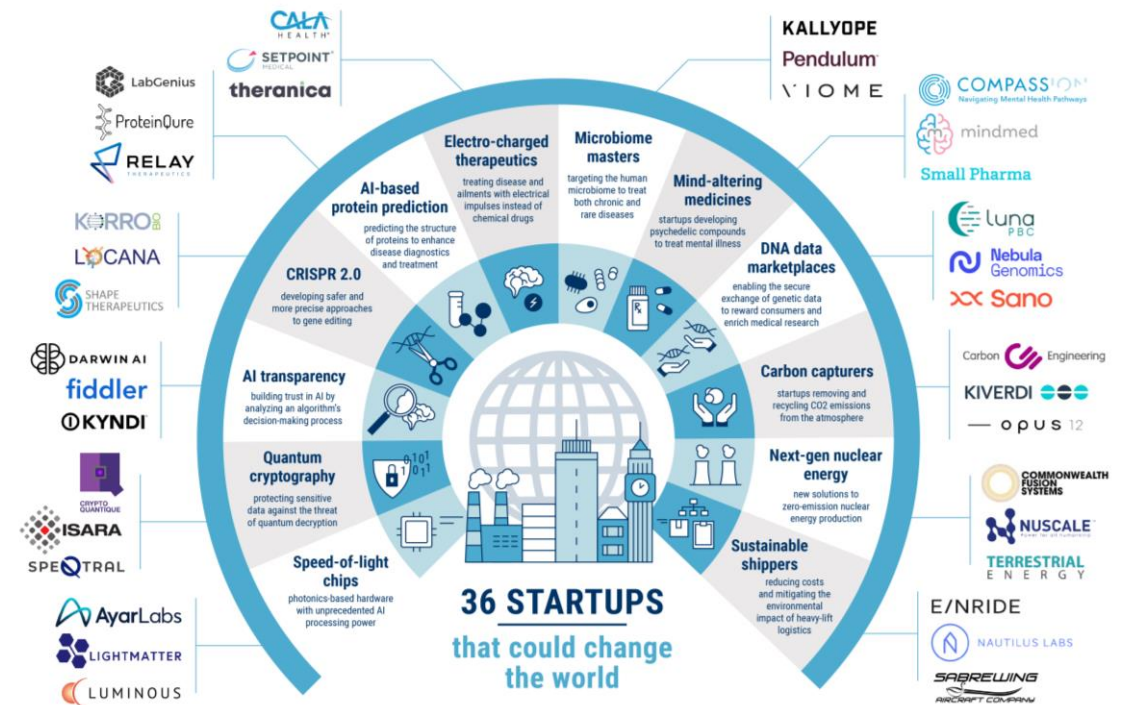


Game Changers 2020

Emerging trends to watch and high-momentum startups with world-changing potential



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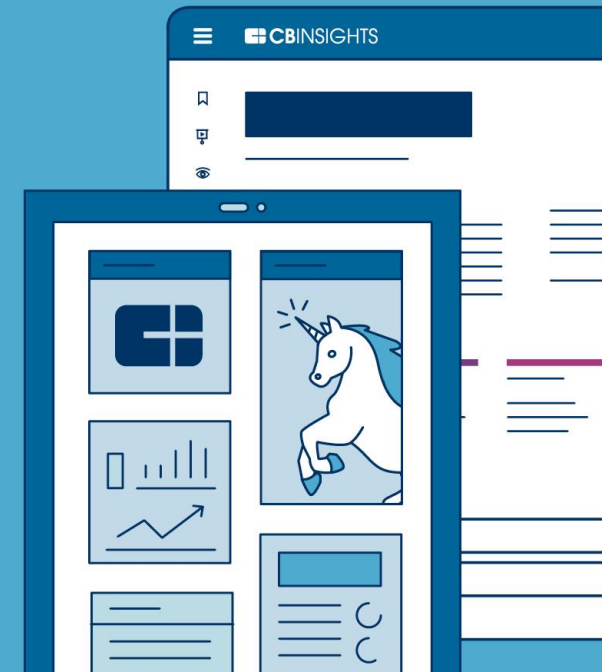
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“CB Insights has allowed us to move at speed. It’s enabled us to get the right people around the room having the right conversation with the right facts. We are now able to progress into net new spaces with authority and credibility.”



Nick Tate

Vice President, Head of NEXT at GSK Consumer Healthcare



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Contents

- 10** 2020 Game Changers
- 16** Company deep dives
- 52** Appendix & methodology

CHALLENGING AN ERA OF STAGNATION

“You look at some of today’s technology companies,
and you just get the feeling that
we could be doing so much more.”



- Peter Thiel, Entrepreneur and Venture Capitalist

Defining Game Changers

noun

An event, idea, or procedure that effects a significant shift in the current manner of doing or thinking about something.

A newly introduced element or factor that changes an existing situation or activity in a significant way.

Our selected startups are high-momentum companies pioneering technology with the potential to transform society and economies for the better.

2020 Game Changer categories

Speed-of-light chips

Photonics-based hardware with unprecedented processing power

Quantum cryptography

Protecting sensitive data against the threat of quantum decryption

AI transparency

Building trust in AI by analyzing an algorithm's decision-making process

CRISPR 2.0

Developing safer and more precise approaches to gene editing

AI-based protein prediction

Predicting the structure of proteins to enhance disease diagnosis and treatment

Electro-charged therapeutics

Treating diseases and ailments with electrical impulses instead of chemical drugs

Microbiome masters

Targeting the human microbiome to treat both chronic and rare diseases

Mind-altering medicines

Startups developing psychedelic compounds to treat mental illness

DNA data marketplaces

Enabling the secure exchange of genetic data to reward consumers and enrich medical research

Carbon capturers

Startups removing and recycling CO₂ emissions from the atmosphere

Next-gen nuclear energy

New solutions to zero-emission nuclear energy production

Sustainable shippers

Reducing costs and mitigating the environmental impact of heavy-lift logistics

2020 Game Changers

Speed-of-light chips



Quantum cryptography



AI transparency



CRISPR 2.0



AI-based protein prediction



Electro-charged therapeutics



Microbiome masters



Mind-altering medicines



DNA data marketplaces



Carbon capturers



Next-gen nuclear energy



Sustainable shippers



International game changers

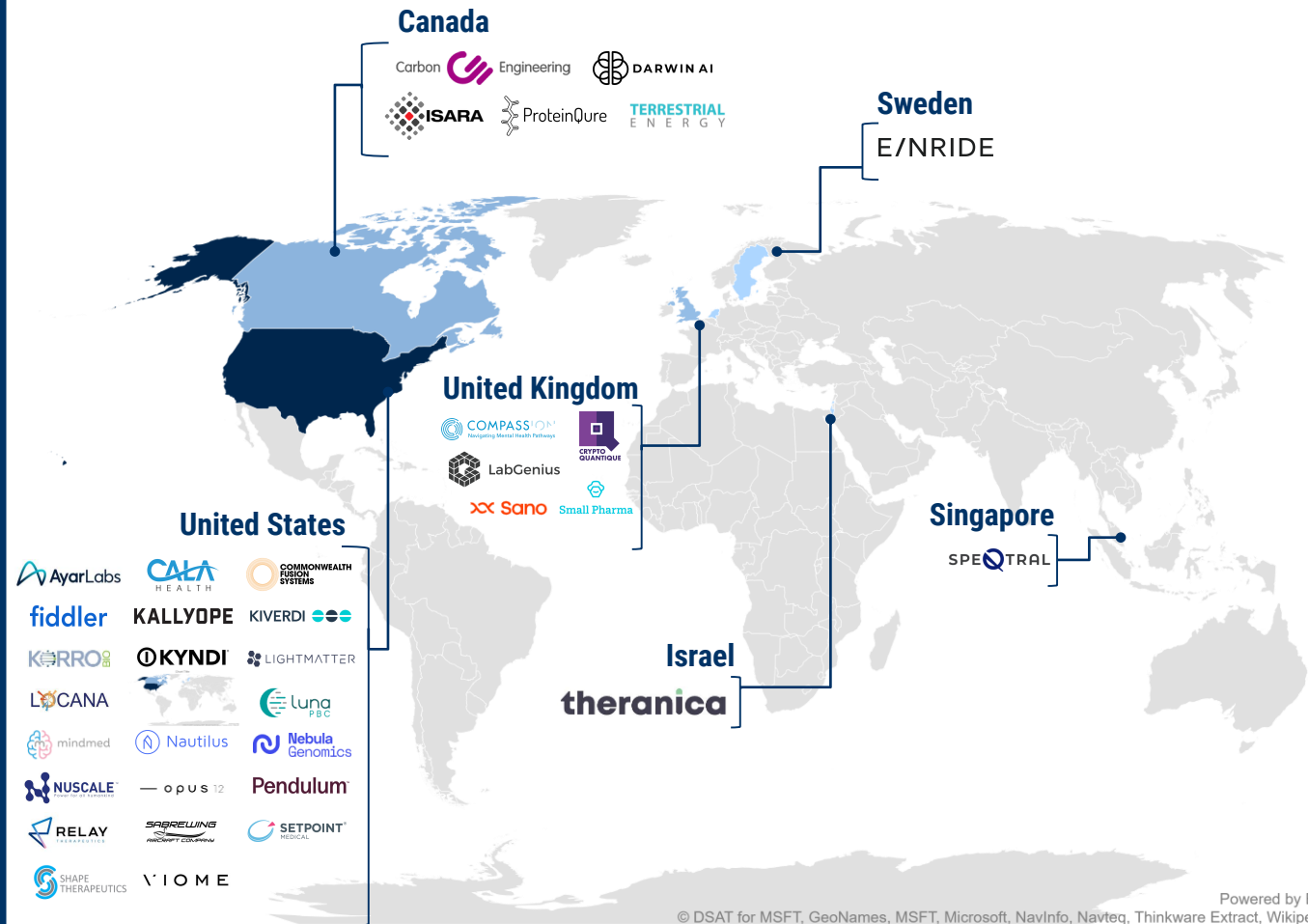
23 of the 36 game changers are based in the US or have moved to the US.

However, 5 other countries are home to game changer companies: Canada, Israel, Sweden, Singapore, and the United Kingdom.



Changing the world

36 companies across 6 countries



Most active investors in game changers

Over 200 unique investors backed this year's cohort of game changers.

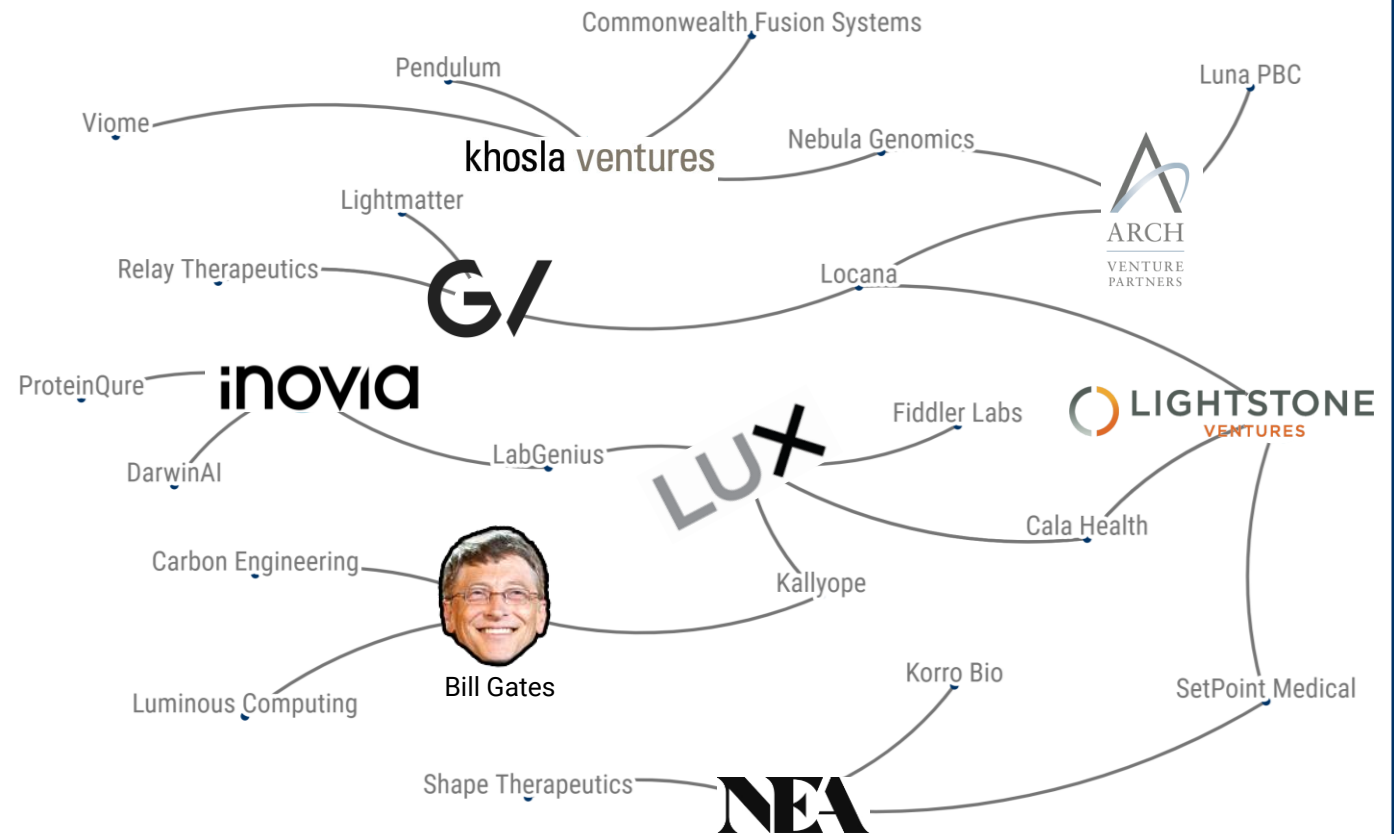
Topping the list are Khosla Ventures and Lux Capital with 4 unique investments each.

20 investors backed multiple game changers.

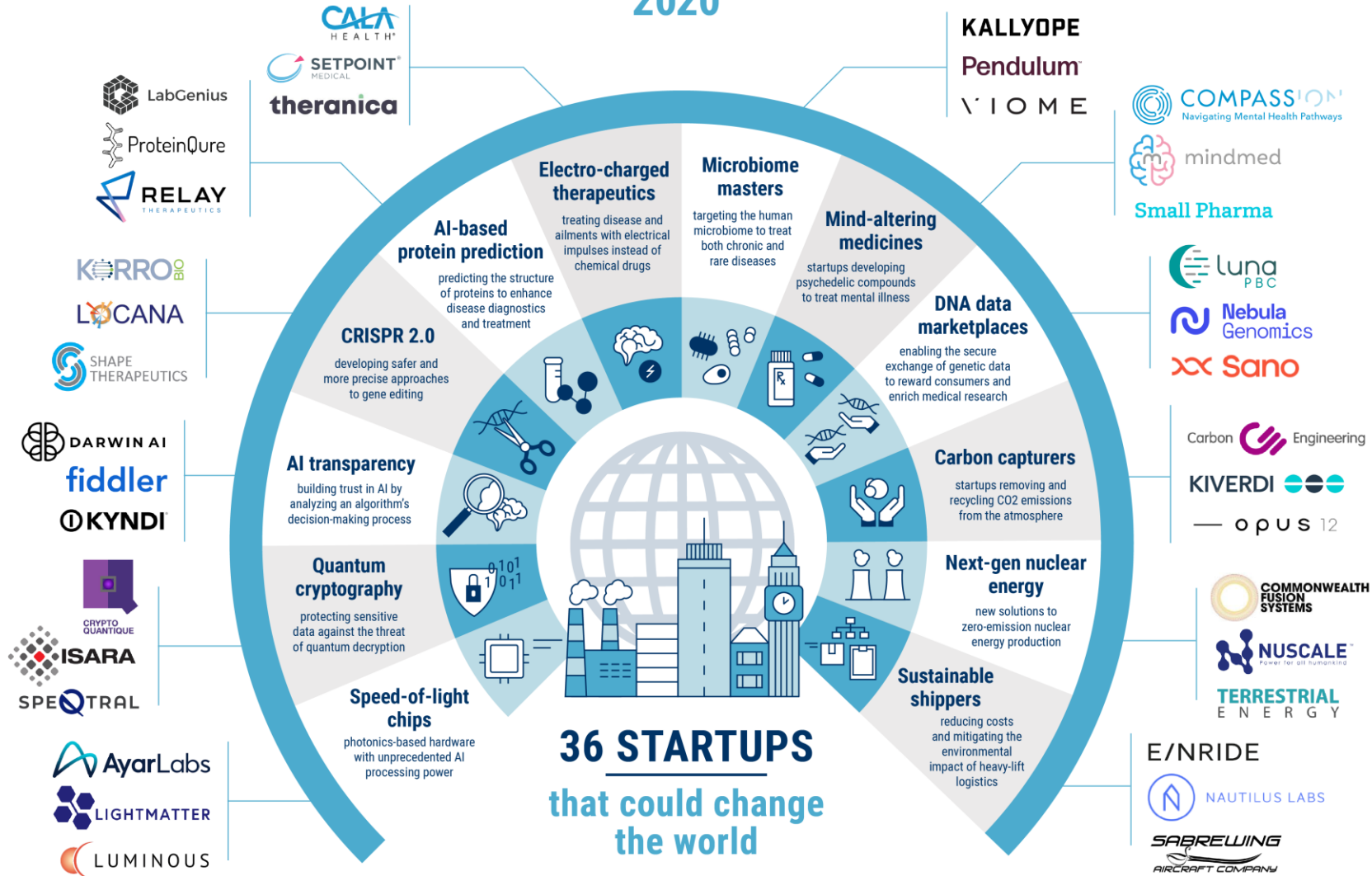
Note that Bill Gates-backed Breakthrough Energy Ventures is also an investor in Commonwealth Fusion Systems.

Top investors backing game-changing companies

Firms with 3 or more unique game changer investments



CBINSIGHTS GAME CHANGERS 2020

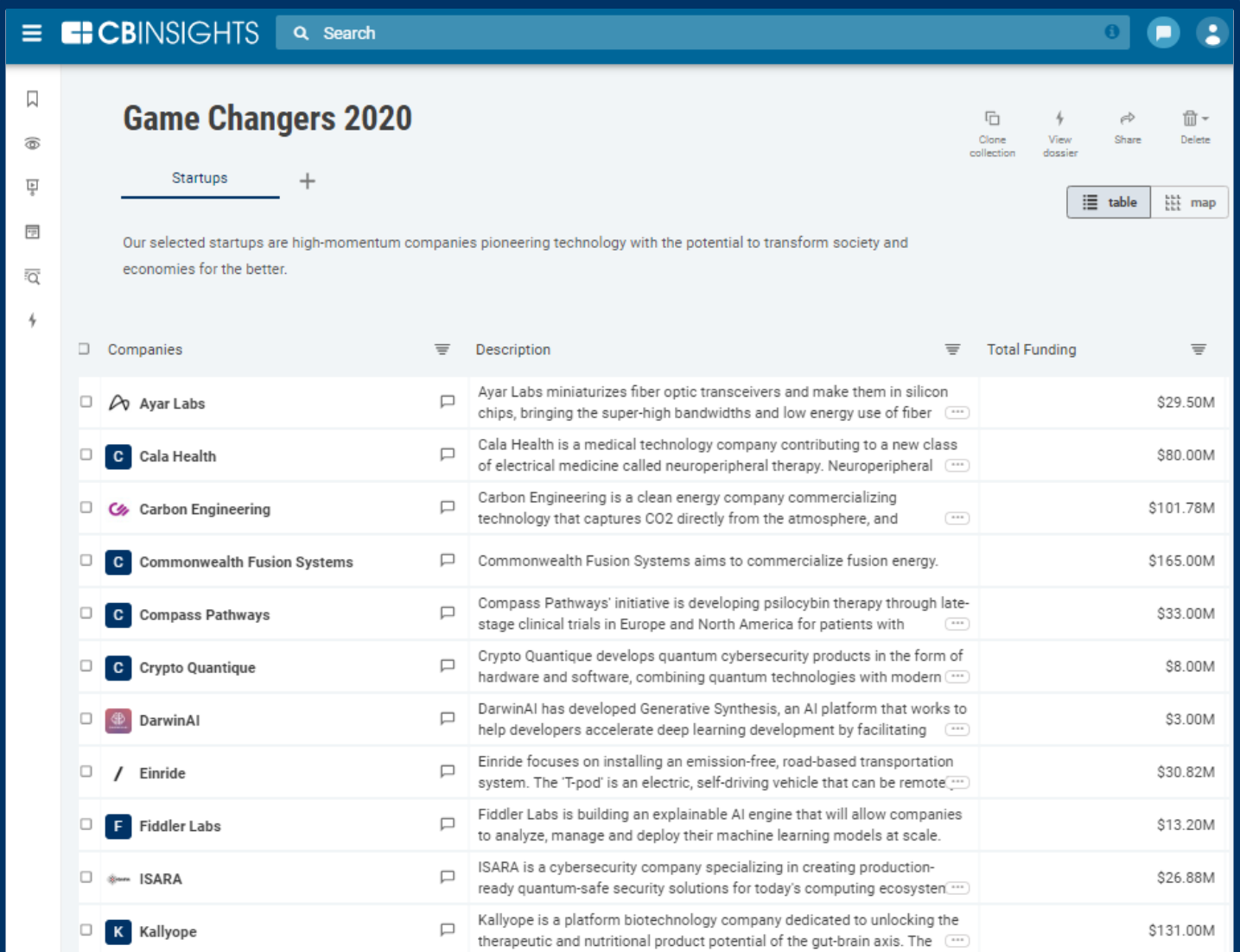


Visit the Game Changers 2020 collection on the CB Insights platform

[CBI Game Changers 2020](#)

Track all of the game changers in this report and many more on our platform using CB Insights' Collections.

Create dynamic market landscapes, collaborate within and beyond your organization, and ensure knowledge is not tied up in people's heads and inboxes.

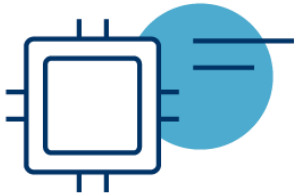


Game Changers 2020

Startups +

Our selected startups are high-momentum companies pioneering technology with the potential to transform society and economies for the better.

Companies	Description	Total Funding
Ayar Labs	Ayar Labs miniaturizes fiber optic transceivers and make them in silicon chips, bringing the super-high bandwidths and low energy use of fiber	\$29.50M
Cala Health	Cala Health is a medical technology company contributing to a new class of electrical medicine called neuroperipheral therapy. Neuroperipheral	\$80.00M
Carbon Engineering	Carbon Engineering is a clean energy company commercializing technology that captures CO2 directly from the atmosphere, and	\$101.78M
Commonwealth Fusion Systems	Commonwealth Fusion Systems aims to commercialize fusion energy.	\$165.00M
Compass Pathways	Compass Pathways' initiative is developing psilocybin therapy through late-stage clinical trials in Europe and North America for patients with	\$33.00M
Crypto Quantique	Crypto Quantique develops quantum cybersecurity products in the form of hardware and software, combining quantum technologies with modern	\$8.00M
DarwinAI	DarwinAI has developed Generative Synthesis, an AI platform that works to help developers accelerate deep learning development by facilitating	\$3.00M
Einride	Einride focuses on installing an emission-free, road-based transportation system. The 'T-pod' is an electric, self-driving vehicle that can be remote	\$30.82M
Fiddler Labs	Fiddler Labs is building an explainable AI engine that will allow companies to analyze, manage and deploy their machine learning models at scale.	\$13.20M
ISARA	ISARA is a cybersecurity company specializing in creating production-ready quantum-safe security solutions for today's computing ecosystem	\$26.88M
Kallyope	Kallyope is a platform biotechnology company dedicated to unlocking the therapeutic and nutritional product potential of the gut-brain axis. The	\$131.00M



Speed-of-light chips

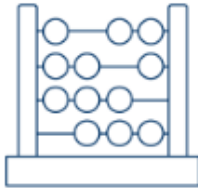

Photonics-based hardware with unprecedented processing power

Computing is reaching an inflection point

The next generation of computing requires chips with faster speeds and higher processing power

Optical chips, which **use higher-bandwidth photons** instead of electrons, can **process AI at unprecedented speeds** with **greater efficiency**.

SPEED
COST
OPERATION

Electrical CPU Today	Optical CPU Tomorrow
Computing with Electrons 1. Current speed is limited 2. Expensive to scale 3. One operation at a time 	Computing with Photons 1. Optical speed is 1000x 2. Fixed cost to scale 3. Many operations at once 

Speed-of-light chips game changers



Headquarters: California, US
Total disclosed funding: \$29.5M

Ayar Labs miniaturizes fiber optic transceivers and makes them in silicon chips, bringing the super-high bandwidths and low energy use of fiber optics inside computers.



Headquarters: Massachusetts, US
Total disclosed funding: \$33.2M

Lightmatter builds chips for artificial intelligence computing. Its architecture leverages unique properties of light to enable fast inference and training engines.



Headquarters: California, US
Total disclosed funding: \$9.0M

Luminous Computing builds a photonics chip that deals with AI workloads.



Quantum cryptography

Protecting sensitive data against the threat of quantum decryption

THE THREAT OF QUANTUM COMPUTING LOOMS

“All the cryptography in use today is based on mathematical problems that will be broken.”



- Vadim Lyubashevsky, Cryptography at IBM Research

Quantum cryptography game changers



Headquarters: England, UK
Total disclosed funding: \$8.0M

Crypto Quantique develops quantum cybersecurity products in the form of hardware and software, combining quantum technologies with modern cryptography.



Headquarters: Ontario, Canada
Total disclosed funding: \$26.9M

ISARA is a cybersecurity company specializing in creating quantum-safe security solutions for computing ecosystems.



Headquarters: Singapore
Total disclosed funding: \$1.9M

SpeQtral develops space-based quantum communication, using satellites to deliver a quantum encryption layer to help secure communications.



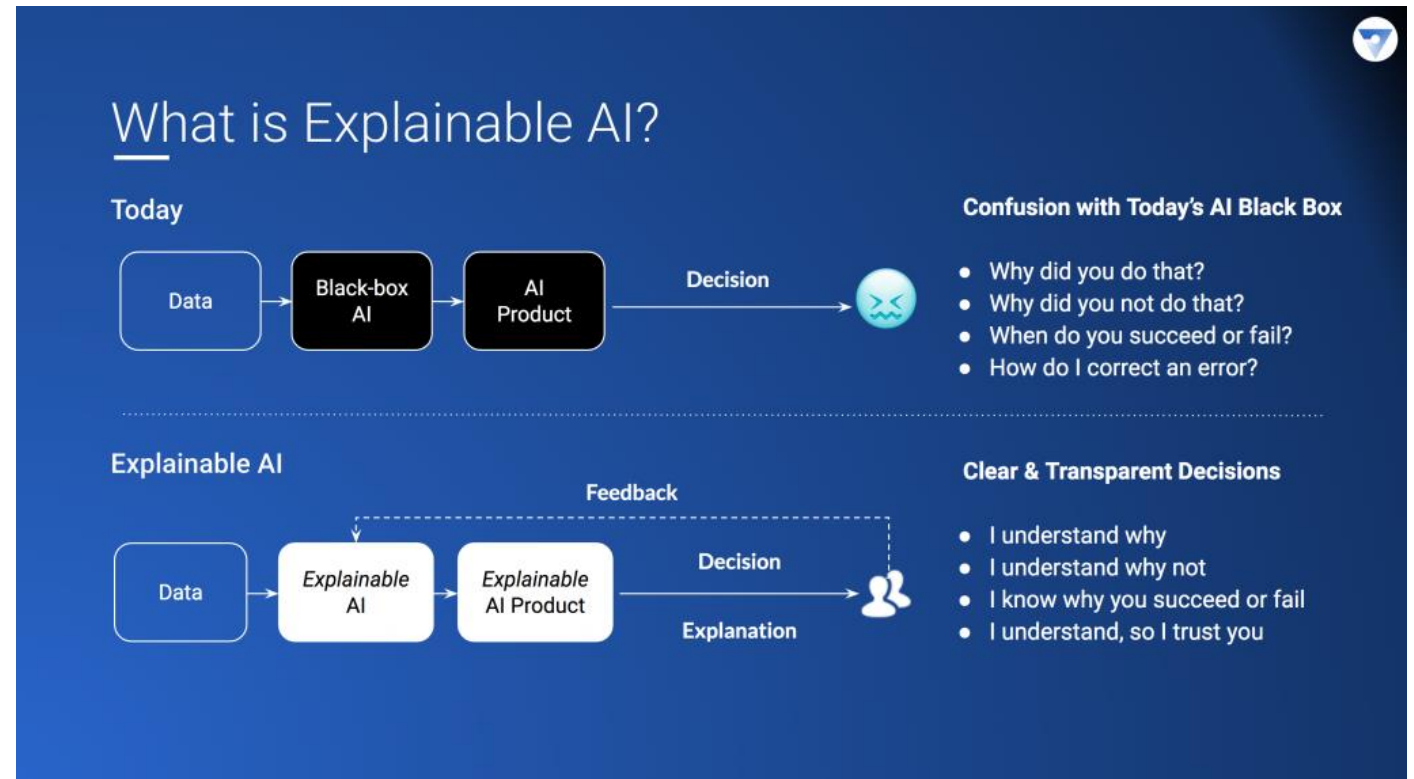
AI transparency

Building trust in AI by analyzing an algorithm's decision-making process

Concerns around AI biases are mounting

AI transparency tech, also known as explainable AI, traces back outputs from AI algorithms to provide a way to understand what's happening in "human terms."

As AI is increasingly used for decision-making across industries, **understanding how and why** an algorithm makes its decisions can **help mitigate inherent biases** associated with most AI systems in existence today.



AI transparency game changers



Headquarters: Ontario, Canada
Total disclosed funding: \$3.0M

DarwinAI is developing AI that can understand a neural network and then learn to generate highly-optimized networks tailored to specific needs and requirements.



Headquarters: California, US
Total disclosed funding: \$13.2M

Fiddler Labs is building an explainable AI engine that aims to help companies to analyze, manage, and deploy machine learning models at scale.



Headquarters: California, US
Total disclosed funding: \$31.6M

Kyndi's AI platform uses machine learning to automate regulated business processes and offer auditable AI systems for government, financial services, and healthcare.



CRISPR 2.0

Developing safer and more precise approaches to gene editing

A NEW ERA OF GENE EDITING

“It is **this new CRISPR 2.0 era** that allows us to **manipulate the genome in a huge new range of dimensions** that were fundamentally not possible before, opening the door to **addressing an entire field of devastating diseases** that were **previously untreatable.**”



a16z

- Andy Tran, Andreessen Horowitz

CRISPR 2.0 game changers



Headquarters: Massachusetts, US
Total disclosed funding: \$4.0M

Korro Bio is using nucleic acid-based therapeutics to target sequences within the genetic code.



Headquarters: California, US
Total disclosed funding: \$55.0M

Locana is an RNA-targeting gene therapy company aiming to develop therapeutics for diseases linked to RNA.



Headquarters: Washington, US
Total disclosed funding: \$35.5M

Shape Therapeutics creates RNA and protein targeting platforms that enable direct in vivo modification of RNA.



AI-based protein prediction

Predicting the structure of proteins to enhance disease diagnosis and treatment

Protein prediction could reshape genomics

Advances in AI and computing are enhancing the study and design of proteins.

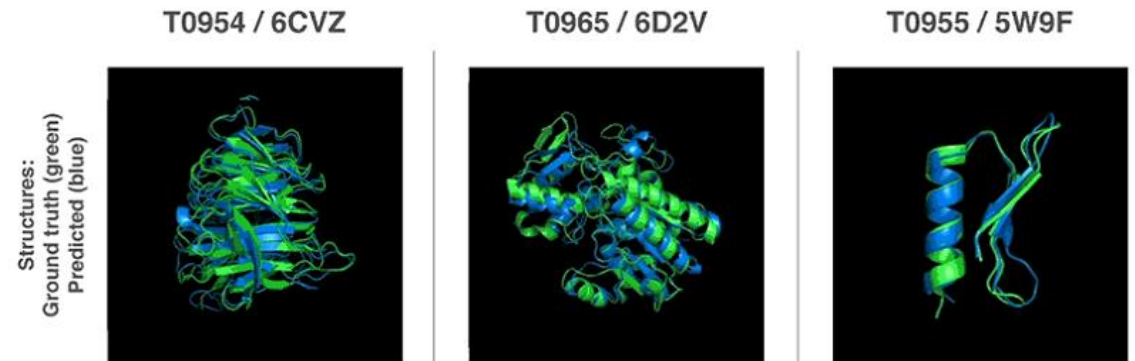
NEW TREATMENTS UNLOCKED

“Understanding how proteins fold is a **long-standing fundamental scientific question** that could one day be **key to unlocking new treatments** for a whole range of diseases – from Alzheimer’s and Parkinson’s to cystic fibrosis and Huntington’s – where misfolded proteins are believed to play a role.”



- Demis Hassabis, CEO and Co-founder of DeepMind

AI is solving the “protein folding problem”



AI can help predict protein structure and overcome the “protein folding problem,” or the challenge of predicting the intricate 3D structure of a protein.

Predicting how amino acid chains fold into 3D protein structures could allow scientists to better understand a protein’s role in the body and more effectively diagnose and treat diseases caused by misfolded proteins.

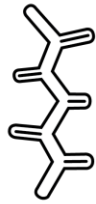
AI-based protein prediction game changers



LabGenius

Headquarters: England, UK
Total disclosed funding: \$13.7M

LabGenius is a full-stack protein engineering company combining AI, robotic automation, and synthetic biology to evolve next-gen protein therapeutics.



ProteinQure

Headquarters: Ontario, Canada
Total disclosed funding: \$4.0M

ProteinQure is a software platform for computational protein discovery, combining molecular simulations, machine learning, and quantum computing to assist with the structure-based design of drugs.



RELAY
THERAPEUTICS

Headquarters: Massachusetts, US
Total disclosed funding: \$520M

Relay Therapeutics is looking to analyze protein motion to develop new approaches for interventions.



Electro-charged therapeutics

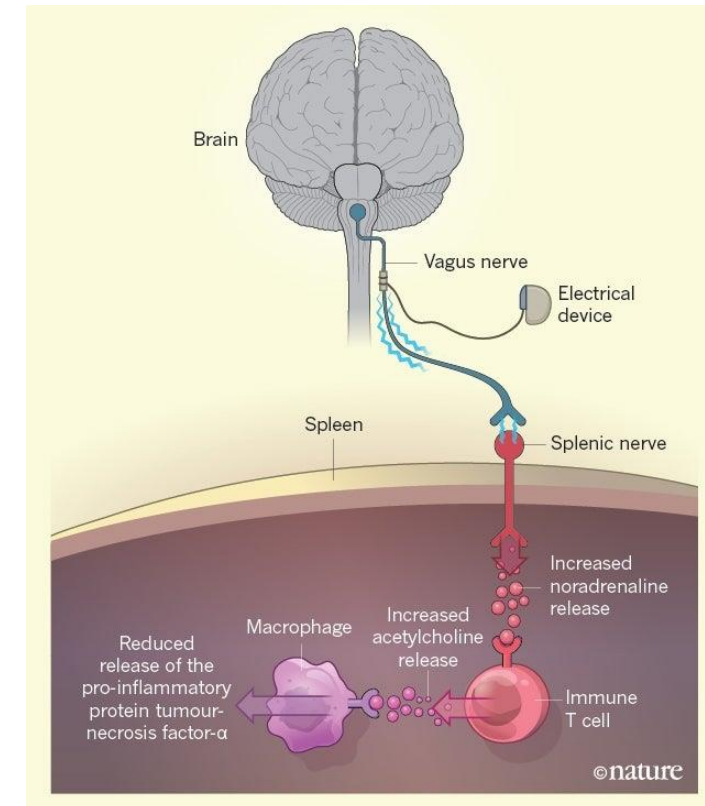
Treating ailments with electrical impulses instead of chemical drugs

The future of chronic illness could be drug-free

Nerve-activated devices offer targeted treatment for injuries and conditions without the use of chemical drugs.

Electroceuticals are devices that **target neural circuits** to regulate the body's organs and functions **without the need for chemicals** or other medicines. The devices aim to target affected areas with **more precision** and **fewer side effects**. This approach aims to treat a host of conditions, including inflammation, autoimmune diseases, and migraines.

Stimulating the vagus nerve with an electrical device has been shown to reduce inflammation in the body



Electro-charged therapeutics game changers



Headquarters: California, US
Total disclosed funding: \$80.0M

Cala Health is a bioelectronic medicine company developing wearable neuromodulation therapies to deliver individualized peripheral nerve stimulation.



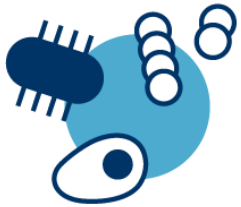
Headquarters: California, US
Total disclosed funding: \$93.3M

SetPoint Medical is developing bioelectronic implants to target autoimmune diseases such as Crohn's disease and rheumatoid arthritis by electrical modulation of the vagus nerve.



Headquarters: Israel
Total disclosed funding: \$41.0M

Theranica is a medical device company that aims to combine advanced neuromodulation therapy with wireless technology to address medical conditions such as migraines.



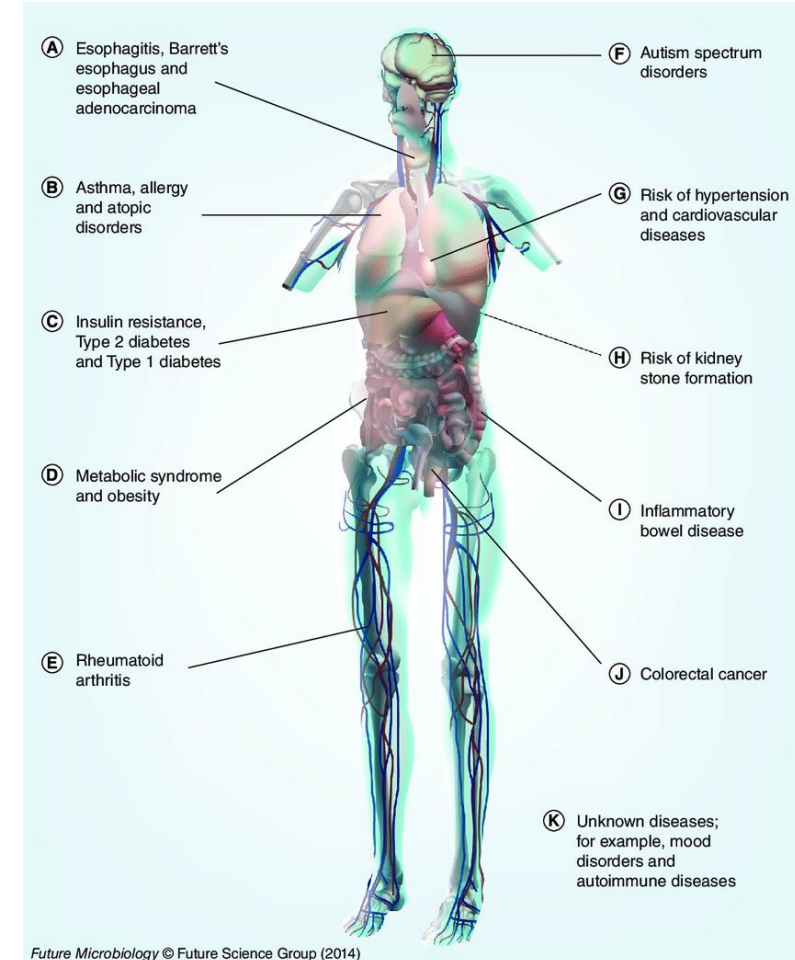
Microbiome masters

Targeting the human microbiome to treat both chronic and rare diseases

Gut microbes can provide powerful insights

Understanding the bacteria living inside us is enhancing therapeutics and disease discovery.

Human gut bacteria can offer **valuable information about overall human health**, as the **human microbiome** is associated with **a number of health conditions**. Companies targeting the microbiome are looking to **reshape the way we treat cancer, neurologic diseases** such as Alzheimer's and Parkinson's disease, and **metabolic diseases** like type 2 diabetes.



Future Microbiology © Future Science Group (2014)

Microbiome masters game changers

KALLYOPE

Headquarters: New York, US
Total disclosed funding: \$131.0M

Kallyope is a platform biotechnology company looking to leverage the therapeutic and nutritional potential of the gut-brain axis.

Pendulum™

Headquarters: New York, US
Total disclosed funding: \$45.5M

Pendulum Therapeutics is developing medical probiotics to target specific health conditions.

VIOME

Headquarters: New Mexico, US
Total disclosed funding: \$45.5M

Viome blends readings from blood, urine, saliva, and stool samples to deliver personalized nutrition recommendations that aim to improve health and wellness.



Mind-altering medicines

Startups developing psychedelic compounds to treat mental illness

Psychedelics are alleviating mental illness

New approaches promise a non-toxic, non-addictive way to treat mental health conditions.

LIFE FOR THE FUTURE

“When taking these medicines, **people go into difficult places** – they **deal with past grief, trauma and suffering**. If there’s enough intention put into supporting that experience, it’s **the beginning of an arc of healing** that can lead to something extraordinary.”



Yale University
School of Medicine

- Dr. Alex Belser, Clinical Research Fellow at Yale University

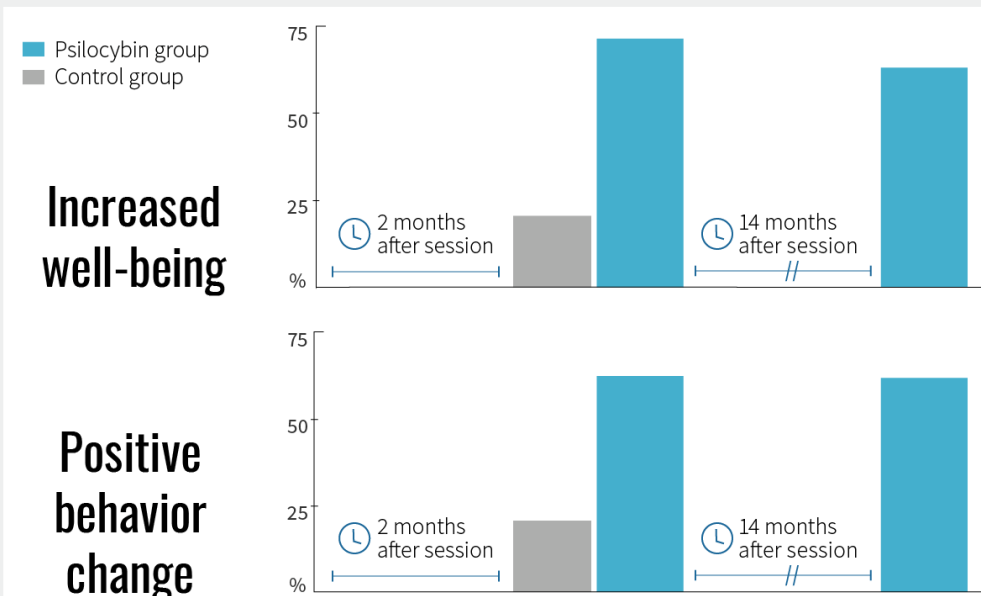
Studies suggest the power of psychedelics



36 healthy volunteers with no previous psilocybin exposure were...



...given a high dose of psilocybin or an active placebo



Percent of volunteers reporting life changes after their psychedelic experience. (Griffiths et al. 2008)

sapiensoup.com

Mind-altering medicine game changers



Headquarters: England, UK
Total disclosed funding: \$33.0M

Compass Pathways is developing psilocybin therapy – a hallucinogenic compound – through late-stage clinical trials in Europe and North America for patients with treatment-resistant depression.



Headquarters: Ontario, Canada
Total disclosed funding: \$6.2M

Mindmed is developing psychedelic-inspired medicines that aim to improve health, promote wellness, and alleviate suffering.



Small Pharma

Headquarters: England, UK
Total disclosed funding: \$1.6M

Small Pharma is working on an antidepressant based on a derivative of ketamine.



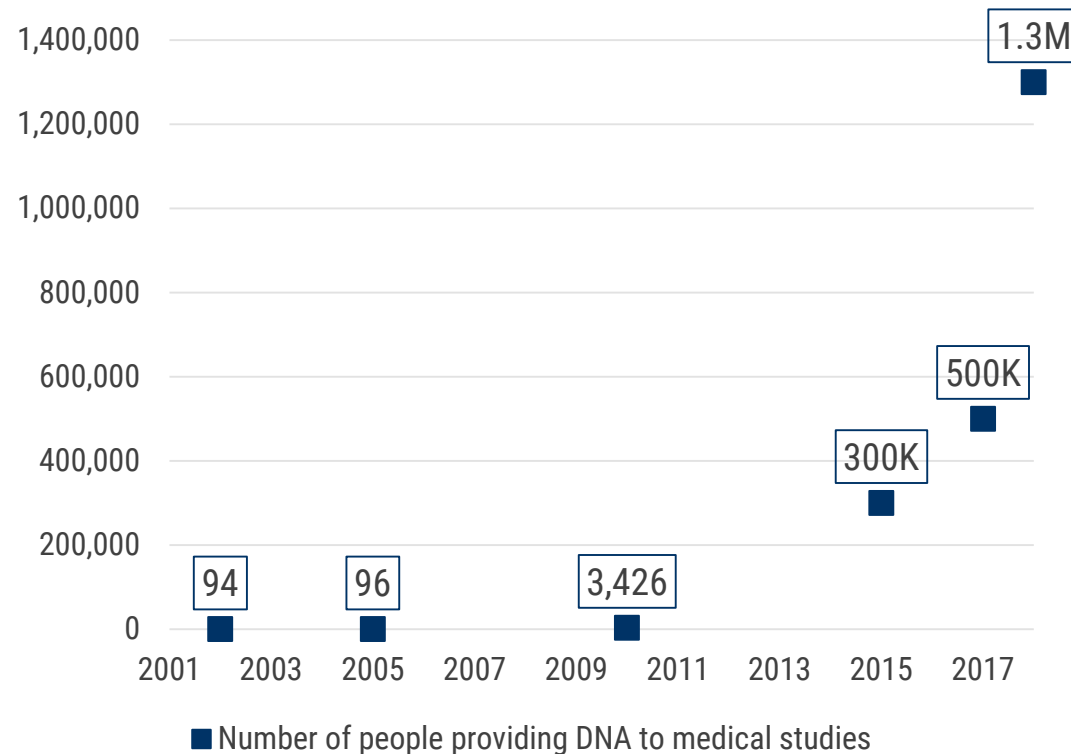
DNA data marketplaces

Enabling the secure exchange of genetic data to reward consumers and enrich medical research

Unlocking the value behind a person's DNA

Companies are creating platforms to enable the secure exchange of genetic data to accelerate medical research and compensate individual contributors.

Medical studies are increasingly relying on DNA data



REWARDING THE CONTRIBUTORS

"Patients should have **the right to decide for themselves** whether they want to share their medical data, and, if so, with whom. Efforts to **empower people** to fine-tune the fate of their medical information are a step in the right direction."



- Adam Tanner, Fellow at Harvard's Institute for Quantitative Social Science

DNA data marketplaces game changers



Headquarters: California, US
Total disclosed funding: \$8.6M

LunaPBC, the creator of LunaDNA, is developing a platform that allows users to contribute genetic data in exchange for company shares.



Headquarters: California, US
Total disclosed funding: \$4.9M

Nebula Genomics leverages blockchain technology to eliminate middlemen with the goal of empowering people to own more of their personal genomic data.



Headquarters: England, UK
Total disclosed funding: \$0.7M

Sano Genetics is developing a platform that allows researchers to access genetic datasets to accelerate treatment of common and rare medical conditions.



Carbon capture

Startups removing and recycling CO₂ emissions from the atmosphere

WE NEED TO GO CARBON NEGATIVE

"**CO₂ removal** has gone from a moral hazard to **a moral imperative.**"



 COLUMBIA | SIPA
Center on Global Energy Policy

- Julio Friedmann, Senior Research Scholar at Columbia University's Center for Global Energy Policy

Carbon capturing game changers



Headquarters: British Columbia, Canada
Total disclosed funding: \$101.8M

Carbon Engineering is commercializing technology that captures CO₂ directly from the atmosphere.



Headquarters: California, US
Total disclosed funding: \$0.7M

Kiverdi uses a bioreactor to convert CO₂ into protein, high-valued oils, nutrients, and bio-based products that can be used in consumer and industrial applications.



Headquarters: California, US
Total disclosed funding: \$1.2M

Opus 12 captures CO₂ and uses water and electricity to recycle it into cost-competitive chemicals and fuels.



Next-gen nuclear energy

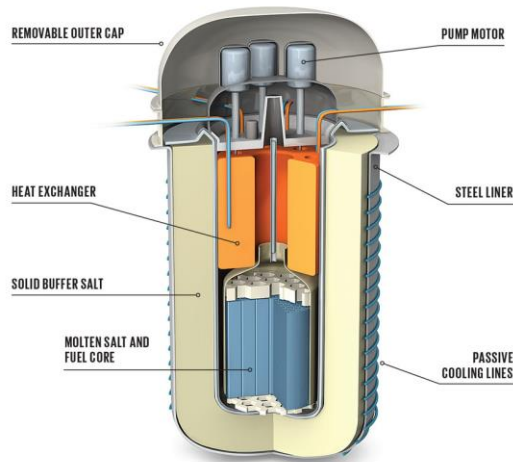
New solutions to zero-emission nuclear energy production

New tech is making nuclear more compelling

Nuclear power offers a way to reliably generate low-carbon energy. Tech solutions for improving nuclear include the following:

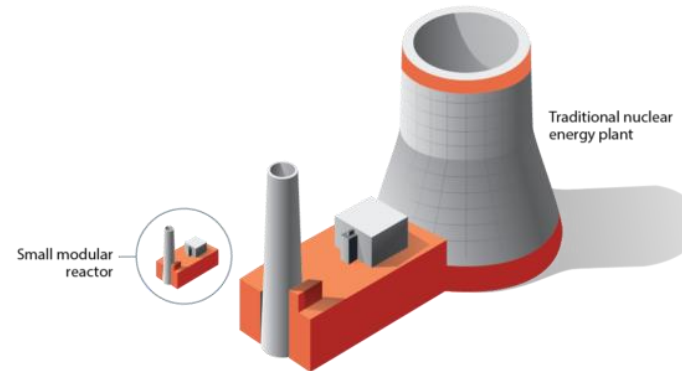
Molten salt reactors

Molten salt reactors rely on liquid fuel instead of solid fuel rods used in traditional nuclear reactors. Using liquid is both **safer** and **simpler in design**.



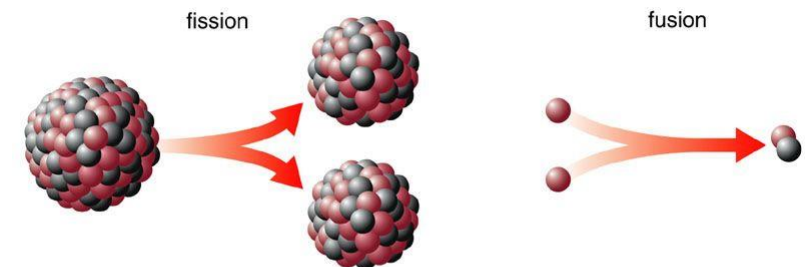
Small modular reactors

Small modular reactors (SMR) are nuclear fission reactors that are less than half the size of traditional reactors. Because of their smaller size, they can be **sited in locations not possible for larger plants** and they require **less capital investment** as they can be more easily manufactured and customized based on demand.



Fusion

Nuclear fusion produces energy from the fusing of lightweight hydrogen nuclei. The approach is a **promising alternative to traditional nuclear fission** – which relies on the deterioration of heavy radioactive nuclei – offering a safer process that also produces power more efficiently.



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Next-gen nuclear game changers



Headquarters: Massachusetts, US
Total disclosed funding: \$165.0M

Commonwealth Fusion Systems aims to commercialize fusion energy. The company is developing high temperature superconductor magnets to build small, low-cost fusion power plants.



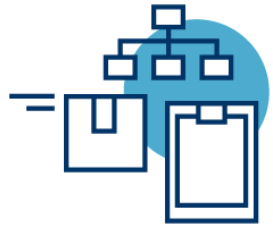
Headquarters: Oregon, US
Total disclosed funding: \$2.7M

NuScale Power has created a new kind of nuclear fission plant – a smaller, scalable version of pressurized water reactor technology, designed with intrinsic safety features.



Headquarters: Ontario, Canada
Total disclosed funding: \$39.2M

Terrestrial Energy is developing a nuclear reactor using molten salt reactor technology.



Sustainable shippers

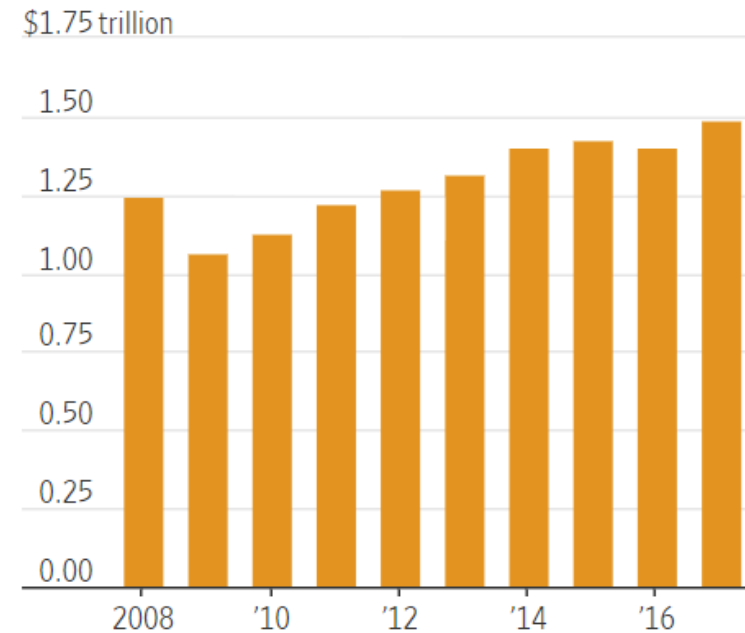
Reducing costs and mitigating the environmental impact of heavy-lift logistics

Logistics costs continue to rise

Labor shortages, rising fuel prices, and outsized demand for deliveries are driving shipping costs to new levels.

In response to rising shipping costs, companies are **automating the movement** and **optimizing the flow of cargo** by land, air, and sea to **reduce labor costs, increase energy efficiency, and enhance operational safety.**

Total U.S. business logistics costs



Sustainable shipping game changers

E/NRIDE

Headquarters: Stockholm, Sweden
Total disclosed funding: \$30.8M

Einride is developing self-driving electric shipping vehicles that are modular and can be adapted to suit various loads.



Nautilus

Headquarters: New York, US
Total disclosed funding: \$13.1M

Nautilus Labs offers cloud-based big data analysis for commercial shipping to reduce fuel costs and boost fleet efficiency.



SABREWING AIRCRAFT COMPANY

Headquarters: California, US
Total disclosed funding: \$3.0M

Sabrewing Aircraft is developing an unmanned vertical take off and landing (VTOL) cargo carrier drone.

Game changers appendix

Additional company data

Game changers annual financing history

Year to date (12/4/19), 2020's cohort of game changing startups has seen 30 deals worth almost \$628M in funding.

Note that \$400M of 2018's total \$651M was driven by Relay Therapeutics' \$400M Series C in December 2018.

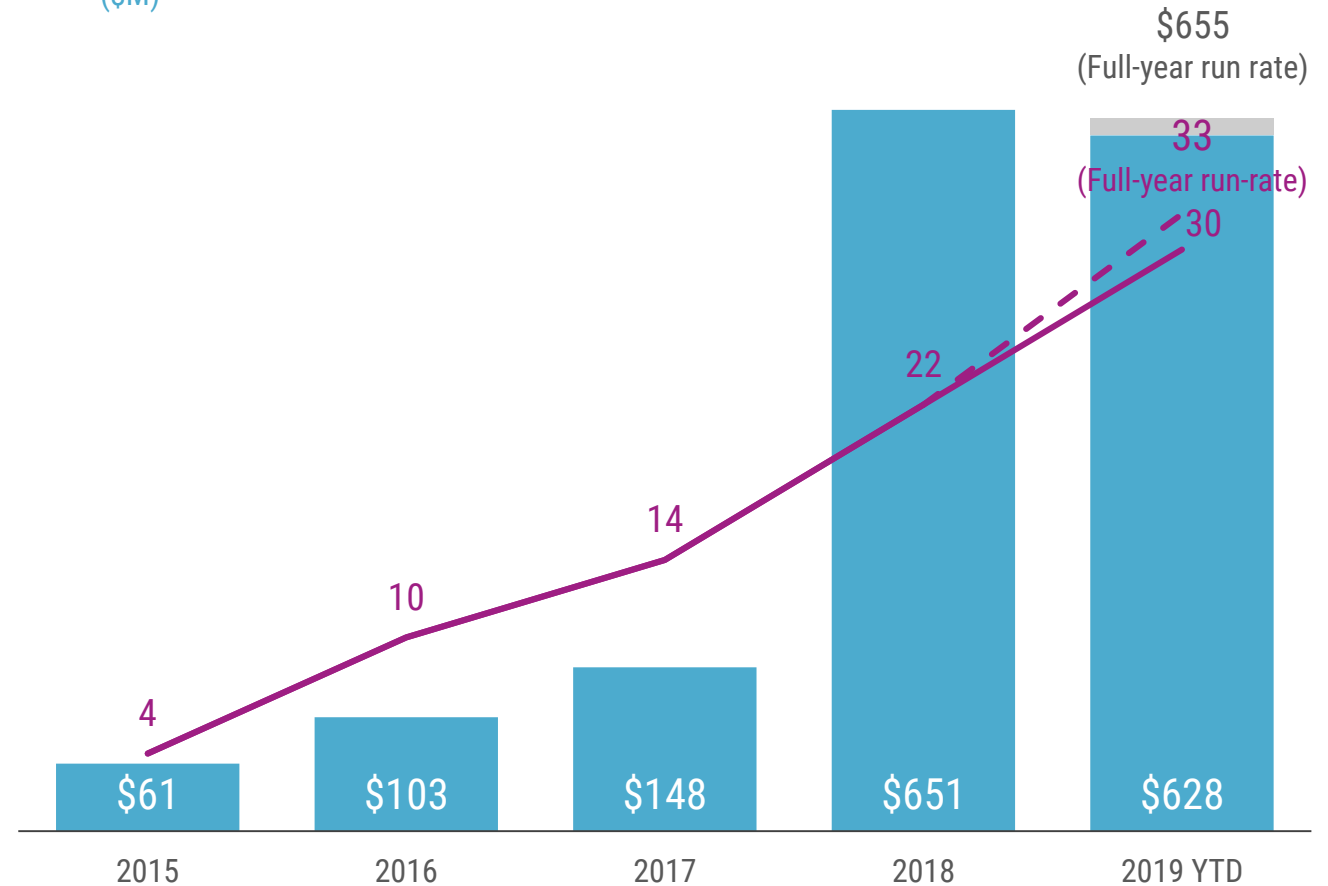


Fueling up for growth

Game changers deal activity; 2015 – 2019 YTD (12/4/19)

Amount of funding
(\$M)

Number of deals



Game changers are high-mosaic companies

CB Insights' data-driven Mosaic Money metric assesses financial signals including funding recency, total amount raised, and investor quality to evaluate private company health.

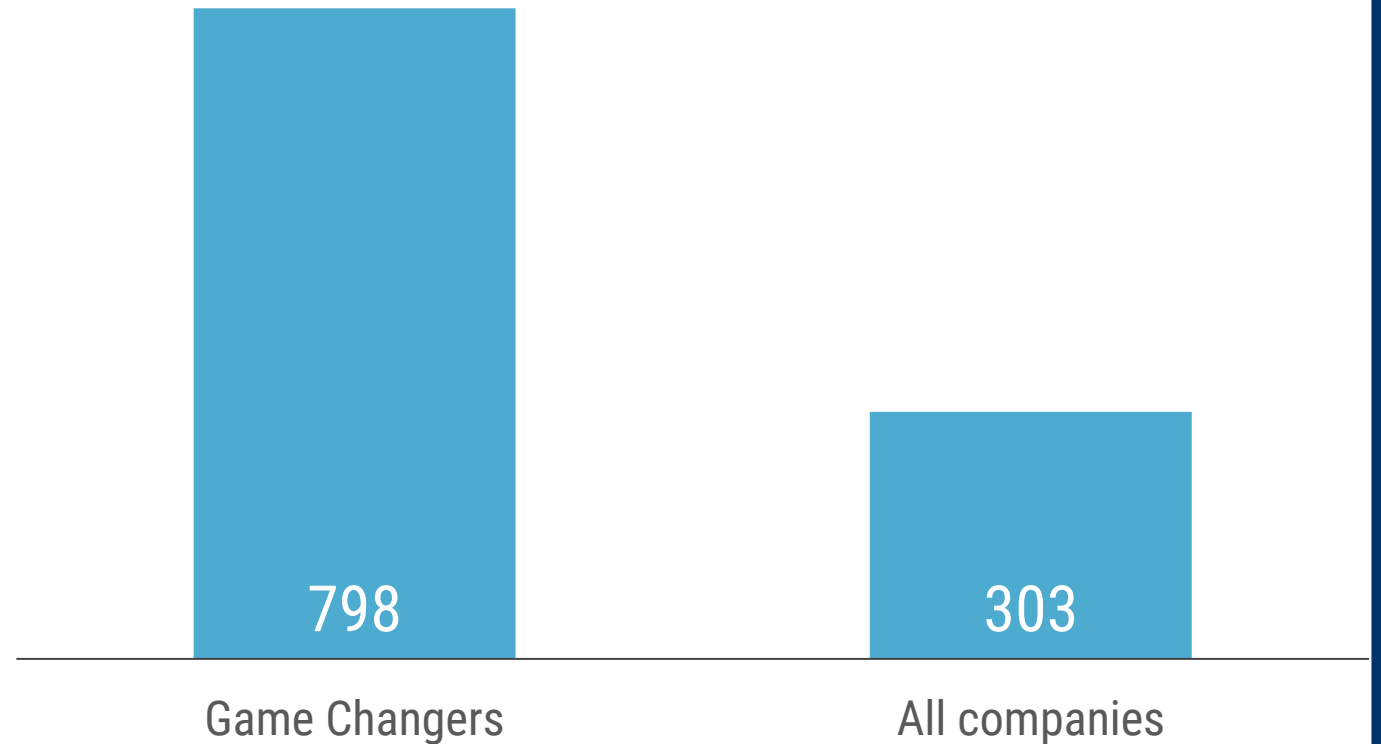
On average, our list of game changers had Mosaic Money scores 2.6x those of all tech companies.

Note that roughly half of 2020's game changer cohort have a Mosaic Money score – Mosaic scores are only calculated for companies that operate in certain technology sectors.



Mosaic money score comparison

Game Changers vs. all companies



Our methodology

How the 12 categories were selected: In addition to looking at where high profile investors are placing their bets across the tech space, we also used CB Insights News Mentions tool, which mines and organizes millions of media articles to quantify media attention to tech trends, to identify game changing tech trends.

How the 36 companies were selected: We used CB Insights Company Mosaic, which tracks private company health using signals including recency of financing, total raised, and investor quality, to identify high-momentum/quickly growing companies within our categories. We gathered this data via our machine learning technology (dubbed The Cruncher) as well as via several thousand direct submissions from firms and individual professionals using The Editor.

The [CB Insights Mosaic](#) page presents the factors considered in the algorithm in greater detail.



WHERE IS ALL THIS DATA FROM?

**The CB Insights platform
has the underlying data
included in this report**

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