



### 2022 PTIE Conference Abstract

Title: Advancing Technology, Innovation and Partnerships Authors: Erwin Gianchandani\* Institution: U.S. National Science Foundation Address: 2415 Eisenhower Ave., Rm. E 12445, Alexandria, VA 22314 Corresponding Author contact information: egiancha@nsf.gov

### Abstract:

Since its establishment in 1950, the National Science Foundation (NSF) has funded discoveries and innovations that have transformed our lives, from the Internet to Google to MRI machines. In this session, I will provide an overview of NSF's first new directorate in more than three decades, the Directorate for Technology, Innovation and Partnerships (TIP), describing how this directorate is advancing critical technologies, accelerating the translation of these technologies from the lab to society, addressing pressing economic challenges, and engaging the Nation's broad and diverse population in this work. For example, a flagship investment led by TIP, the NSF Regional Innovation Engines, constitutes a bold new initiative to spark regional-scale innovation ecosystems throughout the country, and particularly in those parts that have not benefited from the technological booms of the last several decades. Of particular note, I will describe the essential role that success metrics transcending traditional measures of research productivity will play in realizing this vision of expanding the nation's research and innovation ecosystem, and ultimately ensuring the U.S. remains in the vanguard of competitiveness for decades to come.



# ADVANCING TECHNOLOGY, INNOVATION AND PARTNERSHIPS

Erwin Gianchandani NSF Assistant Director for Technology, Innovation and Partnerships

PTIE Conference July 26, 2022

# Today's agenda

- Inspiration, mission, and vision
- Functions, programs







# 75 years ago: The Endless Frontier





# Pressing socioeconomic challenges



Changing climate



Equitable access to education, health care



Critical and resilient infrastructure

# Critical and emerging technologies

- 🐱 Advanced manufacturing
- Advanced wireless
- Artificial intelligence
- Biotechnology

...

- Quantum information science
- Semiconductors and microelectronics



# Evolving research and innovation ecosystem



Pace of discovery accelerated by data, emerging technologies



Demand for societal impact



Opportunity to leverage partnerships

# Today

- Largely investigator-driven
- Primarily academic research teams
- Stream of discoveries improve prosperity, resilience, quality of life

Today	Tomorrow	
<ul> <li>Largely investigator-driven</li> </ul>	<ul> <li>Users / beneficiaries engaged in shaping, conducting research</li> </ul>	
Primarily academic research teams	<ul> <li>Multi-sector teams – academia, industry, government, civil society, communities of practice</li> </ul>	
<ul> <li>Stream of discoveries improve prosperity, resilience, quality of life</li> </ul>	<ul> <li>Important societal and/or economic problems drive research pursuits</li> </ul>	



Today	Tomorrow
Largely investigator-driven	<ul> <li>Users / beneficiaries engaged in shaping, conducting research</li> </ul>
Primarily academic research teams	<ul> <li>Multi-sector teams – academia, industry, government, civil society, communities of practice</li> </ul>
Stream of discoveries improve prosperity, resilience, quality of life	<ul> <li>Important societal and/or economic problems drive research pursuits</li> </ul>
"Technology / supply push"	"Market / demand pull"

# Today: Jump-Starting America



# Today's agenda

- Inspiration, mission, and vision
- Functions, programs



• Status







### THE SPECTRUM OF FUNDAMENTAL RESEARCH



CURIOSITY-DRIVEN, DISCOVERY-BASED EXPLORATIONS

# The Milky Way's Black Hole

### THE SPECTRUM OF FUNDAMENTAL RESEARCH





USE-INSPIRED, SOLUTIONS-FOCUSED INNOVATIONS





# A new "horizontal" to enhance use-inspired and translational research



### **DIRECTORATE FOR TECHNOLOGY, INNOVATION AND PARTNERSHIPS (TIP)**



# March 16, 2022: NSF establishes TIP

"TIP is a critical first step that will accelerate the development of new technologies and products that improve Americans' way of life, grow the economy and create new jobs, and strengthen and sustain U.S. competitiveness for decades to come."

### News Release 22-002

NSF establishes new Directorate for Technology, Innovation and Partnerships

### Meet TIP – Technology, Innovation and Partnerships

A new directorate at the U.S. National Science Foundation

# FY 2023 President's Budget Request



Investments in the Administration's priorities of responding to the pandemic, tackling climate change, spurring economic recovery, innovating for equity, and ensuring national security and economic resilience.

22

# FY 2023 President's Budget Request



23

Realigned investments

New investments

# Accelerate Partnerships Accelerate Partnerships

### PARTNERSHIPS

# Partnerships: A timely, illustrative example

## Intel to Invest at Least \$20 Billion in New Chip Factories in Ohio

Building up U.S. chip production has been a focus of lawmakers and companies alike amid a global shortage of the crucial components.



"To help develop and attract a pipeline of skilled talent from within the region, Intel plans to invest approximately \$100 million over the next decade in partnership with Ohio universities, community colleges and the U.S. National Science Foundation [ranging] from collaborative research projects to building semiconductor-specific curricula for associate and undergraduate degree programs."

# intel. Nat

"Significant investments such as this one will allow us to harness the best ideas from around the country to drive future semiconductor design and manufacturing as well as develop a diverse, next-generation semiconductor workforce, reaffirming U.S. competitiveness in this vital area. Today's announcement builds on our long history of collaboration with industry like Intel to accelerate fundamental research and rapidly bring solutions to market."

- Sethuraman Panchanathan U.S. National Science Foundation Director

### Realigned investments

	Innovation & Tech	nology Ecosystems	
Convergence Accelerator	Emerging Technologies	Regional Innovation	Experiential & Entrepreneurial Learning



### INNOVATION & TECHNOLOGY ECOSYSTEMS

# **Convergence Accelerator**



### Realigned investments

	Innovation & Tech	nology Ecosystems	
Convergence Accelerator	Emerging Technologies	Regional Innovation	Experiential & Entrepreneurial Learning



# NSF Regional Innovation Engines (NSF Engines)

- Cultivate new regional innovation ecosystems throughout the U.S.
- Address major scientific/technological goals while solving societal challenges
- Balance technical and geographic innovation



# NSF Engines: An intentionally different approach

- A different scale
- Iterative co-design/co-creation through intentional engagement of broad, diverse stakeholders ("users")

30

- Cohort-based training + evaluation of the overall approach
- Milestone requirements for continued funding
- Focused success expectations:
  - Regional development
  - Individual and geographic diversity, including mentoring
  - Scaling and sustainability
  - Active participation and engagement
  - IP ownership extends to all contributing parties
  - Changing culture
  - Practitioner/entrepreneur development
  - Integrative/additive

# NSF Engines: Expanding innovation throughout the US



# What is an NSF Engine?

A multi-sector coalition of regional partners working together to catalyze a regional innovation ecosystem in a topic area of regional relevance and national and societal significance.

Engines are led by CEOs and includes partners from industry, institutions of higher education, government, and non-profit and community organizations.





### **PROGRAM DEADLINES:**

- Concept Outlines for Type-1 and Type-2:
- Type-1 Letters of Intent:
- Type-1 Full Proposals:
- Type-1 Letters of Intent:
- Type-1 Full Proposals:

June 30, 2022

August 31, 2022 September 29, 2022

December 15, 2022 January 31, 2023

For more information and to signup for our mailing list, go to: <u>https://beta.nsf.gov/funding/initiatives/regional-innovation-engines</u>

### Realigned investments

	Innovation & Tech	nology Ecosystems	
Convergence Accelerator	Emerging Technologies	Regional Innovation	Experiential & Entrepreneurial Learning



Realigned i	nvestments			New investmen
		Technology	Translation	
	I-Corps	PFI	SBIR/STTR	Innovative Pathways
		Innovation & Techr	nology Ecosystems	
	Convergence Accelerator	Emerging Technologies	Regional Innovation	Experiential & Entrepreneurial Learning
		Partnerships as Accelerate P	s a Foundation Partnerships	
SP		Biological Sciences Mathematical & Physical Sciences	Geosciences (Including Polar Programs) Education & Human Resources Integrative Activities	

![](_page_36_Picture_1.jpeg)

![](_page_37_Picture_1.jpeg)

![](_page_37_Picture_2.jpeg)

![](_page_38_Picture_1.jpeg)

![](_page_39_Figure_1.jpeg)

![](_page_40_Figure_1.jpeg)

![](_page_41_Figure_1.jpeg)

	Technology	Translation	
I-Corps	PFI	SBIR/STTR	Innovative Pathways
	Innovation & Techr	nology Ecosystems	
Convergence Accelerator	Emerging Technologies	Regional Innovation	Experiential & Entrepreneurial Learning
	Partnerships as	s a Foundation	
	Accelerate	Partnerships	
	Biological Sciences Mathematical & Physical Sciences	Geostiences (including Polar Programs) Education & Human Resources Integrative Activities	

# "Designing in" DEIA

### **GOAL:**

To ensure the successful inclusion of minority-serving institutions, two-year institutions, and other academic institutions underrepresented in the NSF portfolio in the NSF Engines program.

### **OBJECTIVES:**

- 1. Emphasize the essential role that MSIs will play in realizing the mission of the NSF Engines
- 2. Gather insight from participating institutions about how they can benefit from and best contribute to the NSF Engines
- 3. Address the questions, concerns, and challenges about engaging in the NSF Engines, or TIP more generally

![](_page_43_Figure_7.jpeg)

![](_page_44_Figure_0.jpeg)

# Today's agenda

- Inspiration, mission, and vision
- Functions, programs

![](_page_45_Picture_3.jpeg)

• Status

![](_page_45_Picture_5.jpeg)

# **TIP** status

- Launched in March 2022
- Re-positioned existing programs, planning new investments

![](_page_46_Picture_3.jpeg)

• Initiating recruiting

![](_page_46_Picture_5.jpeg)

Today	Tomorrow
Largely investigator-driven	<ul> <li>Users / beneficiaries engaged in shaping, conducting research</li> </ul>
Primarily academic research teams	<ul> <li>Multi-sector teams – academia, industry, government, civil society, communities of practice</li> </ul>
Stream of discoveries improve prosperity, resilience, quality of life	<ul> <li>Important societal and/or economic problems drive research pursuits</li> </ul>
"Technology / supply push"	"Market / demand pull"

![](_page_48_Figure_0.jpeg)

# **TIP** Technology, Innovation and Partnerships

https://beta.nsf.gov/tip/latest

**Erwin Gianchandani** NSF Assistant Director for Technology, Innovation and Partnerships egiancha@nsf.gov