

From Lab to Leadership

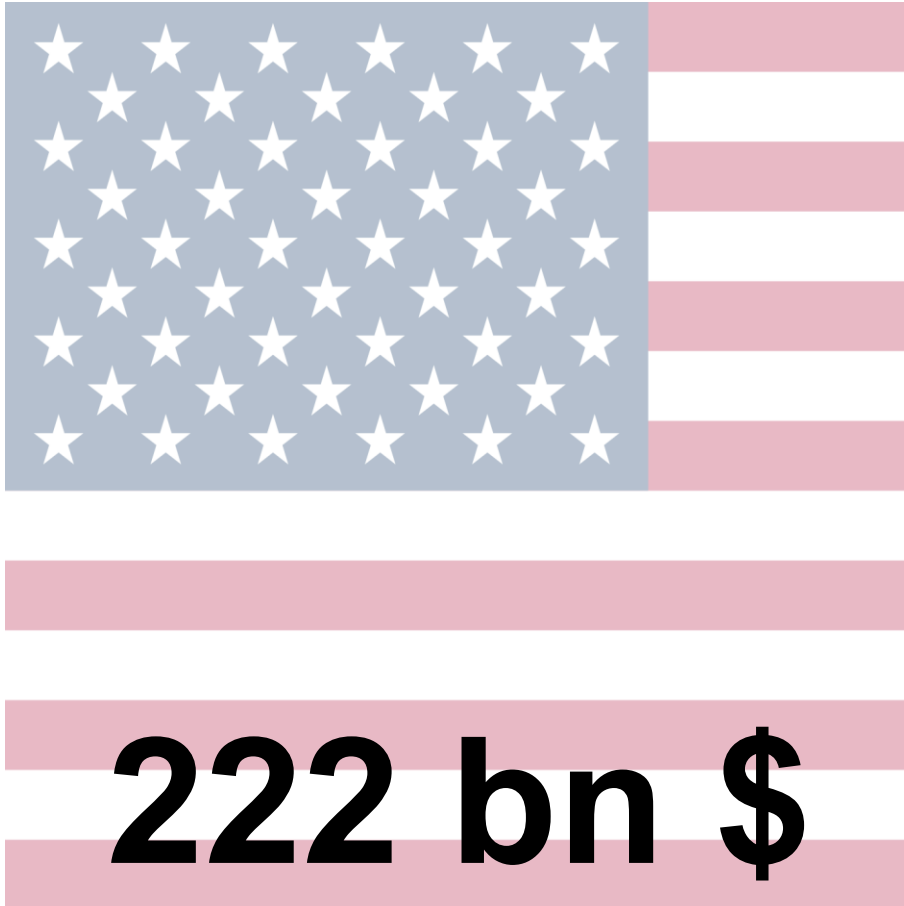
Europe's bet on Semiconductor Startups

Michael Machold – Operational Director TUM Venture Lab Quantum Semicon

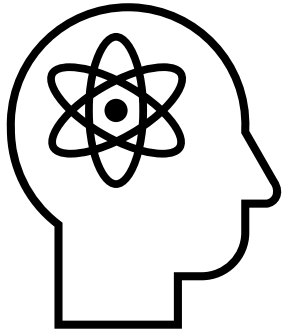
Kevin Berghoff – CEO Quantum Diamonds

November 19th, 2025

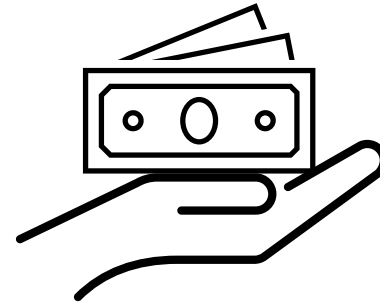
Let's have a look at 2024 VC investments



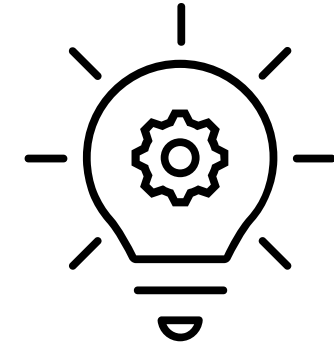
Source: <https://kpmg.com/xx/en/media/press-releases/2025/01/2024-global-vc-investment-rises-to-368-billion-dollars.html>



We love science...
and publications



Salaries for top
engineers in US and
Germany differ
massively



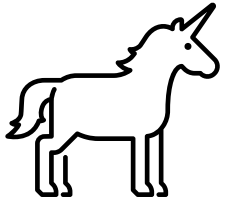
Innovation in
Germany? China
has a different
picture nowadays...

However: We have everything we need!

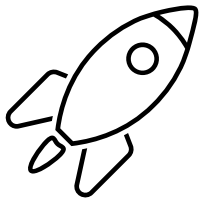
Talents – Education – Ecosystem – Political Enablement

Startups can make the change!

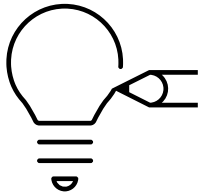
Why start-ups are working differently...



Revolutionizing existing business models



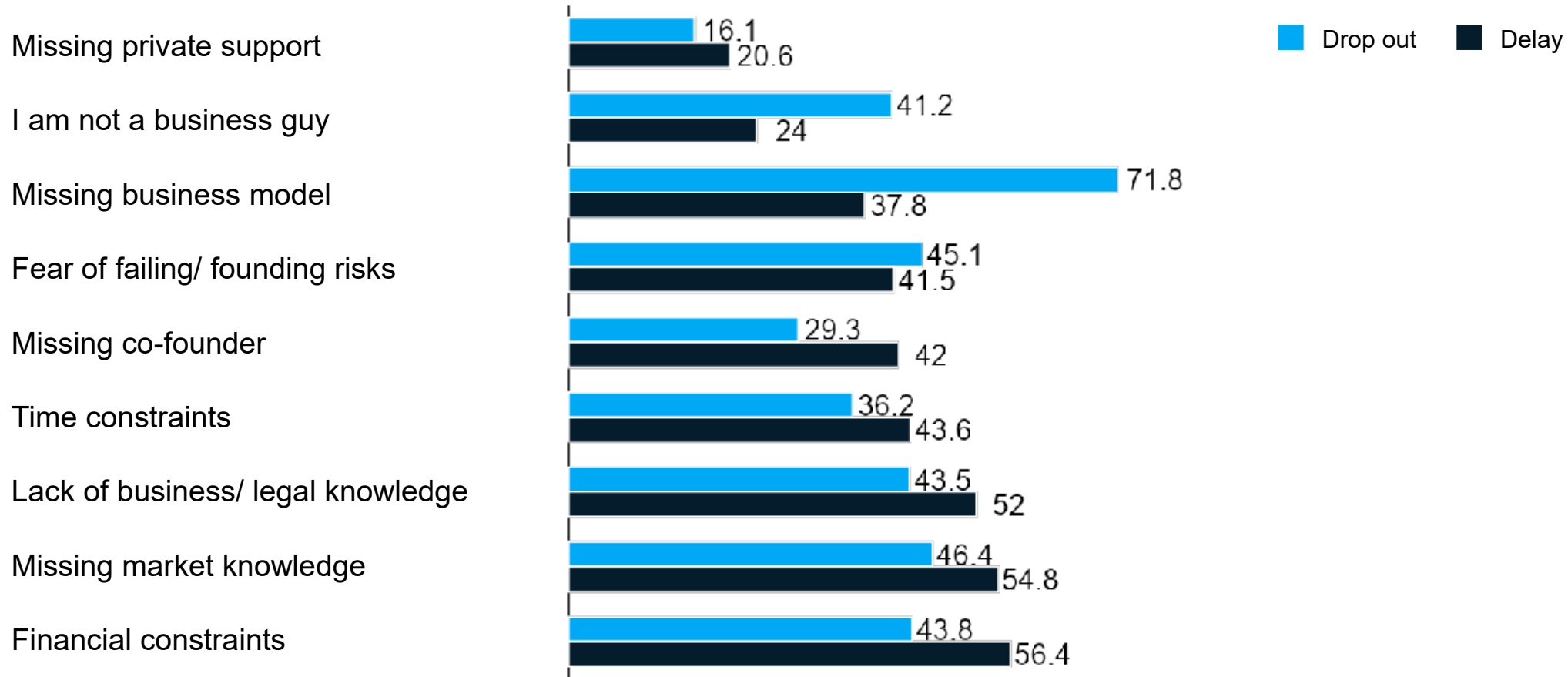
Lightspeed mode –
as constantly running out of money



Culture of **fast adaption** to market needs

What keeps scientists from founding?

Reasons for scientists to drop out or delay company foundation, in % (multiple selection possible)



TUM Venture Labs excel as a highly connected innovation ecosystem

Built on the strengths of two Europe-wide leading institutions:

TUM:

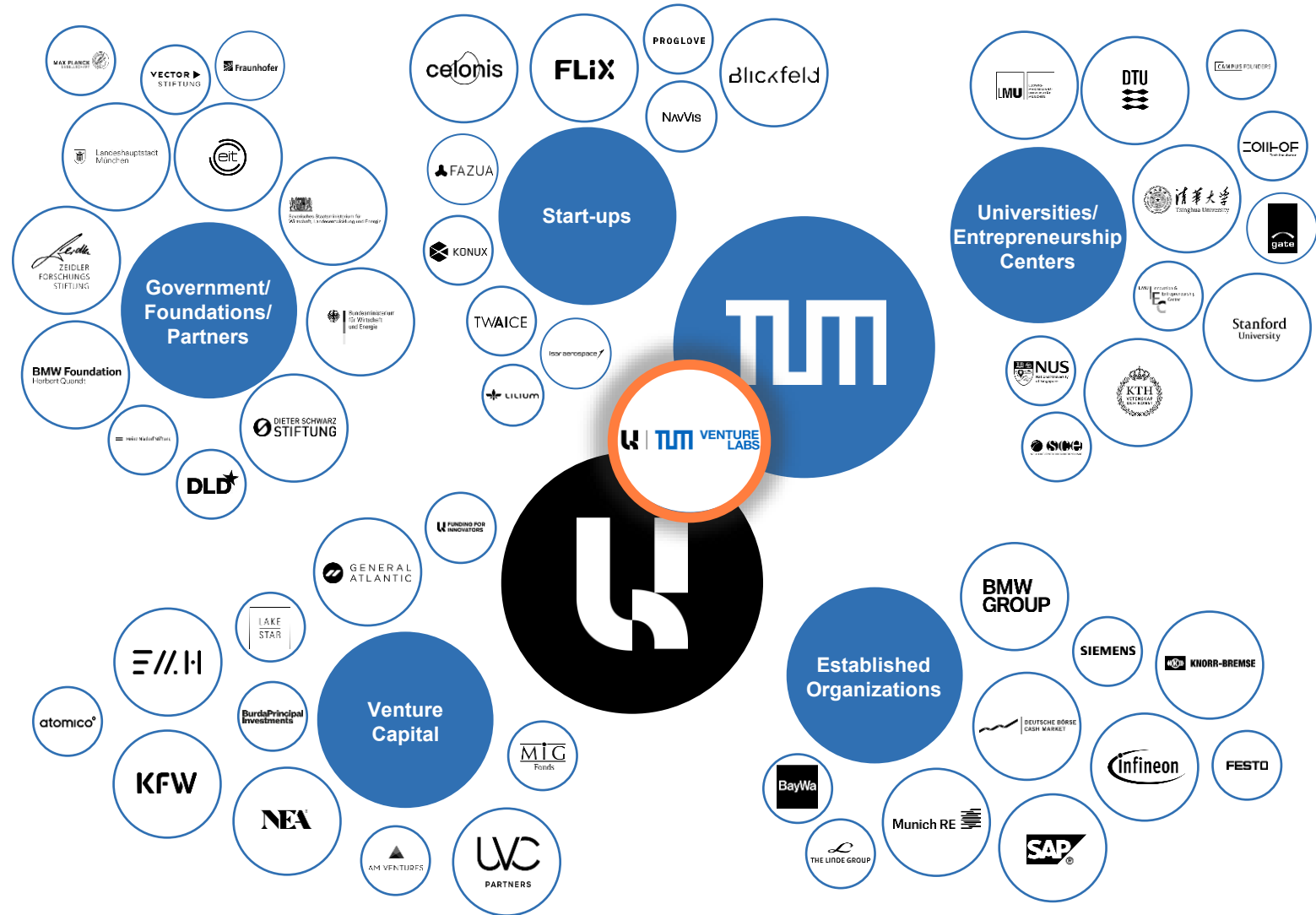
- Top ranked university in the EU
- >50k students (~40% international)
- > 6k scientist
- Biggest Computer Science department in Europe
- Ranked in the top ten in AI globally

UnternehmerTUM:

- Europe's largest entrepreneurship center
- More than 20 years experience in supporting founders & start-ups
- 20+ programs for talents and founders along the entrepreneurial journey



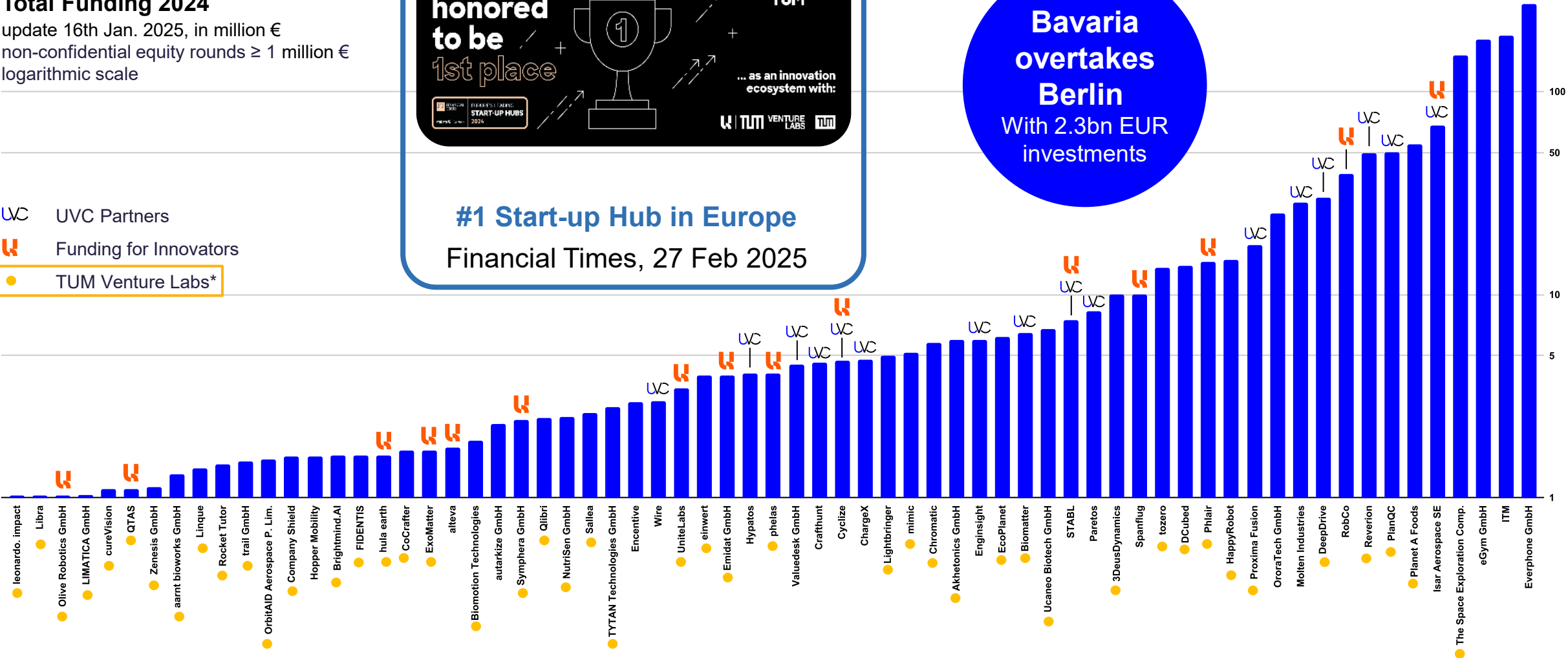
>100 start-ups p.a. &
€2Bn investments p.a.



In 2024, TUM Venture Labs, UnternehmerTUM, and TUM supported start-ups raising around 2 Billion EUR in over 100 funding rounds

Total Funding 2024
update 16th Jan. 2025, in million €
non-confidential equity rounds ≥ 1 million €
logarithmic scale

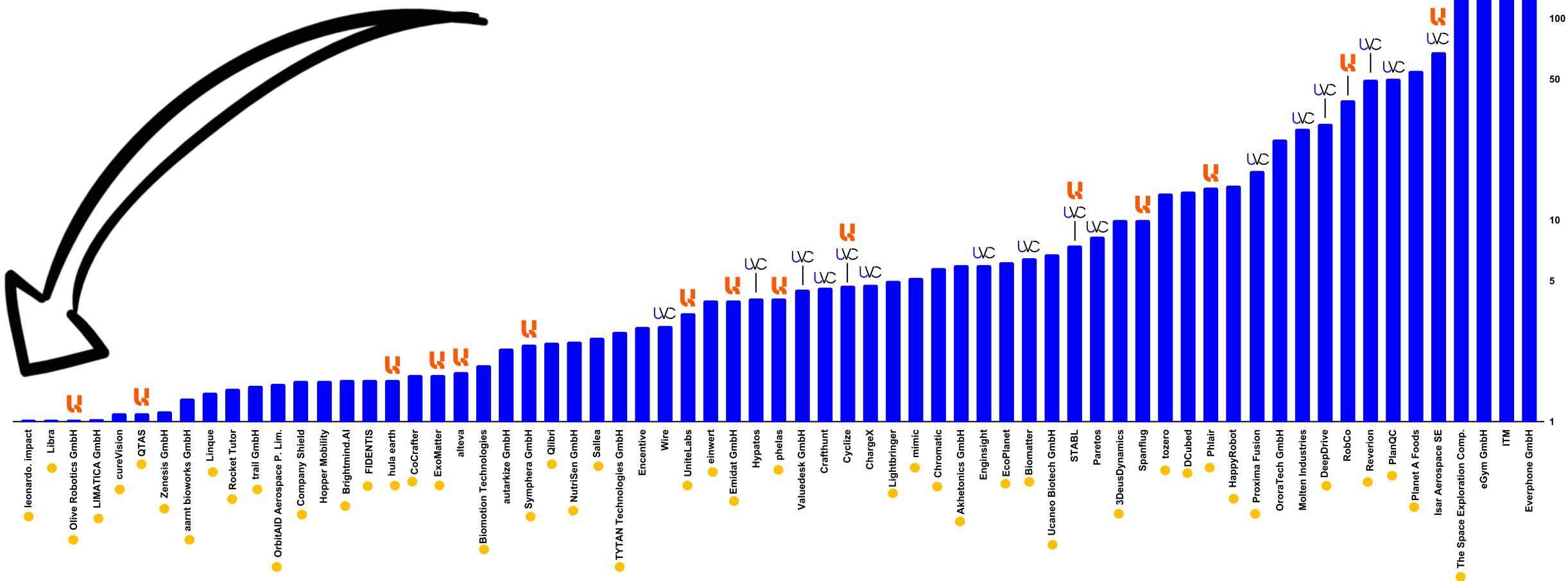
- UVC UVC Partners
- U Funding for Innovators
- TUM Venture Labs*



*These start-ups are part of the TUM Venture Labs Initiative

Sounds impressive...

... however, the magic starts here!



● *These start-ups are part of the TUM Venture Labs Initiative

Our Mission:

We are on track to become **Europe's leading factory** for deep tech and life science start-ups.

We support talents and teams to turn their **deep tech and life science ideas** into **scalable businesses with strong real-world impact**.

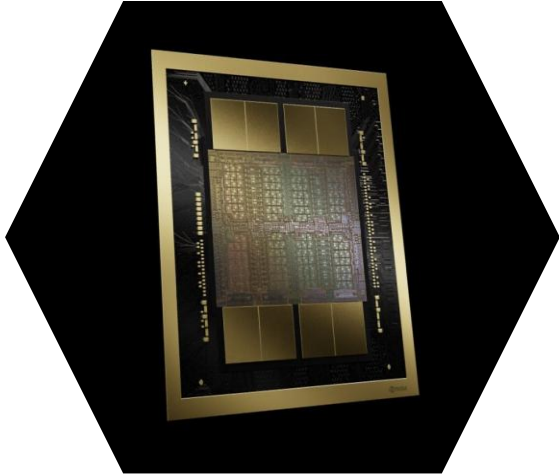
We act as an **integrated network**, combining **exceptional domain expertise** across a wide area of technologies and markets with deep **entrepreneurial experience**.

We support teams **across the entire early life-cycle** from idea generation to business launch and impact.



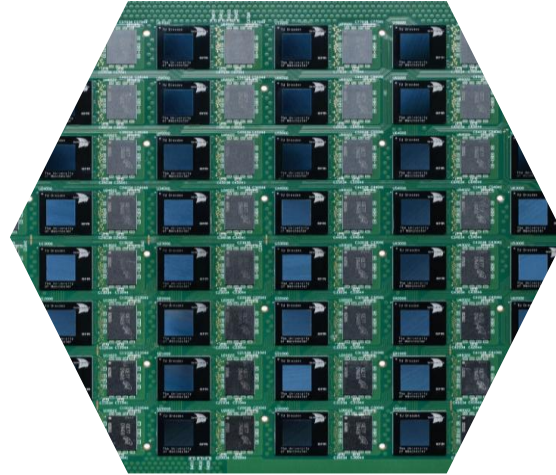
From Evolution to Revolution: Next-gen technologies driving the coming decades of computing

The classical regime:
From CPU over GPU to XPU...



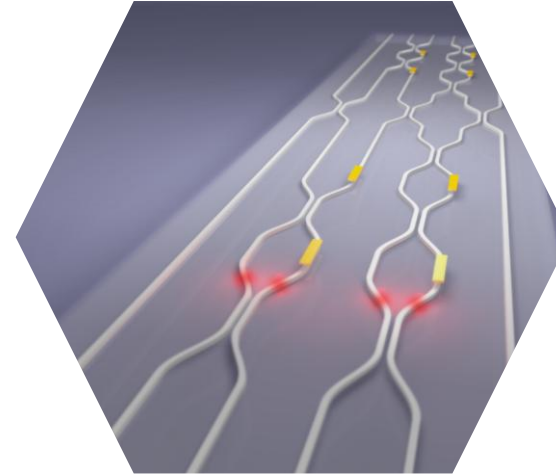
Source: Nvidia

Neuromorphic &
in-memory computing



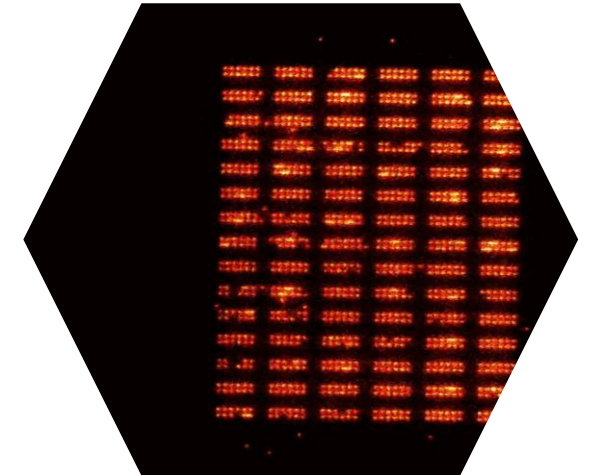
Source: SpiNNcloud

Photonic
computing



Source: University of Bristol

Quantum
computing



Source: planqc

Companies:



groq



SpiNNcloud



AKHETONICS



planqc

IQM

Energy
efficiency:

1x

10x

10-
100x

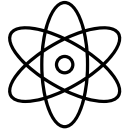
10-
100x

>>

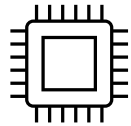
Knowing Deep-Tech Startups can revolutionize Industries, what does this mean for...



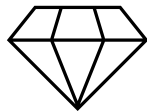
... the way we **design chips**?



... the **materials** we use?



... the way we **compute**?



... the way we **sense**?



... other related fields?

So. Why should you work with startups... and us...?



Access to **innovation** and **technology**



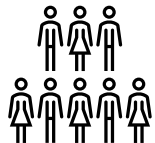
Speed and **Agility**



Access to potential **new markets**



Foster internal **innovation culture**



Access to **talents**

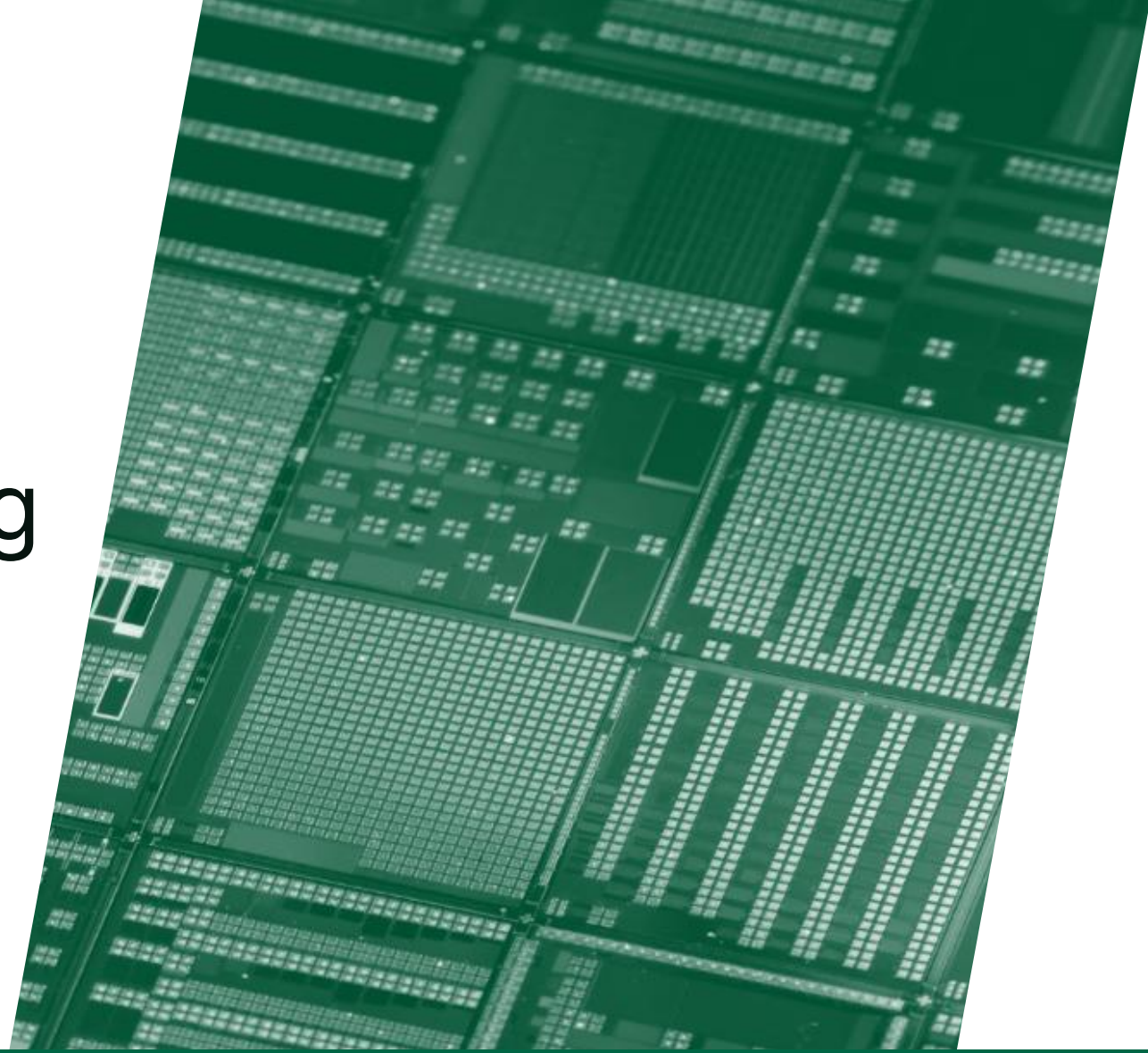


Risk mitigation

Enabling next-gen chip manufacturing

Company Introduction

Confidential



\$100M+
Total funding

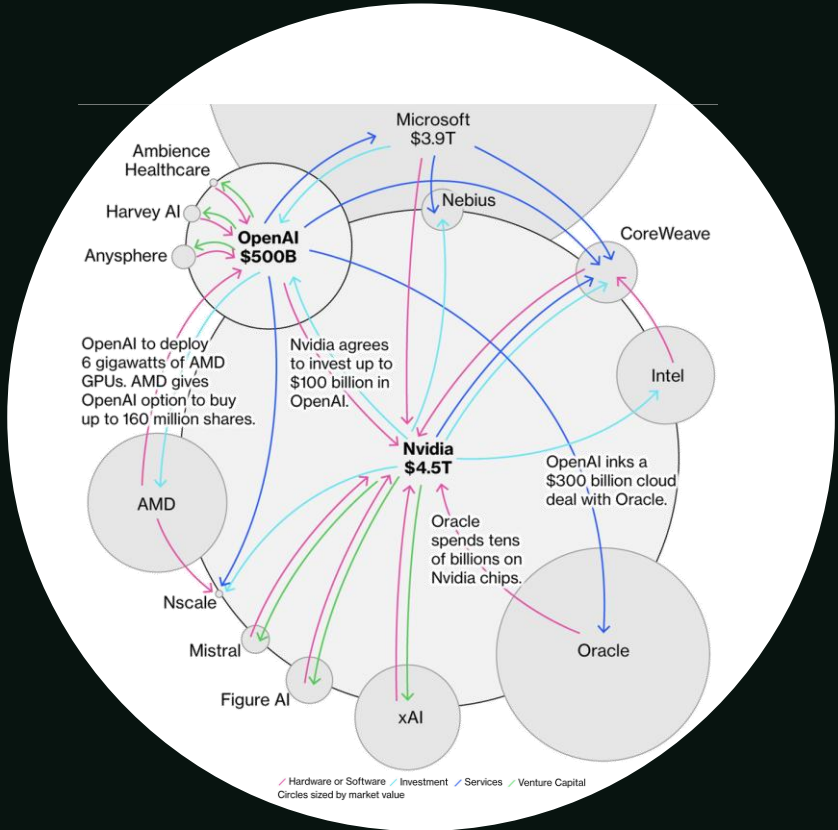
9/10
Leading chipmakers
trust us

40+
Employees and
growing

17
Patents

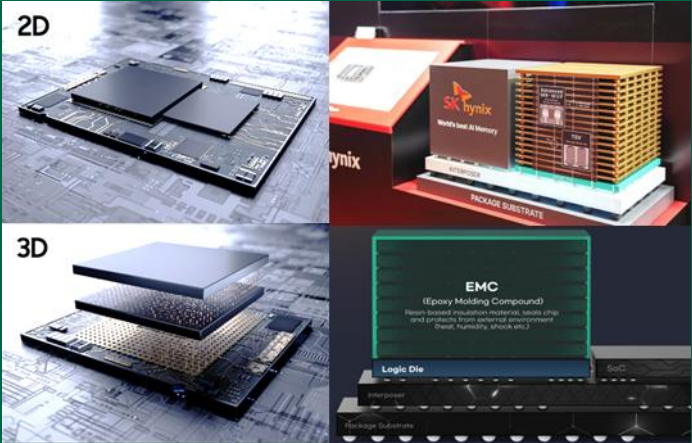
To power the AI era, chips get more complex than ever

Chips are prevalent and are integrated into all future applications



Source: Bloomberg

Complex chip structures require innovation



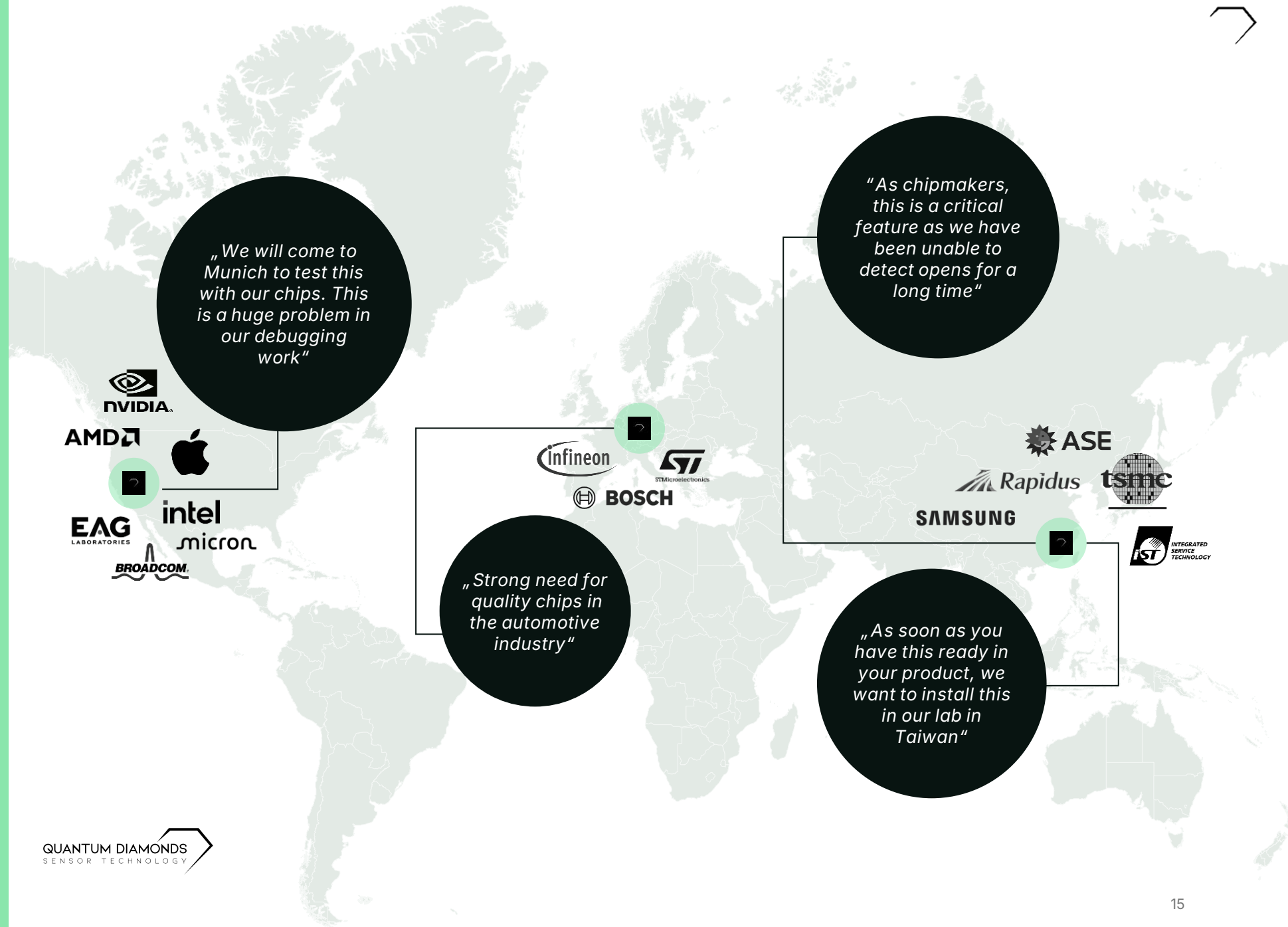
The Korea Herald
"Intel overtakes Samsung, TSMC in 2 nm race, but yields raise doubts"

newelectronics
"Samsung struggling with 3nm yields and remains far behind TSMC"

TrendForce
"Fierce Battle Over 2nm Chip Manufacturing: Significant Yield Gap"

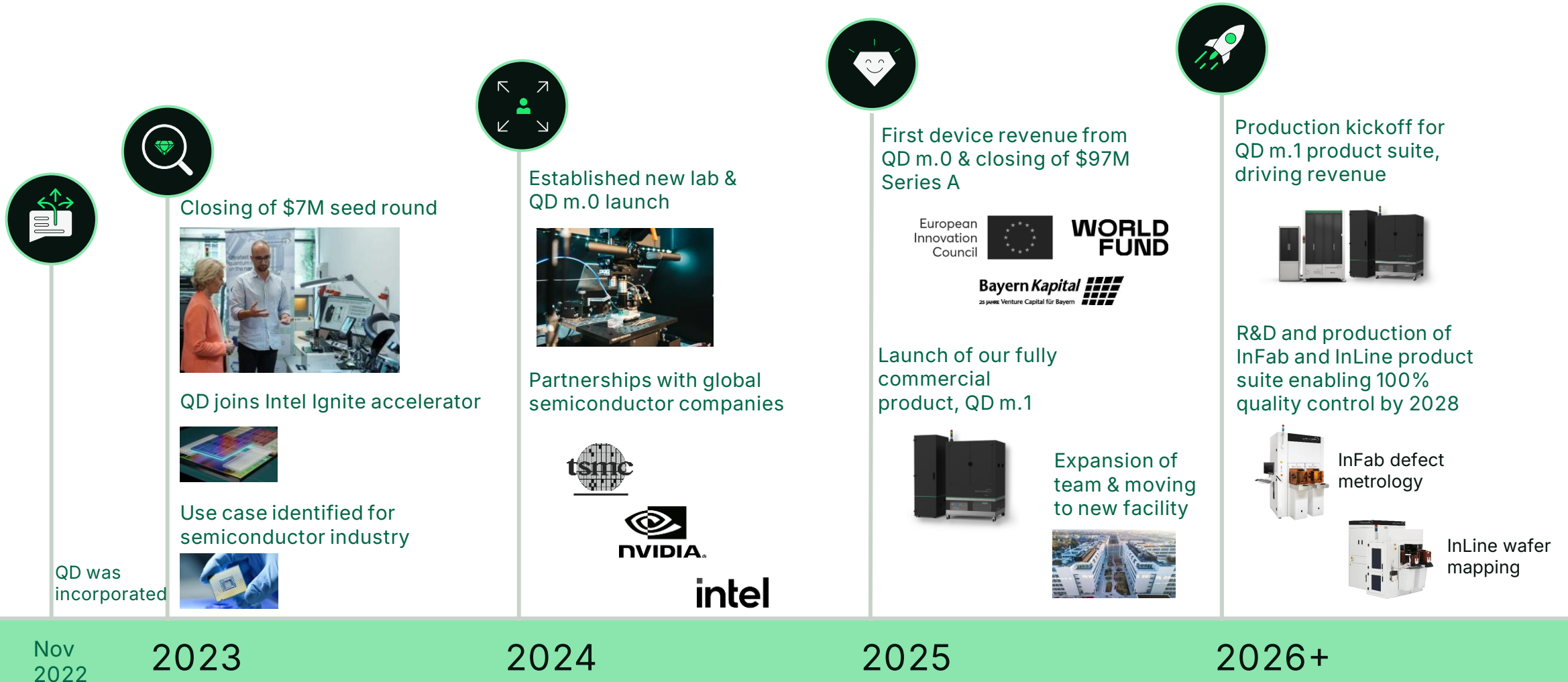
Quantum sensing to increase semiconductor manufacturing yields

In semiconductor manufacturing, quantum sensing is the most relevant innovation in the last decade





Building on pioneering research from Technical University of Munich, QD was established in 2022, successfully generating revenue within three years





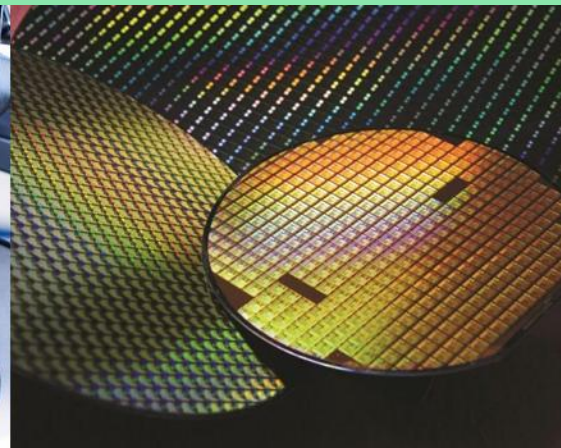
Our technology can sense magnetic fields and reconstruct currents in a multi-layer chip structure in an ultrafast manner and give a precise depth localization

Non-destructive imaging tool

Quantum Diamonds Microscopy (QDM) can be used as a non-destructive imaging tool for chip testing.

Speed & localization

QDM can identify a defective layer much earlier than many optical methods, saving the failure analysis engineer hours of layer-by-layer thinning and polishing.



Validated use case in advanced packaging, detecting layer defects earlier than conventional optical methods

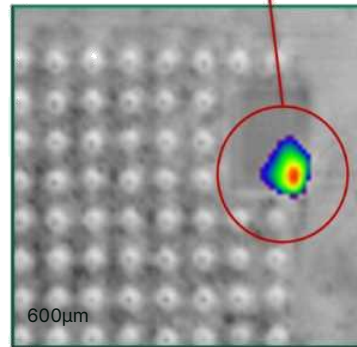
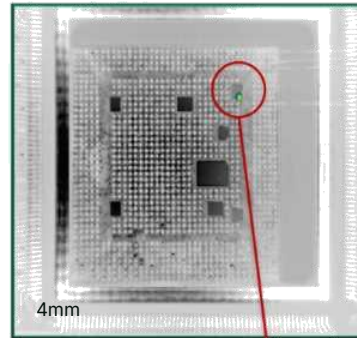
Detecting...

Once an I-V test detects an anomaly at a pin, imaging techniques such as emission microscopy (EMMI) or lock-in thermography (LTI) can be used to locate hotspots.

Localizing...

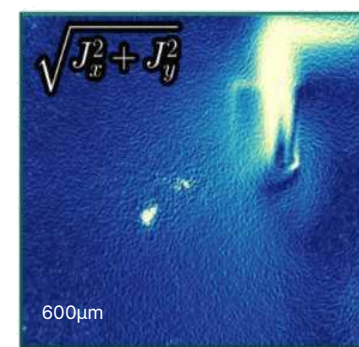
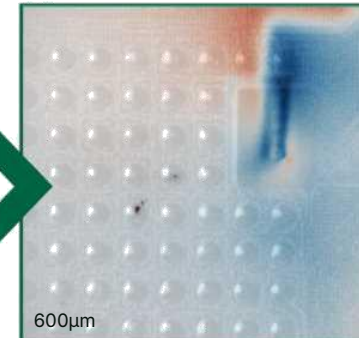
QDM then visualizes the electrical activity in the area and provides layer information.

EMMI / LIT



EMMI used for hotspot information

QDM

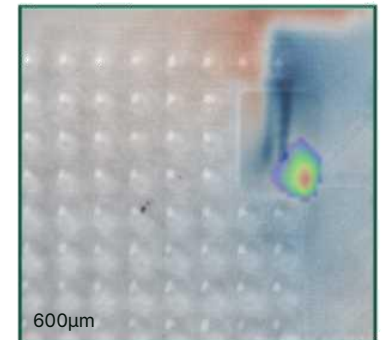


QDM for more information regarding metal trace involved

Physical Analysis

Data from QDM can be used to do layout-informed matching for faster turnover and higher success rate in sample preparation

QDM + EMMI overlay



Overlaid QDM and EMMI show a more complete picture

Abbreviations – I-V testing: Current-Voltage testing; EMMI: Emission Microscopy; LIT: Lock-in Thermography; QDM: Quantum Diamonds Microscopy

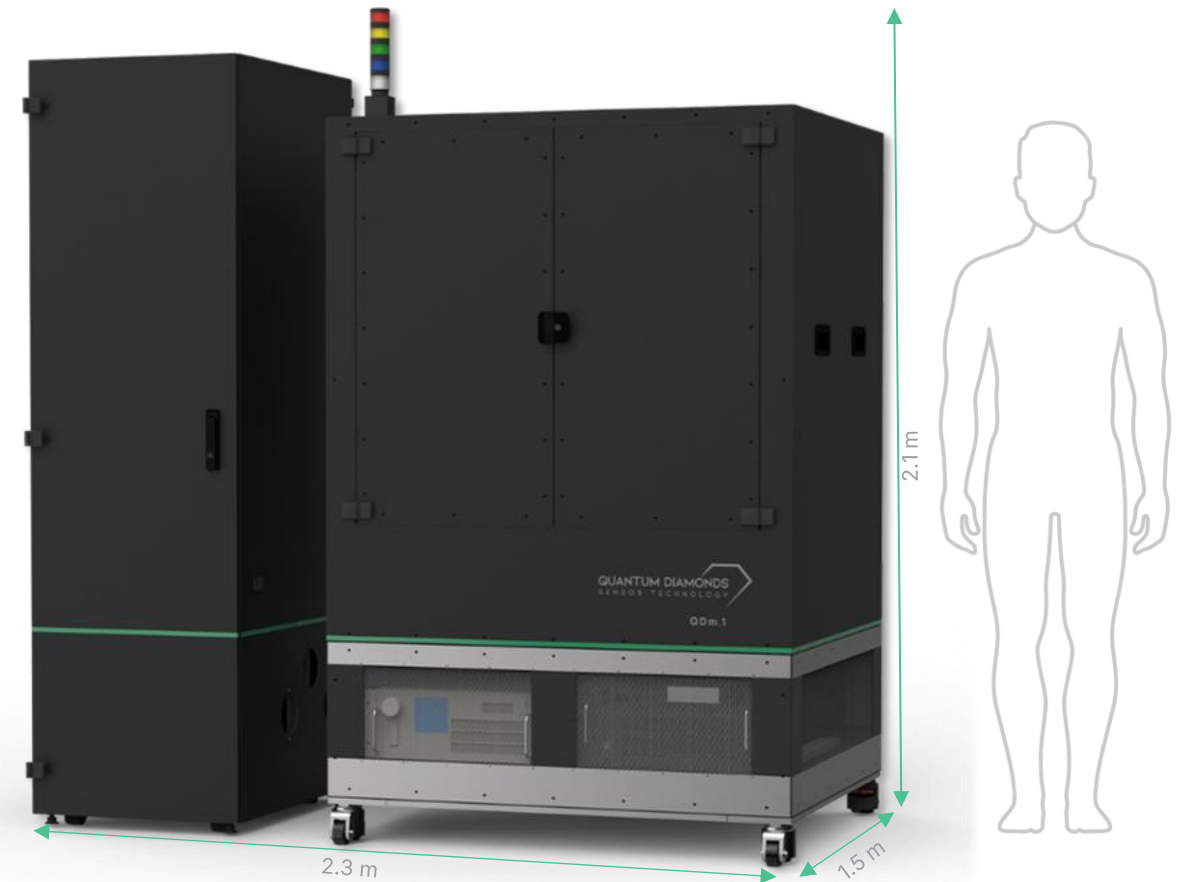
We are ready to ship the world's first integrated quantum sensing tool, a proven solution for chip testing

The QD m.1

Patented diamond sensor technology providing non-destructive imaging of current pathways with exceptional spatial resolution and sensitivity.

A high-resolution magnetic imaging system that enable open and short detection in advanced semiconductors at an unprecedented speed.

We localize opens as intuitive spots on an image, accelerating workflows and improving root-cause analysis in even the most complex architectures.





With increased throughput in our product suite, quantum sensing will enable 100% quality control by 2028

Product
suite



InLab defect localization

In production



InFab defect metrology

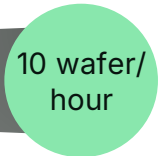
Est. production year: 2027



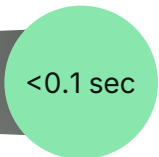
InLine wafer mapping

Est. production year: 2028+

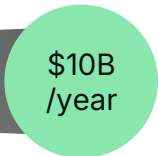
Throughput



Measurement
time per mm²



Revenue
potential





Strong traction with global semiconductor leaders and investors backing positioning us for profitable mass production and future order growth

Customers & Partners



Investors





We combine world-class quantum sensing research with semiconductor excellence

Founders



Kevin Berghoff
CEO



Dr. Fleming Bruckmaier
CTO



Prof. Dr. Dominik Bucher
Scientific Advisor



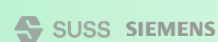
Executives



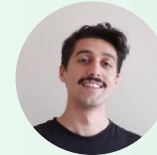
Dr. Marwa Garsi
Co-Head of Hardware



Markus Schieber
Co-Head of Hardware



Dr. Michael Hanke
Head of Software



Bartu Bisgin
Applications Lead



Advisors



Dr. David Su
Former Director
Failure Analysis



Hsi Shan Kuo
Former Director
Process Control



Thomas Schiml
Former Senior
Director R&D



Dr. Antonio
Mesquida Küsters
Former Business Line Lead



\$100M+

Total Funding

40+

Employees and
growing

30%

Share of
PhDs

17

Patents



We make the invisible, visible.
Your success is our mission.

QuantumDiamonds GmbH
Friedenstr. 18
81671 Munich
Germany

Thank you!



Come and visit us in the startup area



TUM Venture Labs

<https://www.tum-venture-labs.de>



Quantum Diamonds

<https://www.qd-st.com/>