

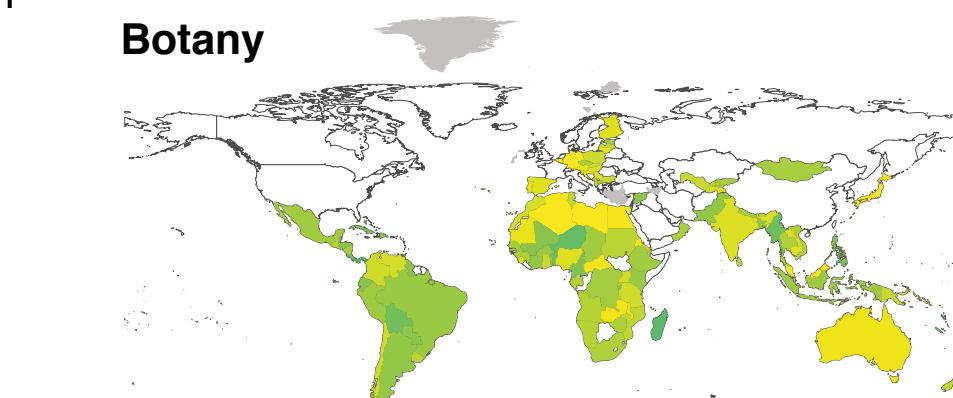
**Data** was sourced from the **Web of Science**. We used all papers published between **1973** and **2017**. Each was associated with a **country**, and one of **144 disciplines**.

A country's indexed publications are constitute their **scientific exports**, and can be studied like economic exports.

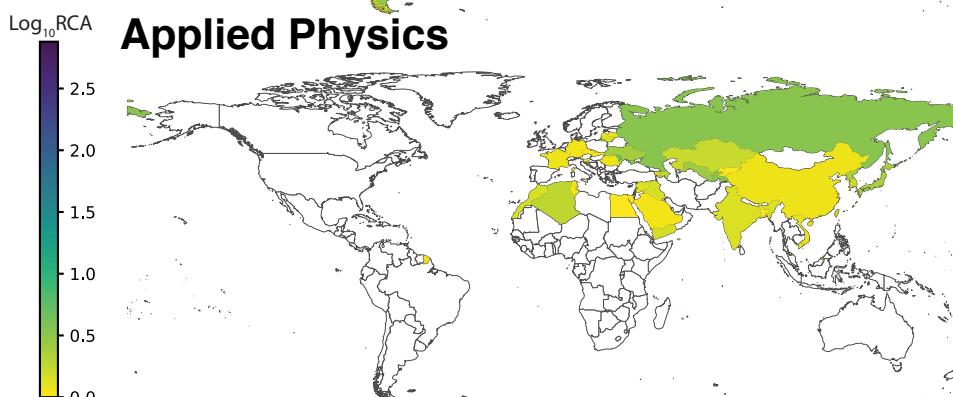
**Revealed Comparative Advantage (RCA)** quantifies the strength of a country's disciplinary production against the world average<sup>1</sup>

An advantage is when  $RCA > 1$

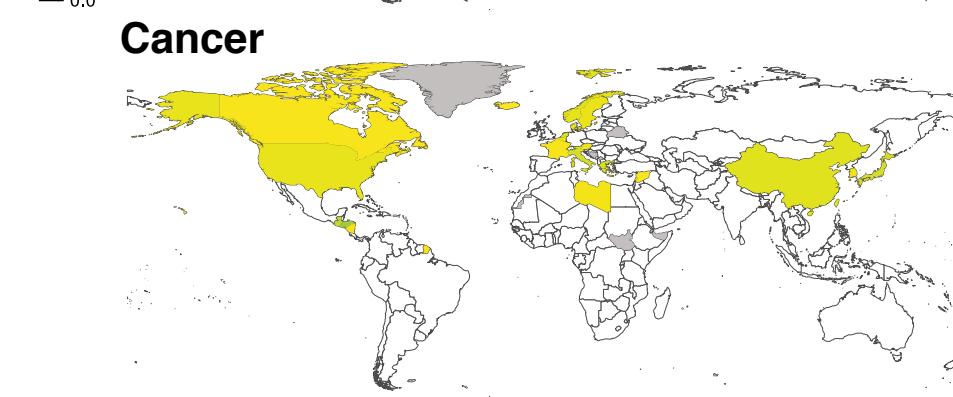
**Botany**, a **resource**-driven discipline, is disproportionately produced in the Global South



**Applied Physics**, an **applied** science discipline, is the specialty of post-soviet nations and rapidly-industrializing economies



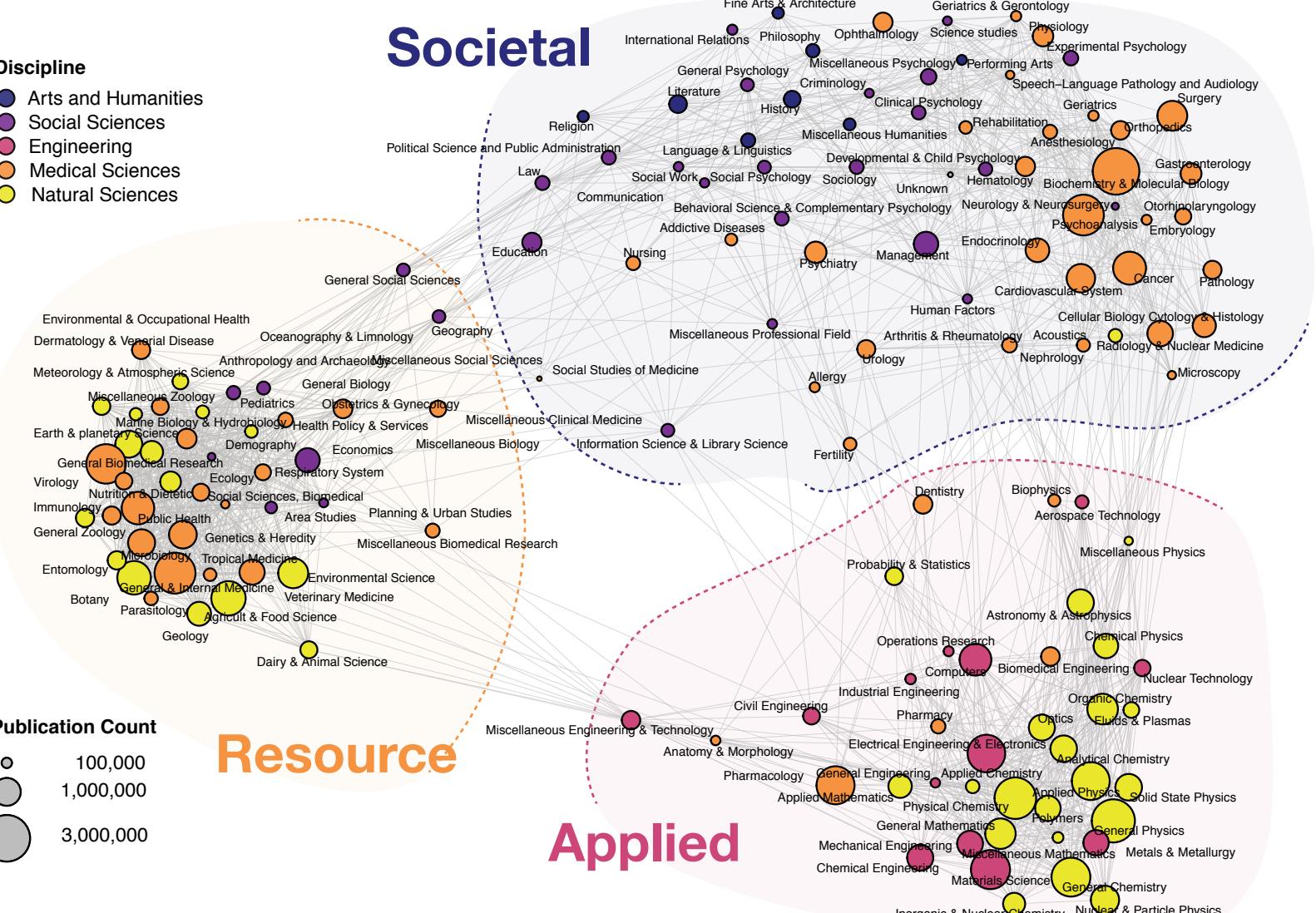
**Cancer**, an expensive biomedical discipline with long-term **societal** benefits, is largely the topic of wealthy Western and East Asian nations



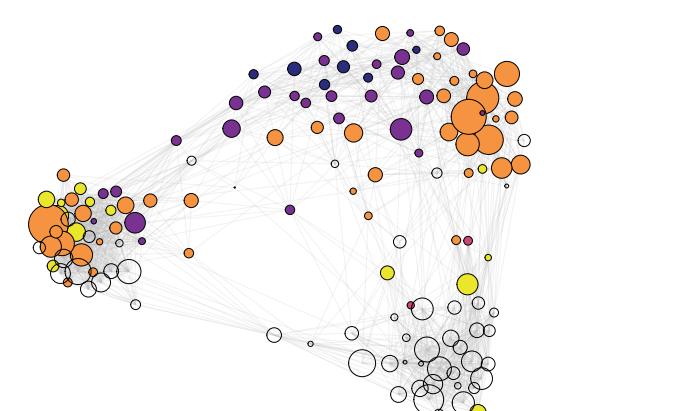
The **proximity** between disciplines  $i$  and  $j$  is how often they are both advantaged ( $RCA_i > 1$ ) in the same country<sup>2</sup>

$$\text{prox}_{ij} = \min\{P(\text{RCA}_i > 1 | \text{RCA}_j > 1), P(\text{RCA}_j > 1 | \text{RCA}_i > 1)\}$$

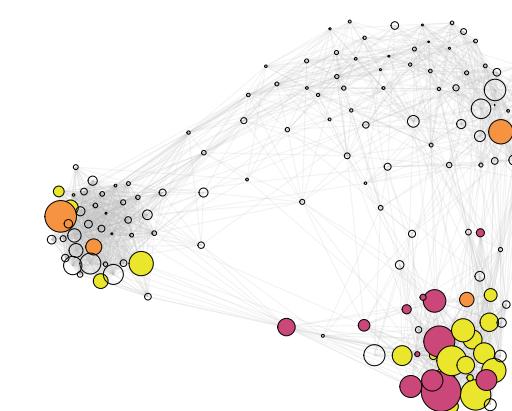
And we construct a network from pairwise proximities, and identify **three clusters** of disciplines that underpin national science



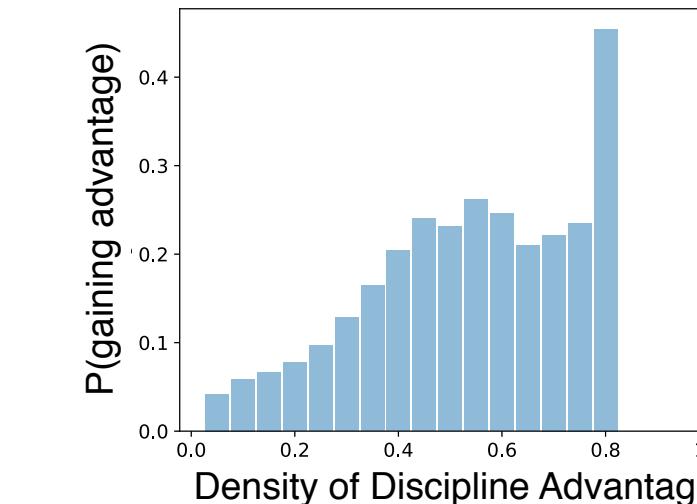
The **U.S.** has broad strength in **Societal** fields, like Sociology or Cancer, and **Resource** fields, like ecology



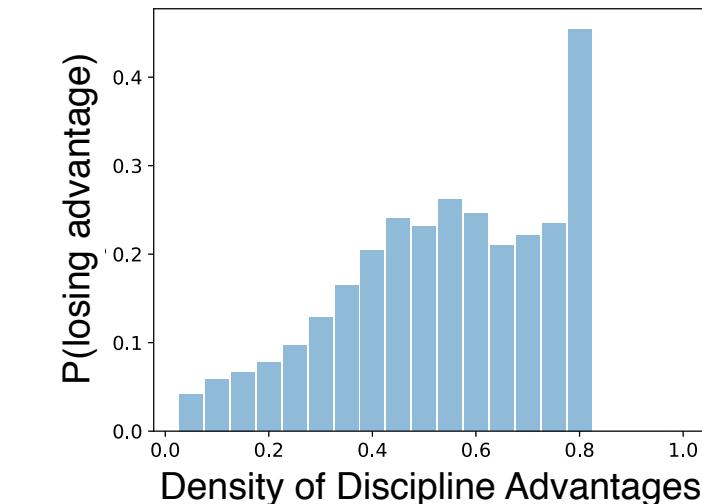
**China** has more focused strength in **Applied** fields, like engineering and Physics physics



**The structure of disciplinary proximity drives the direction of country's scientific development**

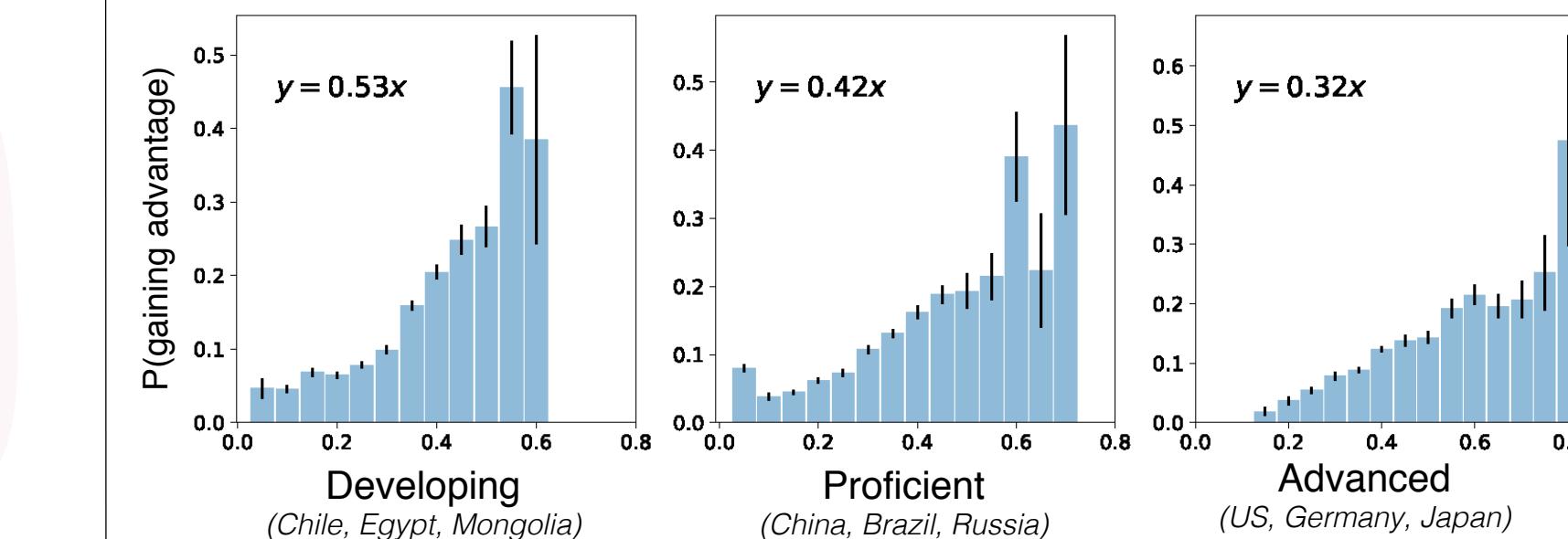


A country is more likely to develop an advantage ( $RCA > 1$ ) when proximate disciplines are already advantaged



Similarly, a country is likely to lose a advantage when there are fewer proximate advantages

**But disciplinary proximity impacts countries differently based on their Science and Technology Index<sup>1</sup>**



For Advanced countries (defined by Science and Technology Index<sup>3</sup>), future development is less dependent on disciplinary proximity—they are already diversified.

Developing countries are more dependent on their current competencies—the **specialty trap**

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[2] Hidalgo, C. A., Klinger, B., Barabási, A.-L., & Hausmann, R. (2007). *Science*, 317(5837), 482–487.

[3] Wagner, C., Brahmakulam, I. T., Jackson, B. A., Wong, A., & Yoda, T. (2001). (MR-1357.0-WB). RAND Publications.