Biobanking

Global Market Overview

FINALLOT

December 2023

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Executive Summary

The biobanking industry plays a crucial role in preserving biological materials, such as samples like tissues, blood, and DNA. The repositories are used for various research aims in healthcare and beyond. Research institutions and companies use biobanks to study genetic disorders, make advancements in personalized medicine, and boost stem cell research. Despite challenges like sustainability issues and concerns about personal data usage, the market is growinging. This growth is fueled by increased funding, rising demands in drug discovery, and strong support for regenerative medicine research. Government agencies and public sector providers hold the largest market share in biobanking, followed by academic and research institutions, with private sector companies accounting for less than 15%. However, with over 1,000 global biobanks and a market expected to reach $76.2 billion by 2026, the industry demonstrates significant potential for investment.

This report provides an overview of the VC market for biobanking, outlining its key technologies, industry trends, and prominent regulations. The second part of the report focuses on promising early-stage start-ups across the sector and specialized funds investing in biobanking.

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Technology Overview

Biobank is a biorepository for preserving and collecting biological material for diagnosis, biodiversity studies, and research. Depending on the research aims, biobanks store different samples, such as tissues, blood, serum, DNA, and RNA. The human biobanks systematically collect biological samples from patients and other public members. Biobanks vary significantly in size, with modest biobanks held at medical institutions compared with a national biobank containing many samples.

The common use of biobanks is to support research of genetic disorders, develop personalized medicine, conduct stem cell research, and maintain and update age demographic databases. In the future, strategic alliances with manufacturers, the scientific community, and policymakers will enhance the development of best-practice biobank procedures, such as staff training, media, quality, freezing, and distribution control and optimization.

Advancement in personalized medicine technology is one of the key contributors to the market's growth in biobanking. Personalized medicine allows drugs to be developed according to a person's genetic makeup. In such a context, biobanks store the data related to a person's genetic characteristics, which can be accessed by the scientist for research and drug discovery.

However, the lack of sustainability and bankruptcy led to the closing down of several biobanks, which remains a significant market challenge. In many cases, the development of technology may make some narrowly focused biobanks obsolete. In addition to this, biobanks can also suffer from closely related biotech industry challenges, such as biotech winter, which essentially were related to the lack of funding and ceased operations of active and potential biobank clients. Moreover, the area is affected by shifts in public opinion, as people positively perceive the use of biobanking for research purposes but negatively the involvement of commercial entities.

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Market Drivers

Driven by the need for annotated biospecimens and data for medical advancements, the biobanking sector has been growing within the industry. Moreover, the introduction of new technologies, automation, and data analytics, drives the evolution of biobanking, contributing to the rise of digital biobanks among other advancements. Chronic illnesses like cancer and heart disease, along with increased pharmaceutical investment in drug development, are key factors propelling the biobanking market forward.

Other market growth drivers include heightened genomic research funding, a trend towards storing newborns' cord blood stem cells, pressing needs in drug discovery, and amplified government and corporate backing for regenerative medicine research. The proliferation of biobanks and a surge in human biosamples are boosting the demand for biobanking infrastructure as well.

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Market Breakdown

Currently, there are more than 1,000 global biobanks storing over 1 billion samples worldwide, where Europe constitutes the largest share of the market. Precision medicine, genomic medicine, and preventative health have emerged as one of the focus areas for healthcare ecosystems worldwide, driving growth in the biobanking market. Such a rise is also supported by increased funding and R&D by healthcare firms.

Essential to enhancing personalized healthcare, biobanks emphasize safeguarding specimen integrity and ensuring efficient access and distribution. This focus aligns with the growing requirement for robust biobanking practices.

As a result, the biobanking market, valued at $61.1 billion in 2021, is projected to grow to $76.2 billion by a CAGR of 4.5% in the near future, marking its critical role in the evolution of modern medicine.

The global biobanking market can be split into segments by sample type, application, and ownership.

Biobanks are owned and managed by various entities, including government agencies and public sector providers, academic institutes and universities, non-profit organizations, and private entities. Government agencies and public sector providers hold the largest share at 40.05%, followed by academic institutes and universities at 30.92% and non-profit and private organizations sharing the rest of the market.

Governments/public sector providers	**40.05%**
Academic institutes/universities	**30.92%**
Non-profit organizations	**15.51%**
Private organizations	**13.52%**

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The global market for government agencies/public sector providers owned biobanking is estimated to increase from $24.7 billion in 2021 to $30.1 billion by 2026, at a CAGR of 4.1% during 2021-2026. Similarly, the market for biobanking owned by private organizations is expected to grow most during the forecast period, from almost $8.0 billion in 2021 to $10.8 billion by 2026, growing at a rate of 6.3% annually.

Ownership Type	2021	2022	2023	2025	2027	CAGR 2022-2027
Governments / public sector providers	24,677.70	25,689.50	26,742.80	28,980.60	31,405.70	**4.10%**
Academic institutes	18,974.60	19,790.50	20,641.50	22,454.80	24,427.50	**4.30%**
Non-profit organizations	9,446.00	9,890.00	10,354.80	11,351.00	12,443.10	**4.70%**
Private organizations	7,989.80	8,493.20	9,028.20	10,201.60	11,527.50	**6.30%**
Total*	**61,088.10**	**63,863.20**	**66,767.30**	**72,987.90**	**79,803.80**	**4.50%**

In the sample type, biobanking comprises several subsegments, including biofluids, tissues, stem cells, DNA/RNA, and other types of specimens collected. Bio-fluids and tissue samples are the most commonly used biospecimens.

By application, the global biobanking market can be split into basic/scientific research and clinical research/therapeutics. Biobanks collect and preserve biological materials like blood and DNA in basic research, aiding studies in human biology and genetics and collaborating with academic institutions. Clinical research biobanks use these materials to develop and test new medical treatments and drugs, often partnering with pharmaceutical companies. Both sectors are integral to biomedical advancement, with basic research informing clinical applications and technological advancements enhancing biobanking's efficacy in both fields.

Regulatory Framework

GLOBAL CONTEXT AND ISO STANDARDIZATION

The need for high-quality biobanking practices has led to an international effort to standardize biobanking procedures. A Working Group of 70 experts from about 30 countries collaborated under the ISO Technical Committee on Biotechnologies (ISO/TC 276) to create a unified standard. This resulted in ISO 20387:2018, a comprehensive guideline harmonizing various national and international standards (e.g., OECD, ISBER, NCI) for biobanking of biological materials from multicellular organisms and microorganisms. The standard focuses on research and development, excluding the therapeutic use of samples, and covers all aspects of the biobanking process, from sample collection to distribution.

GEOGRAPHICALIMPLEMENTATION

Europe:

Several European countries, including the UK, France, Germany, and Italy, have adopted ISO 20387:2018. The standard aligns with the EU Regulation (EC) No. 765/2008 and is moving towards harmonization as an EN standard. This facilitates a consistent approach to biobanking across the European Union.

United States and China:

Both countries have actively embraced ISO 20387:2018, with numerous biobanks accredited under this standard. The USA and China are strongly committed to maintaining high-quality biobanking practices and contributing to global research and development efforts. to biobanking across the European Union.

Other countries, such as

Australia, Brazil, South Africa, South Korea, and India, have implemented the standard, demonstrating a growing global consensus on biobanking practices. Each country adapts the standard to local needs while maintaining international quality and procedural benchmarks.

QUALITY AND ACCREDITATION

ISO 20387:2018 serves as a foundation for accreditation programs in these countries, ensuring the quality and reliability of biobanking practices. The standard's implementation varies but generally includes conformity assessments and certifications by independent bodies. This approach enhances stakeholder confidence and fosters the reproducibility of biomedical research.

EMERGING TRENDS AND FUTURE PROSPECTS

As biobanking becomes increasingly vital for research, especially in fields like personalized medicine, these standards will continue to evolve. Integrating new technologies and methodologies will further refine biobanking practices, ensuring they remain relevant and effective in the rapidly advancing scientific landscape.

Largest VC deals in 2021-2023

IMIDomics successfully secured $16.5 million in a Series A funding round to support researching Immune-Mediated Inflammatory Diseases (IMIDs) via the world's largest IMID biobank. This investment is foundational for their mission to identify novel biomarkers and therapeutic targets, utilizing the biobank's extensive resources. This funding is pivotal in driving forward research and potential new treatments for IMIDs.

July 27, 2021

March 12, 2021

Prometheus Biosciences, in collaboration with Takeda, leveraged a Cedars-Sinai-licensed biobank to raise their IPO to $190 million. This financial boost targets developing PRA023, an innovative anti-TL1A monoclonal antibody for inflammatory bowel disease. Utilizing biobank resources positions Prometheus to challenge Pfizer's dominance in the field and demonstrates the crucial role of biobanks in advancing medical research and drug development.

October 9, 2021

Kingdom Supercultures raised $25 million in a Series A round to develop microbial supercultures. The company utilizes an extensive biobank of microbial strains to develop SupercultureTM ingredients, a new class in the alternative protein industry. This investment was led by Shine Capital and followed a $3.5M seed round in 2020, and was used to expand company's scientific platform and R&D facilities.

Galatea Bio, co-founded by the visionary trio of Carlos Bustamante, Nicholas Katsanis, and Alexander Ioannidis, raised $10 million in funding. Specializing in genetic research, with a focus on underrepresented populations, they blend diverse genetic data with advanced analytical techniques, aiming to bring transformative changes in the field of genomics and healthcare.

November 20, 2022

January 19, 2023

Genepoint Biological Technology successfully secured $29.4 million in a Series D funding round. This investment, led by Beijing Guangda Huitong Engineering Technology Research Institute along with six other investors, is a strong endorsement of their innovative work in cryogenic biomaterials. The funding will support the development of their automated cryogenic cell storage system, a pivotal component in biobank technologies, essential for the future of alternative energy solutions and biotechnology.

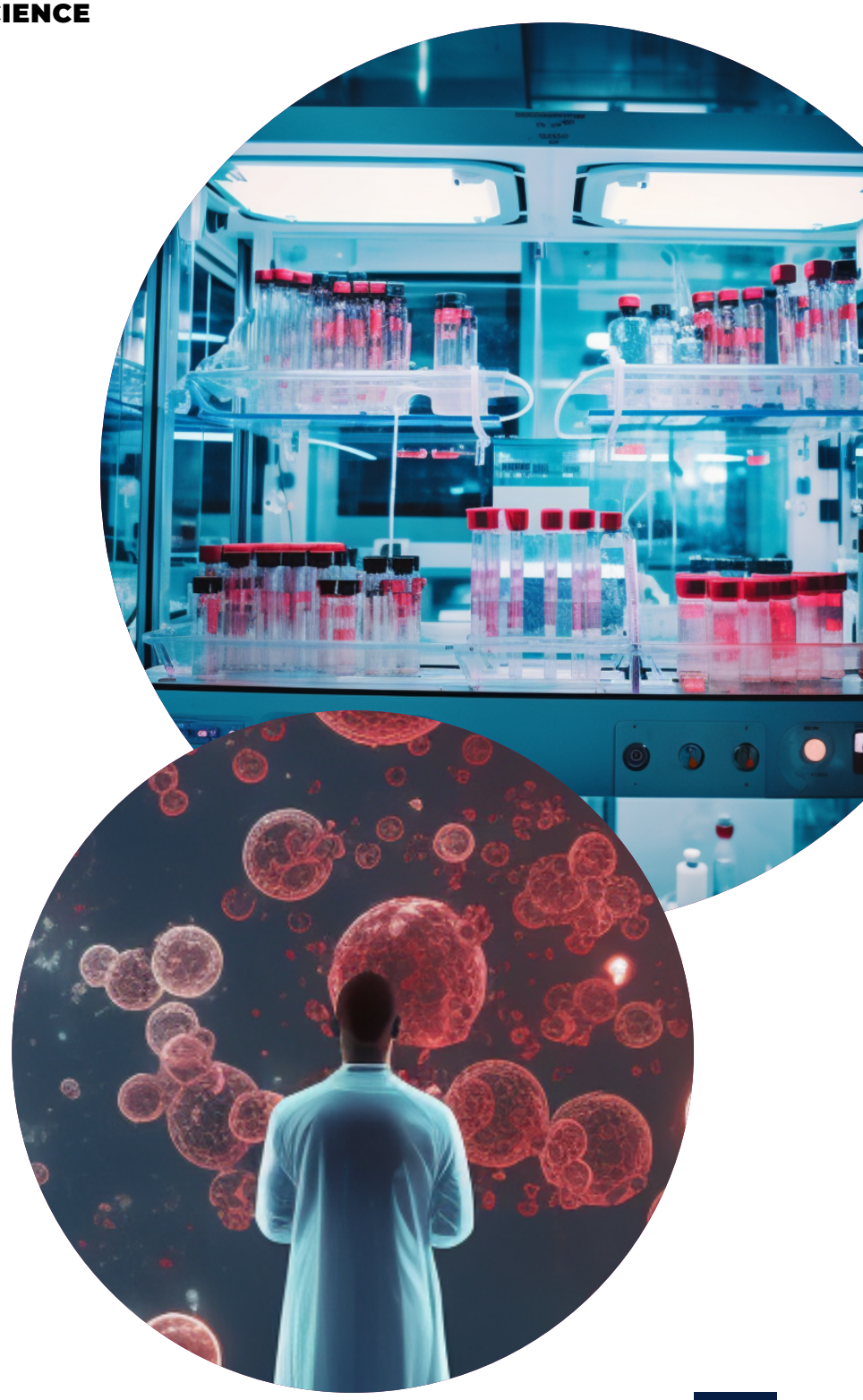
Boca Biolistics announced securing $25 million in private equity from Clairvest Group. The clinical research organization and biomaterials company specializes in procuring, storing, and selling human biological samples, particularly in infectious diseases and oncology. With a robust reputation in the industry, Boca sources samples from its international network of collection sites and provides analytical laboratory testing and characterization services

February 22, 2023

02 Promising Projects and Largest Funds

Promising Early Stage Projects

BIOTECHNOLOGY AND FOOD SCIENCE



Kingdom Supercultures

Kingdom Supercultures, founded in 2019 and based in Brooklyn, New York, has raised $26.35 million to pioneer the creation of microbial cultures for novel food products. Central to their innovation is an extensive biobank of microbial strains, enabling the development of SupercultureTM ingredients. These ingredients, a new class in the food industry, exploit natural microbes' potential, offering functional ingredients and biopreservatives delivered as live cultures for fermentation. This approach mirrors biobank utilization in medical research, revolutionizing food technology.

HEALTHCARE AND BIOMEDICAL TECHNOLOGY

Genepoint Biological Technology

Founded in 2015 and based in Shanghai, China, Genepoint Biological Technology has raised an impressive $51.28 million, focusing on cryogenic biomaterials and automation in healthcare. Their innovative technology spearheads advancements in cryogenic cell storage automation systems and alternative energy solutions. By promoting intelligence, automation, and IoT technology, Genepoint enhances the quality and management of biomaterials, ultimately contributing to the advancement of Precision Medicine. This approach mirrors the biobank-centric strategies in medical research, driving innovation in healthcare.

IMIDomics

Founded in 2015 and based in Barcelona, Spain, IMIDomics has raised $16.5 million to combat immune-mediated diseases, utilizing the world's largest IMID biobank. Their Clinical Discovery Engine focuses on patient-centered research, combining high-quality patient data, omics, analytical tools, and a profound understanding of IMIDs. This multidimensional approach, essential for addressing the complexity of these diseases at individual and group levels, exemplifies the transformative power of biobanks in advancing personalized medicine and targeted healthcare solutions.

Duke BioRepository & Precision Pathology Center

Founded in 1971 and located in Durham, North Carolina, the Duke BioRepository & Precision Pathology Center (BRPC) has secured $200,000 in funding to manage a substantial human tissue biobank for research. The BRPC is crucial in collecting and processing biospecimens from over 10,000 Duke patients in clinical trials. Researchers have access to over 60,000 dedicated research specimens and tens of millions of leftover pathology tissue and blood samples, making it a pivotal resource in medical research and discovery.

Baiban Biotech

Founded in 2014 and based in Hangzhou, China, Hangzhou Baiban Biotech has raised approximately $440,000 (CN¥3,000,000) to develop medical supplies for biobank automation and sample preprocessing. Their expertise focuses on creating ready-coded consumables essential for the Internet of Things and intelligent biomedical research experiments. Their products ensure precise consistency and reliable identification, meeting the demands of various automated equipment essential in biobanking and advancing medical research technologies.

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DATA INTEGRATION AND ANALYSIS

Rosalind

Founded in 2013 and based in San Diego, California, Rosalind provides a Software as a Service (SaaS) platform for biomedicine, specializing in integrating data from biobanks for comprehensive analysis. This platform makes learning bioinformatics engaging and accessible, offering a range of problems that increase in biological and computational complexity. Rosalind serves as a crucial educational tool in bioinformatics, inspired by pioneers like Rosalind Franklin, and aims to inspire a new generation of students in this intersecting field of biology and programming.

OMICA.AI

Founded in 2021 and headquartered in Mexico City, Mexico, omica.ai raised $820,000 to establish itself as a leading biomedical data hub, integrating artificial intelligence with a multi-omics biobank. As the first digital biobank in Latin America, omica.ai is pioneering in developing tools and datasets to propel research and enhance healthcare. Their platform represents a significant stride in precision medicine, making advanced medical insights accessible and revolutionizing the approach to healthcare research and patient care in the region.

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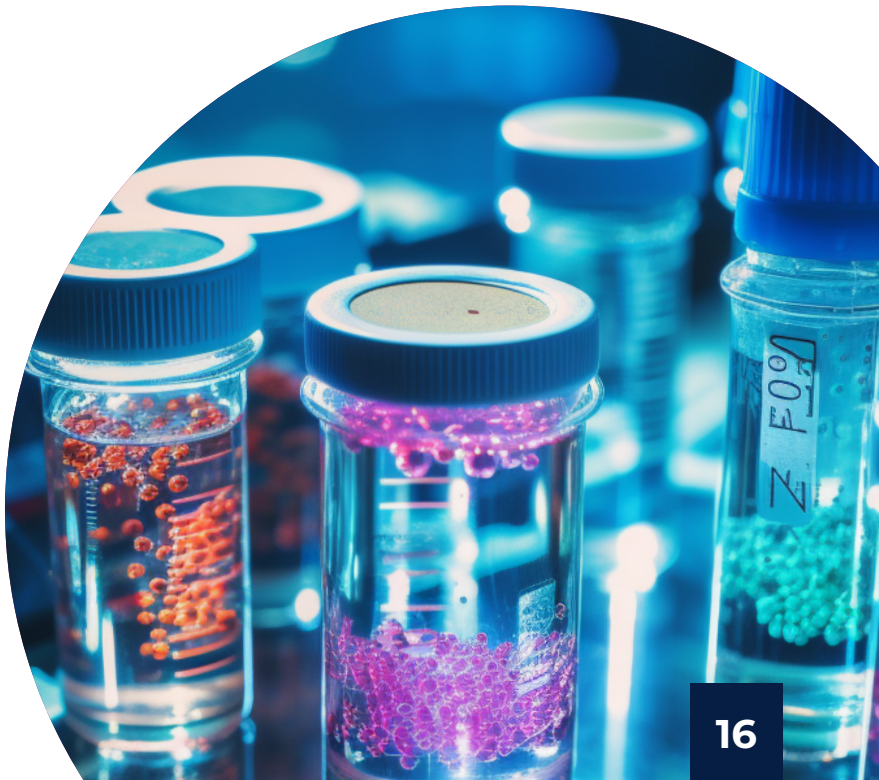
GENETIC RESEARCH AND DRUG DEVELOPMENT

Galatea Bio

Founded in 2021 and based in Hialeah, Florida, Galatea Bio, co-founded by Carlos Bustamante, Nicholas Katsanis, and Alexander Ioannidis, has raised $17 million to drive healthcare discoveries using genetic diversity and a clinical biobank. Recognizing a gap in population studies, especially in underrepresented communities, Galatea Bio focuses on leveraging the surge in genetic information and technological advances to diversify genomic understanding beyond predominantly Northern European communities. Their biobank is crucial in this mission, enhancing precision medicine and genetic research inclusivity.

Arctic Therapeutics

Founded in 2015 and located in Philadelphia, Pennsylvania, Arctic Therapeutics has raised approximately $13.7 million (€12.5 million) to innovate in drug development using bioinformatics and AI, with a focus on genomics research. Their approach includes detailed genetic sequencing to identify disease causes and create effective treatments. Arctic Therapeutics' unique assets include a comprehensive Icelandic genealogy database, a biobank licensed by the Icelandic Ministry of Health, and a partnership with national hospitals to access the National Electronic Health Records (EHR) database.



INNOVATIVE TECHNOLOGY AND CLINICAL RESEARCH

Oncophenomics

Established in 2016 and based in Hyderabad, India, Oncophenomics has raised $60,100, specializing in cancer research, particularly on bioprinting and maintaining a tumor tissue biobank. Their Fathom Dx test is a comprehensive liquid biopsy incorporating a range of genomic and epigenomic biomarkers for personalized cancer treatment. This test helps oncologists select optimal treatments and therapies, including targeted and immunotherapies, utilizing their extensive biobank resources for tailored patient care and advancing precision oncology.

Boca Biolistics

Founded in 2009 and located in Pompano Beach, Florida, Boca Biolistics has raised $25 million, positioning itself as a hybrid Contract Research Organization (CRO) focusing on constructing a leading biorepository. They combine the functions of a specimen biobank, a reference laboratory, and a CRO. This integrated approach enables them to amass industry-leading clinical and molecular data sets, providing robust building blocks to partner with clients and propel scientific advancements in life sciences and medical research.

Bluechiip Limited

Founded in 2003 in Scoresby, Victoria, Australia, Bluechiip Limited, with a funding of $6.16 million, specializes in advanced biobank tracking solutions. Their unique patented technology, designed for a wide temperature range, is ideal for biobanks managing sensitive biosamples. This technology revolutionizes biobanking by enabling precise tracking and temperature monitoring of samples in cryogenic environments. Bluechiip's innovative approach ensures the integrity and quality of biobank samples, which is crucial for research and healthcare, even in extreme conditions like autoclaving and cryogenic storage.

Doppl

Doppl, located in Lausanne, Switzerland, has raised approximately $108,000 (CHF100,000) to lead in citizen-driven medical research with its crowd-sourced biobank. At Doppl's core is a globally sourced database of biological samples pivotal for research and drug development. This model allows citizen donors to contribute and benefit from the research while controlling their biological data. In collaboration with hospitals and laboratories, Doppl is advancing personalized medicine by engineering standard organoids, issue-engineered cell-based in vitro models, for disease modeling and preclinical drug development, fostering a new era in individualized healthcare solutions.

Biobank

Founded in 2003 and located in Lieusaint, France, BIOBank specializes in providing high-quality bone allografts for orthopedics, maxillofacial, and dental surgery, adhering to strict health regulations. Although financial details are unspecified, their expertise lies in sourcing bone grafts from living donors in France and processing them using the innovative Supercrit® technology. This method ensures total viral inactivation, structural integrity maintenance, and high-quality bone integration, improving patient recovery. BIOBank's unique approach in tissue banking and bone allograft treatment positions it as a leader in specialized surgical solutions.

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Specialized funds that invest in biobanking

Sequoia Capital

Founded in 1972, Sequoia Capital is a renowned American venture capital firm based in Menlo Park, California. With an impressive asset portfolio of approximately US$85 billion as of 2022, Sequoia Capital stands at the forefront of investment in the technology sector. The firm primarily focuses on seed-stage, early-stage, and growth-stage investments, targeting a broad spectrum of technology-oriented private companies. This long-standing institution has a rich history of supporting daring and innovative ventures, helping shape the future of technology and entrepreneurship.

Crowdcube

Crowdcube, established in 2011 by founders Luke Lang and Darren Westlake, is a pioneering British investment crowdfunding platform. Based in Exeter, Devon, United Kingdom, it has successfully carved a niche in the financial and venture capital industries. As of 2021, Crowdcube boasts an impressive £3.5 billion in assets under management. The platform provides equity and annual returns to individual investors, focusing on start-ups and growing businesses across diverse sectors, making it a key player in the European investment landscape.

Lux Capital

Founded in 2000, Lux Capital is a forward-thinking investment firm based in New York, New York, United States. Lux Capital has become a notable name in the venture capital sector, focusing strongly on counter-conventional, seed-stage science and technology ventures. The firm manages over $5 billion in assets and is renowned for its dedication to investing in groundbreaking ideas at the intersection of technology and the sciences. Lux Capital's investment portfolio spans various stages, including debt, early-stage venture, late-stage venture, private equity, and seed investments, showcasing its commitment to nurturing innovative companies across multiple sectors.

F-Prime Capital

F-Prime Capital, founded in 1946, is a distinguished venture capital firm based in Cambridge, Massachusetts, United States. With over $4.5 billion in assets under management, F-Prime Capital focuses on creating and investing in healthcare and technology companies. The firm's investment strategy covers a broad spectrum, including therapeutics, medtech, health IT & services, and various technology sectors. F-Prime Capital boasts a global portfolio of nearly 300 companies, including over 30 startups developed in-house, with a presence across the Americas, Europe, and Asia, reflecting its significant impact on global innovation and entrepreneurship.

Pioneer Fund

Founded in December 2016, Pioneer Fund is an innovative venture capital firm based in Toronto, Ontario, Canada. The firm manages a diverse portfolio, primarily focusing on early-stage venture and seed investments in the top Y Combinator startups. With over 419 investments and 13 successful exits, Pioneer Fund has established itself as a key player in the venture capital industry. With a network of over 360 Y Combinator alumni, the fund has made significant strides in supporting and nurturing groundbreaking startups, boasting a unique and collaborative approach to venture capital.

Northern Light Venture Capital

Northern Light Venture Capital (NLVC), founded in October 2005, is a preeminent venture capital firm based in Beijing, China. With a robust $4.5 billion in capital under management, NLVC is one of China's largest venture firms. The firm has made an impressive mark with over 200 investments and over 40 exits. NLVC specializes in early-stage, late-stage, and seed investments, focusing primarily on technology and consumer service companies. The firm partners with global entrepreneurs, fostering the development of sustainable global companies, and has a significant influence in shaping innovative enterprises worldwide.

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