SPECIAL COMPETITIVE STUDIES PROJECT

National Academy of Sciences

National Science, Technology, and Security Roundtable

Dr. Diana Gehlhaus

July 17, 2024

deg@scsp.ai

Agenda

SPECIAL COMPETITIVE STUDIES PROJECT

- Motivation
- State of Play
- State of the Competition
- Challenges
- AI+ and the Future of Work
- Moving Toward a NDEA 2.0
- Staying Ahead

Motivation

SPECIAL COMPETITIVE STUDIES PROJECT

"When I think about how we're going to solve the problems ahead of us, **the answer is people**. We need to acknowledge how powerful people are, particularly those who are willing to take risks and drive societal change"

- **Eric Schmidt**, Former CEO of Google and Chair of National Security Commission on AI, on the innovation challenge

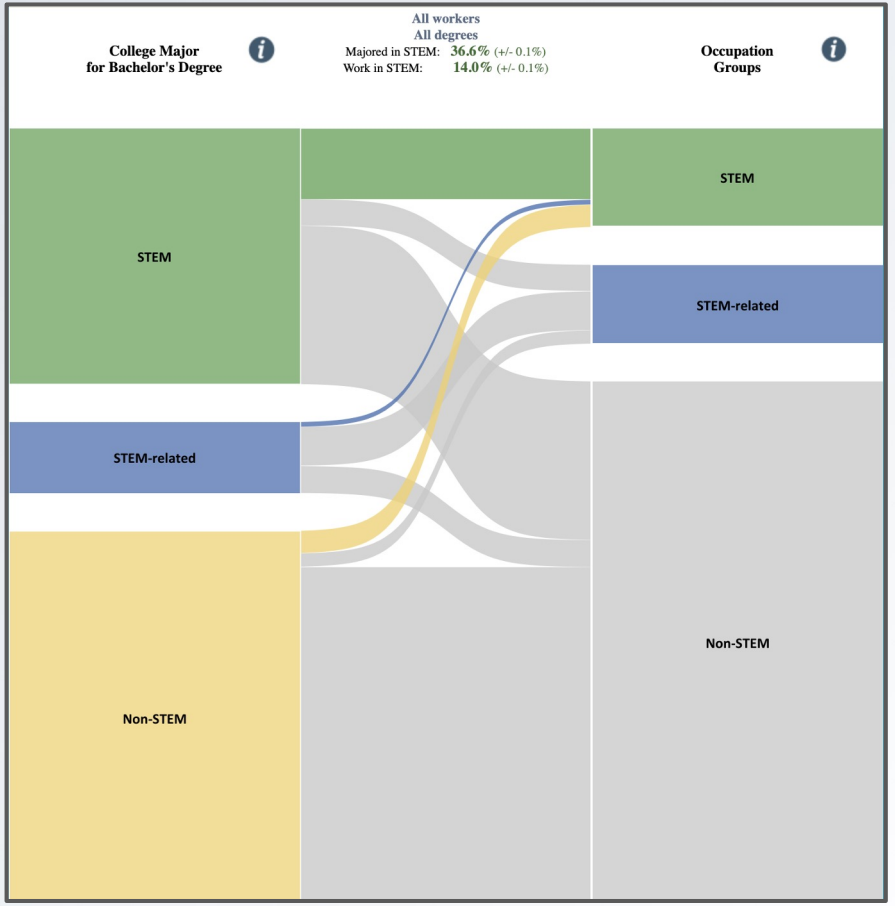
Source: In disruptive times, the power comes from people: An interview with Eric Schmidt, McKinsey Quarterly (2020)

Leaky STEM Talent Pipeline

Of the employed college graduates in 2019, 47% workers reported a bachelor's degree in a STEM area but only 25% worked in a STEM or STEM-related occupation.

This translates into **less than a third (28%) of STEM-educated workers actually working in a STEM job**.

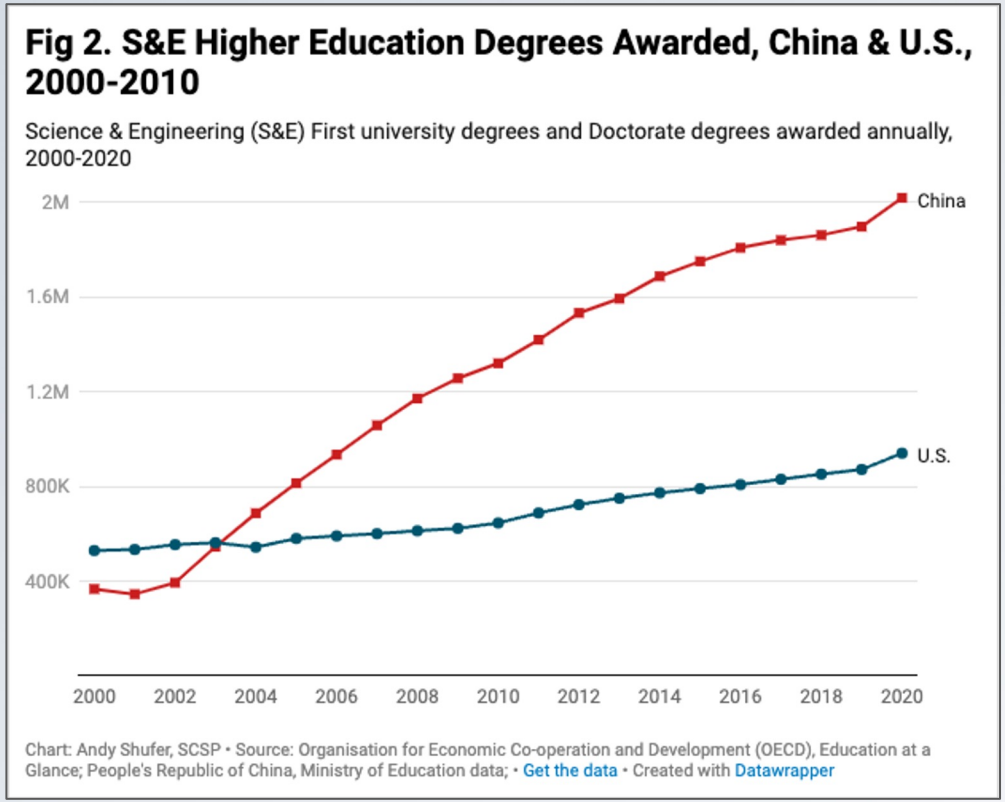
Fig 1. Occupational Pathways of STEM and non-STEM Graduates, 2019



Source: From College to Jobs: Pathways in STEM, U.S. Census Bureau (2021)

State of Play

While U.S. STEM degree awards are rising, China is outpacing us...

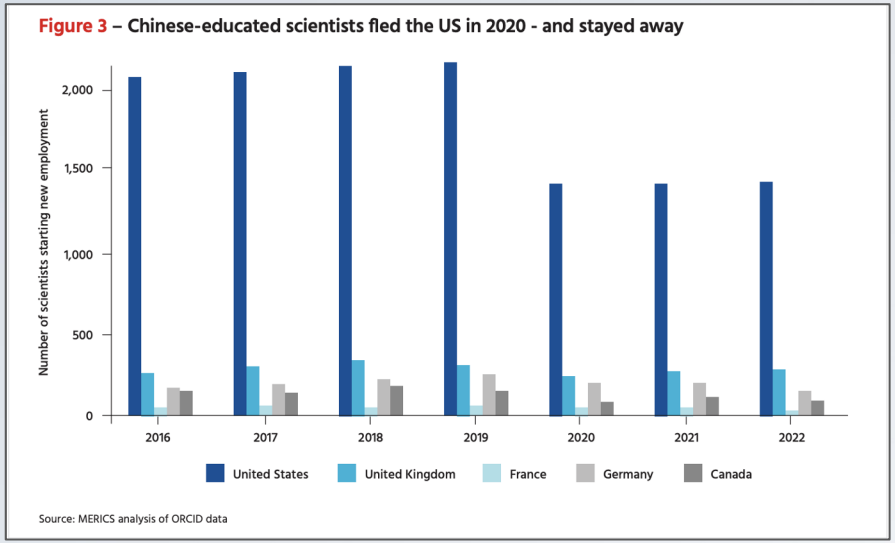


And our reliance is high - **foreign-born talent is the backbone of America's innovation power.**

"In 2022, over half of computer and mathematical scientists and engineers working in the United States were foreign-born." (NSF State of Science and Engineering, 2024)

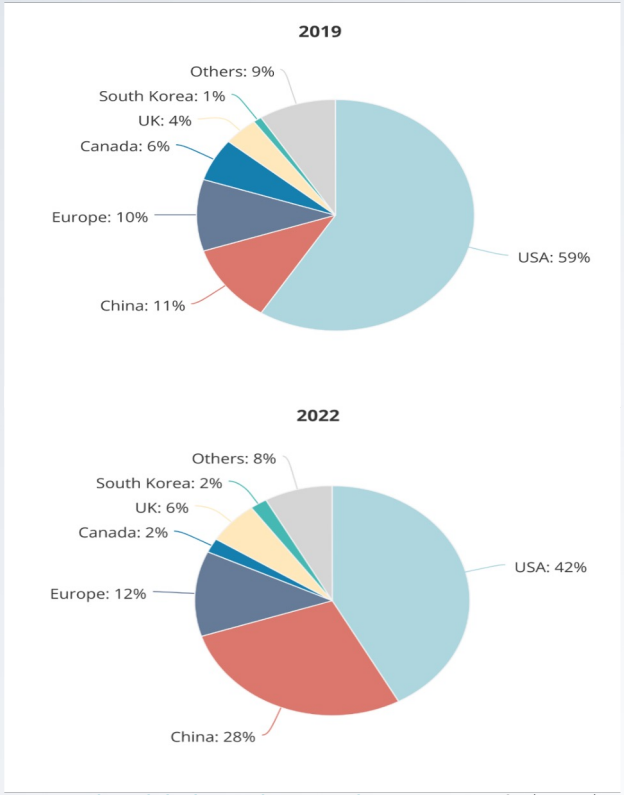
The Competition

China is aggressively recruiting and cultivating a world-class STEM and innovation workforce through its talent programs.



Source: Where China stands in the global race for talent, MERICS (2024)

Fig 4. Leading countries where top-tier AI researchers (top ~20%) work



Source: The Global AI Talent Tracker, Macro Polo (2024).

And recent data reveals China's rising share of top-tier AI research talent.

Persistent and Compounding Challenges

SPECIAL COMPETITIVE STUDIES PROJECT

Plugging the STEM talent pipeline leak

- Previous attempts at solutions have not met the mark
- Lack of consensus on STEM workforce shortages

A Non-Partisan Issue

- Both R's and D's tried to address, strategize, and spend to unblock barriers

Inherent design of U.S. education and training system

- Varying by state; an opportunity and a challenge

Issues compounding with AI+ and emerging technologies

- Longstanding problems become worse as our systems are under strain
- And at an accelerated pace

Balancing Security and Openness: Guardrails

SPECIAL COMPETITIVE STUDIES PROJECT

2020 Visa Restrictions Affected <2% of Applicants

- Possible to impose filters that protect U.S. IP without limiting talent inflows
- Challenge is balancing "too narrow with too broad"

Implement Risk-Based Filters

- Continue to deny visas to identified high-risk factors
- Regularly evaluate policy through an inter-agency process
- Stay up to date on trends in emerging and dual-use technologies

Implement Best Practices

- Reporting requirements, ethics and compliance training, cyber audits, audits of grant applications, disclosures, and affiliations

Source: SCSP, "Economy: Interim Panel Report" (November 2022).

AI+ and the Future of Work

SPECIAL COMPETITIVE STUDIES PROJECT

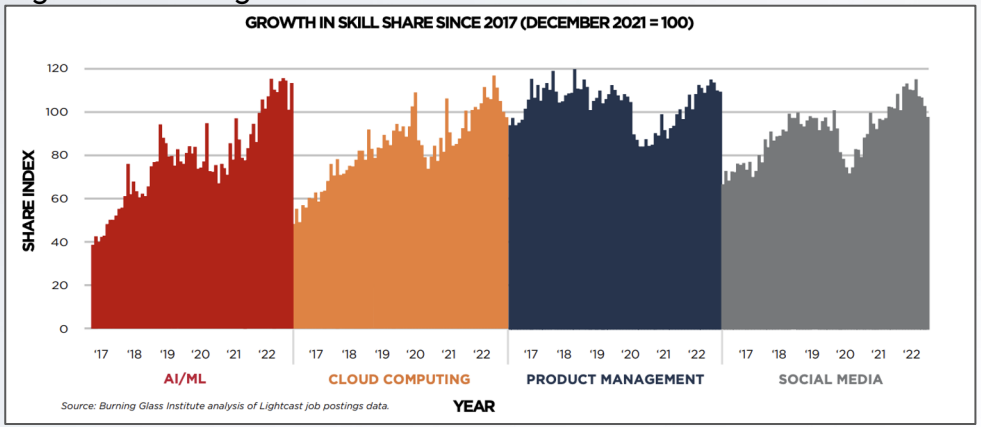
Fig 5. All employees, thousands, computing infrastructure providers, data processing, web hosting, and related services

Fig 6. All employees, thousands, software publishers

Competencies, Credentials, Careers in AI+

- Early indicators of change
- Evolving demand for skills
- Is AI the same as other GPTs?
- How will AI+ diffuse across industries?

Fig 7. The Evolving Nature of Technical Skills Demand



Source: How Skills Are Disrupting Work, The Burning Glass Institute (2022).

Source: Employment, Hours, and Earnings from the Current Employment Statistics survey (National), U.S. Bureau of Labor Statistics (Accessed May 2024).

AI+ and the Future of STEM

SPECIAL COMPETITIVE STUDIES PROJECT

Foundational skills — in communication, writing, collaboration, management, and teaming — are remarkably durable across a career, especially compared to STEM and emerging technology skills.

What makes talent durable in an AI+ future?

Fig 8. Soft Skills Top LinkedIn's List of Skills in Demand

Source: LinkedIn Talent Blog, The 2024 Most In Demand Skills.

Moving from NDEA 1.0 to NDEA 2.0

SPECIAL COMPETITIVE STUDIES PROJECT

Sputnik was a major game changer for education policy

- Sparked the NDEA and STEM revolution as a construct and foundation
- Expansion on the Department of Education and federal student aid

More recently: CHIPS + Science Act

- Consider this another iteration of NDEA 1.0
- Most NSF programs too (STEM)

But that was then…is it time for an update?

- Future of Education (e.g., future of “STEM” in an AI+ world)
- Future of Work (e.g., defining “high-skill” and “job”)

Looking Forward: NDEA 2.0

SPECIAL COMPETITIVE STUDIES PROJECT

Teach AI

aiEDU The AI Education Project

Grow with Google

Increasingly **non-profits and industry** are paving the way

Latent potential of **community and technical colleges** (and partnerships)

Movement toward **skills-based hiring and stackable credentials**

Learning from the **experience of the cybersecurity workforce** (e.g., National Initiative for Cybersecurity Education (NICE) framework).

How can these successes be scaled for AI+?

Reimagining Policies and Institutions

SPECIAL COMPETITIVE STUDIES PROJECT

Economic Policies

- Unemployment Insurance and SSDI
- Workforce Innovation and Opportunity Act (WIOA)
- CHIPS, IRA, AI EO, Tech and Innovation Hubs/Institutes, etc.
- Tax policy and deficit spending

International Policies and Partnerships

- Importance of being a beacon for talent while protecting our IP

Government Institutions

- Navigating the 100+ STEM programs across federal agencies
- Vertical and horizontal coordination and accountability

Staying Ahead: SCSP's Vision for Competitiveness

SPECIAL COMPETITIVE STUDIES PROJECT

Make all K-16 classrooms AI-enabled by 2030

- Integrate AI as a tool and AI+ use cases into all subject areas
- Provide edtech standards and educator professional development

Advanced industry workforce

- Create workforce frameworks for emerging technologies
- Build a Talent Marketplace

High-skilled immigration reform

- Raise H1-B and O-1 visa caps
- Reform green card quotas

National Commission on AI and FoW

- Consensus-based reform

Spotlight: National Commission on AI and the FoW

SPECIAL COMPETITIVE STUDIES PROJECT

Description

The Commission is tasked with conducting a comprehensive review of challenges facing the U.S. education and labor ecosystems as AI and other emerging technologies transform skills demand and the nature of work, along with recommendations for the policies, investments, and needed system reform.

Objectives

1. Assess how AI will **redefine "STEM"**
2. Recommend the policies, investments, and institutional infrastructure that are needed for an **AI-ready U.S. workforce**
3. Recommend necessary **immigration reforms** for the U.S. to be competitive

SPECIAL COMPETITIVE STUDIES PROJECT

Questions?

Dr. Diana Gehlhaus

deg@scsp.ai