Synthetic Biology

Leading makes protecting easier

Are we leading?

24 January 2024

NATIONAL ACADEMIES Sciences Engineering Medicine

Drew Endy, Ph.D.
Martin Family University Fellow of Undergraduate Education
Faculty Co-Director of Degree Programs, Hasso Plattner Institute of Design
Core Faculty, Center for International Security & Cooperation, & Senior Fellow (by courtesy)
Freeman Spogli Institute
Science & Senior Fellow (by courtesy), Hoover Institution
Stanford University

synthesis

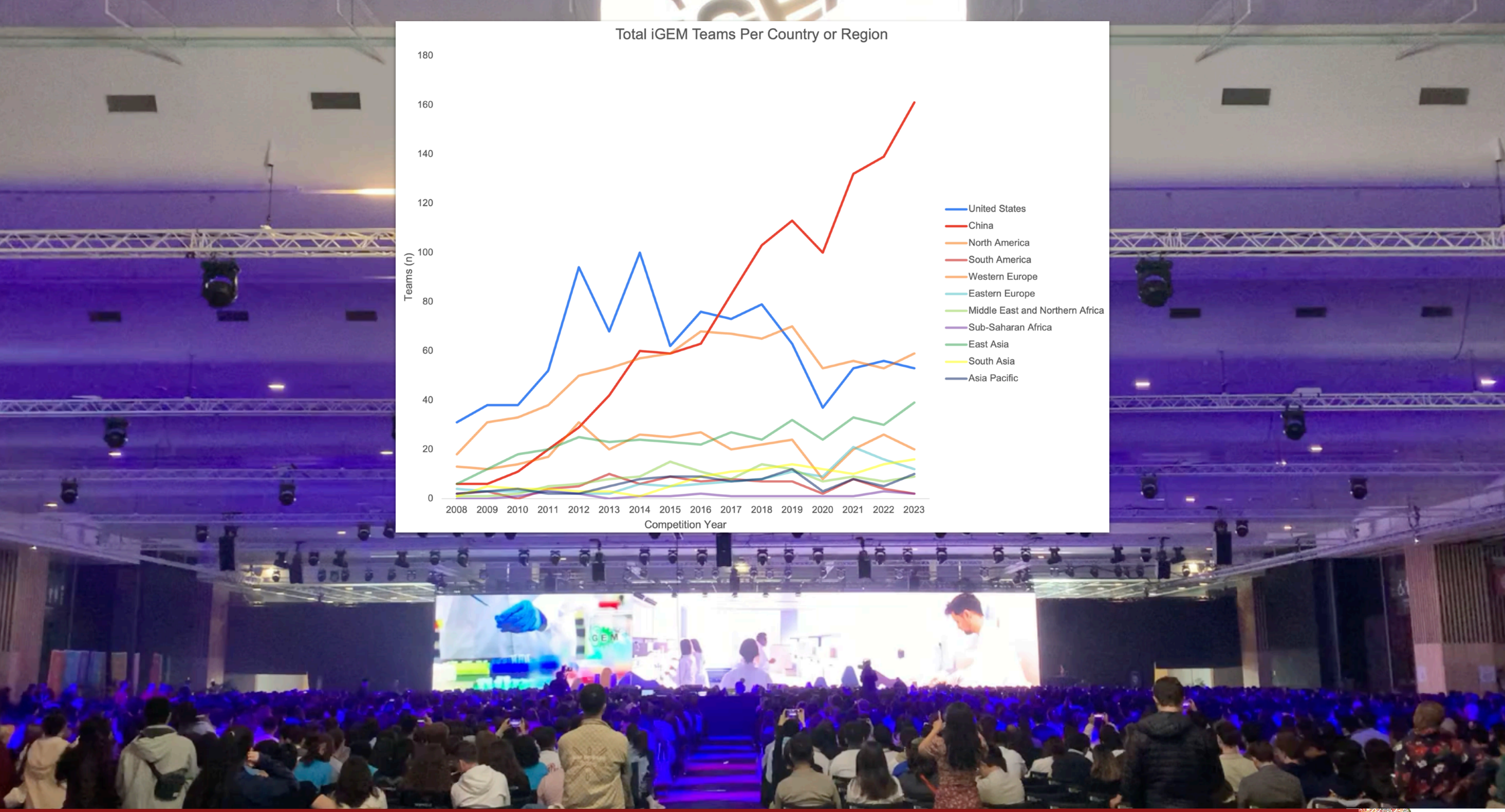
súnthesis

σύνθεσις

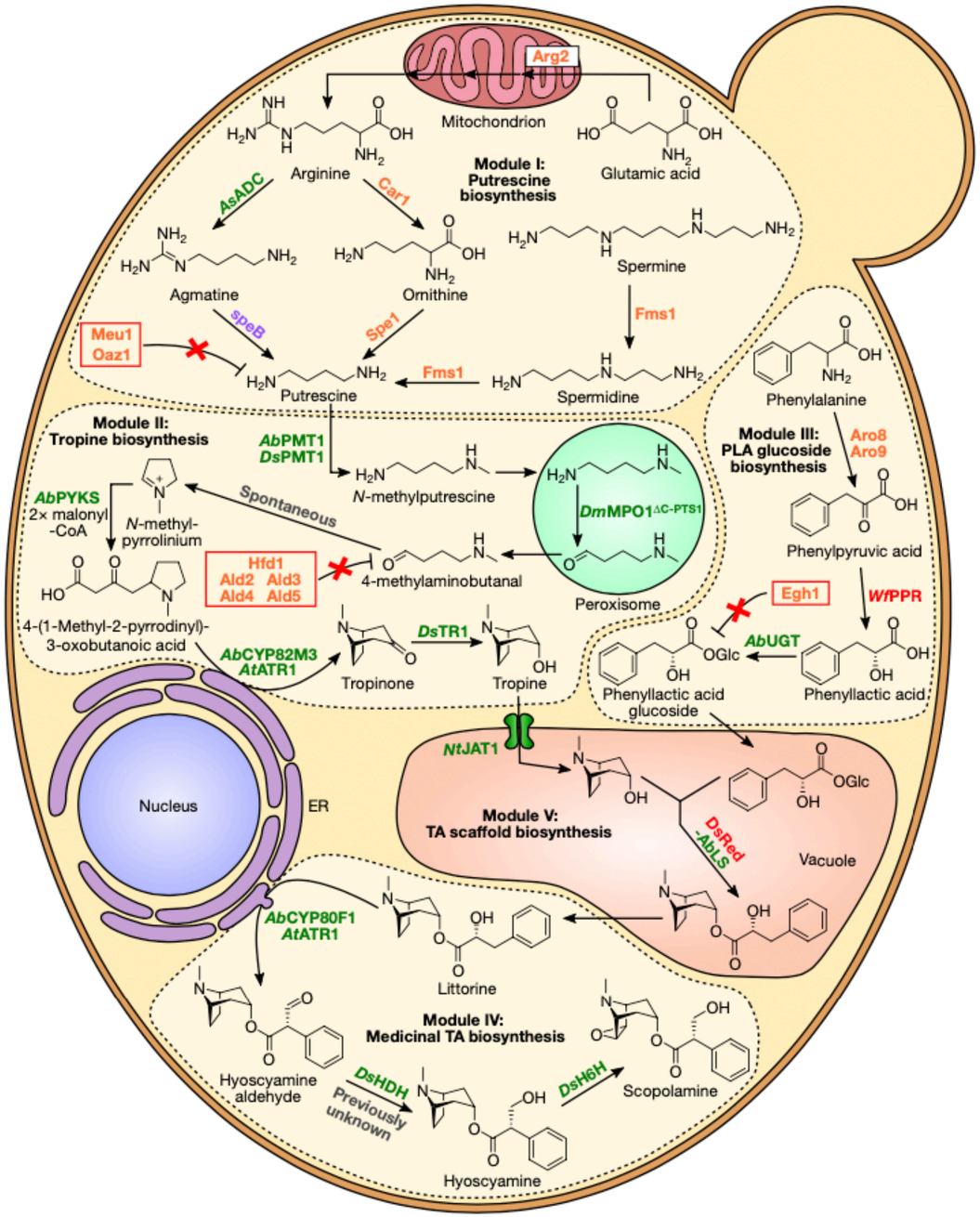
a putting

together,

composition


Total iGEM Teams Per Country or Region
Teams (n)
180
160
140
120
100
80
60
40
20
0
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Competition Year
United States
China
North America
South America
Western Europe
Eastern Europe
Middle East and Northern Africa
Sub-Saharan Africa
East Asia
South Asia
Asia Pacific


14F
合成基因组学研究中心
Center For Synthetic Genomics
13F
定量合成生物学研究中心
Center For Quantitative Synthetic Biology
合成生物学院
Faculty Of Synthetic Biology
12F
细胞与基因线路设计中心
Center For Cell And Gene Circuit Design
11F
合成基因组学研究中心
Center For Synthetic Genomics
定量合成生物学研究中心
Center For Quantitative Synthetic Biology
10F
合成生物化学研究中心
Center For Synthetic Biochemistry
9F
合成生物化学研究中心
Center For Synthetic Biochemistry
8F
合成生物学院
Faculty Of Synthetic Biology
行政支撑办公区
Administrative Office Area
7F
合成测试平台: 噬菌体人工合成平台自动化系统
Build Platform：Synthetic Phage Foundry
6F
合成测试平台: 细菌基因组合成平台自动化系统
Build Platform：Synthetic Bacteria Foundry
5F
合成测试平台: 大片段DNA合成系统
Build Platform：Synthetic DNA Foundry
4F
合成测试平台: 酵母基因组合成与改造自动化系统
Build Platform：Synthetic Yeast Foundry
设计学习平台: 生物设计系统
Design & Learn Platform：Biodesign Automation Core
设计学习平台: 云实验室系统
Design & Learn Platform：Cloud Laboratory Core
3F
用户检测平台: 高级光学检测系统
Test Platform：Microscopy Facility
2F
用户检测平台: 蛋白质和代谢产物分析系统
Test Platform：Proteomics & Metabolomics Facility
1F
用户检测平台: 底盘细胞放大培养系统
Test Platform：Process Scale-up Facility
自动化立库
Automated Warehouse
B1
地下停车场



Forbes 2023 Sustainability Summit AKIRA RUIZ FOR FORBES

Christina Smolke is brewing the **key ingredients** that go into medicines by the vatful. These vats hold 120,000 liters (roughly 31,700 gallons). During five days of fermentation, "the yeast are producing enough drug ingredients to produce over 100 million doses of medication," Smolke, cofounder and CEO of synthetic biology startup **Antheia**, said today at the ***Forbes* Sustainability Summit**. It would take around 10 square miles of growing medicinal plants to reap the same amount, she said – not to mention significantly shrinking the amount of time from years to days. Antheia's first products are thebaine and oripavine, both of them key components in pain management and addiction management medications such as codeine, hydrocodone and naloxone.

OCTOBER 30, 2023

Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence

BRIEFING ROOM ▸ PRESIDENTIAL ACTIONS

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

Section 1. Purpose. Artificial intelligence (AI) holds extraordinary potential for both promise and peril. Responsible AI use has the potential to help solve urgent challenges while making our world more prosperous, productive, innovative, and secure. At the same time, irresponsible use could exacerbate societal harms such as fraud, discrimination, bias, and disinformation; displace and disempower workers; stifle competition; and pose risks to national security. Harnessing AI for good and realizing its myriad benefits requires mitigating its substantial risks. This endeavor demands a society-wide effort that includes government, the private sector, academia, and civil society.

(iii) Within 180 days of the establishment of the framework pursuant to subsection 4.4(b)(i) of this section, all agencies that fund life-sciences research shall, as appropriate and consistent with applicable law, establish that, as a requirement of funding, synthetic nucleic acid procurement is conducted through providers or manufacturers that adhere to the framework, such as through an attestation from the provider or manufacturer. The Assistant to the President for National Security Affairs and the Director of OSTP shall coordinate the process of reviewing such funding requirements to facilitate consistency in implementation of the framework across funding agencies.

4.2. Ensuring Safe and Reliable AI. (a) Within 90 days of the date of this order, to ensure and verify the continuous availability of safe, reliable, and effective AI in accordance with the Defense Production Act, as amended, 50 U.S.C. 4501 *et seq.*, including for the national defense and the protection of critical infrastructure, the Secretary of Commerce shall require:

(i) Companies developing or demonstrating an intent to develop potential dual-use foundation models to provide the Federal Government, on an ongoing basis, with information, reports, or records regarding the following:

(i) any model that was trained using a quantity of computing power greater than 10^{26} integer or floating-point operations, or using primarily biological sequence data and using a quantity of computing power greater than 10^{23} integer or floating-point operations; and