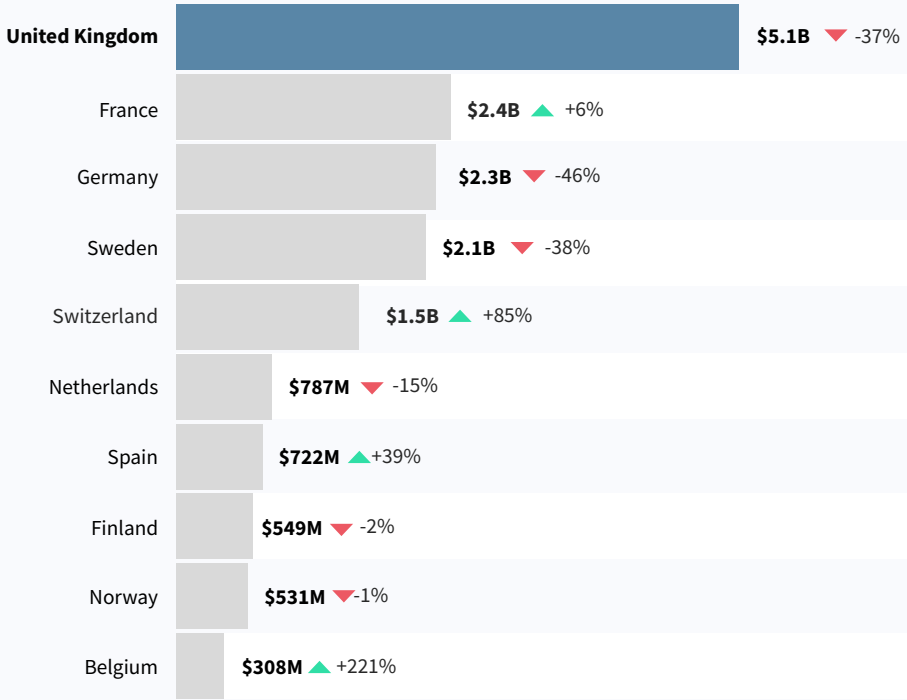
UK Research and Innovation

UK's innovation agency with £1.2B/year budget.

Source: Dealroom.co *Here shown as pure exemplificative purpose a few programs from Europe three biggest economies, bust most European countries have dedicated policies to support Deep Tech, from pioneers like Switzerland, Netherlands and the Nordics to nearly every other state in Europe.

The UK remains the top country in Europe for Deep Tech, followed by France, Germany, and Sweden. Switzerland comes in 5th punching above its weight.

Deep Tech VC investment 2022 (% growth vs 2021)



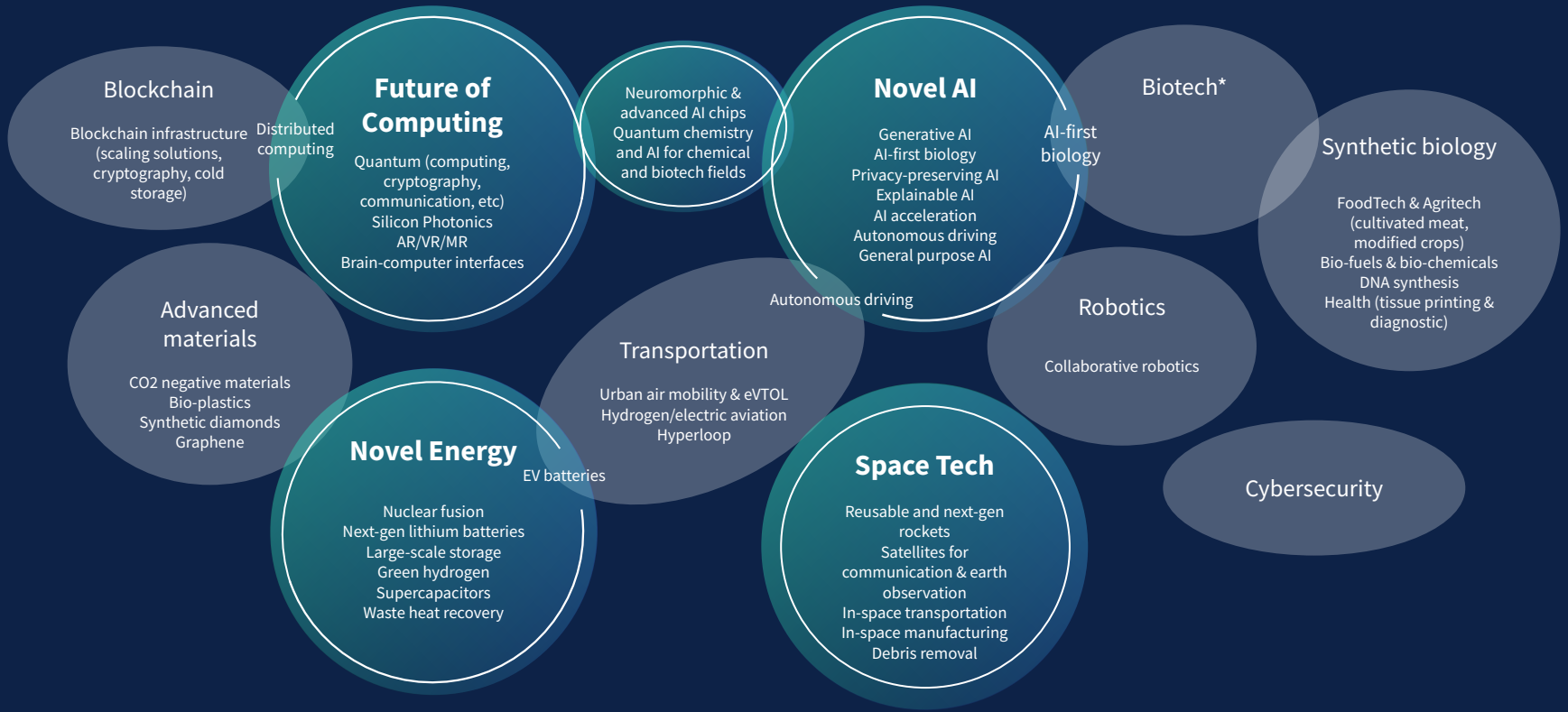
Notable Deep Tech funding rounds in 2022

newcleo · WAYVE · carbon clean
northvolt · H2green steel · MYCORENA
VOLOCOPTER · sunfire · wandelbots
EXOTEC · ITEN · AQEMIA
climeworks · mindmaze · Terra Quantum
SMART PHOTONICS · ioniqa · elestor
H2SITE · SATELLOT · iPRONICS
IQM · ICEYE · VARJO
RELTIME · Z·E·G · HYDROGEN MEM-TECH
aerospacelab · MAGNAX · PHARROWTECH

Source: Dealroom.co.

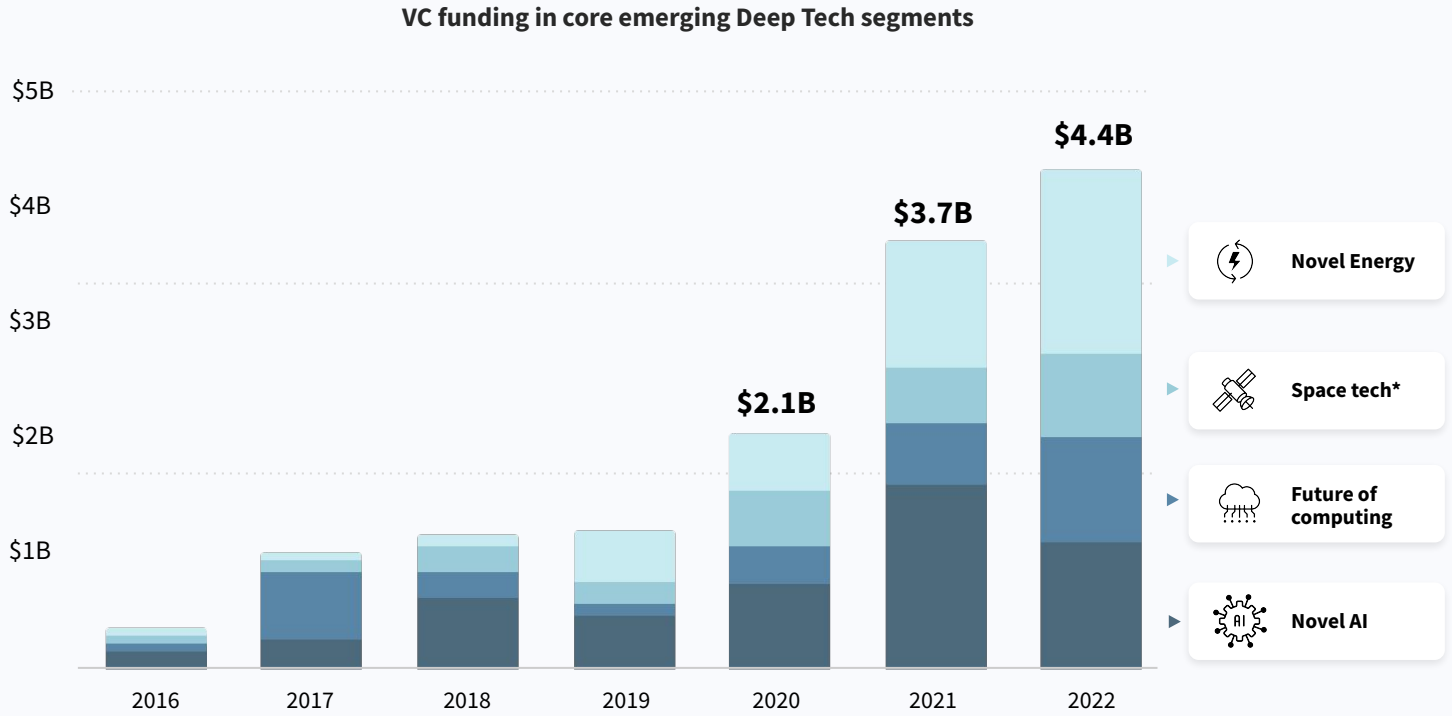
3 | Deep Tech segments to watch

This report focuses on four “new/true frontier” areas of Deep Tech.



Source: Dealroom.co Segments indicated are not meant to be exhaustive but serve as an example of topics of focus.
*Biotech is excluded by our definition of Deep Tech, except for some segments such as AI-first biology, more details here.

Emerging Deep Tech segments of Novel AI, Future of Computing, Novel Energy and Space Tech raised $4.4B funding in 2022, more than doubling the 2020 total.



Source: Dealroom.co *Excluding OneWeb $4.4B raised since 2016.

Novel Energy

Novel energy startups in Europe raised $1.6B in 2022, almost 50% more than 2021 total and 3x compared to 2020.

VC investment in European Novel Energy Deep Tech startups*

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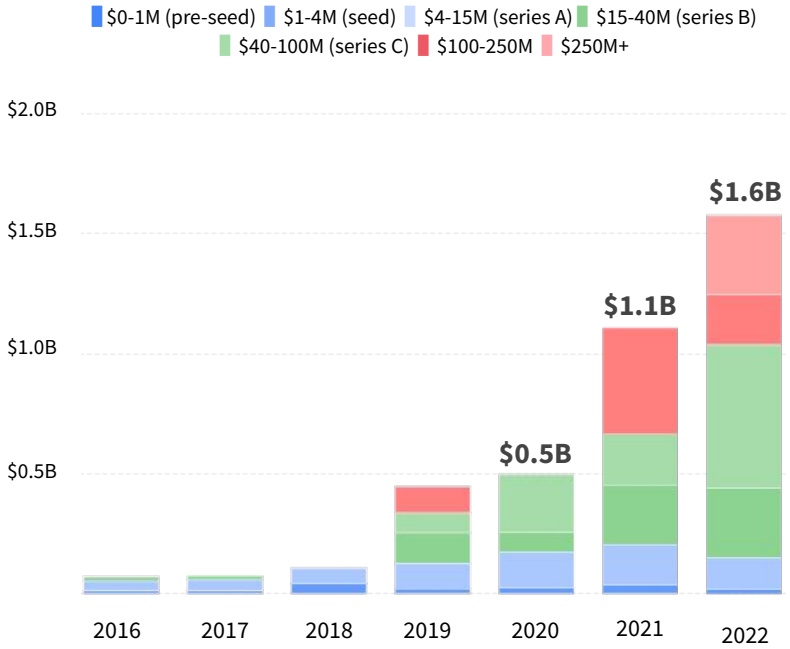


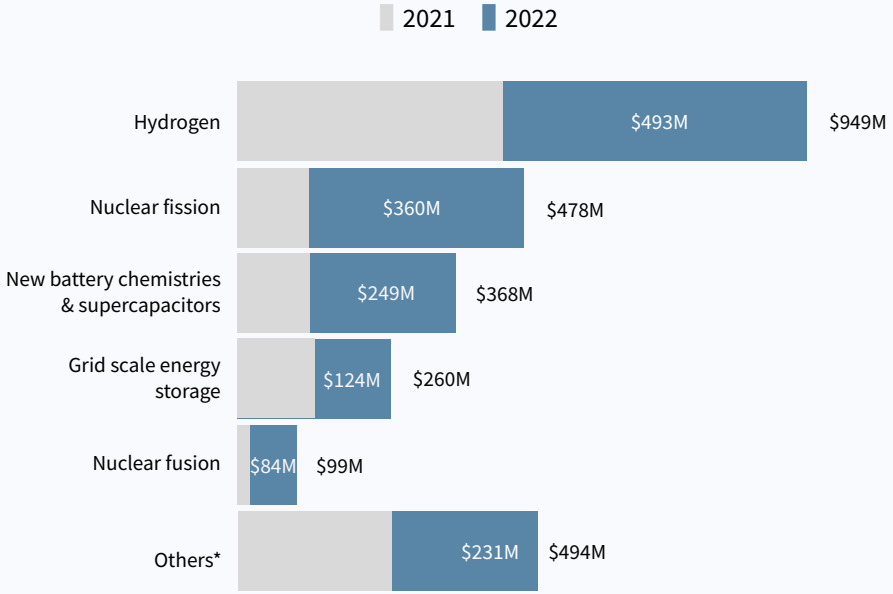
Notable Deep Tech rounds in Novel Energy 2022

Startup	Funding round	Focus
newcleo	€300M Early VC	Nuclear fission
H2 green steel	€260M Series B	CO2-free steel manufacturing
sunfire	€86M Series D	Hydrogen electrolyzers
nyobolt	£50M Series B	New battery chemistries (ultra-fast charging)
first light	$45M Series C	Nuclear fusion
skeleton	€38M Series D	Supercapacitors

Source: Dealroom.co

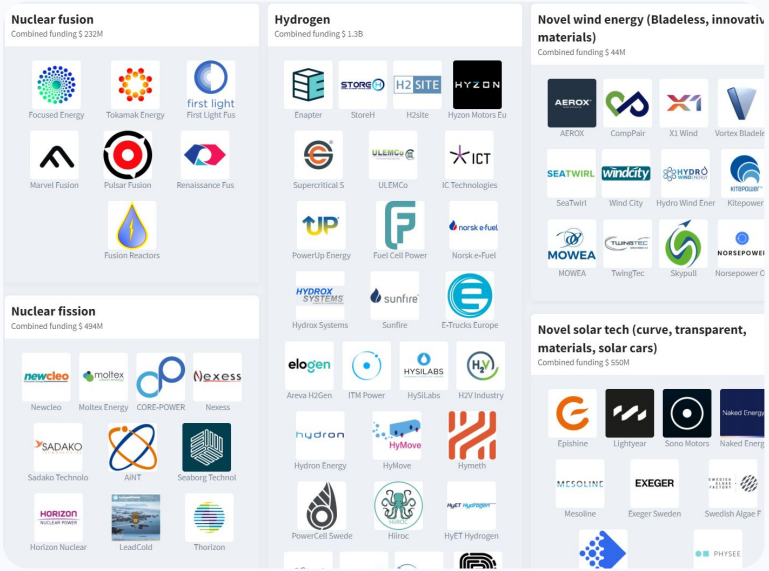
Hydrogen startups have raised the most funding in 2022, followed by nuclear fission, new battery chemistries & supercapacitors.

VC investment in European Novel Energy Deep Tech segments



180+ Novel Energy startups in Europe

Explore list



Source: Dealroom.co. * Deep Tech energy startups active in waste heat recovery, wind energy, solar energy, water & tidal energy, thermal energy storage & heat pumps.

Novel AI

Novel AI startups in Europe raised $1.1B in 2022, down 31% from 2021, but still 60% more than in 2020.

VC investment in European Novel AI Deep Tech startups

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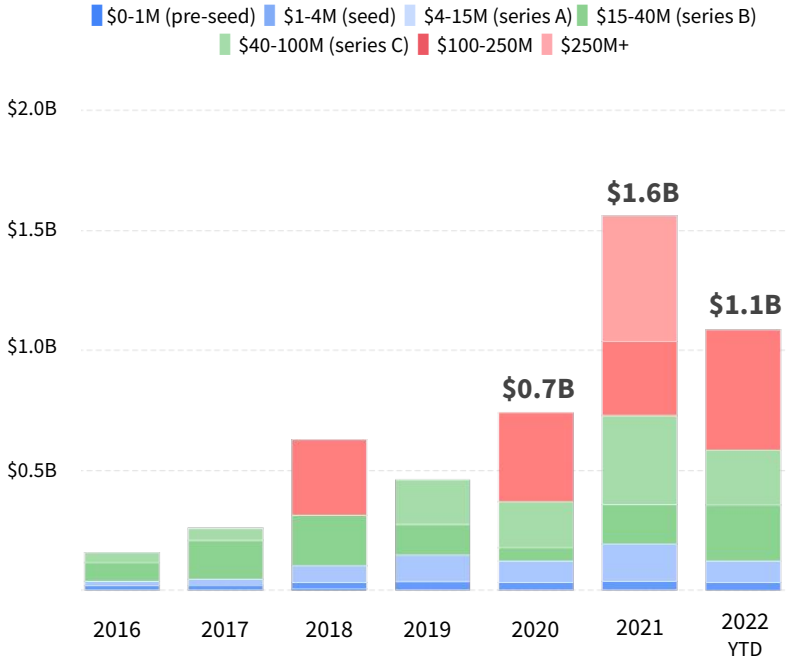


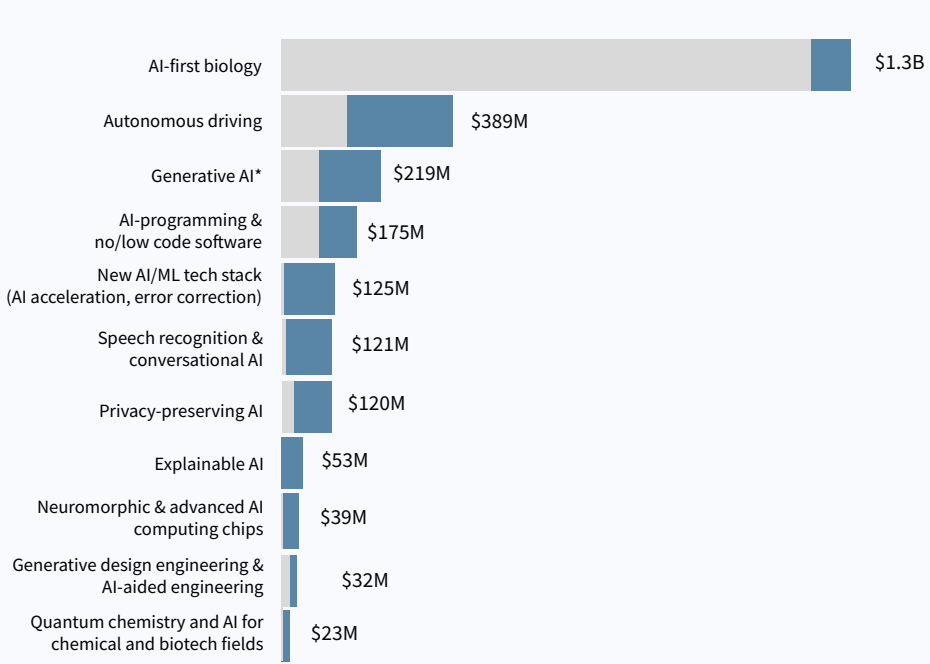
Notable Deep Tech rounds in Novel AI in 2022

Startup	Funding round	Focus
WAYVE	$200M Series B	Autonomous driving
stability.ai	$101M Series A	Generative AI
InstaDeep™	$100M Series B	AI acceleration
Speechmatics	$62M Series B	Speech recognition
causaLens	$45M Series A	Explainable AI (causal AI)
Peptone	$40M Series A	AI-first biology

Source: Dealroom.co

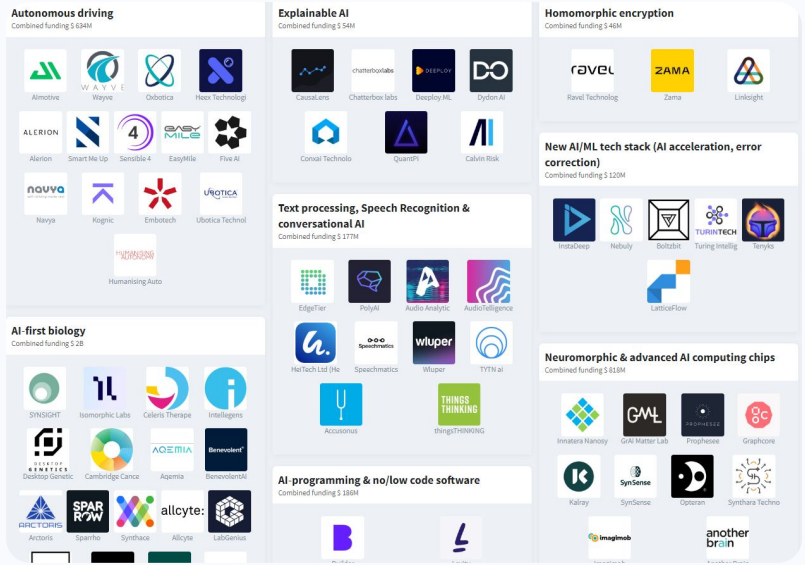
AI-first biology had a big slowdown in 2022. Most other segments of Novel AI accelerated in 2022, including Autonomous driving and Generative AI.

VC investment in European Novel AI Deep Tech segments



160+ Novel AI startups in Europe

Explore list



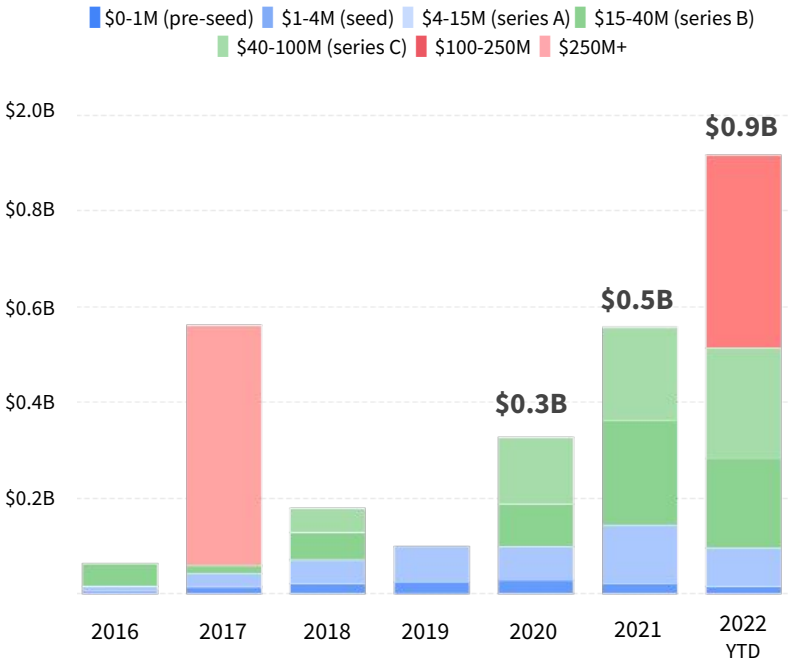
Source: Dealroom.co *Includes only startups developing their own LLMs, for a broader overview have a look at our Generative AI briefing.

Future of Computing

Future of Computing startups in Europe raised $0.9B in 2022, the most active year ever by far.

VC investment in European Future of Computing startups

» view online



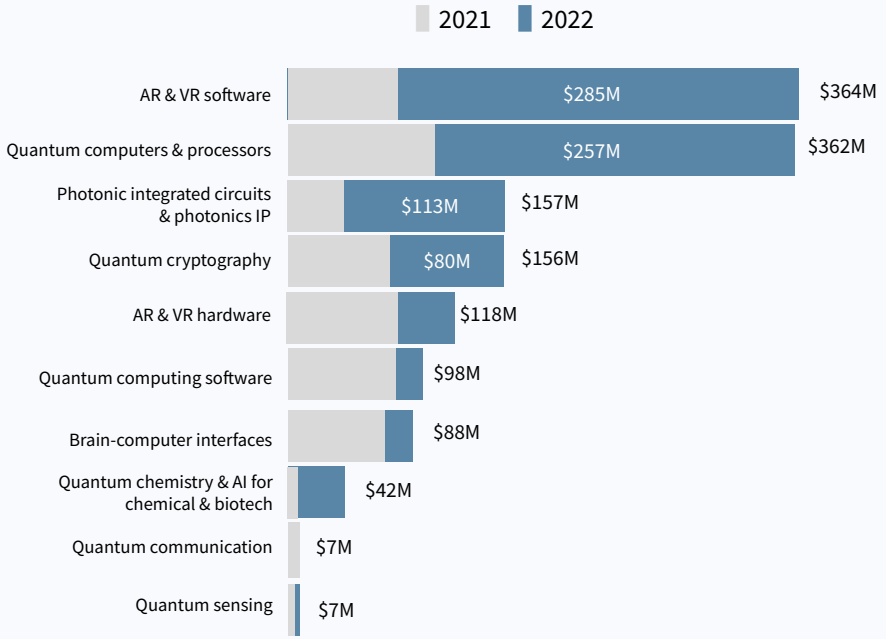
Notable Deep Tech rounds in Future of Computing in 2022

Startup	Funding round	Focus
IQM	€128M Series A	Quantum computers
SMART PHOTONICS	€75M Late VC	Photonics integrated circuits
Terra Quantum	$75M Series A	Quantum computing software & quantum cryptography
eleQtron	€50M Late VC	Quantum computers
OQC	$47M Series A	Quantum computers
INBRAIN NEUROELECTRONICS	€18M Early VC	Brain-computer interfaces

Source: Dealroom.co

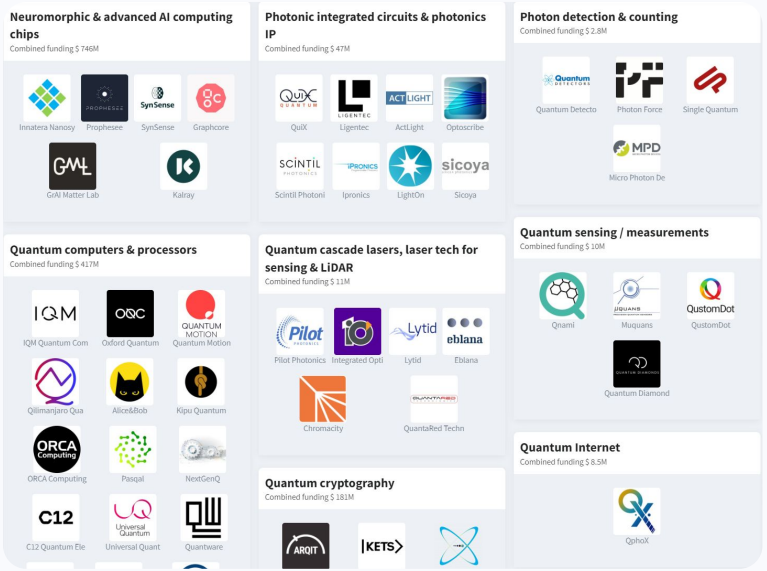
AR & VR software startups raised the most future of computing funding in 2022 and 2021, followed by Quantum computers & processors, Photonics and Quantum cryptography.

VC investment in European Future of Computing Deep Tech segments



140+ Future of Computing startups in Europe

Explore list



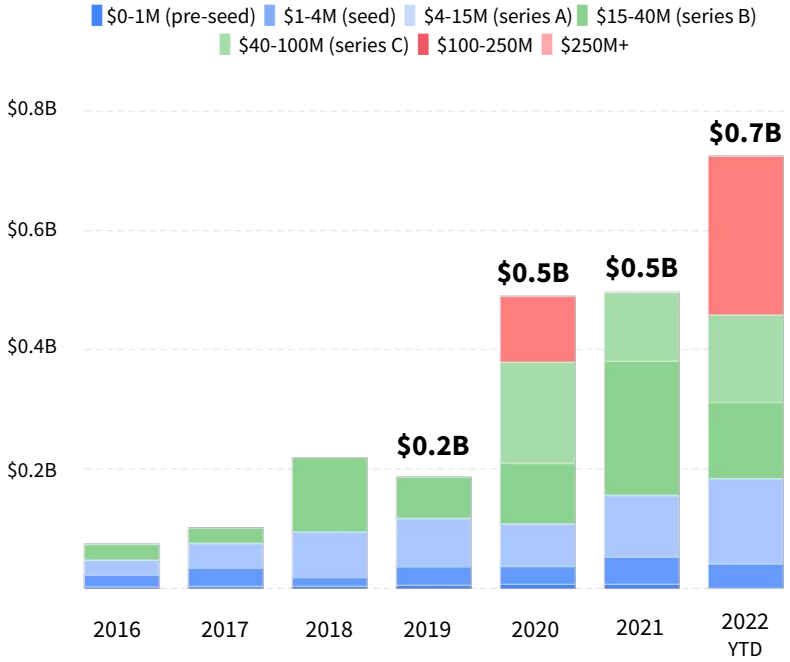
Source: Dealroom.co

Space Tech

Deep Tech x Space Tech startups in Europe raised $0.7B in 2022, almost 1.5x 2021 total when excluding OneWeb megarounds.

VC investment in European Deep Tech x Space Tech startups*

» view online



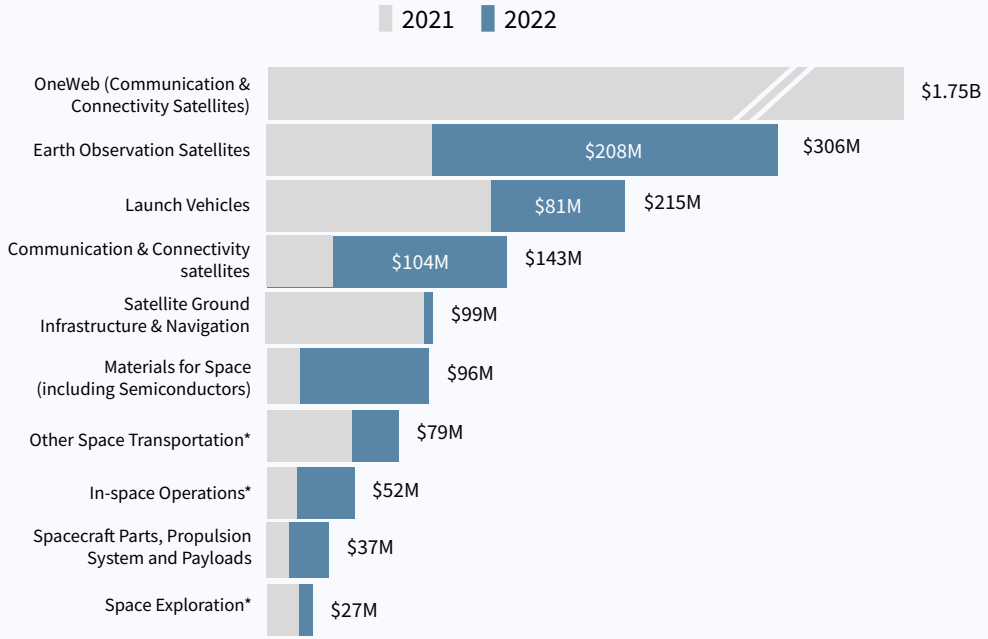
Notable Deep Tech rounds in Space Tech in 2022

Startup	Funding round	Focus
ICEYE	$136M Series D	Earth observation satellites
ORBEX	£40M Series C	Space launch rockets
E-SPACE	$50M Seed	Communication & connectivity satellites
aerospacelab	€40M Series B	Earth observation satellites
Destinus.	$29M Seed	Hypersonic planes
LiveEO	€19M Early VC	Satellite imagery

Source: Dealroom.co *Excluding OneWeb $4.4B raised since 2016.

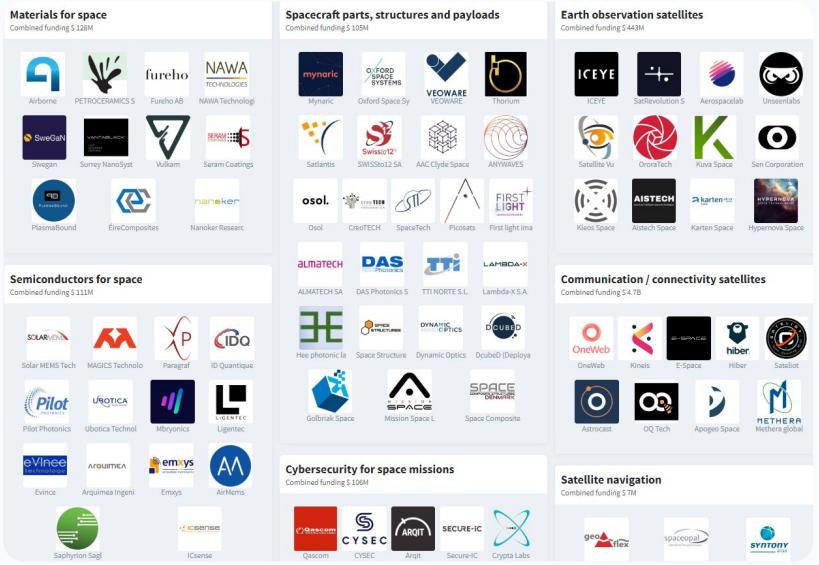
Earth Observation Satellites raised the most funding among Deep Tech x Space tech startups, when excluding Oneweb, followed by Launch Vehicles and Communication & Connectivity Satellites.

VC investments in Deep Tech x Space Tech in Europe



150+ Deep Tech x Space Tech startups in Europe

Explore list



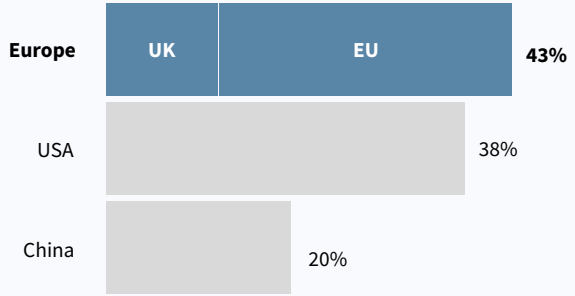
Source: Dealroom.co For deeper insights on Space Tech segments explore our European Space Tech report. *Other space transportation includes in-space transportation, spaceplanes and hypersonic flight, stratospheric balloons and platforms.Space exploration includes in-space manufacturing, in-space human presence, space resource exploration and space utilities. In-space operations includes mission planning and control, spacecraft servicing and debris removal, in-space research & space cybersecurity.

LAKE STAR | (w)C Walden Catalyst | dealroom.co

4 | Accelerating European Deep Tech

Europe has the great technical talent and research leadership required to play a key role in the future of global Deep Tech.

High share of highly-cited research publications*

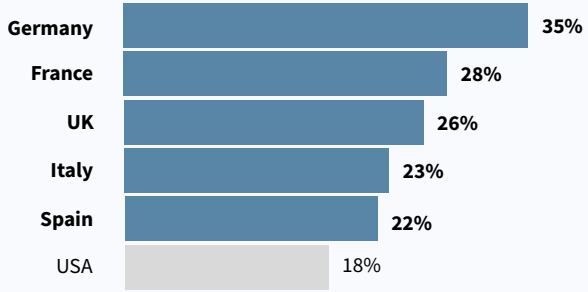


Europe excels in Computer Science ranking (THE 2022)

1. Oxford	**11. Imperial College London**
2. Stanford	12. UCLA
3. MIT	13. Tsinghua (Beijing)
4. ETH Zurich	14. Caltech
4. Cambridge	**15. TU Munich**
6. CMU	16. Singapore Nanyang
7. Harvard	17. University of Washington
8. Berkeley	18. Cornell
8. National University of Singapore	19. Peking university
10. Princeton	**20. École polytechnique fédérale de Lausanne**

European students are more into science*

(portion of graduates in Science, Technology, Engineering, and Mathematics)



… and does well also in Engineering ranking (THE 2022)

1. Harvard	11. University of California
2. Stanford	12. Peking university
3. Berkeley	**13. Imperial College London**
4. MIT	14. Georgia Tech
5. Cambridge	15. Singapore Nanyang
6. Oxford	16. Yale
7. Princeton	17. Tsinghua (Beijing)
8. Caltech	18. Carnegie Mellon University
9. ETH Zurich	**19. École polytechnique fédérale de Lausanne**
10. National University of Singapore	20. University of Michigan-Ann Arbor

* * Benedict Evans / Mosaic Ventures Dec 2020. Data originally from BEIS/SCOPUS/UNESCO.

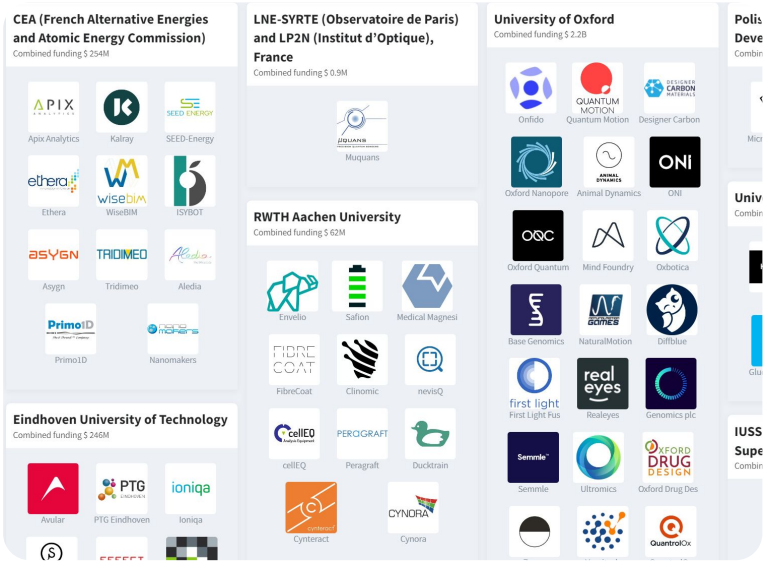
Indeed many European Deep Tech successes have their roots in academia.

Most valuable European Deep Tech spinouts [» view online]

Company	Category	University	Valuation	VC funding
BIONTECH	Biotech	Johannes Gutenberg University Mainz	$23B	$1.4B
celonis	Process mining	TUM	$13B	$1.8B
climeworks	CO_2 capture	ETH Zurich	$2.2-3.3B	$777M
DARKTRACE	Cybersecurity	Cambridge	$2.2B	$230M
OXFORD NANOPORE	AI Biotech	Oxford	$2.1B	$1.3B
mindmaze	VR health	EPFL	$1.5B	$339M
SENSIRION	Smart sensors	ETH Zurich	$1.4B	-
AGILE ROBOTS	Robotics	German Aerospace Center (DLR)	$1.0B	$260M

400+ Deep Tech spinouts by university

Explore list

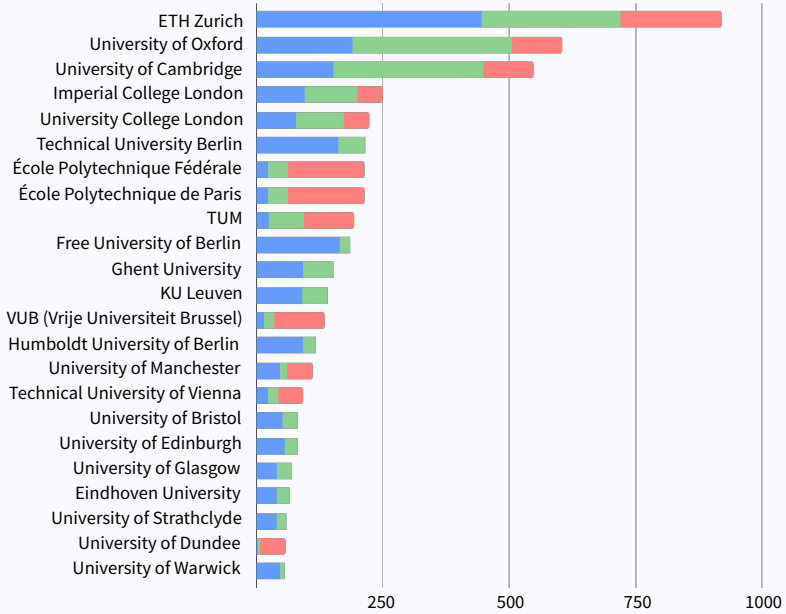


Source: Dealroom.co.

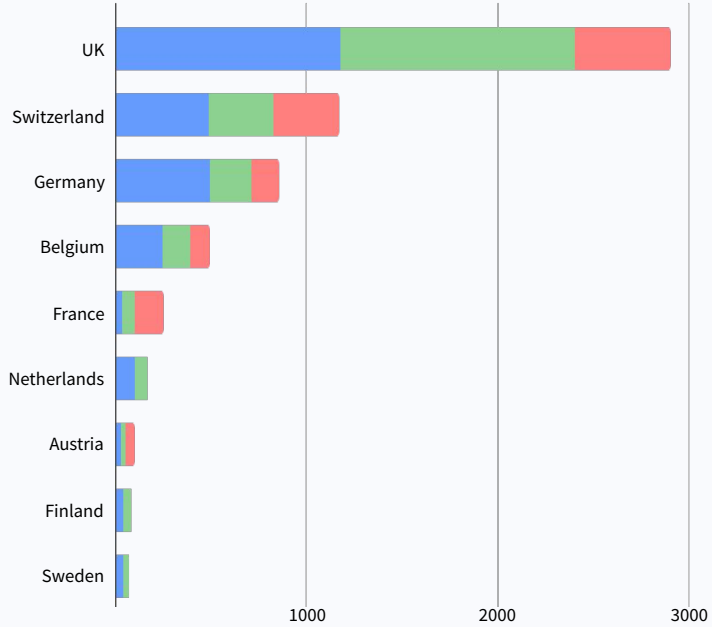
Universities in the UK created the most spinout value, followed by Switzerland and Germany. ETH, Oxford and Cambridge are the top universities overall.

Total number of spinouts (1 point) | Total number of spinouts that raised series A (5 points) | Total number of spinouts with unicorn valuation (50 points)

European universities which created most spinout value*



University spinout value created by universities' country*

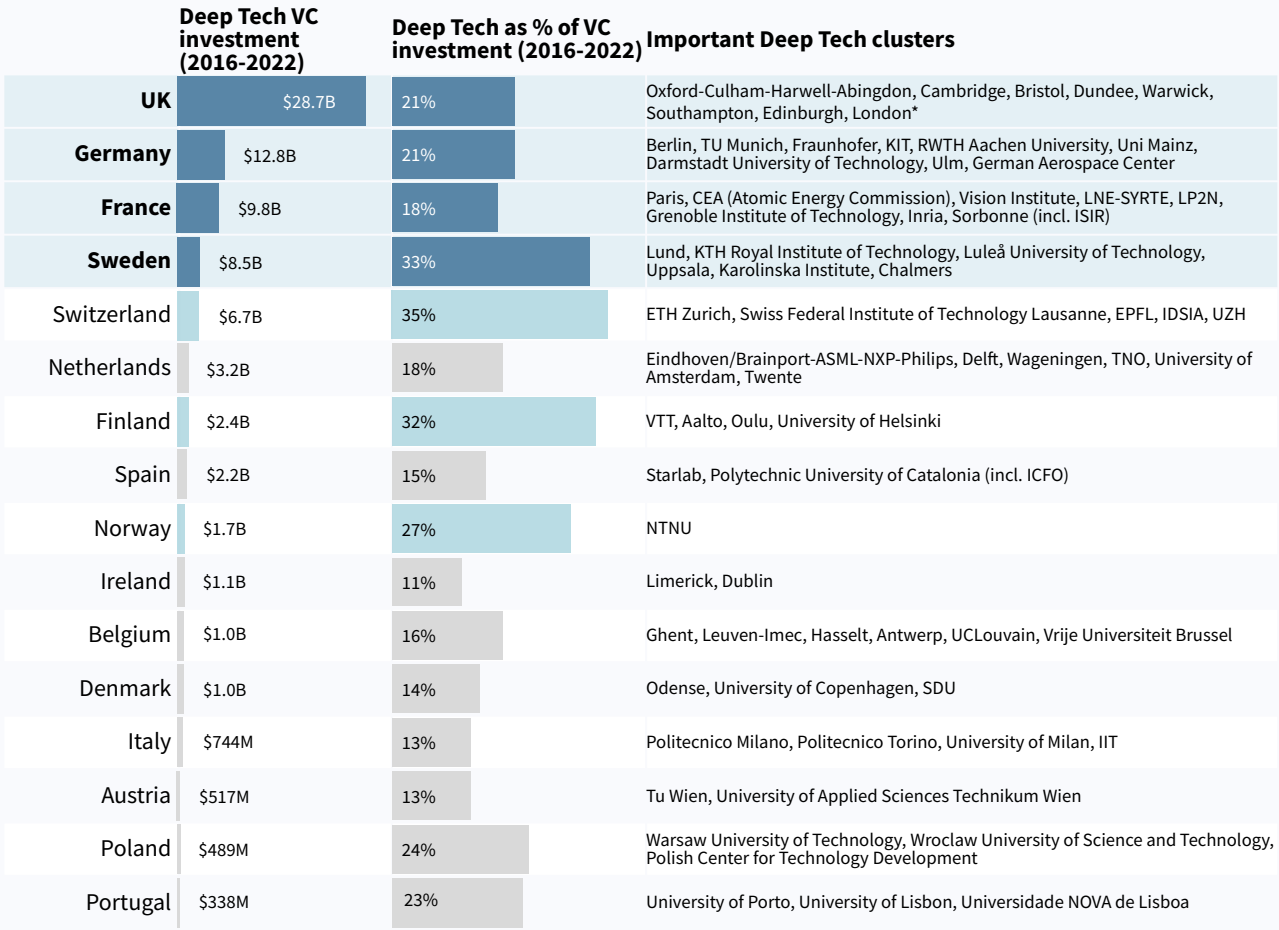


Source: Dealroom.co. Data a Oct 30 2022.
*France has a mediated system for university spinouts which limits visibility on university value creation.

Europe is dotted with Deep Tech clusters.

Source: Dealroom.co.
Clusters shown are based on benchmarking based on patents, Deep Tech startup creation and funding at different stages from early to unicorns.

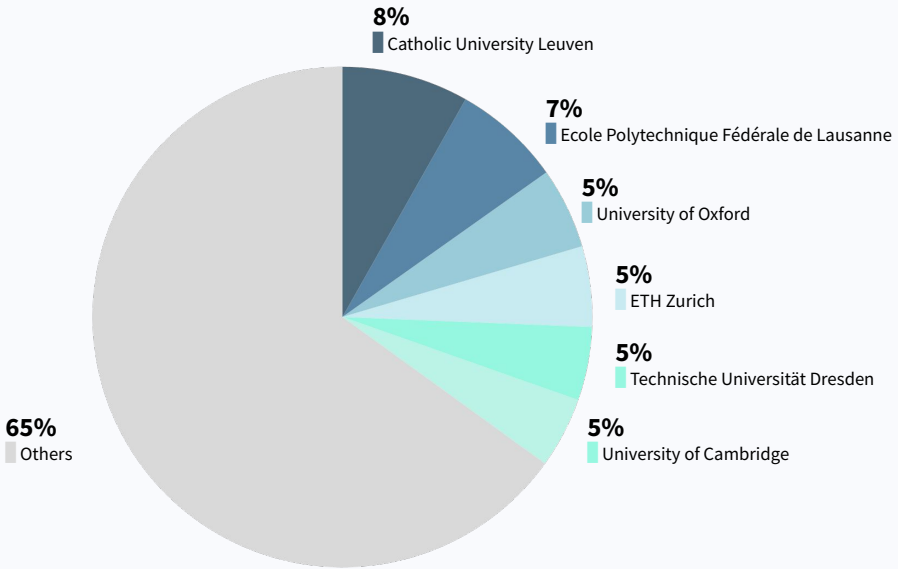
UK, Germany, France and Sweden are the largest Deep Tech ecosystems in Europe. Switzerland, Sweden, Finland and Norway are the most Deep Tech focused ecosystems.



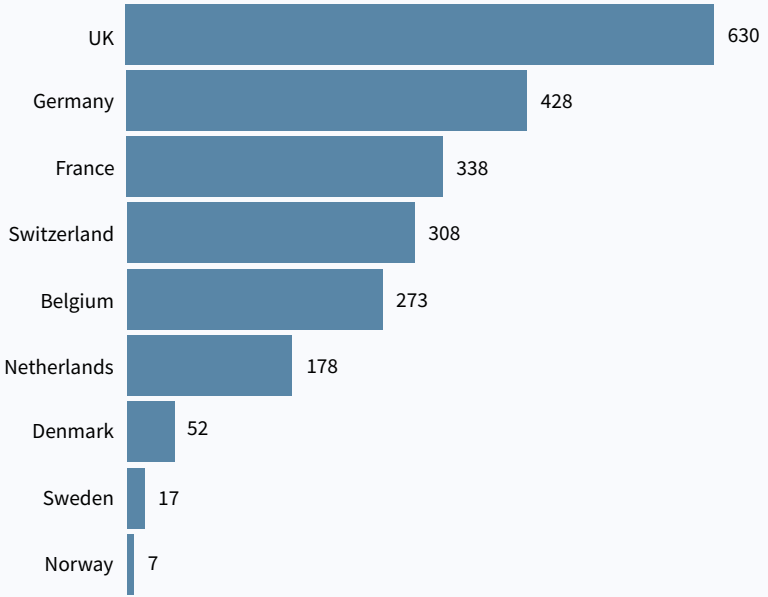
Source: Dealroom.co. *London Deep Tech cluster includes Imperial College, University College

Leuven, Lausanne, Oxford, Zurich, Dresden and Cambridge lead by Deep Tech oriented patents*. Overall the UK leads, followed by Germany, France and Switzerland.

Active patents held by top European universities*



Active patents held by top European universities by university country*



Source: Cipher AI data analyzed by Dealroom. *Top 55 European universities by number of patents held. Categories of patents considered include UTT classes: Energy (Batteries, Fuel cells, Nuclear, photovoltaics, wind turbines), Information (3d printing, AR & VR, blockchain, image processing, ML, Speech recognition, Life sciences (surgical robotics), Mechanical (robotics), semiconductors (lithography, memory, processors, substrates, transistors), Sensor & optics (laser, lidar)

There are still considerable obstacles in the path from academic scientific research to scalable commercialization in Europe.

THE STRENGTHS

Academic research & scientific talent

Europe has the **largest share of highly-cited research publications** (43%).[1]

European students are into science. The **percentage of STEM graduates is much higher in Europe** (22-35%), than in the US (18%).[1]

Europe hosts **leading science & engineering universities** being home to 6 of the top 20 Computer Science and 5 of the top 20 Engineering universities.[2]

THE CHALLENGES

Research spinout process

Spinning out from European universities is expensive. They tend to take double digit ownership, at times exceeding >30%. However, this is often fully dilutable equity, in contrast with US 5-10% common share.[3]

Spin-out arrangements can **drag on for >1 year** in some cases, due to a lack of standardized terms.

Universities often do **not encourage entrepreneurship**, focusing instead on academic publications output.

THE CHANCES

Talent & first steps

Despite the great scientists, **IP and technical know-how, technology-related skills** are **still the biggest need** for deep-tech companies.[4]

There is also a **lack of Sales & Business Development** with technical expertise seen as top priority by investors and third highest by founders.[4]

Other barriers include the local economies' **lack of necessary facilities, talent and expertise** to commercialise further development.[3]

1) Taken from Benedict Evans / Mosaic Ventures Dec 2020. Data originally from BEIS/SCOPUS/UNESCO. 2) Times Higher Education World University Rankings 2022
3) Busting myths and moving forward: the reality of UK university approaches to taking equity in spinouts (UCI)
4) Can Europe Create Its Own Deep-Tech Giants? (BCG)

There is still a long way to go to achieve inclusion in Deep Tech.

Looking at gender inclusion specifically, some success stories have already emerged in Europe…

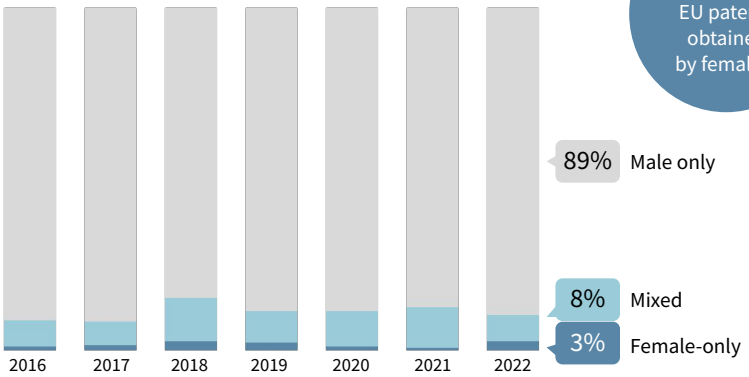
Darktrace
$2.2B

BioNTech
$22.6B

Proximie
$320M—$480M

… but more is needed to achieve a more prosperous industry…

VC investment in European Deep Tech startups by founder gender



10%
EU patents obtained by females*

<6%
startups are female-only founded*

> *"More must be done to avoid unconscious bias.*

Last year only 3% of VC funding in Deep Tech was invested in startups that were female-only founded. However, diversity of thought, opinion and creativity is essential for our Deep Tech ecosystem to thrive. To that end, we must strive towards inclusivity, across all backgrounds and genders, for the space to reach its full potential."

Christina Franzeskides
Deep Tech Investor at **Lakestar**

 Source: Dealroom.co. *Women TechEU 2021 (EISMEA)

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