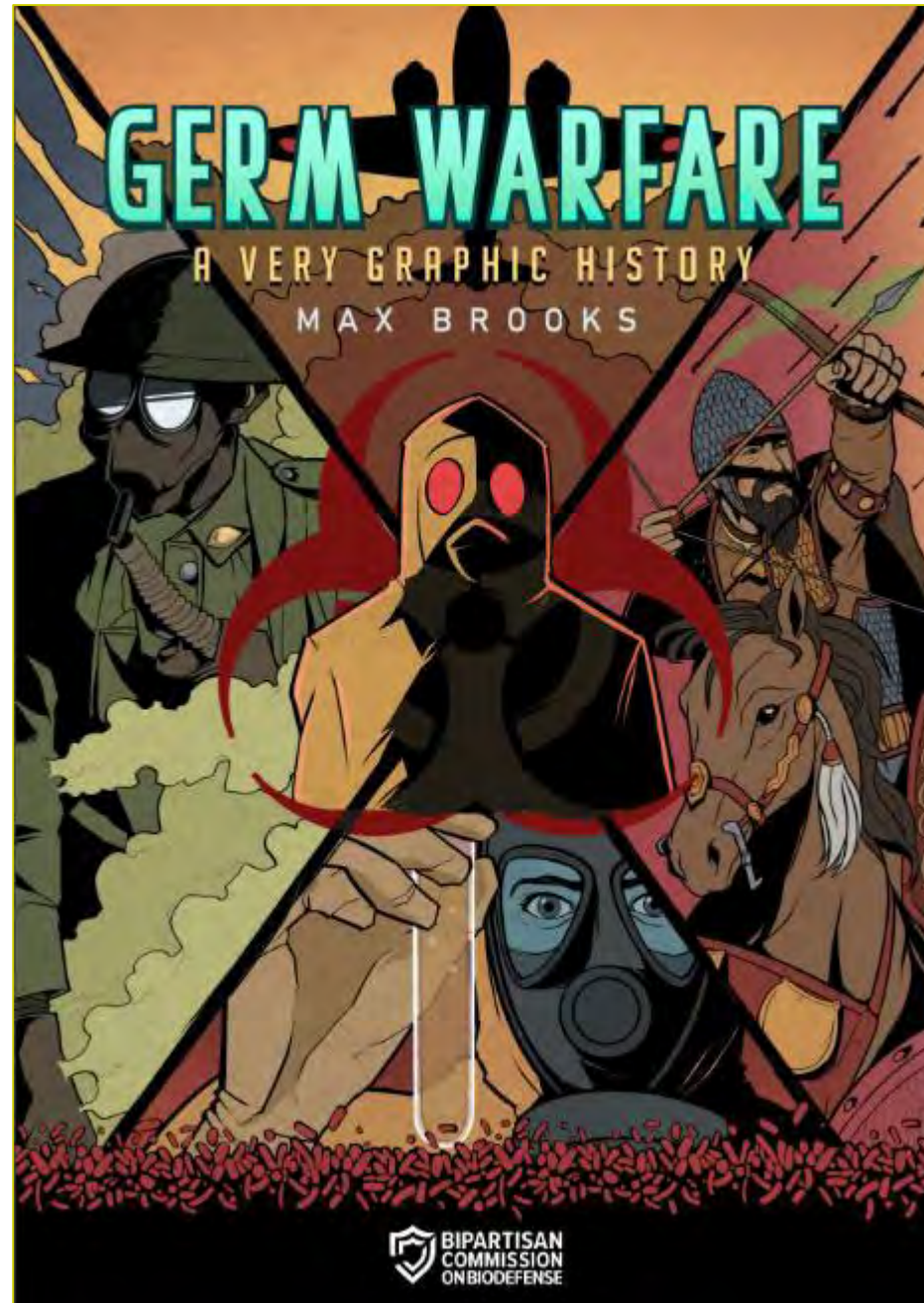
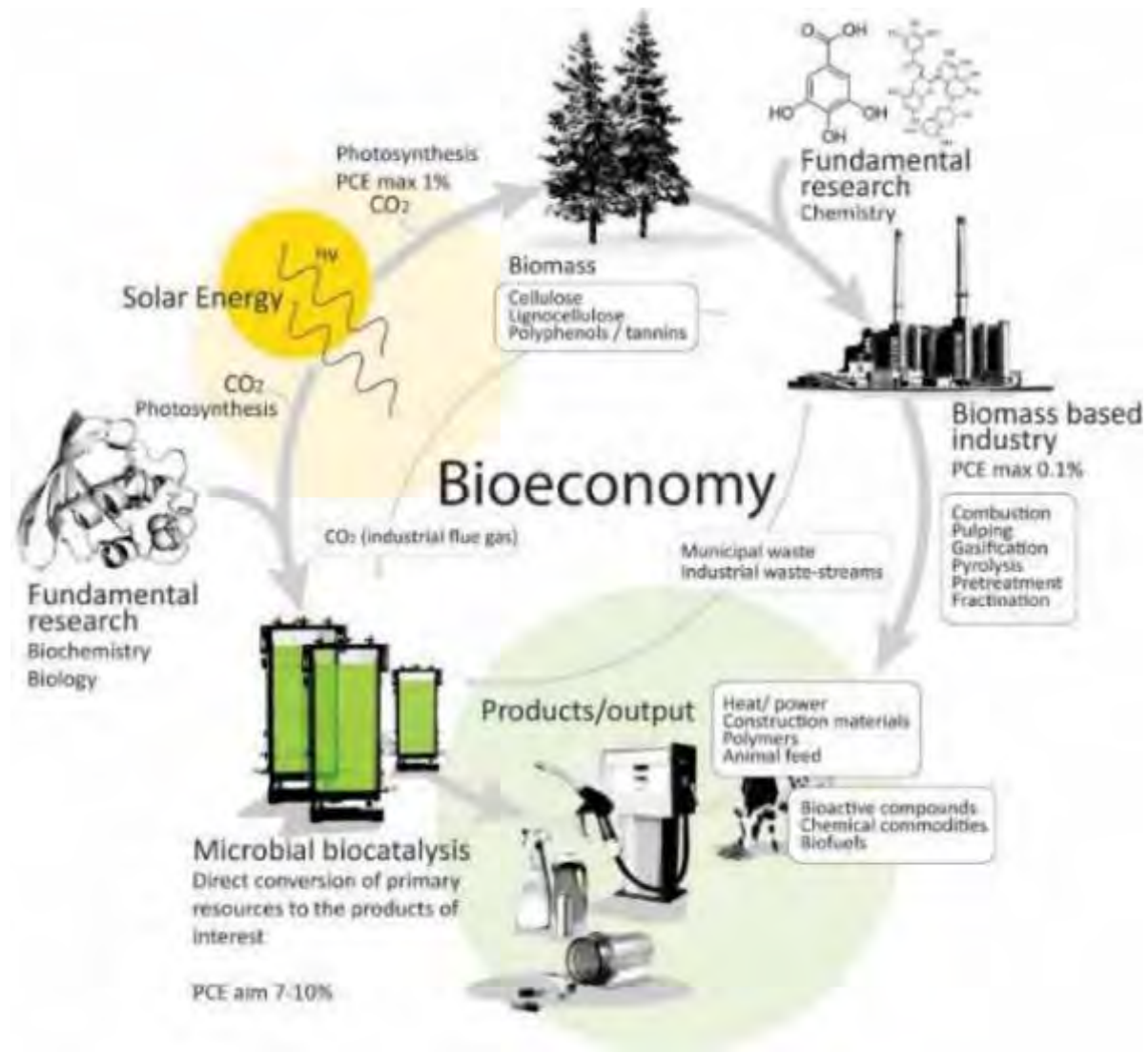


Safeguarding the Bioeconomy: Biotechnology Needs a Security Patch...BADLY



<https://biodefensecommission.org/germ-warfare/>

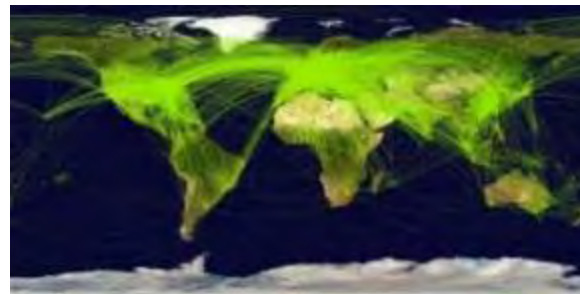


“PRECISION/PERSONALIZED” MEDICINE

Data is the New Oil Fueling the *Bio Space Race*



<http://lsi.ubc.ca/our-vision/personalized-medicine/projects/>



<http://www.telegraph.co.uk/finance/newsbysector/mediatechnologyandtelecoms/electronics/10540860/Fitbit-in-push-to-lead-the-wearable-tech-boom.html>

Another Day, Another Health Insurance Hack Affecting 11 Million People

By Lily Hay Newman



Names, birthdays, email addresses, physical addresses, telephone numbers, Social Security numbers, member IDs, bank account information, ***medical information, and insurance claims*** may all have been exposed in the breach.

www.slate.com/blogs/future_tense/2015/03/18/premera_blue_cross_health_insurer_hacked_11_million_financial_and_medical.html

China Doubles Down on the Double Helix

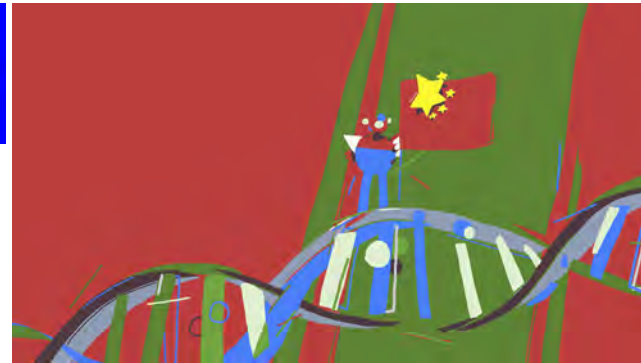
KEY PLAYERS IN GENOMICS IN CHINA

COMPANY	HEADQUARTERS	FOUNDED	MAIN PRODUCTS
AnnoRoad Genomics	Beijing	2012	Genome sequencing, liquid biopsy tests, noninvasive prenatal testing, and direct-to-consumer tests that reveal cancer risks
Berry Genomics	Beijing	2010	Noninvasive prenatal testing, exome sequencing, and direct-to-consumer tests that reveal cancer risks
BGI	Shenzhen	1999	Genome sequencing; also manufactures a sequencer
CloudHealth Genomics	Shanghai	2014	Genome sequencing, "liquid biopsy" blood tests for cancer, and direct-to-consumer tests that can reveal a child's ability to absorb certain nutrients
Gene+	Beijing	2015	Direct-to-consumer tests that reveal cancer risks and genomic sequencing of tumors to help cancer doctors develop personalized treatment plans
HaploX	Shenzhen	2014	Liquid biopsy tests and direct-to-consumer tests that reveal cancer risks
Mega Genomics	Beijing	2016	Genome sequencing and direct-to-consumer tests that reveal cancer risks and tolerance of certain medications
Novogene	Beijing	2011	Genome sequencing and liquid biopsy tests
WuXi NextCode	Cambridge, Massachusetts*	2013	Genome sequencing, cloud storage for genomic data, and a genomic database that helps scientists research variation across population groups
Yang Zi Investment Group	Nanjing	2016	State-owned investment group that built a sequencing center

*WuXi NextCode is a subsidiary of WuXi Biologics, a subsidiary of WuXi Biologics, a subsidiary of WuXi Biologics.



Nov. 2, 2017



About 30 percent of the world's sequencing machines were in China as of 2015, but the country has been gearing up to increase its share.

In 2016, the state-owned Yang Zi Investment Group built a sequencing center in Nanjing that's capable of sequencing the genomes of **400,000 to 500,000 people a year**.

BGI is granted patent in 16 countries for non-invasive prenatal genetic test technology

October 10, 2014, Shenzhen, China-- The European Patent Office has issued patent number for invention to BGI for its independently researched non-invasive prenatal genetic test (NIPT) technology. The patent is effective in 15 member countries including England, Belgium, Spain, Slovenia, Hungary, Sweden, Turkey, Switzerland, Italy, France, Denmark, Germany, Czech Republic, Poland and Romania





July 7, 2021



China's gene giant harvests data from millions of women

A prenatal test used worldwide sends gene data of pregnant women to the company that developed it with China's military.

The privacy policy on the NIFTY test's website says data collected can be shared when it is "directly relevant to national security or national defense security" in China.



BGI And Huawei Collaborate To Build Big Data Storage For Genomics

 **BioSpace** Sep. 21, 2015

BGI signed an agreement with Huawei Technology, a Shenzhen networking and telecom equipment maker, to develop big data storage systems for genomic research.

www.biospace.com/News/bgi-and-huawei-collaborate-to-build-big-data/392057

华大基因
BGI



WuXi NextCODE, Huawei Launch Precision Medicine Cloud for China

 **Bio-IT World** May 24, 2016

WuXi AppTec and Huawei launched the China Precision Medicine Cloud today. The two companies hope the platform will support the **Chinese government's Precision Medicine Initiative**, and link researchers across China through a **secure nationwide network**.

www.bio-itworld.com/2016/5/24/wuxi-nextcode-huawei-launch-precision-medicine-cloud-china.aspx

WuXiNextCODE
Leading Genomics



CRISPR bombshell: Chinese researcher claims to have created gene-edited twins

By **Dennis Normile** Nov. 26, 2018 , 1:10 PM



doi:10.1126/science.aaw1839

A New Era of Vaccine Diplomacy: Navigating the US-China Rivalry in Southeast Asia, 2020–2022

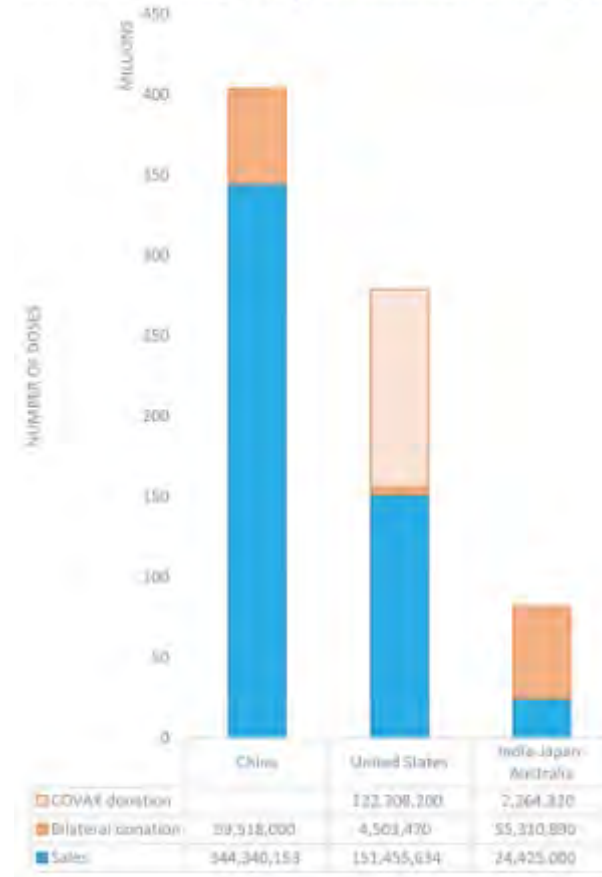


April 9, 2025

The COVID-19 pandemic has amplified vaccine diplomacy as a key arena of great power competition.

Vaccine diplomacy not only extends great power competition but also shapes it, as recipient countries increasingly exert agency in the process.

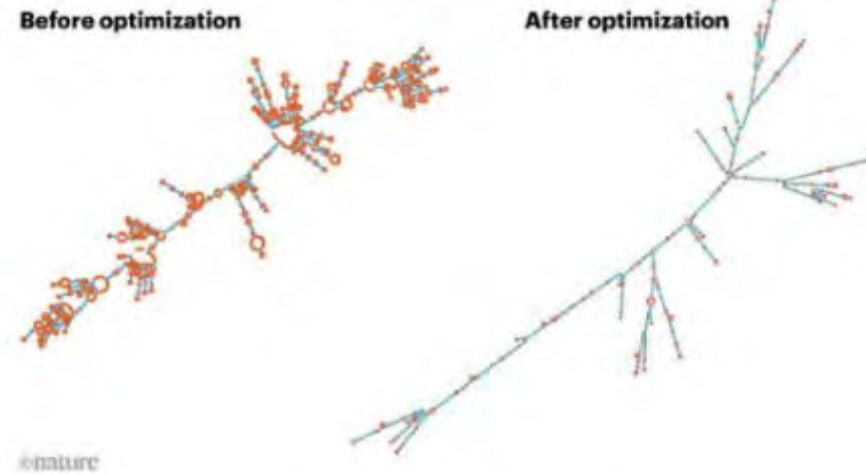
Source: UNICEF <https://www.unicef.org/supply/covid-19-market-dashboard>.



COVID-19 vaccines sold and donated by China, the United States, and Quad partners to ASEAN member states.

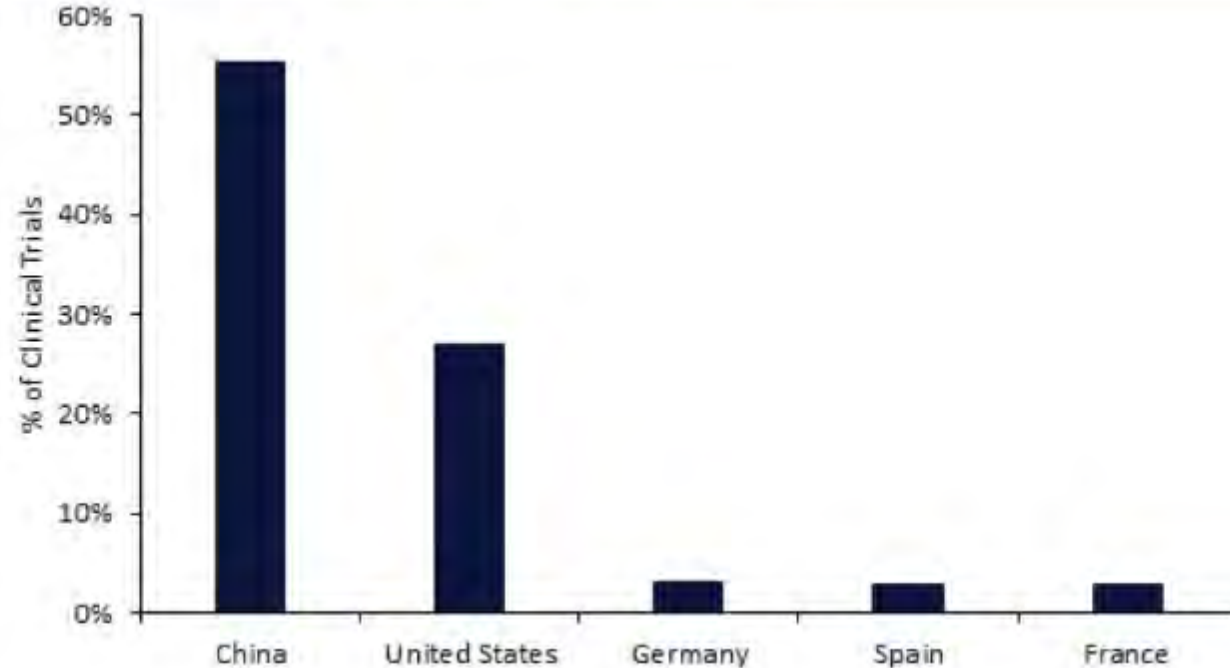
'Remarkable' AI tool designs mRNA vaccines that are more potent and stable

Software from Baidu Research yields jabs for COVID that have greater shelf stability and that trigger a larger antibody response in mice than conventionally designed shots.



China Dominates CAR-T Therapies

Figure 1: Percentage of clinical trials for CAR-T therapies by country



As part of Healthy China 2030 and other pharma and healthcare visionary programmes, China enhanced its focus on innovative therapies.

China's race for domination in this field means that of the ten companies involved in the development of CAR-T drugs, six are based in China.

Global Innovative Drug Development

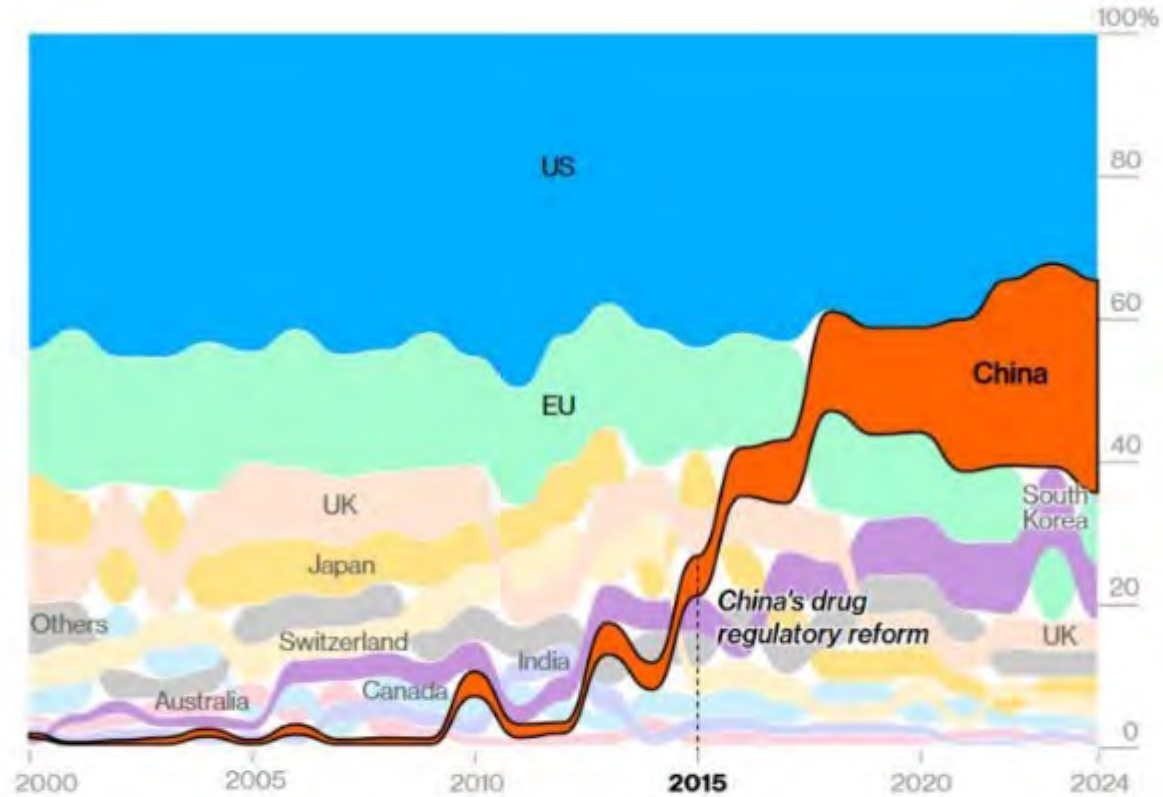
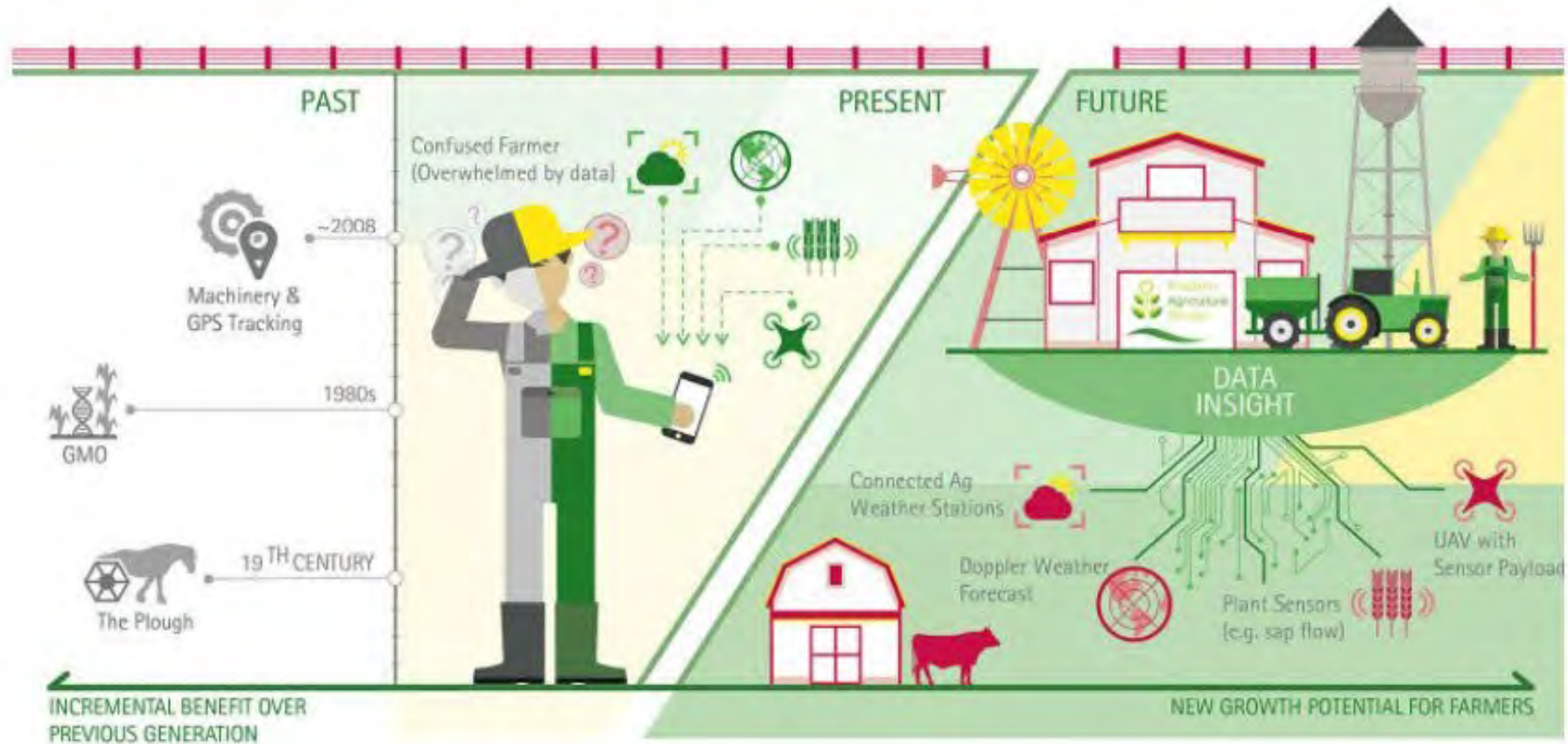


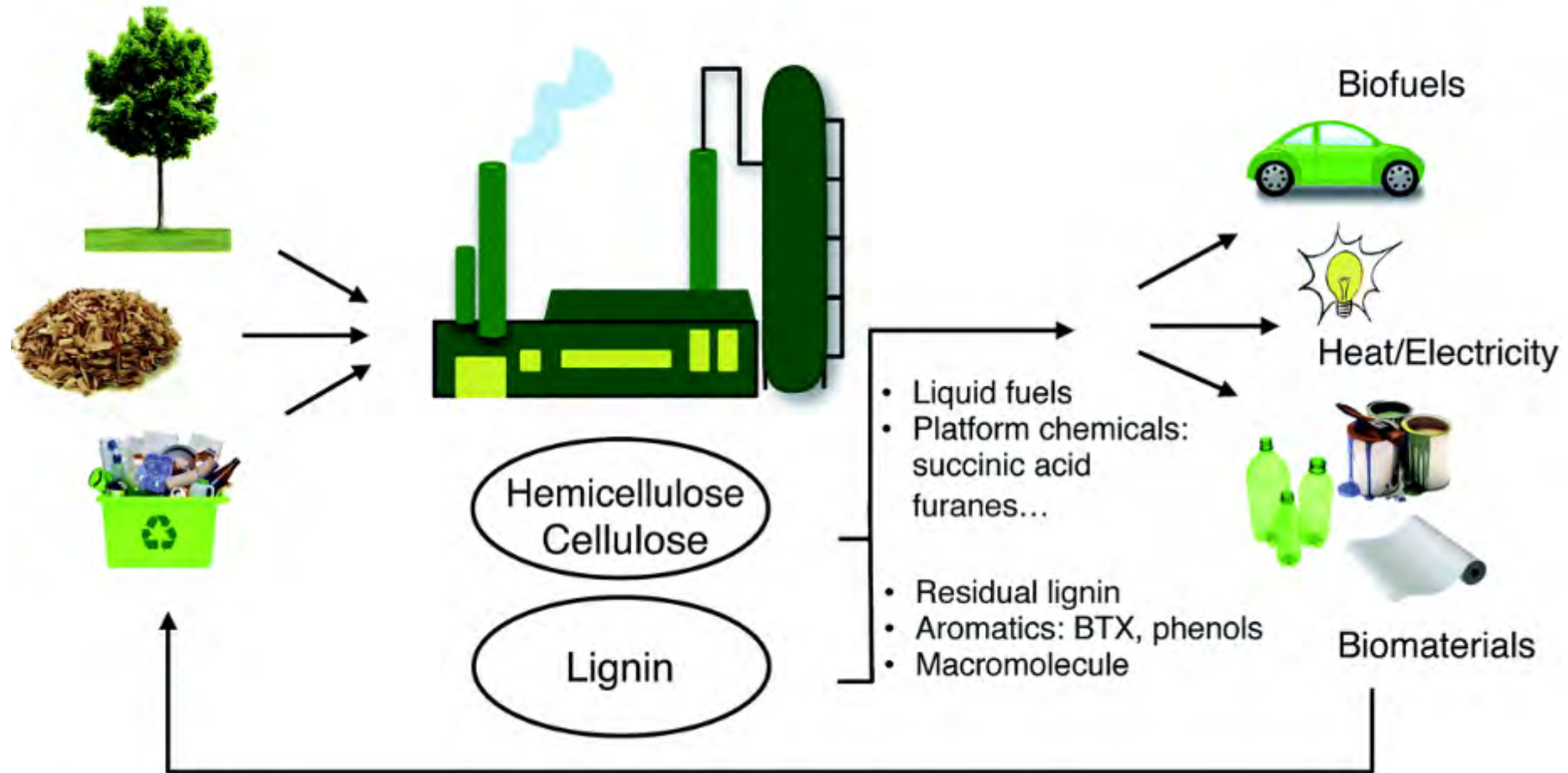
Figure: The Annual share of various countries of innovative drugs entering development.
Image Source: Norstella data analyzed by Bloomberg

Evolution of Digital Agriculture

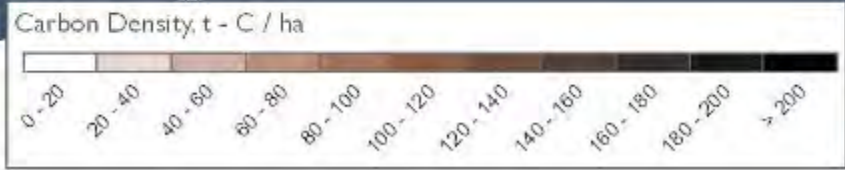


<https://medium.com/remote-sensing-in-agriculture/digital-technologies-in-agriculture-adoption-value-added-and-overview-d35a1564ff67>

Biomanufacturing



Global Above- and Below-ground Living Biomass Carbon Density



Ruesch, Aaron, and Holly K. Gibbs. 2008. New IPCC Tier-1 Global Biomass Carbon Map For the Year 2000.

BGI-Sanya and KeyGene collaborate on spatial transcriptomics

EUROFRUIT

Nov. 22, 2022

BGI-Sanya, part of the Chinese BGI Group, one of the world's largest genome research organisations, and Dutch agro-food research company KeyGene have announced the start of their first research collaboration.

The first joint project is set to focus on identifying lead genes involved in the interaction between plants and pathogens in order to develop crop varieties that contain ***novel and durable resistances against pathogens.***



<https://www.fruitnet.com/eurofruit/bgi-sanya-and-keygene-collaborate-on-spatial-transcriptomics/247667.article>

Why Syngenta Acquired FarmShots: “It’s Definitely a Race”



March 16, 2018

Syngenta acquired remote sensing startup FarmShots in February 2018, in the first publicized acquisition of an agtech startup in 2018 for a major strategic player in agriculture.



FarmShots uses high-resolution satellite and drone imagery to deliver plant health analyses and offers insight into field conditions based on patterns of light absorption.

AgriEdge is deployed on **17 million acres in the US**. The grower loyalty is extremely high – better than 90% re-enrollment every year and it’s a significant part of the Syngenta sales in the US that go through this platform.

<https://agfundernews.com/syngenta-acquired-farmshots.html>



Syngenta is offering a \$250 rebate on 40 units of NK[®] soybeans or a \$1,000 rebate on 40 units of NK corn. Growers may also qualify for a one-year subscription to the **AgriEdge** whole-farm management program.

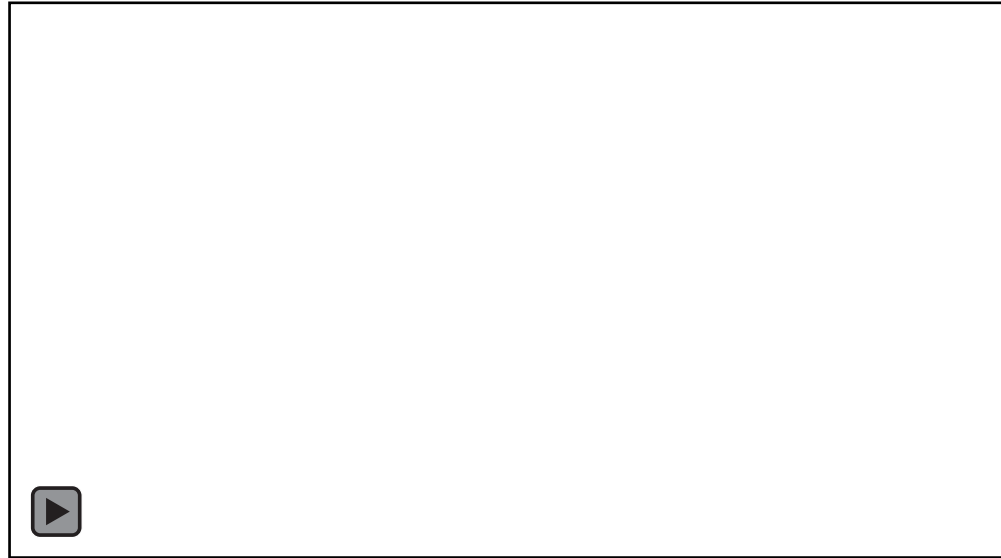
Syngenta Strategic Moves

Date	Type	Partner	Focus Area
Feb 2025	Acquisition	Novartis Genetic Library	Biologics (natural compounds & strains)
2025 (pending)	Acquisition	Intrinsyx Bio	Nitrogen-fixing endophytes
Mar 2025	Partnership	Planet Labs	Satellite imagery for digital ag
Oct 2024	Collaboration	Taranis	AI-powered remote scouting
Feb 2025	Strategic Alliance	Ginkgo Bioworks	Biological trait acceleration
Feb 2025	Strategic Alliance	Provivi	Pheromone-based pest control
Feb 2025	Strategic Alliance	Lavie Bio	Bio-insecticide discovery
Feb 2025	Strategic Alliance	Lithos Crop Protect	Sprayable pheromone control
Feb 2025	Strategic Alliance	TraitSeq	AI/ML for biological product development
Jul 2024	Partnership	Intrinsyx Bio	Nutrient uptake enhancement

Chinese drone maker XAG nets \$182m funding from Baidu, SoftBank



Nov. 16, 2020



www.youtube.com/watch?v=Q5eZpKdv2CM

XAG says its products and ancillary services are available in 42 countries worldwide, and claims they operate across more than 100 million acres of farmland. Its customer base includes almost 5 million smallholder farmers.

The startup has partnered with the likes of German agro-chemicals major Bayer, Chinese telecoms giant **Huawei**, and European aircraft manufacturer Airbus.

<https://agfundernews.com/chinese-drone-maker-xag-nets-182m-funding-from-baidu-softbank.html>

Take Your Farming to New Heights



with DJI T50 Sprayer Drones!



Auburn Ag Products is happy to announce that we are now an official dealer for DJI Agricultural & Enterprise Drones! The cutting-edge DJI Agras T50 is revolutionizing crop spraying with:

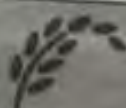
- ✓ **Precision Spraying** – Cover more acres faster with pinpoint accuracy.
- ✓ **Efficiency** – Save time, labor, and chemicals with advanced technology.
- ✓ **Durability** – Built tough for the most demanding farming conditions.



Boost your yield and reduce costs with the power of smart farming. The future of agriculture is here—don't get left behind!



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Auburn Ag Products – Supporting Farmers, Growing Success.

China to adopt genetically modified maize and soy: why it matters for South Africa

THE CONVERSATION

Academic rigor. Journalistic flair.

Jun. 16, 2022

Something important for global agriculture happened this past week but received minimal media coverage.

The Chinese National Crop Variety Approval Committee released two standards that clear the path for cultivating genetically modified (GM) crops in the country.

The change in regulations would potentially lead to an improvement in yields.

This is aligned with China's ambition of becoming self-sufficient in **essential grains and oilseeds** in the coming years.



China lifts restrictions on Russian wheat imports



CNN BUSINESS Feb. 25, 2022

China has relaxed restrictions on imports of Russian wheat, a move that could address food security concerns in the world's second largest economy and ease the impact of Western sanctions on Russia.

Russia is the world's top producer of wheat. Previously, China had restricted wheat imports from Russia due to concerns about the presence of dwarf bunt fungus — a disease that can cause severe loss of yield for wheat and other crops.

www.cnn.com/2022/02/25/business/wheat-russia-china-intl-hnk/index.html

May 8, 2024

The Sino-Russian Land Grain Corridor and China's Quest for Food Security



Hong Wu via Getty Images

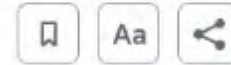
In October 2023, Russia and China signed a massive grain supply contract worth 2.5 trillion rubles (\$25.8 billion) amid ongoing disruptions to Russian and Ukrainian agricultural exports. Under the agreement, Russia's EPT grain export company is expected to supply 70 million tons of Russian grain, legumes, and oilseeds to China Chengtong over the next twelve years.

<https://asiasociety.org/policy-institute/sino-russian-land-grain-corridor-and-chinas-quest-foodsecurity#:~:text=The%20development%20of%20the%20NLGC,proposed%20by%20Beijing%20in%202012.>

China's Xi willing to work with Angola as it moves on from oil

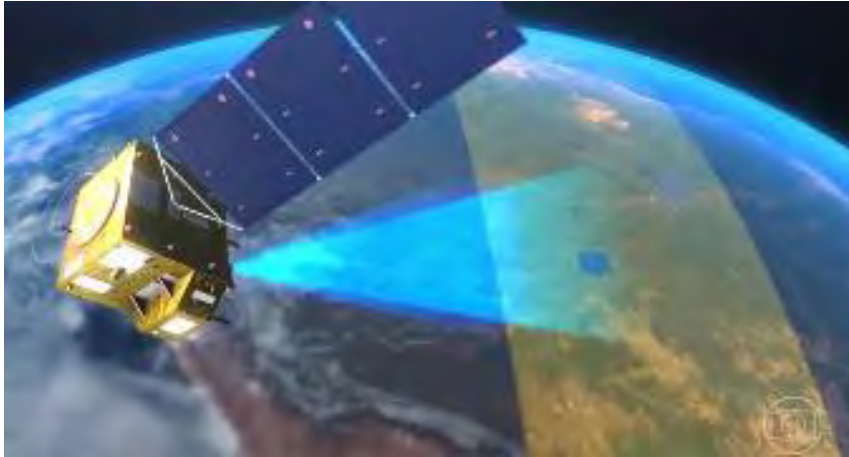
By Joe Cash

March 15, 2024 8:16 AM EDT · Updated 2 months ago



Xi told Lourenço on Friday Chinese firms could "help Angola achieve agricultural modernisation, industrialisation and economic diversification," the state media report said, part of Beijing's long-term drive to deepen economic and political ties with Africa.

April 14, 2023



Lula and Xi sign 15 agreements on trade, agriculture, new satellite



Lula meets with Xi Jinping in Beijing on Friday. Photo: Ricardo Stuckert/Planalto Palace

CBERS-6 is expected to be launched from China in 2028. Images from these satellites are used to provide information on deforestation, agriculture, droughts, land use, and water reservoirs, among others.

<https://brazilian.report/liveblog/2023/04/14/china-lula-agreements/>

Argentina poised for first China corn cargoes in 15 years

Buenos Aires Times

Feb. 7, 2024



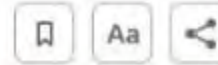
Argentina completed steps a few weeks ago to get approval from Beijing to open the Chinese market for its corn, after striking an agreement on sanitary requirements last year.

Syngenta AG has chartered the MSXT Echo tanker to send 66,000 metric tons of soybeans to China, one of several routine Argentine soy shipments to Asia.

US corn, soy exporters continue battling huge Brazilian supplies

By Karen Braun

October 6, 2023 4:13 AM EDT - Updated 7 months ago



Commentary | By Karen Braun



Soya bean crops are loaded onto a truck after it had being collected in Lucas do Rio Verde's fields, in the central Brazilian state of Mato Grosso, March 18, 2004. [Brazil, the world's second largest producer of soya beans, will have its yields reduced in the 2003/2004 crop due to problems with adverse climate conditions and... [Purchase Licensing Rights](#)  Read more

Mar. 29,
2022

China makes genetic data a national resource

Bethany Allen-Ebrahimian, author of [Sovereign China](#)

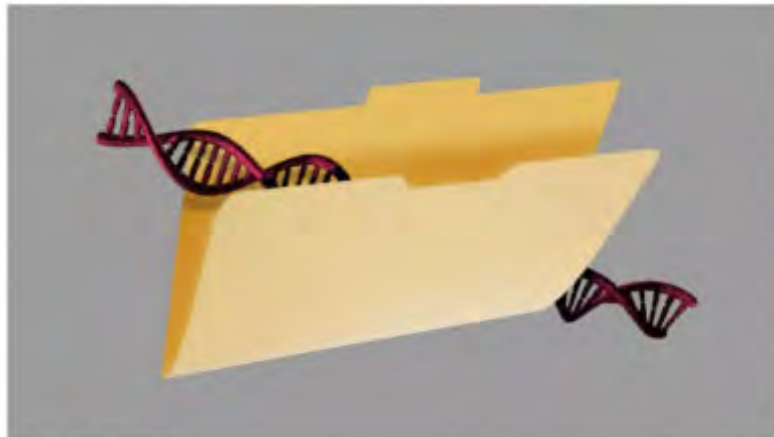
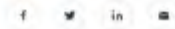


Illustration: Sarah Orliko/Keos

The Chinese government has identified genetic data as a national strategic resource and is strengthening state control over the country's gene banks and other repositories of genetic information.

www.axios.com/china-makes-genetics-data-national-resource-87c6c56c-753b-4329-b91f-496d2853cbac.html

China unveils five-year plan for bioeconomy

By Ouyang Shijia | chinadaily.com.cn | Updated: 2022-05-10 13:12



An aerial photo shows the Kekeya green project in Aksu, Northwest China's Xinjiang Uyghur autonomous region. [Photo: cr]

The new plan is in line with the requirements of the **14th Five-Year Plan**, which pledged to promote the integration and innovation of biotechnology and information technology, as well as accelerate the development of **biomedicine, biological breeding, biomaterials, bioenergy and other industries to enhance bioeconomy in scope and strength.**

China seeks to boost food output with five-year smart farming plan



Oct. 25, 2024



The 2024-2028 smart agriculture action plan will aim to establish a digital planting technology scheme as well as a national agricultural and rural big data platform by 2028, the agriculture ministry said in a statement.

The urgency to adopt **big data, GPS navigation systems and artificial intelligence** in farming comes as the world's largest grains producer stepped up investments in farm machinery and seed technology in its quest for food security.

www.reuters.com/markets/asia/china-seeks-boost-food-output-with-five-year-smart-farming-plan-2024-10-25/

China Standards 2035 Strategy: Recent Developments and Implications for Foreign Companies



Jul. 26, 2022



China views standardization as a way to strengthen its research and development (R&D) ecosystem by elevating whole-sector capacities, particularly in critical and emerging industries like **AI, quantum computing, and biotechnology**.

The Action Plan, in articles 17 to 21, also stresses greater involvement for China in international standard-setting bodies.

China also views technical standards through the lens of green and sustainable development. The Action Plan mentions carbon-neutral standards, which are instrumental in saving energy, regulating large-scale energy consumption, and maintaining energy efficiency.



International
Organization for
Standardization

- Long-term objective: Introducing a new global standard for data-driven agrifood systems.
- Immediate objective: Developing the reference architecture needed to ensure the proposed new standard becomes reality.

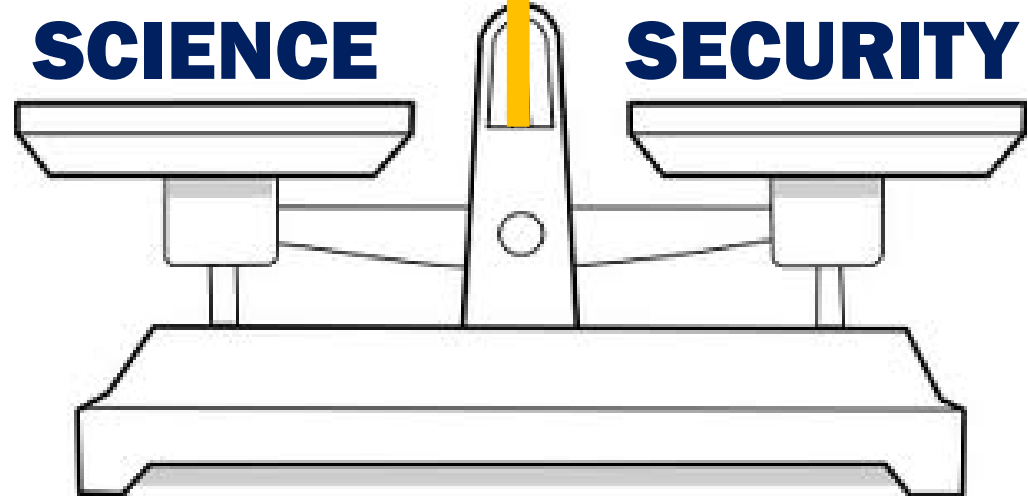


Secretariat: DIN (Germany)

Committee Manager: Mrs Dr Sophie Oberländer-Hayn

Chairperson (until end 2029): Mr Rafael Andres Ferreyra, Industry Data Standards & Collaborations Lead at **Syngenta**

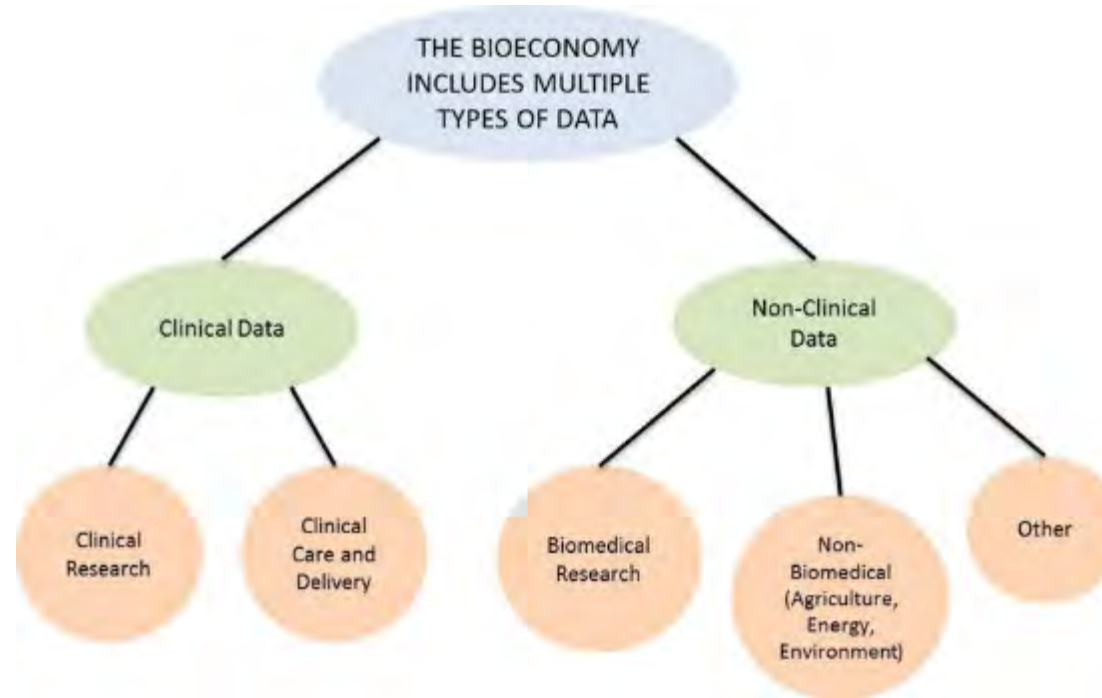
**NATIONAL
SECURITY**



FBI Safeguarding the Bioeconomy Awareness Raising



2014



2016

Future Challenges

- Scoping the bioeconomy
- Broad, holistic assessment of the biological threat/vulnerability
- Development of countermeasures and policies to further grow and safeguard the bioeconomy

National Academies of Science Safeguarding the Bioeconomy



Jan. 14, 2020


- Division on Earth and Life Studies
Health and Medicine Division
- Division on Engineering and Physical Sciences
- Board on Life Sciences
- Board on Agriculture and Natural Resources
- Board on Science, Technology, and Economic Policy
- Board on Health Sciences Policy
- Forum on Cyber Resilience
- Committee on Safeguarding the Bioeconomy

While the United States has been a leader in advancements in the biological sciences, other countries are also actively investing in and expanding their capabilities in this area.

Maintaining competitiveness in the bioeconomy is key to maintaining the economic health and security of the United States and other nations.

www.nap.edu/catalog/25525/safeguarding-the-bioeconomy

Personalis Wins New Contract to Sequence >34,000 Whole Human Genomes for the VA's Million Veteran Program

 Personalis November 30, 2017



Menlo Park, CA – Personalis, Inc., a provider of advanced genomic sequencing and analytics for immuno-oncology, today announced a new contract with the US Department of Veterans Affairs (VA) to sequence over **34,000 whole human genomes** for the VA's Million Veteran Program (MVP).

The US Blocked China's Purchase of a Fertility Clinic Over Concerns About Medical Data Security



Oct. 16, 2020



Nation's fertility clinics struggle with a growing number of abandoned embryos

www.nbcnews.com/health/features/nation-s-fertility-clinics-struggle-growing-number-abandoned-embryos-n1040806

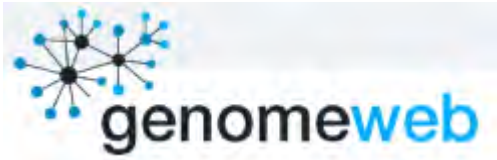
The San Diego area is home to some of the most sensitive military facilities in the country, such as Marine Corps Air Station Miramar and Naval Base San Diego, the home port of the US Pacific Fleet.

"Your genetic material, your biological material, is one of the most intimate pieces of information about you, who you are, what your vulnerabilities may be, what your diseases have been in the past, what your family history is."

- John Demers, Dept. of Justice National Security Division

www.cnn.com/2020/10/16/trump-administration-blocked-chinese-purchase-of-us-fertility-clinic.html

US Department of Defense Adds BGI Genomics to Blacklist of 'Chinese Military Companies'



October 7, 2022

"The Department is determined to highlight and counter the PRC Military-Civil Fusion strategy, which supports the modernization goals of the People's Liberation Army (PLA) by ensuring its access to advanced technologies and expertise are acquired and developed by PRC companies, universities, and research programs that appear to be civilian entities."



BIOSECURE Act Becomes Law, Limiting Grants With “Biotechnology Companies of Concern”

December 31, 2025

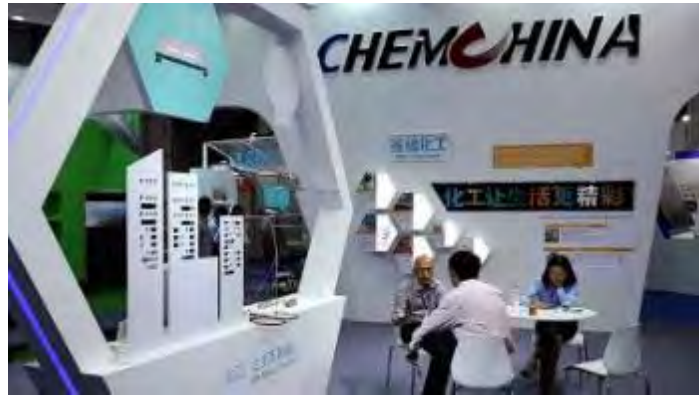
The law, enacted on December 18, 2025, restricts US federal procurement and grants involving biotechnology products or services provided by “biotechnology companies of concern.”

The Act does not name specific companies as “Biotechnology Companies of Concern” (BCCs) but treats any company on the Department of Defense (Department of War) 1260H list of “Chinese military companies” as a BCC — including BGI, FGI, and MGI.

Arkansas becomes first state to force out Chinese company: Gov. Sarah Huckabee Sanders orders seed company to sell off 160 acres amid security concerns

Daily **Mail**
.com

October 18, 2023



- *Syngenta* must sell 160 acres of farmland owned in Craighead County
- The company faces a \$280,000 fine for failing to disclose foreign ownership promptly
- The order comes as part of state law which forbids certain countries from holding land

BEYOND TIKTOK — THE NATIONAL SECURITY RISKS OF CHINESE AGRICULTURAL DRONES

CLARIS DIAZ AND EMILIAN KAVALSKI

NOVEMBER 25, 2024

COMMENTARY



Understanding the Impact of China's Low Altitude Economy Strategy



Case Study: Agriculture

- Identify vulnerabilities and patterns
 - Servicing 500 million hectares
 - Thermal imagery and LiDAR
 - Mapping and monitoring
- Agricultural IP theft
 - GMO crops
 - Potential for remote access or analysis adjustments



APPLIED RESEARCH LABORATORY FOR
**INTELLIGENCE
AND SECURITY**



DJI Agras T50 Sprayer Drone



- Institute a **comprehensive, enterprise-wide security posture**
- Identify, prioritize, and commit to protecting your **"Crown Jewels"**
- Implement robust **insider threat awareness programs**
- Know **who you are doing business with**
- Stay **connected** on threat information and security best practices

THANK YOU



Edward H. You

Founder & Principal
Former Supervisory Special Agent, FBI